CENTRAL VERMONT REGION

2008 REGIONAL TRANSPORTATION PLAN

Adopted September 9, 2008

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INTRODUCTION

Chapter One

VISION AND MISSION FOR TRANSPORTATION IN THE REGION

The Central Vermont Regional Planning Commission takes a regional/balanced view of transportation issues. The focus of this transportation plan is therefore on transportation issues which are regional in scope or which have regional implications. This emphasis on regional issues should not be taken to downplay the importance of local transportation issues on the region's transportation system. The region's major highway system, rail freight facilities, transit system, etc. will not function efficiently without feeder systems which likewise operate efficiently. To emphasize the scope and scale of the regional transportation issues facing Central Vermont and its communities, CVRPC established a vision and mission statement to guide the development of transportation goals, policies, and action items.

Vision - "To maintain and develop a transportation system that facilitates travel while preserving the region's character."

Mission - "Preserve, enhance, and develop an integrated, multimodal regional transportation system to accommodate the need for movement of people and commerce in a safe, cost-effective, environmentally responsible, and equitable manner, that conforms with other elements of the regional plan."

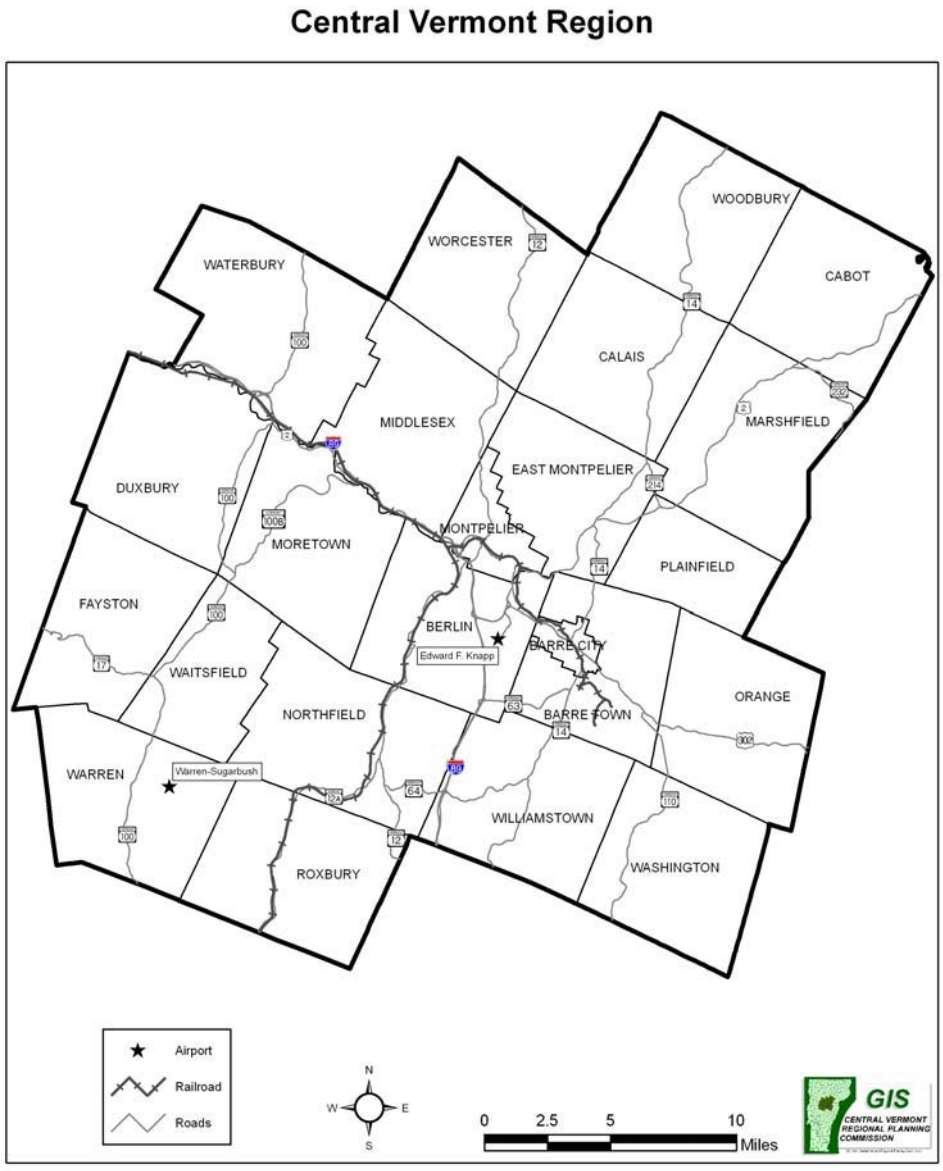
OVERALL PURPOSE OF PLAN

The Regional Transportation Plan is the culmination of a thorough study of the multi-modal transportation needs within the Central Vermont Region. **Figure 1** presents an overall map of the region. The Central Vermont Region consists of the 20 municipalities which comprise Washington County, plus three communities from Orange County -- Washington, Williamstown, and Orange. The region encompasses several major cities in terms of employment (Montpelier and Barre City) and lies in close proximity both to substantial residential areas as well as the state's major employment centers.

State and Federal Requirements

Development of the Regional Transportation Plan for the Central Vermont Region is a direct response on the part of Central Vermont Regional Planning Commission (CVRPC) to the Vermont Agency of Transportation (VTRANS) Transportation Planning Initiative. One goal of the Initiative is to establish transportation planning as an ongoing process. The Regional Transportation Plan meets the transportation goals of Title 24, VSA Chapter 117 Section 4302 "(4) To provide for safe, convenient, economic and energy efficient transportation systems that respect the integrity of the natural environment, including public transit options and paths for pedestrians and bicyclers. (A) Highways, air, rail and other means of transportation should be mutually supportive, balanced and integrated." The Regional Transportation Plan is consistent with the objectives of the federal Intermodal Surface Transportation Efficiency Act (ISTEA), the Transportation Equity Act for the 21st Century (TEA-21), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).

Figure 1


Central Vermont Region
WOODBURY
WORCESTER
WATERBURY
CABOT
CALAIS
MIDDLESEX
MARSHFIELD
EAST MONTPELIER
DUXBURY
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
Edward F. Knapp
BARRE CITY
WAITSFIELD
ORANGE
NORTHFIELD
BARRE TOWN
WARREN
Warren-Sugarbush
WILLIAMSTOWN
WASHINGTON
ROXBURY
Airport
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CENTRAL VERMONT REGIONAL PLANNING COMMISSION

Relationship to Regional Plan

This Regional Transportation Plan is consistent with the 2008 Central Vermont Regional Plan. It satisfies the requirements of the Regional Plan's Transportation Element, and contributes to the Regional Plan's purpose "of guiding and accomplishing a coordinated, efficient and economic development of the region which will, in accordance with present and future needs and resources, best promote the health, safety, order, convenience, prosperity and welfare of the inhabitants as well as efficiency and economy in the process of development." (Title 24 VSA Chapter 117 Section 4347).

COORDINATION WITH LOCAL PLANS

This Regional Transportation Plan is consistent and compatible with plans of the member communities and adjoining regions. The information contained in this plan is intended to supplement and provide a basis for updating Local Transportation Plans. The plan also addresses transportation issues that go beyond individual town boundaries, and provides a forum for municipal cooperation to meet these regional needs.

The CVRPC Transportation Advisory Committee (TAC) is comprised of town appointed representatives from the communities of the Central Vermont Region. The role of the TAC is to oversee the development of the Regional Transportation Plans, formulate the region's position on transportation issues, and participate in the review and development of VTRANS functions, programs, and policies. A TAC member's responsibility is to educate the entire TAC on their local transportation concerns. The TAC member is also responsible for communicating regional transportation issues back to their local Select Board and Planning Commission.

ORGANIZATION OF PLAN

The Regional Transportation Plan is organized into six chapters. **Chapter One** presents an overview of the plan purpose and process. **Chapter Two** presents the transportation goals developed specifically for the Regional Transportation Plan. **Chapter Three** contains descriptive material on the region's land use patterns, on current and forecast population and employment in the region, and on current work trip travel patterns in the region. **Chapter Four** describes the existing transportation system, its performance, and projected future performance of the highway system. **Chapter Five** presents regional, and corridor level recommendations.

NEXT STEPS

CVRPC will use the Plan recommendations as a basis from which to develop a yearly Regional Transportation Projects List (RTPL). Likewise, CVRPC will use the Transportation Plan information and recommendations to assist in the development of projects for inclusion in the VTRANS Project Scoping and Development process. The Plan vision and recommendations will also play a role in ongoing Act 250 review processes. CVRPC expects that VTRANS will make full use of the technical and qualitative analyses presented in the Regional Transportation Plan and will consider the recommendations contained herein. Finally, the plan will serve as a tool for local and regional planners, land use officials, and elected officials in guiding their decisions regarding transportation issues.

REGIONAL TRANSPORTATION GOALS

Chapter Two

The vision and mission statements presented in Chapter One provides an overall direction which the CVRPC believes should be followed. To guide these steps, CVRPC established a series of nine goals which further define this direction. These goals are described below, as well as the policies written to provide guidance of how the goals can be achieved.

GOAL 1. To achieve a regional transportation planning process that is comprehensive, multimodal, and public, and is integrated with regional and local land use planning as outlined in the Central Vermont Regional Plan.

Policies:

1. Encourage municipalities' analysis of transportation needs at the local level, including the relationships between development patterns and transportation needs, and which considers various modes of travel.

2. Encourage coordination and cooperation in comprehensive transportation planning among the various municipalities in the Region and at the regional, State, and private levels.

3. Undertake a comprehensive regional analysis of existing and anticipated travel behavior and multi-modal approaches to accommodating anticipated travel demand.

4. Balance regional and local decision-making, and flexibility in transportation planning, when conflicts develop between local and State plans.

5. Promote a project prioritization process that takes the goals of the Regional Transportation Plan into consideration.

6. Promote open and inclusive public participation in the multimodal planning and development of transportation projects.

7. Support the planning and design of the region's transportation system to encourage development and re-development in existing villages, cities, and designated growth centers.

8. Encourage the full integration of transportation and land use planning at the regional and local level.

GOAL 2. To preserve and maintain the existing transportation system.

Policies:

1. Support the necessary steps for evaluating, prioritizing, and implementing preventive maintenance programs for all elements of the transportation system.

2. Promote a funding strategy that realizes maximum use of all available resources to ensure adequate maintenance of the existing transportation system.

3. Encourage development patterns that reflect the planned capacity of the transportation system. Level of Service C will be taken as the preferred condition. Level of Service D should be accepted within the more urban, built-up sectors of the region (for example: Montpelier, Barre City, Northeast Berlin, South Barre, Waterbury Village, Northfield Village, Waitsfield Village, and Irasville).

GOAL 3. Enable the transportation system to operate at it's highest efficiency by managing travel demand and encouraging shifts to under-utilized and more efficient travel modes

Policies:

1. Develop a strategy that encourages maximum use of all available transportation resources and allocates those resources to the optimum functioning of the transportation system.

2. Support the education of the Region's employers in the development of Travel Demand Management Programs (e.g. telecommuting, flextime, compressed work weeks, rideshare matching, preferential parking, commuter fringe benefit, etc.). Facilitate the establishment of Transportation Management Associations to organize and administer TDM programs.

3. Educate the public on modal choices available.

4. Encourage preservation of existing rights-of-way for future transportation purposes. In particular, work to retain abandoned railroad rights-of-way for transportation uses such as trails and bike paths.

5. Consider new or expanded public transit services that serve intra-regional and intercity travel needs.

6. Encourage full accessibility to the Region's transportation services for the Region's residents in need.

7. Establish aggressive, but realistic, targets for modal shares along regional transportation arteries.

8. Support updating and optimization of traffic signal timings on a regular schedule and coordinate where appropriate.

9. Market public transit to new users.

GOAL 4. To integrate modes of travel in order to allow for their most effective use and ultimately reduce dependence on single occupant vehicles.

Policies:

1. Encourage the development of park and ride lots for car and van pools, and encourage employers to provide incentives to car and van pool users.

2. Promote physical and operational connections between various modes of transportation.

3. Ensure adequate mobility for all segments of the population, including residents who cannot or do not use private automobiles.

4. Foster a sense of mutual respect among users of the various modes of transportation.

5. Encourage the availability of multiple options for the movement of people and goods.

GOAL 5. To establish a transportation system that minimizes consumption of resources and maximizes the protection of the environment.

Policies:

1. Support efforts to minimize negative environmental impacts associated with the transportation system (including air quality, noise levels, surface water, vegetation, agricultural land, fragile areas, and historical/archaeological sites).

2. Encourage the preservation and enhancement of scenic views and corridors.

3. Support efforts to minimize energy consumption, especially nonrenewable energy resources, and explore expanded use of alternative fuels.

4. Factor direct and indirect costs and benefits into decision-making. Impacts which are not easily expressed in dollar values should also be considered.

5. Promote public awareness of the environmental impacts resulting from use of the region's transportation system.

6. Promote a transportation system that encourages concentrated development, allows greater access to residences, employment, and services, and facilitates carpooling, bus and rail service, and non-motorized travel.

GOAL 6. To make necessary improvements to achieve a transportation system appropriately structured and designed to safely, effectively, and economically move goods and people.

Policies:

1. Encourage the appropriate scale and design of streets, highways, and other transportation infrastructure to serve local traffic, destination traffic, and through traffic.

2. Foster a neighborhood street system characterized by a network of interconnected streets that minimizes through traffic in residential neighborhoods.

3. Promote safety-targeted measures at High or Potential Accident Locations, and promote traffic safety region-wide.

4. Promote projects that limit the conflicts between the motor vehicle traffic stream, pedestrians, and the rail system.

5. Encourage access management policies that reduce traffic congestion and maintain capital investment.

6. Consider new facilities when demand warrants (e.g. when alternatives to reduce congestion and improve safety have been attempted) and/or when other strategic state, regional, or local goals apply.

7. Foster a sense of safety and comfort for riders of public transit.

GOAL 7. Promote a transportation system design that strives for aesthetic and functional characteristics that improve the quality of life.

Policies:

1. Support the design of visually attractive and durable infrastructure such as roadways, pathways, and bridges.

2. Support high architectural standards for terminal buildings, stations, shelters, garages, and other facilities.

3. Respect and enhance the built environment by restoration of period transportation structures where possible and maintain the natural environment through architectural, landscaped, and engineered features.

4. Encourage traffic calming efforts to minimize conflicts between traffic and surrounding neighborhoods.

5. When feasible, encourage restoration or preservation of historic bridges.

6. Foster improvements that are contextually appropriate.

GOAL 8. To promote a regional transportation system that preserves and enhances residential and economic development potential in growth areas.

Policies :

1. Provide transportation system improvements at locations where they will or can serve growth areas.

2. Foster transportation and commerce links that contribute to the economic health of the region.

3. Encourage transportation system improvements that renew and improve downtowns, growth areas, and neighborhoods.

GOAL 9. To promote a regional public transportation system.

Policies :

1. Provide for basic mobility for transit-dependent persons.

2. Support public transit that provides access to employment.

3. Encourage congestion mitigation to preserve air quality and the sustainability of the highway network.

4. Support public transit that advances economic development with emphasis directed toward tourist areas.

THE CENTRAL VERMONT REGION

Chapter Three

PHYSICAL FEATURES

Key physical features in the Central Vermont Region are illustrated in **Figure 2**. The region is characterized by a series of north-south mountain ranges (Green Mountains, Northfield Range, Worcester Range, Irish Hills, Woodbury Mountains, and Groton Range). These mountain ranges grow progressively larger on the western edge of the region, and create increasingly more significant barriers. Between the ranges are north-south river valleys (Mad River, Dog River, North Branch, Stevens Branch, and Kingsbury Branch). The only exception is the Winooski River, which cuts across the mountains west to Lake Champlain. These physical features have a great influence on the location of transportation facilities and development. Almost all major roads are parallel and most village centers are located on these rivers. As a result, north-south travel is relatively easy, but east-west travel can be difficult.

LAND USE

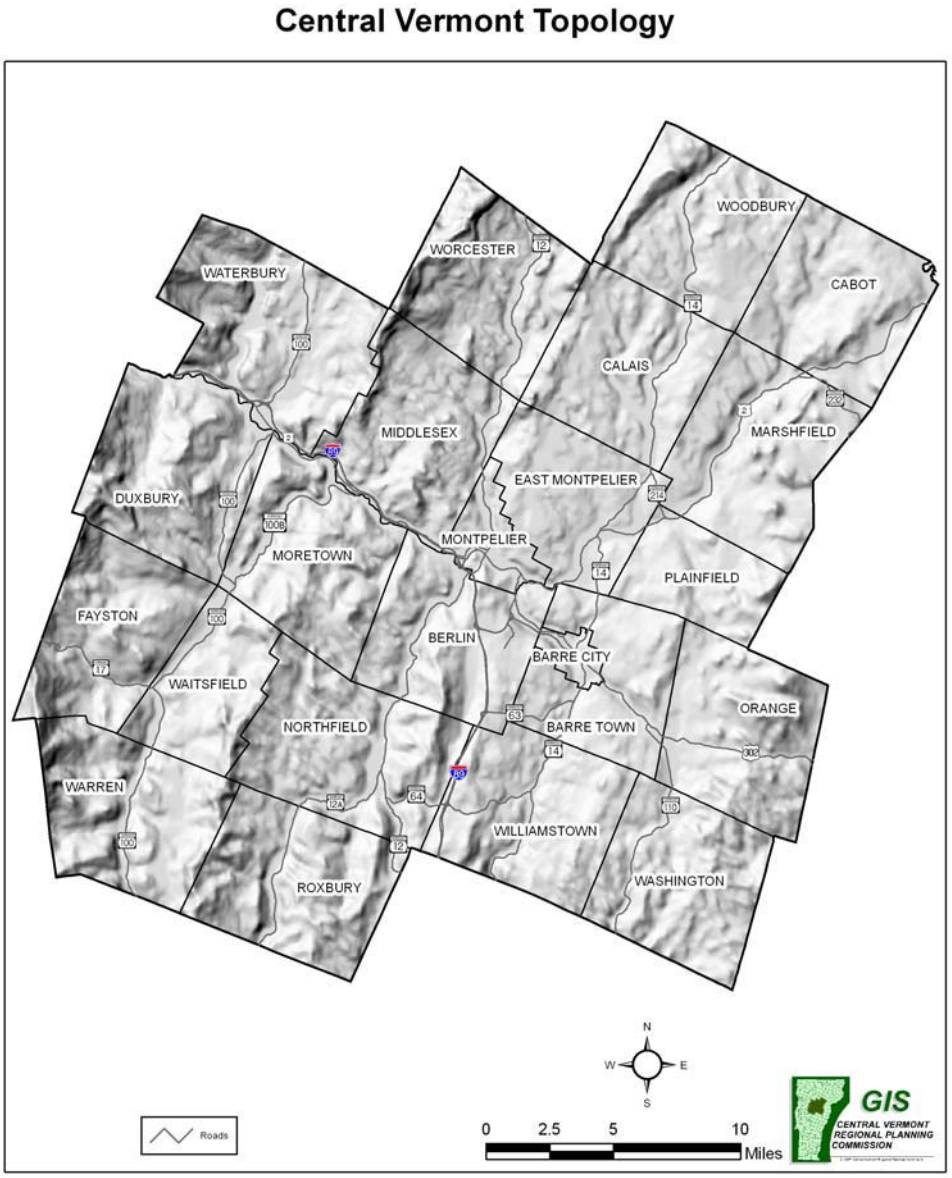
Existing land use in the Central Vermont Region has been categorized and mapped using Vermont E911data. Residential, Commercial, and Industrial were the major groupings used for built up land. The remaining land was categorized as either Vacant Building/Land (previously developed land which is currently not in use or abandoned) or Open Land (consisting of all land still in a vegetative state). **Figures 3** and **4** present summary maps of current land use in the region.

GROWTH AREAS

Figure 5 schematically depicts the areas in the Central Vermont Region that have concentrations of development and are recognized by the Region's residents as their growth areas. The figure differentiates between regional growth areas, subregional growth areas, and village or local growth areas. Each classification is described below.

The regional and subregional growth areas comprise the principal concentrations of employment, retail, medical, and personal business sites in the region. Their vitality is critical to the overall, balanced well-being of the Central Vermont Region. These are the areas where peak period traffic congestion is at its worst in the region. These are also the areas where efforts to reduce travel demand through ridesharing, transit, and other measures will be the most effective. The following section of this chapter, **Commuter Travel Characteristics**, concentrates on work trips attracted to these areas. The Plan recommendations for transportation system improvements also focuses on the specific needs of these growth areas.

Figure 2


Central Vermont Topology
WOODBURY
WORCESTER
WATERBURY
CABOT
CALAIS
MIDDLESEX
MARSHFIELD
EAST MONTPELIER
DUXBURY
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
WAITSFIELD
ORANGE
NORTHFIELD
BARRE TOWN
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WILLIAMSTOWN
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CENTRAL VERMONT REGIONAL PLANNING COMMISSION

Figure 3

Central Vermont Residential Land Use

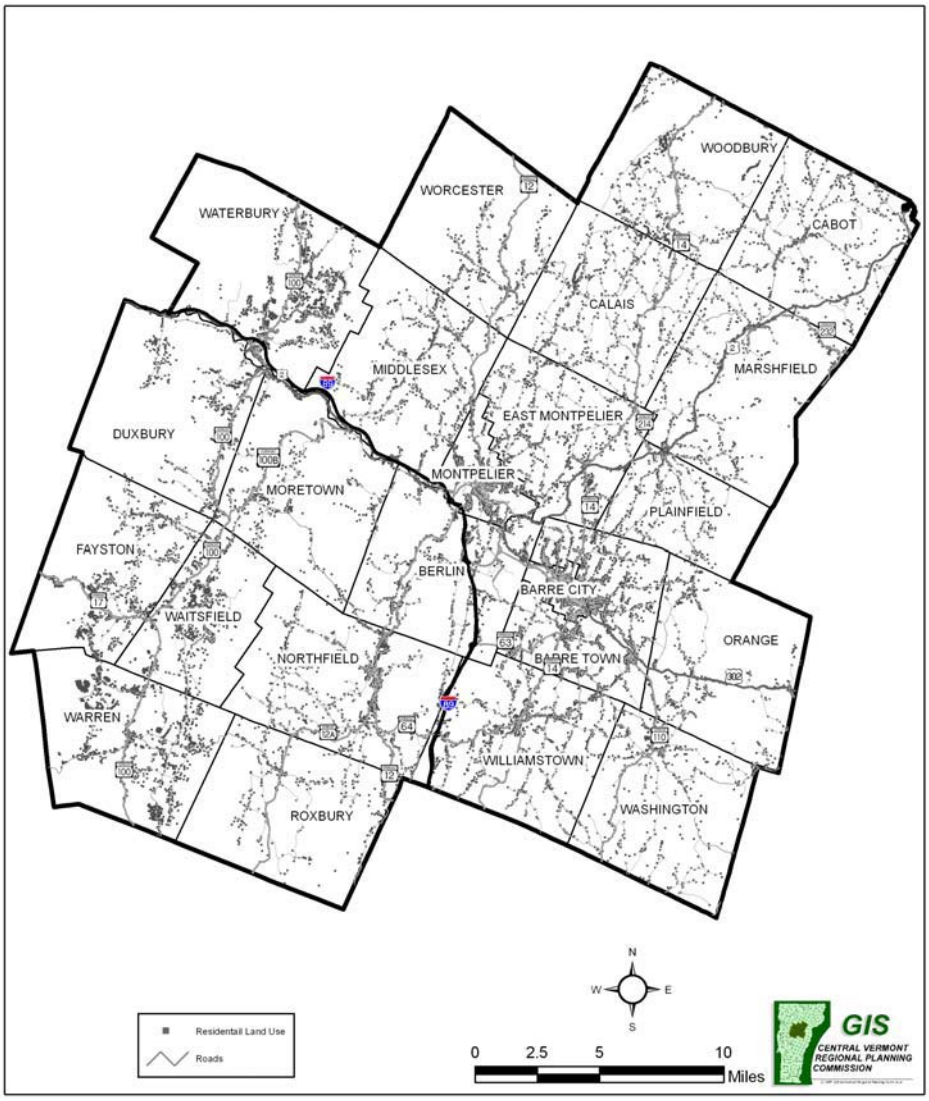


Figure 4

Central Vermont Commercial/Industrial Land Use

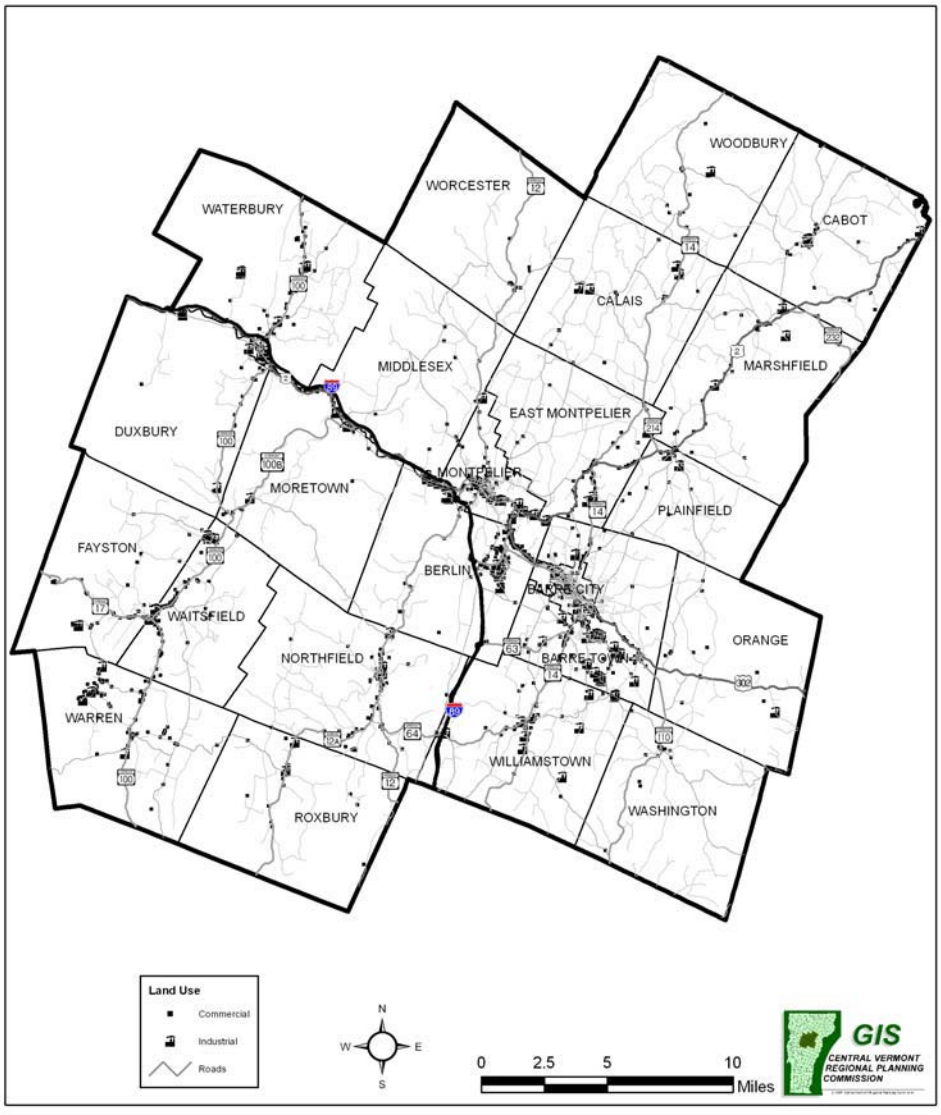
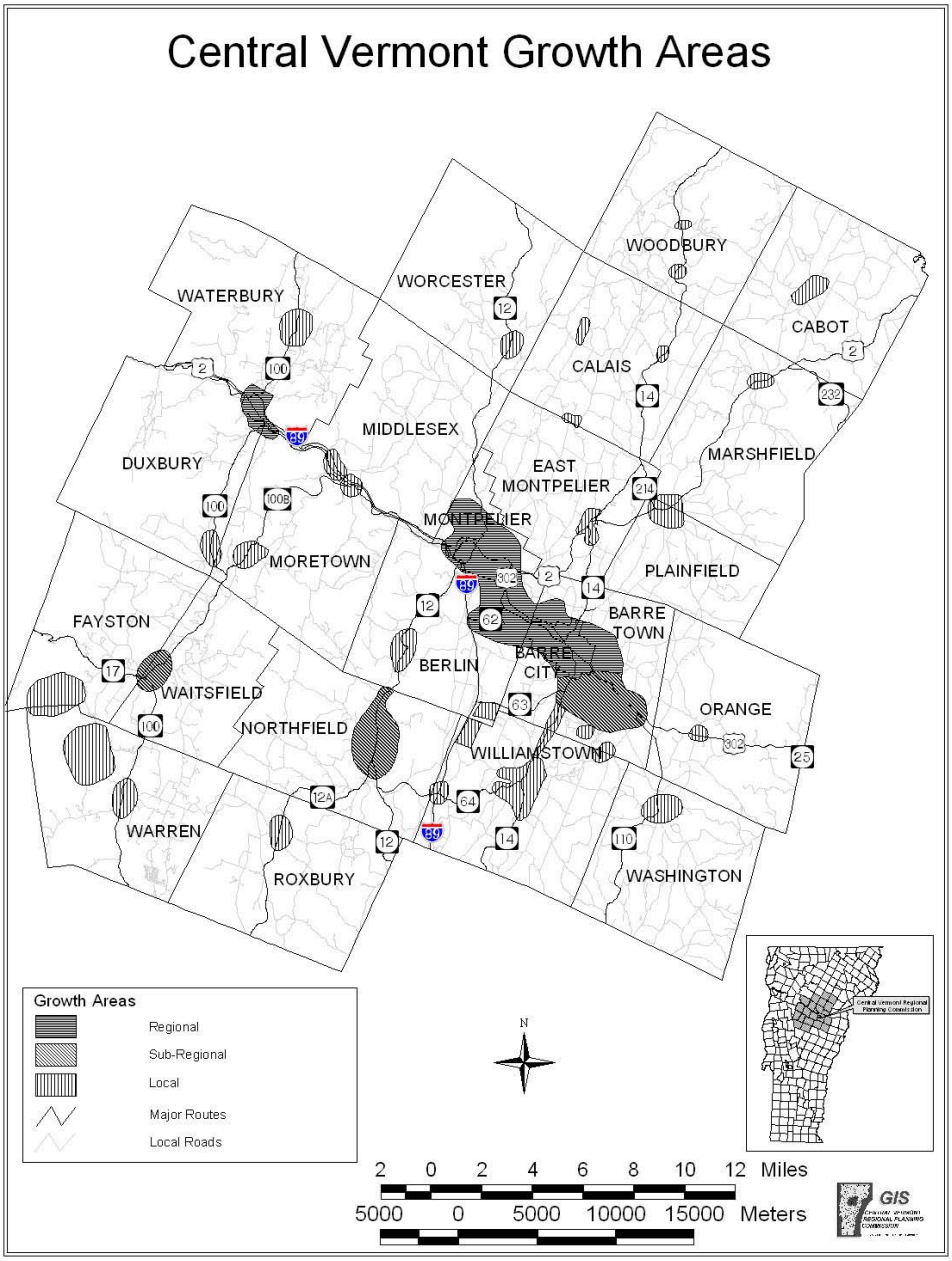


Figure 5


Central Vermont Growth Areas
WOODBURY
WORCESTER
WATERBURY
CABOT
CALAIS
MIDDLESEX
DUXBURY
MARSHFIELD
EAST MONTPELIER
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BARRE TOWN
BERLIN
BARRE CITY
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
ROXBURY
WASHINGTON
Growth Areas
Regional
Sub-Regional
Local
Major Routes
Local Roads
N
2 0 2 4 6 8 10 12 Miles
5000 0 5000 10000 15000 Meters
GIS

The regional growth areas encompasses portions of Montpelier, Barre City, Berlin, and Waterbury. In the downtown areas of Montpelier, Barre City, and Waterbury there is substantial mixing and density of land uses. The region's greatest concentrations of office space, retail space, banking services and other generators of personal business are located in downtown Montpelier and Barre City. These regional centers are not only the dominant attractors of work and personal business trips in the Region, they also attract significant numbers of trips from the outside the Region. Relative to the other downtown areas, Montpelier and Waterbury have more office space (such as the State Office Complex). Barre City also has State Offices at the McFarland House, and has more manufacturing and industrial land uses.

Outside the densely developed downtown areas of Montpelier and Barre City, there are significant pockets of commercial development present along Route 302 in Berlin. In addition, the Hospital Hill sector of Berlin contains the hospital and affiliated medical land uses, the Berlin Mall and associated retail uses, some senior citizen housing, the Knapp Airport, and an industrial park. Both the Route 302 corridor and the Hospital Hill/Berlin Mall sectors of the Region are also significant generators of trips from outside the region and are included within the regional community center. Finally, residential land uses can be found on all roadway corridors radiating out from the Barre City and Montpelier downtowns

The region's subregional growth areas contain between 1,000 and 4,000 employees and serve as significant generators of work, retail, and personal business trips for the region's residents. As shown in **Figure 5**, the subregional community centers are found in Northfield, Barre Town, and Waitsfield/Irasville Villages. Each area functions as a retail center, with a major shopping center, for distinct sub-regions. Northfield is home to Norwich University and Cabot Hosiery. Barre Town contains the Wilson Industrial Park and the Rock of Ages granite quarries and processing plant. Waitsfield is the center of tourist related services supporting the Sugarbush and Mad River Glen Ski Areas.

Most communities in the region also have one or more villages or local growth area. A village center typically will have dense residential development, small locally-servicing businesses, and some community facilities (churches, Town Hall, schools). In addition, some may have a smaller employment centers (under 1000 employees) such as: Williamstown (manufacturing, trucking), and Cabot (Cabot Cheese Factory).

REGIONAL DEMOGRAPHICS

Table 1 presents the population and demographic characteristics of the region by jurisdiction, based on 2000 U.S. Census data. Overall, 63,276 persons reside in the 23 jurisdictions which comprise the Central Vermont Region, in 25,746 households. **Figure 6** shows how the households are distributed across the Region.

An estimated 10,567 persons are elderly (at least 60 years old). Senior citizens are the fastest growing age cohort in Northwest Vermont[1]. As shown in **Figure 7**, the number of people over the age of 65 is projected to increase by 96% in Northwest Vermont[2]. The number of people in the 0 to 15 and 16 to 64 age cohort categories will be growing at much slower rates. The number of individuals living below

[1] Northwest Vermont includes Washington, Chittenden, Addison, Grand Isle, Franklin, and Addison Counties.
[2] Age cohort projections developed by Economic and Policy Resources, Inc. for the "Economic and Demographic Forecast Northwest Vermont and Chittenden County 2000 to 2035 and Beyond", September 2000.

the poverty level has remained stable increasing slightly from 4,738 in 1990 to 4,770 in 2000. According to the 2000 Census, there are 2,047 households without a car in the central Vermont Region. The percent of households without a car dropped slightly between 1990 and 2000 from 8.9% to 8.0%. Over 60% of the region's households without cars are located in Barre City and Montpelier.

Table 2 lists the estimated year 2000 employment for each municipality in the Central Vermont Region. The data presented are taken from the "Economic and Demographic Forecast Central Vermont Region 2000 to 2020" prepared for the Central Vermont Economic Development Corporation, Chamber of Commerce and Regional Planning by Economic and Policy Resources, Inc. Employment data presented in **Table 2** are different than the employment data provided by the Vermont Department of Employment and Training (VT DET). The VT DET data include only employees covered by unemployment insurance. The data in **Table 2** includes self-employed workers, proprietors, and uncovered workers in addition to employees covered by unemployment insurance. All employment data are presented by place of work rather than place of residence. Therefore, the employment numbers include people commuting into the Central Vermont Region for work. As indicated in **Table 3,** non-manufacturing jobs are the fastest growing sector of employment in the Central Vermont Region. According to the "Economic and Demographic Forecast Central Vermont Region 2000 to 2020", non-manufacturing jobs are expected to account for approximately 84% of the total growth in employment in the Central Vermont Region over the next twenty years

Total employment in the Region for the year 2000 is estimated at 43,300. **Figure 8** shows how the employment is distributed throughout the Central Vermont Region. The largest share of the Region's employment, 28%, is located in the City of Montpelier. Over 65% of the Region's employment is located in the Montpelier, Barre City, Barre Town, and Berlin area. Twelve percent of the Region's employment is also concentrated in the Town of Waterbury. Smaller concentrations of job are located in the Waitsfield/Warren area with 6% of the Region's employment and in the Town of Northfield, with 5% of the Region's employment.

Table 1. Year 2000 Central Vermont Region Demographics

Municipality	Total Population	Occupied Households	Elderly Persons (60+)		Individuals Below Poverty Level		Occupied Households with Zero Cars	
			Total	Percent of Population	Total	Percent of Population	Total	Percent of Households
Barre City	9,291	4,220	2,049	22%	1,175	13%	804	19%
Barre Town	7,602	2,951	1,427	19%	395	5%	117	4%
Berlin	2,864	1,109	616	22%	191	7%	84	8%
Cabot	1,213	452	161	13%	90	7%	5	1%
Calais	1,529	616	198	13%	99	6%	6	1%
Duxbury	1,289	569	169	13%	64	5%	4	1%
East Montpelier	2,578	1,007	406	16%	93	4%	5	0%
Fayston	1,141	484	172	15%	63	6%	13	3%
Marshfield	1,496	575	206	14%	135	9%	6	1%
Middlesex	1,729	663	170	10%	107	6%	11	2%
Montpelier	8,035	3,739	1,516	19%	767	10%	472	13%
Moretown	1,653	650	216	13%	109	7%	36	6%
Northfield	5,791	1,819	852	15%	303	5%	112	6%
Orange	965	362	143	15%	68	7%	8	2%
Plainfield	1,286	487	160	12%	128	10%	29	6%
Roxbury	576	227	75	13%	52	9%	3	1%
Waitsfield	1,659	734	289	17%	97	6%	30	4%
Warren	1,681	742	258	15%	134	8%	16	2%
Washington	1,047	406	140	13%	64	6%	8	2%
Waterbury	4,915	2,011	707	14%	298	6%	142	7%
Williamstown	3,225	1,248	446	14%	257	8%	61	5%
Woodbury	809	329	88	11%	6	1%	67	20%
Worcester	902	346	103	11%	75	8%	8	2%
Total for CVRPC Region	63,276	25,746	10,567	17%	4,770	8%	2,047	8%

Table 2. Central Vermont Region Total Employment by Municipality

Municipality	1980		1990		2000	
	Employment	Percent of Regional Employment	Employment	Percent of Regional Employment	Employment	Percent of Regional Employment
Barre City	5,894	20.2%	6,773	18.1%	6,512	15.0%
Barre Town	1,643	5.6%	2,462	6.6%	3,560	8.2%
Berlin	2,668	9.1%	4,319	11.6%	6,317	14.6%
Cabot	215	0.7%	366	1.0%	604	1.4%
Calais	112	0.4%	170	0.5%	143	0.3%
Duxbury	209	0.7%	253	0.7%	207	0.5%
East Montpelier	465	1.6%	631	1.7%	792	1.8%
Fayston	116	0.4%	169	0.5%	196	0.5%
Marshfield	135	0.5%	188	0.5%	113	0.3%
Middlesex	248	0.9%	205	0.5%	314	0.7%
Montpelier	10,442	35.8%	11,522	30.8%	12,109	28.0%
Moretown	165	0.6%	313	0.8%	390	0.9%
Northfield	1,664	5.7%	2,176	5.8%	2,339	5.4%
Orange	49	0.2%	62	0.2%	103	0.2%
Plainfield	497	1.7%	483	1.3%	685	1.6%
Roxbury	41	0.1%	70	0.2%	102	0.2%
Waitsfield	928	3.2%	1,259	3.4%	1,680	3.9%
Warren	768	2.6%	1,091	2.9%	1,090	2.5%
Washington	53	0.2%	108	0.3%	106	0.2%
Waterbury	2,261	7.7%	4,033	10.8%	5,134	11.9%
Williamstown	459	1.6%	538	1.4%	612	1.4%
Woodbury	38	0.1%	72	0.2%	90	0.2%
Worcester	133	0.5%	124	0.3%	101	0.2%
Total for CVRPC Region	29,203	100.0%	37,386	100.0%	43,300	100.0%

Table 3. Central Vermont Region Employment by Sector

Major Employment Sector	1980	1990	2000	Percent Change 1980 to 2000
Manufacturing	3,197	4,013	4,839	51%
Non-Manufacturing	18,733	25,437	29,972	60%
Government	6,511	7,412	7,965	22%
Farm	762	524	524	-31%
Total Region	29,203	37386	43300	48%

Figure 6. Year 2000 Distribution of Households by Municipality

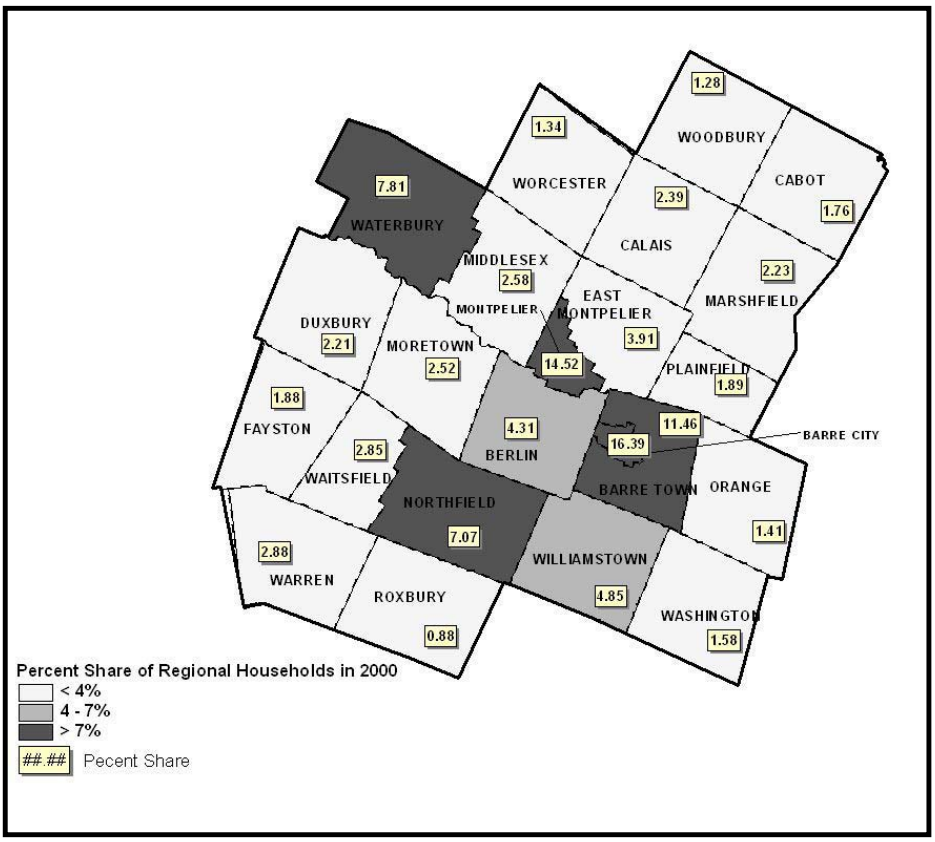


Figure 7. Projected Percent Increase in Population by Age Cohort for Northwest Vermont

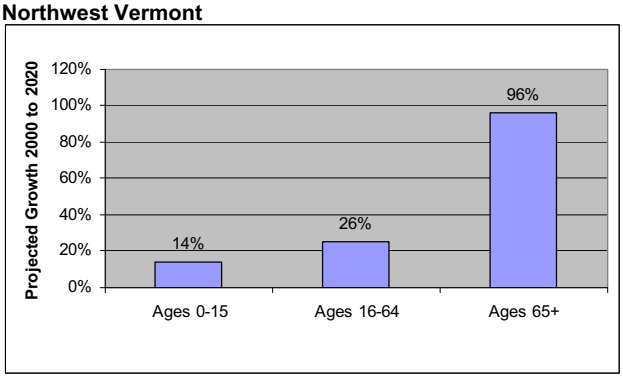
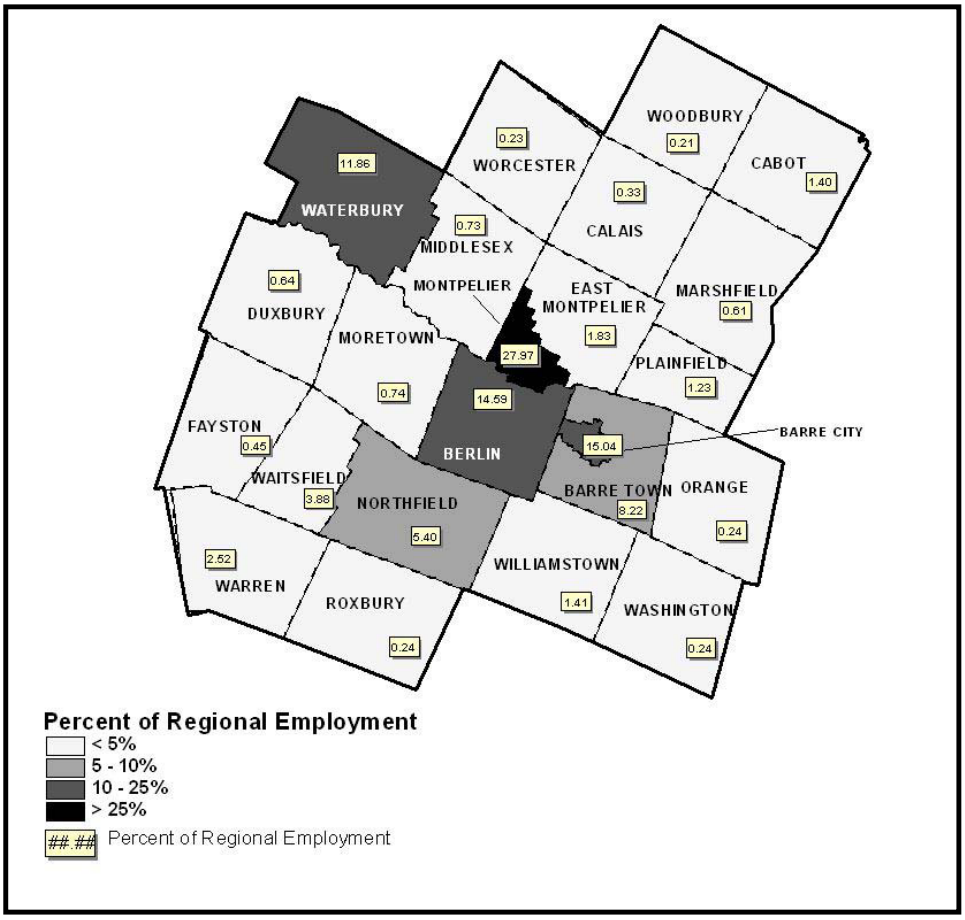


Figure 8. Distribution of Year 2000 Employment



POPULATION AND EMPLOYMENT FORECASTS

A major focus of the Regional Transportation Plan is the set of long-range recommendations for improvements to the transportation system. Population and employment projections are needed in order to forecast travel for the year 2020.

Population, households, and employment projections are taken from the "Economic and Demographic Forecast Central Vermont Region 2000 to 2020" prepared for the Central Vermont Economic Development Corporation, Chamber of Commerce and Regional Planning by Economic and Policy Resources, Inc. **Table 4** summarizes the historical changes and **Table 5** summarizes the projected changes. As indicated in **Table 4**, households and employment grew at twice the rate of population. **Table 5** assumes this trend continues through the 2020 planning horizon. Households are expected to grow at a faster rate than population because the average household size is decreasing. Employment is projected to grow at a faster rate than population due to an increase in multiple job holders, the continued inflow of workers from surrounding counties, and an increase in the number of senior citizens in the work force.

Table 4. Historical Changes in Population, Households and Employment in the Central Vermont Region

	1980	1990	2000	Average Annual Growth Rate 1990 to 2000
Population	56,284	59,619	63,276	0.6%
Housing Demand	Not Available	22,625	25,675	1.3%
Employment	29,203	37,386	43,300	1.5%

Table 5. Projected Change in Population, Households and Employment in the Central Vermont Region 2000 to 2020

	2000	2020	Projected Absolute Change 2000 to 2020	Projected Average Annual Growth Rate 2000 to 2020
Population	63,276	73,080	9,804	0.7%
Housing Demand	25,675	33,534	7,859	1.3%
Employment	43,300	56,962	13,662	1.4%

Tables 6 – 8 on the following pages present the 2000 to 2020 forecast of population, households, and employment for each municipality in the Central Vermont Region. These tables show the absolute change between 2000 and 2020. Also presented is the percent share of new Regional population, household, and employment growth projected within each municipality. The percent share, which are also mapped in **Figures 9** and **10**, show the projected distribution of new population, households, and employment across the Central Vermont Region over the next twenty years.

Barre Town and Waterbury are projected to receive the largest share of regional household growth. In general, the projected household growth is distributed almost consistently across the region. This indicates a region-wide trend from rural agriculture to low density sub-urban land use. Projected employment growth, by contrast, is assumed to concentrate around the Montpelier-Barre-Berlin-Barre Town core and Waterbury.

Table 6. Central Vermont Region 2000 to 2020 Population Forecast by Municipality

Municipality	Year 2000		Year 2020		Population Change 2000 to 2020	
	Total	Percent of Region	Total	Percent of Region	Absolute Change	Percent Share of Projected Regional Growth
Barre City	9,291	15%	8,626	12%	-665	-7%
Barre Town	7,602	12%	8,747	12%	1,145	12%
Berlin	2,864	5%	3,515	5%	651	7%
Cabot	1,213	2%	1,453	2%	240	2%
Calais	1,529	2%	2,052	3%	523	5%
Duxbury	1,289	2%	1,820	2%	531	5%
East Montpelier	2,578	4%	3,151	4%	573	6%
Fayston	1,141	2%	1,766	2%	625	6%
Marshfield	1,496	2%	1,821	2%	325	3%
Middlesex	1,729	3%	2,460	3%	731	7%
Montpelier	8,035	13%	7,780	11%	-255	-3%
Moretown	1,653	3%	2,301	3%	648	7%
Northfield	5,791	9%	6,311	9%	520	5%
Orange	965	2%	1,276	2%	311	3%
Plainfield	1,286	2%	1,306	2%	20	0%
Roxbury	576	1%	703	1%	127	1%
Waitsfield	1,659	3%	2,250	3%	591	6%
Warren	1,681	3%	2,421	3%	740	8%
Washington	1,047	2%	1,311	2%	264	3%
Waterbury	4,915	8%	5,579	8%	664	7%
Williamstown	3,225	5%	4,224	6%	999	10%
Woodbury	809	1%	1,098	2%	289	3%
Worcester	902	1%	1,109	2%	207	2%
Total for CVRPC Region	63,276	100%	73,080	100%	9,804	100%

Table 7. Central Vermont Region 2000 to 2020 Region Household Forecasts by Municipality

Municipality	Year 2000 Households		Estimated Year 2020 Households		Household Change 2000 to 2020	
	Total	Percent of Region	Total	Percent of Region	Absolute Change	Percent Share of Projected Regional Growth
Barre City	4,220	16%	4,462	13%	242	3%
Barre Town	2,951	11%	3,907	12%	956	12%
Berlin	1,109	4%	1,601	5%	492	6%
Cabot	452	2%	612	2%	160	2%
Calais	616	2%	962	3%	346	4%
Duxbury	498	2%	830	2%	332	4%
East Montpelier	1,007	4%	1,468	4%	461	6%
Fayston	484	2%	810	2%	326	4%
Marshfield	575	2%	792	2%	217	3%
Middlesex	663	3%	1,042	3%	379	5%
Montpelier	3,739	15%	4,153	12%	414	5%
Moretown	650	3%	1,023	3%	373	5%
Northfield	1,819	7%	2,282	7%	463	6%
Orange	362	1%	523	2%	161	2%
Plainfield	487	2%	558	2%	71	1%
Roxbury	227	1%	316	1%	89	1%
Waitsfield	734	3%	1,046	3%	312	4%
Warren	742	3%	1,126	3%	384	5%
Washington	406	2%	556	2%	150	2%
Waterbury	2,011	8%	2,675	8%	664	9%
Williamstown	1,248	5%	1,787	5%	539	7%
Woodbury	329	1%	519	2%	190	2%
Worcester	346	1%	484	1%	138	2%
Total for CVRPC Region	25,675	100%	33,534	100%	7,859	100%

Table 8. Central Vermont Region 2000 to 2020 Employment Forecasts by Municipality

Municipality	Year 2000 Employment		Estimated Year 2020 Employment		Employment Change 2000 to 2020	
	Total	Percent of Region	Total	Percent of Region	Absolute Change	Percent Share of Projected Regional Growth
Barre City	6,512	15%	7,567	13%	1,055	8%
Barre Town	3,560	8%	5,684	10%	2,124	16%
Berlin	6,317	15%	10,188	18%	3,871	28%
Cabot	604	1%	705	1%	101	1%
Calais	143	0%	188	0%	45	0%
Duxbury	277	1%	342	1%	65	0%
East Montpelier	792	2%	990	2%	198	1%
Fayston	196	0%	238	0%	42	0%
Marshfield	263	1%	298	1%	35	0%
Middlesex	314	1%	453	1%	139	1%
Montpelier	12,109	28%	13,929	24%	1,820	13%
Moretown	320	1%	380	1%	60	0%
Northfield	2,339	5%	3,076	5%	737	5%
Orange	103	0%	136	0%	33	0%
Plainfield	534	1%	604	1%	70	1%
Roxbury	102	0%	134	0%	32	0%
Waitsfield	1,680	4%	2,410	4%	730	5%
Warren	1,090	3%	1,235	2%	145	1%
Washington	106	0%	139	0%	33	0%
Waterbury	5,134	12%	7,200	13%	2,066	15%
Williamstown	612	1%	805	1%	193	1%
Woodbury	90	0%	129	0%	39	0%
Worcester	101	0%	132	0%	31	0%
Total for CVRPC Region	43,300	100%	56,962	100%	13,662	100%

Figure 9. Distribution of Projected Household Growth 2000 to 2020 Across the Central Vermont Region

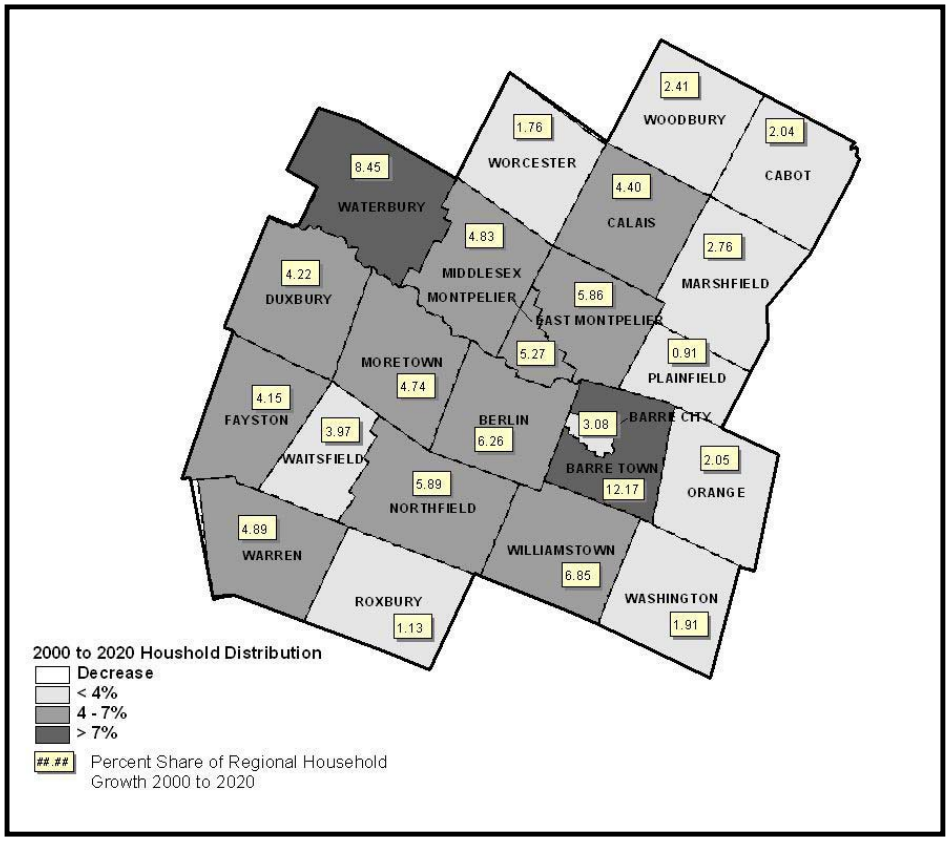
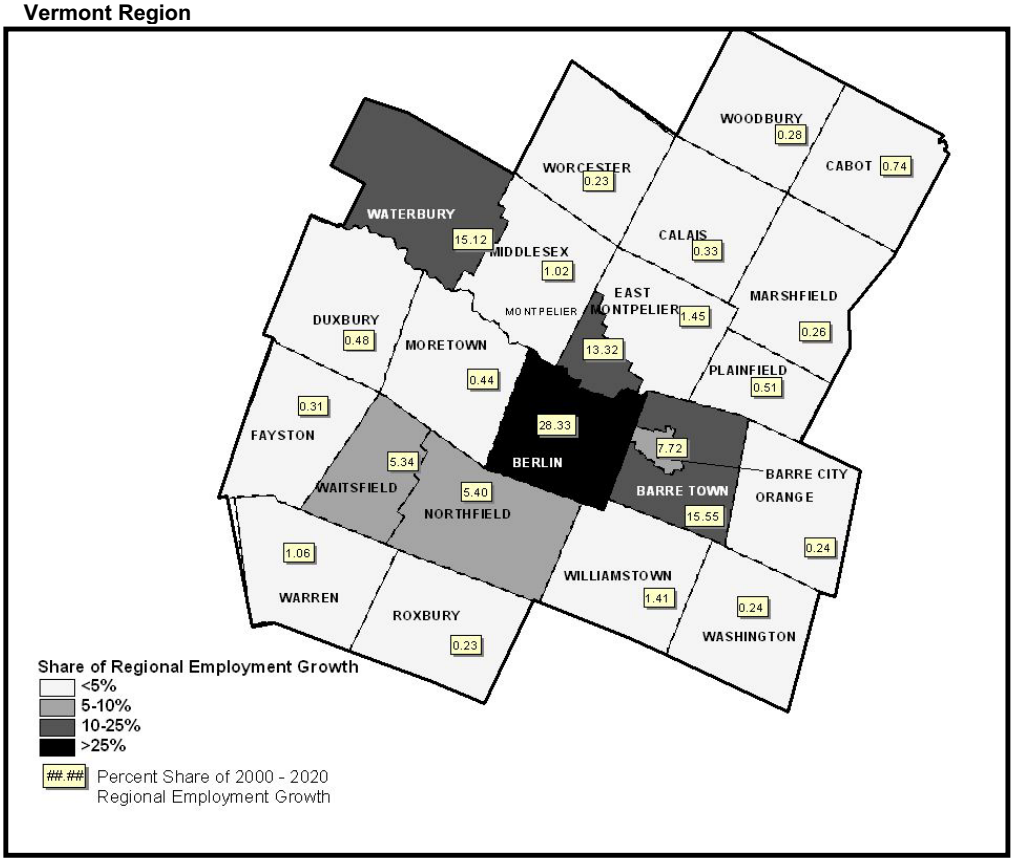


Figure 10. Projected Distribution of New Jobs between 2000 and 2020 Across the Central Vermont Region



COMMUTER TRAVEL CHARACTERISTICS

Commuter Travel Patterns

Table 9 and Table 10 present county 2000 Census Journey to Work trip patterns to and from Washington County. The tables show that Chittenden and Lamoille Counties represent the largest source of jobs and employees out of the region. Since 1990, the most significant growth in work trip patterns has also occurred in these two counties.

Table 9

Journey to Work Patterns to Washington County

Residence County	1990 Census	% Trips to Wash. Co.	2000 Census	% Trips to Wash. Co.	Percent Change 1990 - 2000
Washington	23,494	80.70%	25,345	76.95%	8%
Orange	2,250	7.73%	2,776	8.43%	23%
Chittenden	1,267	4.35%	1,852	5.62%	46%
Lamoille	553	1.90%	931	2.83%	68%
Caledonia	576	1.98%	794	2.41%	38%
Orleans	168	0.58%	245	0.74%	46%
Windsor	151	0.52%	220	0.67%	46%
Addison	157	0.54%	204	0.62%	30%
Total *	29,112		32,938		

*** Total includes counties with less than 0.5% of all trips**

Table 10

Journey to Work Patterns from Washington County

Workplace County	1990 Census	% Trips from Wash. Co.	2000 Census	% Trips from Wash. Co.	Percent Change 1990 - 2000
Washington	23,494	87.65%	25,345	82.07%	8%
Chittenden	1,489	5.56%	2,821	9.14%	89%
Lamoille	437	1.63%	729	2.36%	67%
Orange	597	2.23%	681	2.21%	14%
Windsor	98	0.37%	185	0.60%	89%
Caledonia	190	0.71%	159	0.51%	-16%
Addison	51	0.19%	64	0.21%	25%
Total *	26,803		30,881		

*** Total includes counties with less than 0.5% of all trips**

Table 11 presents information from the 2000 Census on commute trip patterns within, to, and from the Central Vermont Region. The table shows the number of people residing in each community in the region who are employed and seven major jurisdictions of their employment. For example, in the upper-left-hand corner of the table, there are 1,486 residents of Barre City who commute to an employment site in Barre City. Reading across that top row of data, the table indicates a total of 4,464 residents of Barre City are employed (again, from 2000 U.S. Census data records).

The 2000 journey-to-work data is useful in describing general commuting patterns in the Central Vermont Region. Observations on the 2000 data include:

- With the exception of Berlin, the largest percentage of workers in any of the seven major employment centers resided in the same municipality in which they were employed;
- Montpelier had a wide dispersion of workers from every town in the region and every county in the state;
- Workers in Barre City were drawn primarily from areas near Barre Town and adjacent municipalities.
- Waterbury had a high number of commuters from Chittenden and Lamoille Counties

The "Economic and Demographic Forecast for Central Vermont" contains an analysis on employment

exporting and importing by municipalities for the year 2000. Municipalities have been placed into the job import or export categories shown in **Table 12** for both 1990 and 2000. The following observations can be made about changes in commuter travel patterns in 2000 based on **Table 12**:

- Montpelier remained the largest employment center in the Central Vermont Region and imports the largest number of employees;

- The number of employees imported to Waterbury increased between 1990 and 2000;

- Barre City imported less workers in 2000 than in 1990; and

- The following municipalities exported workers in 1990, but became job importers in 2000:
  - Barre Town
  - Warren
  - Waitsfield

As indicated in the "Economic and Demographic Forecast for Central Vermont", the Central Vermont Region remains a job importing region overall in 2000.

Table 11. 2000 Journey-To-Work Commuter Trips for Major Employment Centers in the Central Vermont Region

				Place of Work (Major Employment Centers)						
	Barre City	Barre Town	Berlin	Chittenden Cty	Montpelier	Northfield	Waitsfield	Waterbury	Other	Total
Residence										
Barre City	1486	306	742	299	793	134	79	163	390	4464
Barre Town	1062	818	573	200	707	97	25	89	442	4065
Berlin	216	60	364	122	345	103	15	47	134	1436
Cabot	51	36	53	19	77	3	6	4	383	643
Calais	97	29	78	41	223	10	4	31	266	803
Duxbury	26	8	21	176	52	2	63	203	142	730
East Montpelier	138	64	94	92	474	26	18	45	457	1430
Fayston	15	4	18	85	33	3	190	26	265	670
Marshfield	81	20	79	36	134	25	12	33	345	772
Middlesex	68	33	78	116	328	9	5	75	253	1005
Montpelier	227	75	310	411	2142	133	67	220	572	4298
Moretown	27	24	78	173	120	14	68	132	234	925
Northfield	230	101	204	137	420	1239	22	52	483	2938
Orange	110	51	39	21	79	9		6	169	489
Plainfield	91	32	78	37	153	7	6	17	331	756
Roxbury	28	8	20	27	35	52	5	4	101	285
Waitsfield	12	14	20	101	48	2	455	59	246	977
Warren	22	22	29	64	24	2	229	42	489	954
Washington	106	50	60	19	102	1	2	11	239	594
Waterbury	47	52	130	626	286	19	46	944	388	2750
Williamstown	336	246	143	66	262	22		29	596	1716
Woodbury	36	26	62	23	73	5		18	237	485
Worcester	15	23	57	36	162	4	9	29	146	495
Addison County	10	3	3	N.A.	49	5	47	18	N.A.	N.A.
Bennington Cty				N.A.	11		2	3	N.A.	N.A.
Caledonia Cty	123	113	48	N.A.	233	6		67	N.A.	N.A.
Chittenden Cty	97	48	171	N.A.	586	56	67	466	N.A.	N.A.
Essex County		3		N.A.	10				N.A.	N.A.
Franklin County	10	3	2	N.A.	60	16		10	N.A.	N.A.
Grand Isle Cty				N.A.	19			4	N.A.	N.A.
Lamoille County	80	31	56	N.A.	297	10	9	320	N.A.	N.A.
Orange Cty (Part)	268	146	158	N.A.	211	110	9	42	N.A.	N.A.
Orleans County	23	20	3	N.A.	94			33	N.A.	N.A.
Rutland County	4	4	3	N.A.	25	6	2	19	N.A.	N.A.
Windham County	3	2	14	N.A.	34				N.A.	N.A.
Windsor County	22	25	12	N.A.	93	19	8	19	N.A.	N.A.
Total	5209	2502	3829	2821	8882	2177	1470	3298	7308	N.A.

Table 12. Comparison between 1990 and 2000 Employment Export and Import Municipalities

Municipality	Year	Exports Workers	Imports Workers		
			1 to 1,250	1,250 to 2,500	2,500 to 5,000
Montpelier	1990				✓
	2000				✓
Barre City	1990			✓	
	2000		✓		
Barre Town	1990	✓			
	2000		✓		
Berlin	1990		✓		
	2000				✓
Waitsfield	1990	✓			
	2000		✓		
Warren	1990	✓			
	2000		✓		
Waterbury	1990		✓		
	2000			✓	

Commute Mode Shares for Area Residents

Table 13 presents the commute trip mode shares (as reported in the 2000 Census) for the employed residents in each of the 23 Central Vermont jurisdictions. Overall, 75 percent of the employed residents in the region drive alone on their commute trip and 12 percent carpool/vanpool.

Carpooling or vanpooling is a significant mode for the journey-to-work for all municipalities in the Central Vermont Region. The jurisdictions with the highest reported usage of carpooling and vanpooling are Woodbury, Worcester, and Orange (all rural communities whose employed residents have longer than average commute trips and therefore a greater propensity to rideshare). Other rural communities such as Duxbury, Middlesex, Moretown, and Plainfield have a percentage of residents carpooling to work that is higher than the regional average of 12.4%. The percentage of residents carpooling to work from the urban areas of Barre City and Waterbury are also higher than the regional average.

Transit serves a small percentage of the regional journey-to-work (0.4%).

The walk mode share is highest in the communities of Montpelier and Northfield where approximately fifteen percent of the employed residents walk to work. The higher density nature of these municipalities combined with the number of job opportunities and the availability of a sidewalk network makes walking a viable option. Walking is also an important mode for non-work trips in these communities. According a marketing survey conducted in downtown Montpelier, 20% of customers walked to the store rather than drove.

Six percent of employed residents in Central Vermont work at home. The highest percentages of work-at-home residents are found in the rural communities.

Table 13. Commute Trip Mode Shares by Place of Residence – Year 2000 Census

Municipality of Residence	Employed Residents	Drove Alone	Carpool - Vanpool	Bus	Walked	Other Means	Work at home
Barre City	4,464	73.8%	15.4%	0.7%	5.6%	0.8%	3.7%
Barre Town	4,065	80.9%	13.4%	0.0%	1.8%	0.3%	3.6%
Berlin	1,436	79.4%	11.3%	0.3%	1.9%	0.9%	6.3%
Cabot	643	69.5%	11.4%	1.6%	5.6%	2.0%	10.0%
Calais	803	73.0%	11.1%	1.2%	2.5%	0.1%	12.1%
Duxbury	730	76.7%	14.5%	1.4%	0.8%	0.1%	6.4%
East Montpelier	1,430	79.0%	7.6%	0.0%	2.7%	0.0%	10.8%
Fayston	670	75.2%	7.9%	0.3%	3.4%	1.9%	11.2%
Marshfield	772	74.2%	10.1%	0.5%	3.5%	0.5%	11.1%
Middlesex	1,005	76.0%	13.9%	0.0%	1.0%	1.0%	8.1%
Montpelier	4,298	66.7%	11.7%	0.7%	15.2%	1.7%	4.0%
Moretown	925	75.6%	12.9%	0.0%	1.9%	0.6%	9.0%
Northfield	2,938	68.7%	12.3%	0.2%	14.7%	1.2%	3.0%
Orange	489	78.9%	17.0%	0.0%	0.4%	0.0%	3.7%
Plainfield	756	65.7%	13.0%	0.0%	9.5%	0.7%	11.1%
Roxbury	285	83.9%	11.6%	0.4%	1.4%	0.0%	2.8%
Waitsfield	977	74.0%	10.6%	0.0%	4.1%	1.0%	10.2%
Warren	954	77.9%	9.3%	0.6%	4.9%	0.2%	7.0%
Washington	594	79.5%	9.3%	0.0%	2.0%	1.7%	7.6%
Waterbury	2,750	76.5%	12.8%	0.3%	4.2%	0.4%	5.7%
Williamstown	1,716	79.4%	10.1%	0.0%	1.6%	0.2%	8.7%
Woodbury	485	71.5%	17.5%	0.4%	4.9%	1.0%	4.5%
Worcester	495	73.1%	17.6%	0.0%	2.2%	0.8%	6.3%
Total for CVRPC Region	33,680	74.5%	12.4%	0.37%	5.8%	0.8%	6.0%

Commute Mode Shares for Area Workers

Data on mode share for employees by place of work, which is provide in the Census Journey-to-Work data, is not yet available for the 2000 Census. **Table 14** compares journey-to-work mode share in 1990 for employed residents of the Central Vermont Region, and all employees that work in the Central Vermont Region, including those that commute from surrounding areas. The comparison shows that carpooling remains significantly high for all employees in the Central Vermont Region, irregardless of where they live. In 1990, the largest amount of carpooling/vanpooling trips had employment destinations in Montpelier and Waterbury. Carpooling/vanpooling was also a significant means of travel to jobs in Barre City, Barre Town, Northfield, and Waitsfield.

Table 14. Comparison of Journey-to-Work Mode Share in 1990 by Place of Residence and Place of Work

	Drive Alone	Carpool - Vanpool	Bus	Bike	Walk
Place of Residence- Mode Share of Employed Central Vermont Residents	79.7%	14.9%	0.3%	0.3%	4.8%
Place of Work - Mode Share of All Employees working in Central Vermont	81.1%	13.6%	0.3%	0.2%	4.8%

Summary of Findings

- The population of the Central Vermont Region is projected to increase by 15% between 2000 and 2020 resulting in an additional 9,804 people.

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- Housing demand in the Central Vermont Region is expected to increase by 31% between 2000 and 2020, twice the rate of population, due to aging of the population and other demographic factors. This growth will result in demand for an additional 7,859 housing units.

- Employment is also expected to grow at double the rate of population, increasing by 32% between 2000 and 2020. The additional jobs are explained by multiple job holders, an increasing percentage of senior citizens in the work force, and increases in the number of the workers imported from surrounding regions.

- Similar to national trends, the largest growing age cohort will be people over the age of 65. This age group will continue to fill jobs as noted above, but may also have special transportation needs.

- In current settlement trends continue, households will disperse throughout the Central Vermont Region while employment and services concentrate in a growing central core consisting of Montpelier, Barre City, Barre Town, and Berlin. Smaller concentrations of employment are anticipated in the Waterbury, Waitsfield/Warren, and Northfield areas.

- Driving alone to work is the dominant mode choice for Central Vermont workers and will likely continue to dominate as households disperse and employment concentrates within a few areas of the Region. Rideshare also plays a significant role in the journey to work and will remain a viable option as households continue to disperse and workers are imported from outside of the Region. Driving along and rideshare account for 87% of the work trips in the Central Vermont Region.

- Walking has a significant mode share in Montpelier and Northfield and is also an important mode for non-work trips in those communities.

Additional travel characteristics can be found in the detailed results of the 2006 VTrans Long Range Business Plan Survey in Appendix D.

The Transportation System

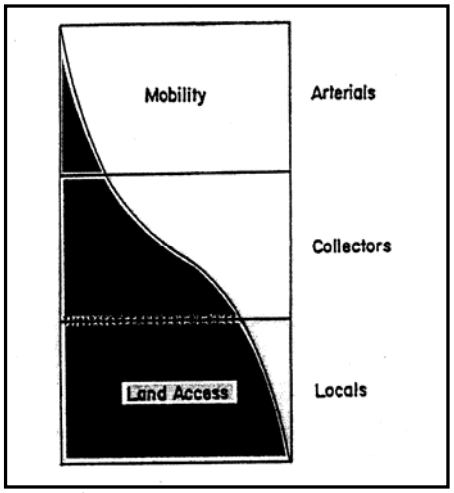
Chapter 4

HIGHWAY SYSTEM CHARACTERISTICS AND USAGE

Roadway Functional Classification

The road network in the region consists of highways classified as interstate highway and expressways, principal arterials; minor arterials; major collectors; minor collectors; and local streets, as shown in **Figure 12** . The classification system is organized as a hierarchy of facilities, as shown in **Figure 11**, based on the degree to which the roadway facility serves mobility and access to adjacent land uses. Interstate highways and expressways, at the top of the hierarchy, are devoted exclusively to mobility, with very limited access to adjacent land. Arterials and Collectors provide both mobility and access. The local road system is devoted exclusively to providing local access, with limited capacity and relatively slow speeds.

Figure 11. Relationship of Functional Class to Traffic Mobility and Land Access



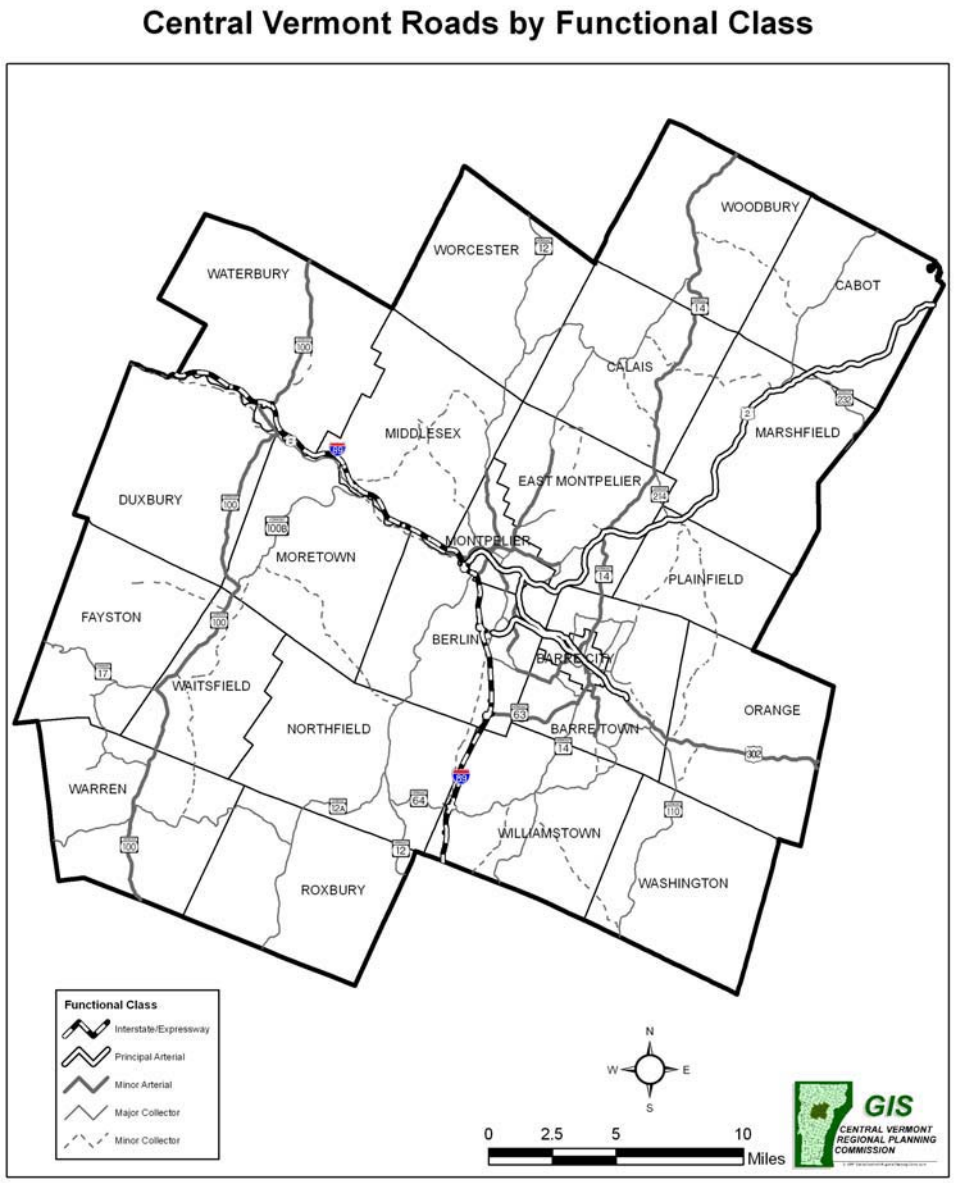
Interstate Highway and Expressway System -- The interstate highway system primarily serves statewide and interstate travel on facilities designed to federal interstate highway standards. Other freeways and expressways serve a similar function but are not designed to interstate highway standards. **I-89** is the region's only interstate highway. Two other roadways in the region (**Montpelier State Highway** in Montpelier and **Route 62** in Berlin and Barre City) are classified as other freeways and expressways due in part to their direct connection with I-89.

Principal Arterial System -- In every Vermont region there exists a system of streets which can be identified as unusually significant to the region in which it serves. These principal arterials carry the major portion of trips entering the region as well as the majority of through movements desiring to bypass the central commercial areas of the region. In addition, the principal arterial system carries significant intra-regional travel (such as between the Montpelier and Barre City commercial districts) and between these business districts and major urban areas outside the region. This system stresses mobility of vehicles over access to abutting land. The region's principal arterial system consists of:

- **Route 2** from the Washington County line in Cabot, through Marshfield, Plainfield, East Montpelier, and into Montpelier to the Montpelier State Highway/Bailey Avenue intersection;
- **Route 302** from Barre Town, through Barre City and Berlin, to its terminus at Route 2 in Montpelier; and
- **Route 14** from the Barre Town/East Montpelier line to its westerly intersection with Route 302 in Barre City.

Minor Arterial System -- The minor arterial system interconnects with and augments the principal arterial system and provides service to trips of moderate length. The minor arterial system places more emphasis on land access than the principal arterial system as well as achieving an acceptable level of mobility. The minor arterial system also serves as a primary connection between the state's counties. Minor Arterials are shown in **Figure 12**.

Figure 12


Central Vermont Roads by Functional Class
WOODBURY
WORCESTER
WATERBURY
CABOT
CALAIS
MIDDLESEX
MARSHFIELD
EAST MONTPELIER
DUXBURY
MORETOWN
MONTPELIER
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
WAITSFIELD
ORANGE
NORTHFIELD
BARRE TOWN
WARREN
WILLIAMSTOWN
ROXBURY
WASHINGTON
Functional Class
Interstate/Expressway
Principal Arterial
Minor Arterial
Major Collector
Minor Collector
N
W
E
S
0
2.5
5
10
Miles
GIS
CENTRAL VERMONT
REGIONAL PLANNING
COMMISSION

Major Collector System -- The major collector street system balances land access service and traffic circulation within residential neighborhoods, commercial, and industrial areas. It differs from the arterial system in that facilities on the collector system may penetrate residential neighborhoods, distributing trips from the arterial system through the area to the ultimate destination. A primary function of the major collector system is to serve intra-county trips. Major Collectors are shown in **Figure 12**.

Minor Collector System -- The minor collector street system provides service to smaller communities in rural areas of the region and is spaced to collect traffic from local roads to the major collector system. Within the urban sectors of the region, a primary function of the minor collector system is to serve intra-town trips. Minor Collectors are shown in **Figure 12**.

Table 15 shows the distribution of roads in the Central Vermont Region by functional classification and **Table 16** shows the annual vehicle miles of travel in 2006 by functional class in Washington County. Although the annual vehicle miles of travel data are not available for the Central Vermont Region as a whole, the percentage of VMT by functional class will be similar to that shown for Washington County. A comparison of the two tables shows that while roads with the highest functional classification make up a relatively small portion of total highway miles, they carry a relatively large portion of all vehicle miles traveled.

Table 15. Miles of Highway by Functional Class for the entire Central Vermont Region

Functional Class	Miles	Percent of Total
Interstates and Expressways	38.3	2.6%
Principal Arterial	30.8	2.1%
Minor Arterial	92.5	6.2%
Major Collector	175.1	11.7%
Minor Collector	107.1	7.2%
Local	1048.5	70.3%
Total Miles	**1492.2**	**100.0%**

Table 16. 2006 Annual Vehicle Miles of Travel by Functional Class in Washington County

Functional Class	Annual Vehicle Miles of Travel	Percent of Total
Interstates and Expressways	201,528,496	28%
Principal Arterial	91,112,142	13%
Minor Arterial	155,703,149	22%
Major Collector	113,241,583	16%
Minor Collector	21,440,834	3%
Local	133,679,681	18%
Total Miles	717,462,419	100%

Roadways are also classified by jurisdiction – i.e. the government entity that owns the facilities and has responsibility for their operations and maintenance. In general, jurisdictions can include federal, state, county and local communities (although roads directly owned by the Federal Government are rare). In Vermont, roads are either owned by the State of Vermont and maintained by the Vermont Agency of Transportation (VTrans) or by the local community in which they are located. Local roads make up the

majority of the road network in terms of road miles, while State roads are generally larger facilities that carry the most traffic.

Classifications by function and by jurisdiction are related; roads with higher classifications tend to be under state jurisdiction. For example, Expressways and Arterials are generally state roads, while Local Roads are almost always under local jurisdiction. Collector roads are the middle category where roads can fall under either type of jurisdiction.

National Highway System

The National Highway System (NHS) is part of the National Intermodal Transportation System which consists of Interstate and Defense Highways and principal arterial roads essential for interstate and regional commerce, travel, national defense, intermodal transfer facilities, international commerce and border crossings. Federal law (the Intermodal Surface Transportation Efficiency Act (ISTEA), the Transportation Efficiency Act for the 21st Century (TEA-21), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)) established the development of a National Intermodal Transportation System that is economically efficient and environmentally sound, providing the foundation for the Nation to compete in the global economy, and to move people and goods in an energy efficient manner. In addition, this system intends to provide improved access to ports and airports, the Nation's link to international commerce.

Within the Central Vermont Region, the roadway sections included on the NHS are I-89 (throughout the region), Route 2 from the Washington County line in Cabot into Montpelier to its intersection with Montpelier State Highway and Bailey Avenue, and Montpelier State Highway from Route 2 to its interchange with I-89.

Vermont Byways Program

The VTrans has created a state-wide program to recognize and promote the state's most unusual roadways. The ultimate objective of this program is to identify those roadways that exhibit such exceptional scenic, cultural, historic, natural, recreational, or archaeological resources that these roads should be both managed and promoted in special ways. The program is designed to encourage the creation of public/private partnerships along these special roads and to allow those partnerships to define the ways in which those roads should be promoted and managed.

The Program provides protection for owners of private property in that (1) existing land use regulations need not be modified, (2) the Program does not have powers of zoning or condemnation, (3) residents in or along a corridor are not required to participate, (4) the Program is intended to promote economic growth and development in a balanced manner, and (5) the Program and/or data collected as part of the Program are not intended to be used in an Act 250 hearing, nor would it preclude any land development otherwise permitted by existing zoning. The Central Vermont Regional Planning Commission also recognizes that designation as a Byway should not have special influence in the regulatory review process.

There are four primary benefits that can be derived from a byway designation. The first is the additional tourists who will travel along roadways that are designated as scenic on state tourism maps. For communities wishing to strengthen their tourist economies, the byways program offers a strong tool to achieve that objective.

A second benefit that communities can derive is that of accessing federal grant moneys that have been allocated through the National Scenic Byways Program. These grant moneys are available for the creation of marketing materials, the construction of visitor centers and interpretive facilities, the development of interpretive programs, acquiring scenic easements, and roadway improvements such as scenic pull-offs.

A third benefit that can be derived from the byways programs is the protection and management of roads that have unusual qualities. For communities that feel that some of their narrow, winding, historic road layouts are essential to the character of their community, a byway designation would give towns the option to develop roadway maintenance standards to prevent the roadway's character from being damaged or destroyed by inappropriate highway improvements.

The final potential benefit that some communities may seek is the careful identification and assessment of how the special resources lying within a roadway corridor should be managed. Whether it be the protection of special archaeological or historic resources , the management of sensitive ecosystems along the corridor, or the use of land use regulations to manage growth and development, communities can use the byways program to achieve these types of results.

The following US and State Highways have been designated a Vermont Byway **Figure 13**:

Mad River Byway

> Middlesex Village (Route 2); Moretown (Route 100B); Waitsfield, Warren, Granville Gulf Reservation (Route 100); Fayston, and Buels Gore to the top of the Appalachian Gap (Route 17).

Potential Byways

Route 100 from Waterbury Village to the Stowe/Morrisville Town Line is currently under corridor management planning. Another potential Byway is Route 14 south of Williamstown Village. It is recommended that any road that exhibits the intrinsic qualities, should consider byway planning.

Figure 13

Central Vermont Byways

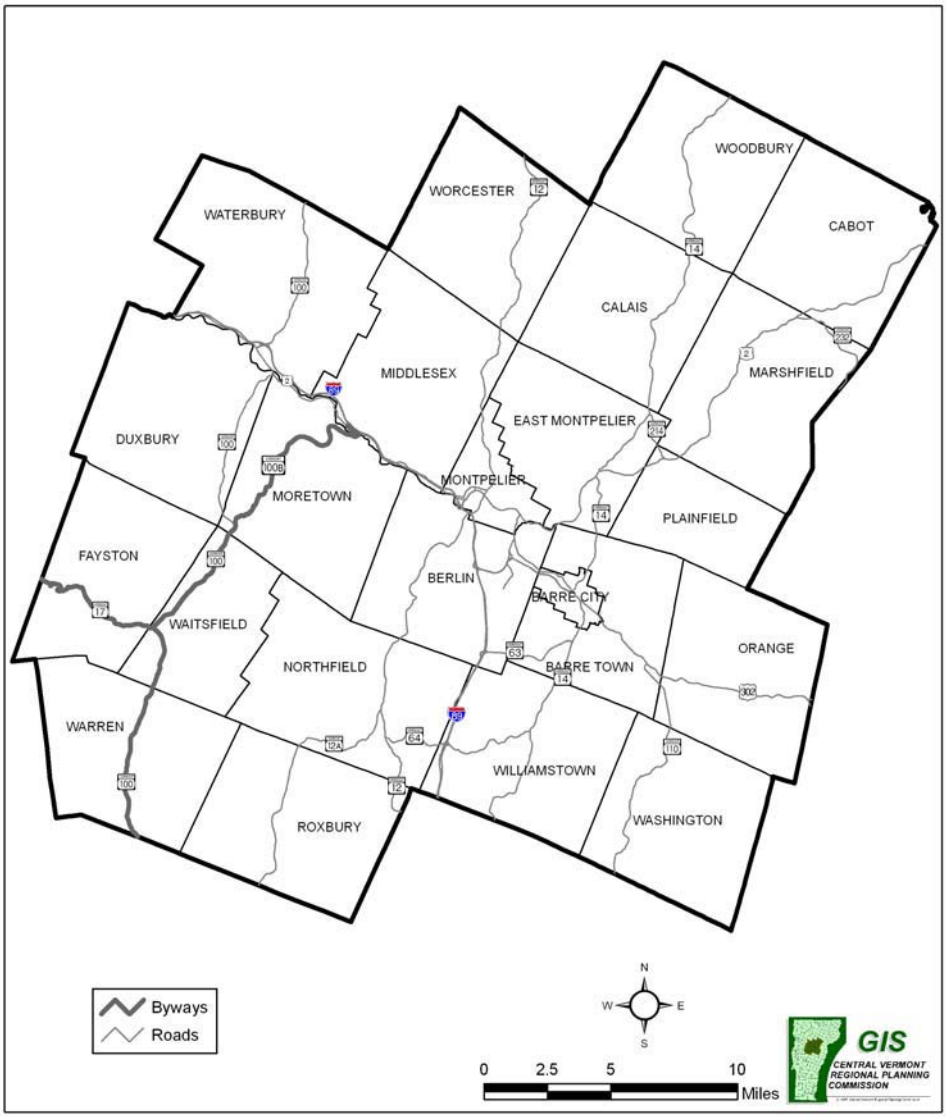


Figure 14

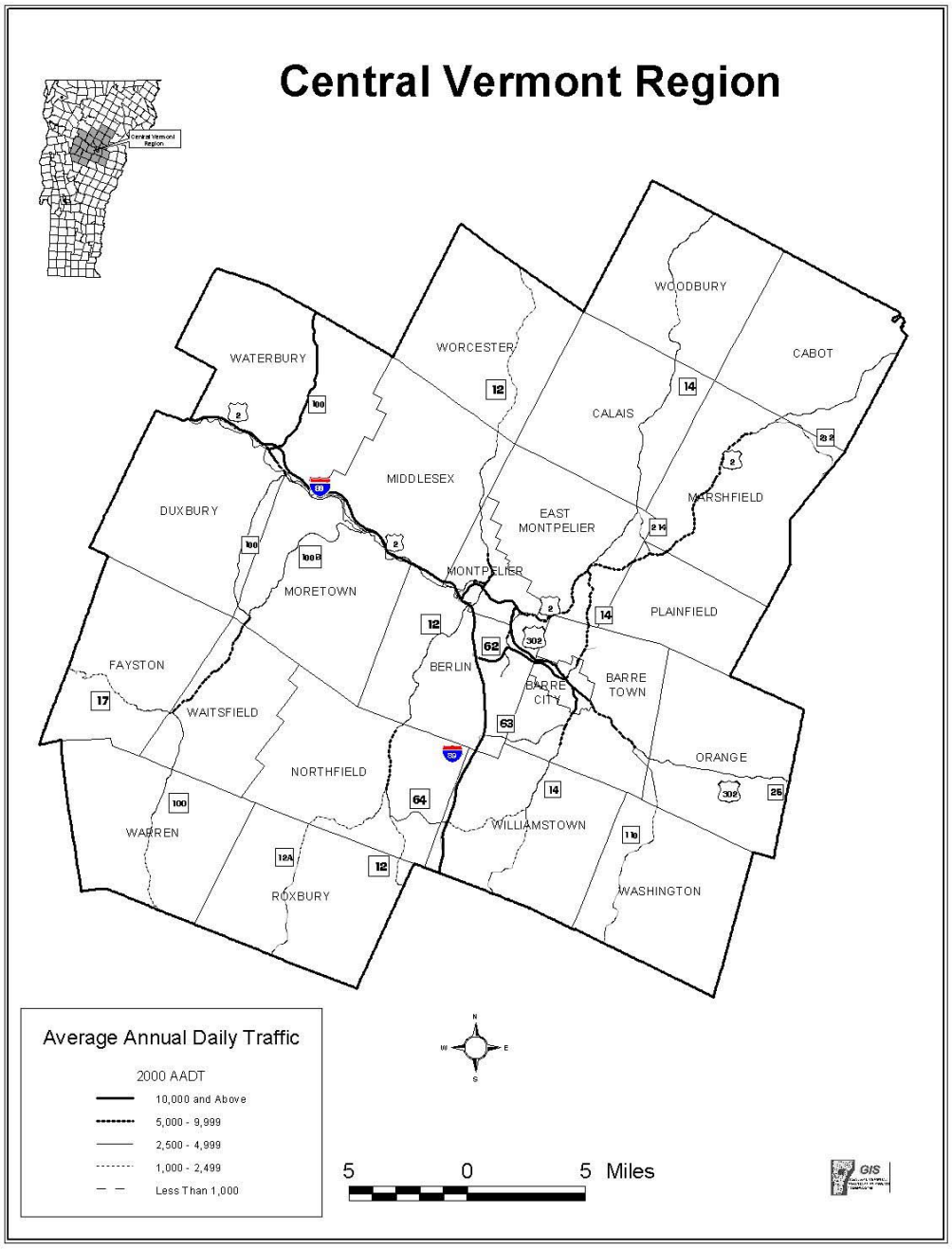
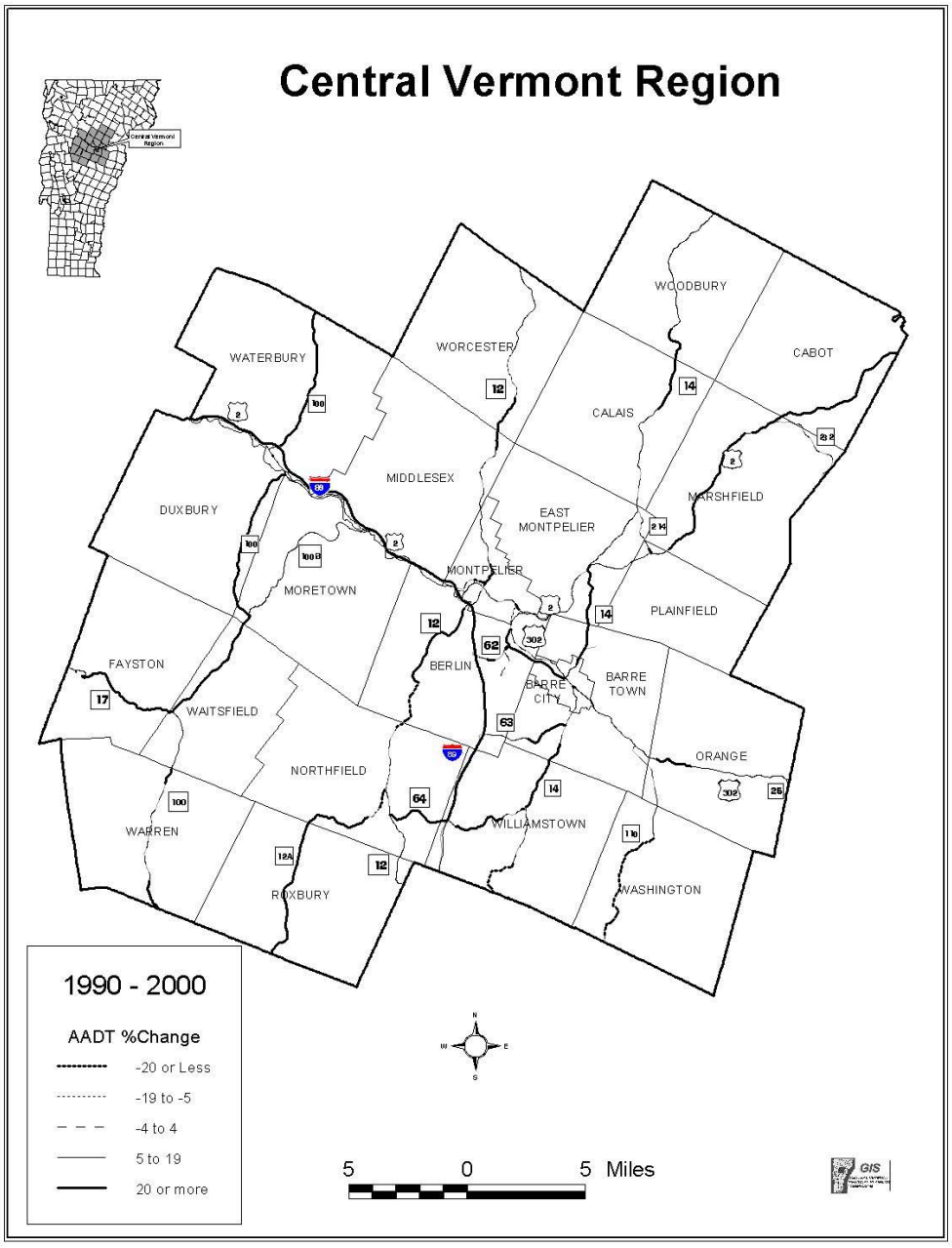

Central Vermont Region
WOODBURY
WORCESTER
CABOT
WATERBURY
CALAIS
MIDDLESEX
MARSHFIELD
DUXBURY
EAST MONTPELIER
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
BARRE TOWN
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
ROXBURY
WASHINGTON
Average Annual Daily Traffic
2000 AADT
10,000 and Above
5,000 - 9,999
2,500 - 4,999
1,000 - 2,499
Less Than 1,000
5 0 5 Miles
GIS

Figure 15


Central Vermont Region
WOODBURY
WORCESTER
CABOT
WATERBURY
CALAIS
MIDDLESEX
MARSHFIELD
DUXBURY
EAST MONTPELIER
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
BARRE TOWN
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
WASHINGTON
ROXBURY
1990 - 2000
AADT %Change
-20 or Less
-19 to -5
-4 to 4
5 to 19
20 or more
5 0 5 Miles
GIS

Average annual daily traffic (AADT) volumes for all state highways and several other major roadways in the region are shown in **Figure 14**. These AADT values are for the year 2000 and are based on automatic traffic recorder counts taken by VTrans. Year 2000 AADT for major road segments in the Region are listed in **Table 23** on page 62.

The highest traffic volumes in the Region are found on I-89, which carries approximately 25,000 vehicles per day between Berlin and Waterbury. Excluding the Interstate, the highest traffic volumes in the Region are found in the Montpelier, Barre, and Berlin area and in the Route 100 Corridor north of I-89. The fact that these areas have the highest traffic volumes is consistent with the role they serve as employment centers in the Region, as well as being located at the cross roads of major highways. Traffic volumes along the major state highways in these areas range between 10,000 and 16,000 vehicles per day. Traffic volumes decrease as the state highways reach out into the surrounding communities dropping to between 5,000 and 10,000 vehicle per day.

Historical Trends & Future Projections

As shown in **Table 17**, Vehicle Miles of Travel (VMT) grew faster than population, households and employment between 1990 and 2000. **Table 17** also shows that VMT growth on non-interstate highways was in-line with growth in households and employment. For over forty years the VMT showed very steady growth with the exception of the 1974 energy crisis. More recent VMT data (2003-2005) showed a significant decline, which relates to the sharp spike in fuel prices. At this time it is uncertain what the long term effect rising fuel prices will have on future traffic volumes. For this reason, new projections have not been calculated for this plan. When the 2010 Census, and a longer period of VMT data is available, an update to the future traffic volumes will be more reasonable.

Table 17. Comparison between 1990 to 2000 Growth in Central Vermont Region Vehicle Miles of Travel, Population, and Employment

	1990	2000	Percent Change
Population	59,619	63,276	6%
Households	22,625	25,675	13%
Employment	37,386	43,300	16%
Daily VMT with I-89	1,411,355	1,707,474	21%
Daily VMT without I-89	800,082	915,643	14%

As discussed in Chapter 3, population, household, and employment did not grow at the same rate across the Region. Therefore, it is reasonable to expect that traffic growth, as shown in **Figure 15,** varied across the Region as well. In **Figure 16**, the Region has been divided into seven sub-regions. These sub-regions were developed based on the distribution of households and employment documented in Chapter 3. **Table 18** demonstrates that the VMT growth is significantly different among the seven sub-regions.

Table 18. 1990 to 2000 Percent Change in Daily Vehicle Miles of Travel by Sub-Region

Sub-Region	1990	2000	Percent Change
Route 100	204,146	250,196	23%
Route 12 South	46,217	51,852	12%
Route 12 North	19,399	20,941	8%

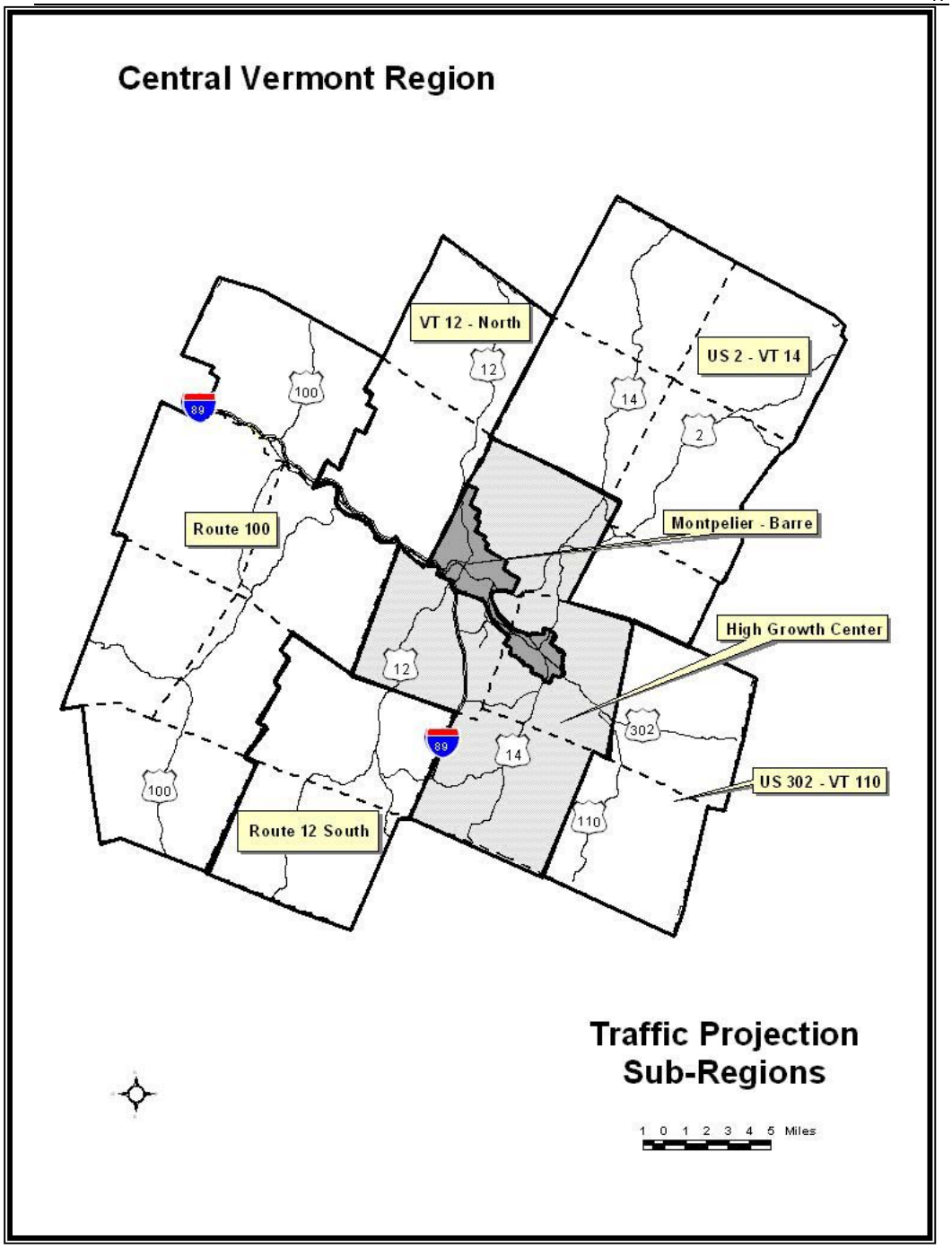
US 2 – VT 14 North	100,681	118,979	18%
US 302 - VT 110	31,071	32,632	5%
High Growth Center	243,392	278,532	14%
Barre - Montpelier - US 302	155,176	162,511	5%
Total Region without I-89	800,082	915,643	14%

Traffic projections developed for the year 2020 recognize that growth varies across the Region. As noted above, growth in VMT is related to growth in households and employment. Using statistical analysis, a mathematical relationship was developed between VMT and growth in households and employment. Using this relationship, the twenty-year growth factors shown in **Table 19** were developed for the sub-regions with two exceptions. The household-employment model predicted an 8% growth in VMT during the twenty year time period in the Barre-Montpelier-US 302 sub-region. Although this sub-region is not expected to experience as much housing growth as the rest of the Region, it will remain an employment center. Therefore, it was decided that the statewide average growth rate for an urban area of 15% between 2000 and 2020 was more appropriate for the Barre-Montpelier-US 302 sub-region. The second exception is I-89. Traffic growth on I-89 is affected by many other factors beyond the Region's household and employment growth. Therefore, the statewide average growth rate for interstates is used for I-89.

Table 19. Growth Factors Used to Estimate 2020 Traffic Volumes

Sub-Region	20 Year Growth	Annual Growth Rate	Methodology
Route 100	48%	2.0%	Household & Employment Relationship
Route 12 South	28%	1.2%	
Route 12 North	56%	2.2%	
US 2 - VT 14 North	42%	1.8%	
US 302 - VT 110	45%	1.9%	
High Growth Center	38%	1.6%	
Barre - Montpelier - US 302	15%	0.7%	Statewide average for urban areas
I-89	45%	1.9%	Statewide average for interstates

Figure 16. Traffic Projection Sub-Regions



- This section of the plan uses congestion, safety, and physical condition performance measures to identify existing and future deficiencies. A variety of methods are used to identify and quantify these deficiencies, including capacity analysis of both intersections and road segments; safety analysis using accident data; VTrans highway and bridge sufficiency ratings, and VTrans pavement condition ratings.

Congestion

Congestion has been estimated for all signalized intersections in the Region, major stop-controlled intersections, and the major road segments. Year 2000 & 2006 segment congestion is based on data collected in the field. Year 2020 segment traffic volumes were estimated using the growth factors presented in **Table 19**.

Level of service (LOS) is the standard measure used to quantify the operational performance of highway facilities as perceived by the user. The grades A, B, C, D, E and F are the six possible LOS ratings where "A" indicates excellent conditions with free flow, "E" indicates intolerable conditions with unstable flow, and "F" indicates that demand exceeds capacity. **Table 20** summarizes the differences between the LOS ratings.

There is almost universal agreement that levels of service A, B and C are acceptable and LOS F is not. Because Level of Service ratings attempt to measure how well a facility is operating as perceived by the driver, the acceptability of LOS D varies by the location of the facility and the policies of state department of transportations, and other municipal and regional organizations involved in transportation planning. On rural highway facilities where speeds are often higher and drivers expect a higher level of mobility, LOS D may not be acceptable. On the other hand, in urban areas and activity centers where drivers expect and are accustomed to greater delays, an LOS D is often considered acceptable and is often wide spread. In some cases, LOS E may be acceptable in urban areas and activity centers

Table 20. Qualitative Description of Level of Service

Level of Service	Traffic Operations
LOS A	Free flow conditions, vehicles are completely unimpeded, and minimal delay at intersections
LOS B	The ability to maneuver in a traffic stream is only slightly restricted and there are insignificant delays at intersections.
LOS C	Traffic flow is stable but the ability to maneuver and change lanes is more restricted than LOS B. Vehicles begin to back-up at intersections.
LOS D	A small increase in traffic may cause substantial increases in delay at intersections and decreases of travel speeds on road segments.
LOS E	Significant delays at intersections with road segment travel speeds at approximately 1/3 of the posted speed.
LOS F	Extremely slow travel speeds, high delays, and extensive vehicle back-ups at intersections

For the Central Vermont Region, LOS D is considered the extreme and should only be accepted for long-term planning purposes within the more urban, built-up sectors of the region (for example: Montpelier, Barre City, Northeast Berlin, South Barre, Waterbury Village, Northfield Village, and Waitsfield). Throughout most of the region, LOS C will be taken as the preferred condition and the threshold to be used in identifying potential problem locations.

Signalized Intersections

There are Thirty signalized intersections in the region. This analysis uses the same intersections studied in the 2003 Regional Transportation Plan. LOS is based on recent detailed studies. For all other intersections, the latest turning movement counts were obtained from VTrans for these sites and these data were adjusted to reflect 2007 PM design hour volumes. The volumes were then entered into Synchro (v6), a traffic engineering software package, to obtain Level of Service (LOS) as reported in the table below. The analysis is also based on the lanes at each intersection (left, through, right) and the type of control (traffic signal, stop sign).

Lane configurations and traffic signal cycle lengths were assumed to be the same as those used in the 2003 analysis. Traffic signals were assumed to be semi-actuated and uncoordinated, and were not optimized for this analysis. Synchro does not report an overall intersection LOS for unsignalized intersections. Results of the analysis are presented in **Tables 21 & 22**.

Table 21. Level of Service

	Intersection	Town	Overall LOS
Signalized Overall LOS			
1	US 302-VT14-Elm	Barre City	D
2	VT 14-Prospect-Church	Barre City	C
3	US 302-VT62-VT14	Barre City	D
4	VT 62 -Berlin Street	Barre City	B
5	US 302-Hill Street[1]	Barre City	B
6	VT 14-VT 63-Middle Road	Barre Town	B
7	US 2-Stowe Street	Waterbury	D
8	US 2-Park Row	Waterbury	B
9	VT 12-Vine Street	Northfield	C
10	Montpelier State Highway-National Life	Montpelier	C
11	US 2 (Lower State Street)-Bailey Ave	Montpelier	D
12	Memorial Drive-Taylor Street	Montpelier	C
13	US 2 (Memorial)-US 2 (Berlin)-VT 12 (Main)-VT 12 (Northfield)	Montpelier	F
14	Memorial Drive-(Montpelier State Hwy)-Bailey Ave Ext.	Montpelier	B
15	Main Street-State Street	Montpelier	F
16	US 2-US 302	Montpelier	C
17	US 2-Berlin Street-Granite Street	Montpelier	D
18	US 2-Pioneer Street	Montpelier	A
19	US 302-Berlin State Highway	Berlin	C
20	US 302-McDonalds-Burger King	Berlin	B
21	US 302-Ames Shopping Center	Berlin	B
22	US 302-VT Shopping Center	Berlin	A
23	VT 62-Payne Turnpike	Berlin	E
24	VT 62-Berlin Mall	Berlin	D
25	Fisher Road-Berlin Mall[1]	Berlin	B
26	VT 62-Fisher Road-BSH	Berlin	C
27	VT 100-Blush Hill-Stowe Street	Waterbury	C
28	VT 100-Shaws Drive	Waterbury	C
29	VT 14-Parkside Terrace	Barre City	A
30	VT 14-Ayers-Hill Street	Barre City	B

Table 22.

	Intersection	Town	LOS
Unsignalized Worst Leg LOS			
31	State Street-Taylor Street	Montpelier	F
32	State Street-Elm Street	Montpelier	D
33	VT 14-Circle Street	Barre City	F
34	VT 14-Quarry Street	Barre City	D
35	VT 100-VT 17	Waitsfield	D
36	US 2-VT 14-Quaker Hill Road	E. Montpelier	F
37	US 2-VT 14	E. Montpelier	F
38	VT 100-Guptil Road	Waterbury	F
39	US 2-VT 100 (Moretown)	Moretown	F
40	I-89 Exit 10 SB Off-ramp-VT 100	Waterbury	F
41	I-89 Exit 10 NB Off-ramp-VT 100	Waterbury	F
42	US 302-VT 110-Cobble Hill	E. Barre	C
43	Elm Street-Summer Street	Barre City	F
44	Summer Street-Seminary Street	Barre City	C
45	VT 14-Summer Street	Barre City	F
46	US 302-Berlin Street	Barre City	F
47	US 302-Beckley Street	Barre City	E
48	Main Street-Spring Street (roundabout)	Montpelier	A
49	US 2-VT 214	Plainfield	C
50	VT 14-Sterling Hill Road-Bridge	Barre Town	F
51	US 2-VT 100 (Waterbury)	Waterbury	F

The following is a summary of two locations with signalized intersections which will be affected by projects on the VTrans State Transportation Improvement Program.

US Route 2 / US Route 302 (Montpelier) – The level of service presented for this intersection represents the signalized portion only. There is also an un-signalized "crossover" area which is currently experiencing LOS F. A scoping report was completed for this intersection with a roundabout presented as the preferred alternative. Design on the roundabout will begin in year (2003) with construction anticipated by 2008.

US Route 302 (Barre City Main Street) – A project is being designed for US Route 302 through Barre City as VTrans project FEGC F 026-1(34). This project proposes to interconnect the signal at North Main and Washington / Elm Street with the signal at South Main and Prospect Street to optimize signal progression.

Several of the stop-controlled "problem" intersections in the region have been or are currently being examined. The following summary presents the proposed changes being considered for each intersection and gives the current status of each project.

VT Route 100 / VT Route 17 (Waitsfield) – Changes have been considered for this intersection as part of bridge project BHF 0200(9). It is possible that this Y-intersection would be relocated such that VT Route 17 intersects with VT Route 100 further south. A roundabout is currently under consideration for the relocated intersection. Relocation would eliminate the hazard caused at the current location due to the combined horizontal and vertical curve.

VT Route 14 / Quarry Street (Barre City) – A scoping report is currently being prepared for this intersection by VTrans as project MEGC M 6000(11). At this time a preferred alternative has not been officially identified. It is likely that a signalized intersection with separate left and right-turn lanes on Quarry Street and a left-turn lane, along with a three-phase signal with protected plus permitted left-turn phasing.

US Route 2 / VT Route 14 / Quaker Hill Road (East Montpelier) – Changes to this intersection are being designed by VTrans as project STPG 028-3(35)S. As recommended in the scoping report, the intersection of VT Route 14 is being relocated away from Quaker Hill Road thereby forming two separate T-intersections. A new signalized intersection is being designed with separate left and right-turn lanes on VT Route 14 and a left-turn lane on US Route 2. The signal will operate as a three-phase signal with protected left-turn phasing for US Route 2 left-turns.

US Route 2 / VT Route 14 (East Montpelier) – Changes are being considered for this intersection as part of bridge project BRF 037-1(7). The scoping study recommends that this intersection be signalized with separate left and right-turn lanes on VT Route 14 and a left-turn lane on US Route 2 with protected plus permitted left-turn phasing for US Route 2.

US Route 2 / VT Route 100 (Waterbury) – A scoping report was prepared for this intersection under project STPG SGNL(18). This report compared a signal to a roundabout. The original recommendation was for a signalized intersection with a left-turn lane on US Route 2, separate left and right-turn lanes on VT Route 100 and retaining the right-turn slip lane on US Route 2. The report recommended a four phase signal with a protected left-turn phase for US Route 2 and an exclusive pedestrian phase. Since this report, the roundabout design has been improved, and is under design

Related to this intersection project are the I-89 Exit 10 ramps. Both the northbound and southbound exit ramps experience Level of Service F. The southbound ramp is at a critical level, in that traffic frequently backs up into the Interstate shoulders, and is under design for signalization

VT Route 14 / Sterling Hill Road / Bridge Street (Barre Town) – A scoping report was prepared for this intersection which recommended that left-turn lanes be added to VT Route 14 and that the intersection be signalized. There were several phasing / cycle length scenarios presented in the report. It is possible that protected left-turn phasing would be required for safety reasons which would result in a lower overall level of service for the intersection.

Roadway Segments

Roadway segments were analyzed using *HCS 2000*, a software package that utilizes the methodologies outlined in Chapters 20 – 23 of the *Highway Capacity Manual 2000* to analyze levels of service for two-lane highways, multi-lane highways and freeways.

For the purpose of this study, all two-lane highway segments in the region were analyzed as Class II highways with 12-foot travel lanes, 2-foot shoulders, 65/35 % directional splits, 5% trucks and buses, 0.85 peak hour factors and 100% no-passing zones.

A freeway is defined as a divided highway with full control of access and two or more lanes for the exclusive use of traffic in each direction. Level of service on freeways is defined by speed, density and flow rate. A description of LOS A- F for freeway segments is presented on pages 13-8 through 13-10 of the *Highway Capacity Manual 2000*. Interstate 89 is the only freeway in the region.

Multilane highways differ from freeways in that they are not completely access controlled. They can have at-grade intersections and occasional traffic signals. Level of service on multilane highways is based on density, which is calculated by dividing per-lane flow by speed. Page 12-8 in the *Highway Capacity Manual 2000* provides a description of LOS A – F for multilane highways. Peak hour volumes used for the analyses were assumed to be 10% of the Average Annual Daily Traffic (AADT) volumes with a 65/35 direction split for each roadway segment. VT Route 62 and the Montpelier State Highway segment from Exit 8 to Montpelier were analyzed using this methodology.

As shown in **Figure 17**, unacceptable levels of service are shown on US routes 2 and 302, in the Barre/Montpelier area and on VT Route 100 north of I-89 in Waterbury. As shown in **Figure 18**, by 2020, this congestion is projected to spread east along US 2, east along US 302, south along VT Route 100, and south along VT Route 14. Congestion is also projected in 2020 along VT Route 100 between Waitsfield and Duxbury, and on VT Route 62. **Table 23** provides average annual daily traffic, and level of service ratings for the various road segments analyzed

Road segments in the Region where level of service is projected to drop to E or F in 2020 include:

- US Route 2 in Montpelier between Main Street and US Route 302;
- US Route 2 in East Montpelier Village;
- US Route 2 in Waterbury Village;
- US Route 302 from US 2 in Montpelier, through Berlin and Barre City, to west of VT Route 14 in Barre Town;
- VT Route 14 in Barre City;
- VT Route 62 in Berlin between the Berlin State Highway and Route 302; and
- VT Route 100 between Waterbury Village and Waterbury Center.

Figure 17

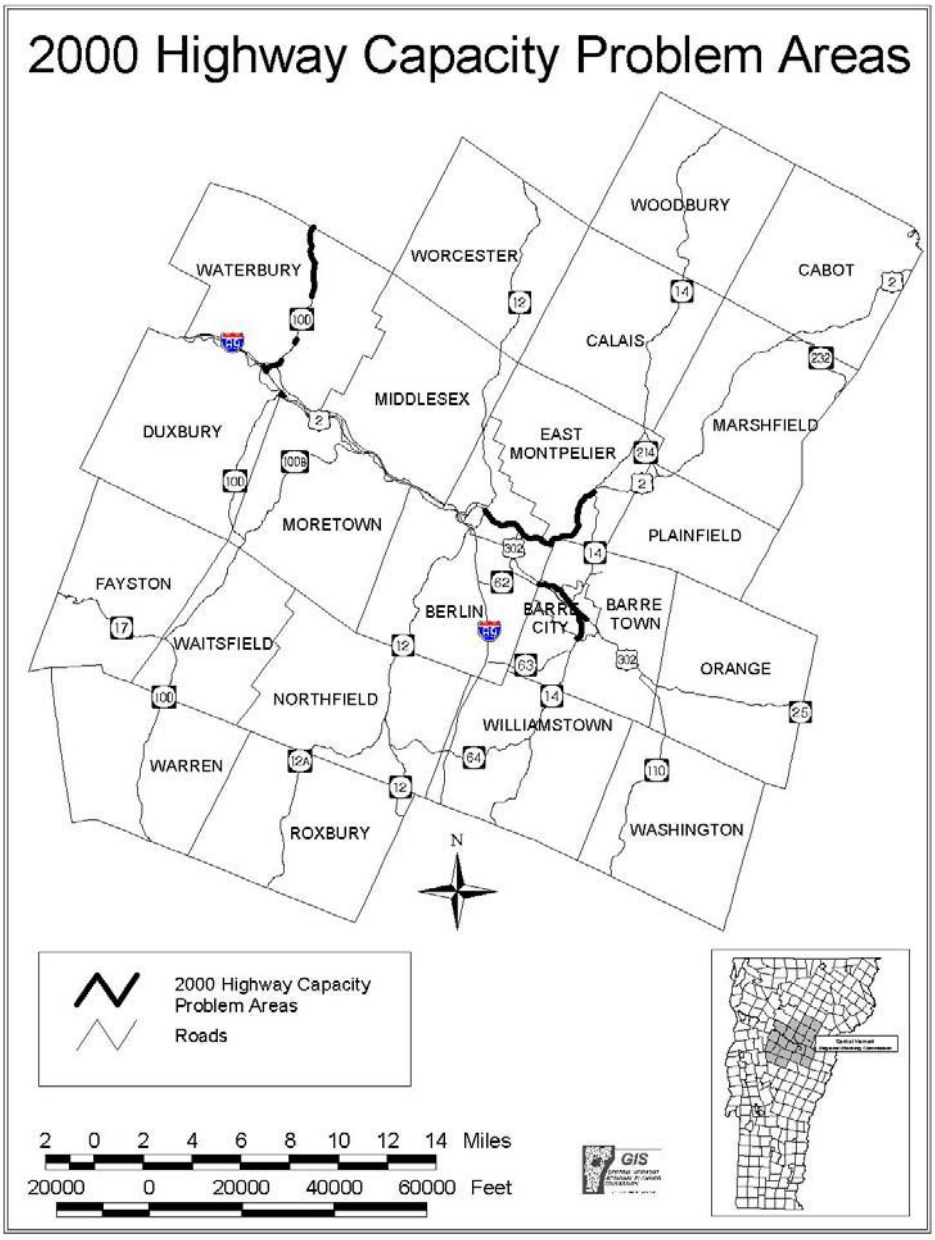

2000 Highway Capacity Problem Areas
WOODBURY
WATERBURY
WORCESTER
CABOT
CALAIS
MIDDLESEX
DUXBURY
EAST MONTPELIER
MARSHFIELD
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
BARRE TOWN
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
ROXBURY
WASHINGTON
N
2000 Highway Capacity Problem Areas
Roads
2 0 2 4 6 8 10 12 14 Miles
20000 0 20000 40000 60000 Feet
GIS

Figure 18

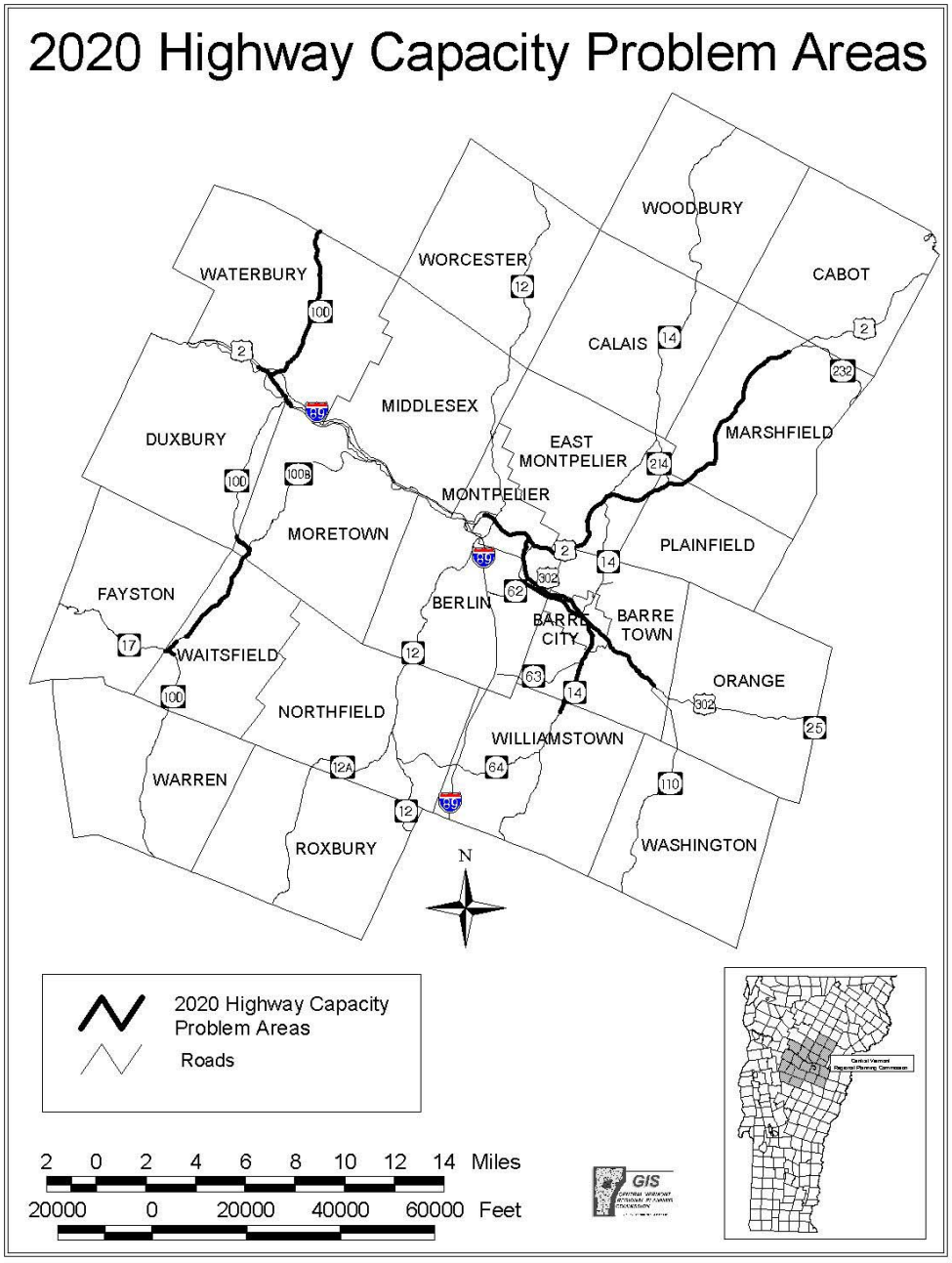

2020 Highway Capacity Problem Areas
WOODBURY
WORCESTER
CABOT
WATERBURY
CALAIS
MIDDLESEX
DUXBURY
EAST MONTPELIER
MARSHFIELD
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
BARRE TOWN
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
ROXBURY
WASHINGTON
N
2020 Highway Capacity Problem Areas
Roads
2 0 2 4 6 8 10 12 14 Miles
20000 0 20000 40000 60000 Feet
GIS

Table 23.

		AADT's			Level of Service		
Highway	Segment	2000	2006	2020	2000	2006	2020
Interstate 89	south of Exit 5 (Route 64)	12,300	13,900	17,835	A	A	A
	between Exits 5 and 6 (Route 63)	15,600	16,100	22,620	A	A	B
	between Exits 6 and 7 (Route 62)	15,100	16,800	21,895	A	A	B
	between Exits 7 and 8 (Mplr State Hwy)	20,700	21,200	30,015	B	B	C
	between Exits 8 and 9 (Route 2)	25,500	26,100	36,975	B	B	C
	between Exits 9 and 10 (Route 100)	22,800	23,300	33,060	B	B	C
	north of Exit 10	24,700	25,200	35,815	B	B	C
U.S. Route 2 (east)	Bailey Avenue to Taylor Street	12,100	12,100	13,915	D	D	D
	Taylor Street to Main Street	12,200	13,100	14,030	D	D	D
	east of Main Street	16,500	16,800	18,975	E	E	E
	west of Route 302	15,600	15,600	17,940	E	E	E
	between Route 302 and E Mplr	10,100	10,600	13,938	D	D	D
	East Montpelier Village	11,200	10,900	15,456	D	D	E
	between E Mplr and Plainfield	6,600	5,800	9,108	C	C	D
	Plainfield Village	7,100	7,600	10,082	C	C	D
	between Plainfield and Marshfield	6,000	7,000	8,520	C	C	D
	Marshfield Village	5,100	5,300	7,242	C	C	C
	east of Marshfield Village	3,100	3,600	4,402	C	C	C
U.S. Route 2 (west)	between Montpelier and Middlesex Ctr	2,500	2,600	3,400	C	C	C
	Middlesex	3,500	3,800	4,760	C	C	C
	between Middlesex and Route 100	3,600	4,100	4,896	C	C	C
	west of Route 100 (east)	8,700	7,600	12,876	D	C	D
	Waterbury Village	12,000	13,300	17,760	D	D	E
	east of Route 100 (west)	10,300	12,200	15,244	D	D	D
	west of Route 100 (west)	2,400	3,200	3,264	B	C	C

		AADT's			Level of Service		
Highway	Segment	2000	2006	2020	2000	2006	2020
U.S. Route 302	between Route 2 and Berlin State Hwy	14,100	14,300	16,215	D	D	E
	between Berlin St Hwy and VT Shop Ctr	15,100	11,900	17,365	D	D	E
	east of Vermont Shopping Center	13,600	12,200	15,640	D	D	E
	at Barre City/Berlin line	12,800	12,100	14,720	D	D	D
	west of Route 62	16,600	15,000	19,090	E	D	E
	east of Route 14 (west)	18,600	17,700	21,390	E	E	E
	west of Route 14 (east)	17,600	16,700	20,240	E	E	E
	at Barre City/Barre Town line	7,200	6,800	8,280	C	C	D
	East Barre Village	6,600	6,800	9,108	C	C	D
	east of Route 110	3,700	3,900	5,106	C	C	C
	Orange Center	3,500	3,800	5,075	C	C	C
Business Route 2	east of Bailey Avenue	7,900	8,500	9,085	D	D	D
	west of Main Street	8,300	8,500	9,545	D	D	D
	between State Street and Barre Street	12,900	11,800	14,835	D	D	D
	between Barre Street and Route 2	11,800	11,900	13,570	D	D	D
Vt. Route 12 (south)	in Roxbury	1,000	920	1,280	A	A	B
	south of Route 64	1,600	1,400	2,048	B	B	B
	south of Route 12A	4,400	4,400	5,632	C	C	C
	Northfield Community Centers	6,200	6,300	7,936	C	C	D
	between Northfield Ctrs and Riverton	3,900	4,100	5,382	C	C	C
	between Riverton and Montpelier line	3,600	4,200	4,968	C	C	C
	Montpelier	4,600	5,100	6,348	C	C	C
Vt. Route 12 (north)	north of State Street	8,200	8,100	9,430	D	D	D
	at Elm Street	5,400	7,100	6,210	C	C	C
	at Montpelier/Middlesex line	4,100	3,900	4,715	C	C	C
	in Middlesex	2,500	2,300	3,900	C	B	C
	in Worcester Village	2,200	1,600	3,432	B	B	C
	at Worcester/Elmore line	1,000	1,100	1,560	A	B	B

		AADT's			Level of Service		
Highway	Segment	2000	2006	2020	2000	2006	2020
Vt. Route 12A	south of Roxbury	590	730	755	A	A	A
	north of Roxbury	1,600	1,600	2,048	B	B	B
	south of Route 12	2,100	2,000	2,688	B	B	C
Vt. Route 14 (south)	at Williamstown/Brookfield line	810	870	1,118	A	A	A
	south of Williamstown Village	2,400	2,400	3,312	B	B	C
	Williamstown Village	4,100	4,400	5,658	C	C	C
	south of Route 63	6,600	8,200	9,108	C	C	D
	South Barre	8,400	10,700	9,660	D	D	D
	at Barre Town/Barre City line	8,200	10,000	9,430	D	D	D
	Barre City	15,700	13,000	18,055	E	D	E
Vt. Route 14 (north)	between Seminary Rd and Route 302	6,500	6,400	7,475	C	C	C
	at Barre City/Barre Town line	7,200	7,100	8,280	C	C	D
	south of Route 2	5,000	6,300	6,900	C	C	C
	north of Route 2	4,000	4,400	5,520	C	C	C
	between N Mplr and E Calais Village	4,100	4,100	5,822	C	C	C
	East Calais Village	3,200	3,200	4,544	C	C	C
	at Calais/Woodbury line	2,500	2,700	3,550	C	C	C
	between S Woodbury and Woodbury	2,400	2,800	3,408	B	C	C
Vt. Route 17	west of Irasville	3,800	3,800	5,624	C	C	C
	west of German Flats Rd	1,000	1,000	1,480	A	A	B
	west of Mad River Glen	790	990	1,169	A	A	A
Vt. Route 25	east of Route 302	1,500	1,600	2,175	B	B	B
Vt. Route 62	I-89 Exit 7 to Berlin State Highway	13,600	13,600	18,768	A	A	B
	between Berlin St Hwy and Route 302	11,900	12,100	16,422	A	A	A
Vt. Route 63	I-89 Exit 6 to Route 14	4,700	5,300	6,486	C	C	C

		AADT's			Level of Service		
Highway	Segment	2000	2006	2020	2000	2006	2020
Vt. Route 64	Route 12 to I-89 Exit 5	4,500	3,400	6,210	C	C	C
	I-89 Exit 5 to Route 14	2,200	2,600	2,816	B	C	B
Vt. Route 100 (south)	south of Warren Village	1,100	1,300	1,628	A	B	B
	Warren Village	3,200	4,400	4,736	C	C	C
	between Warren and Waitsfield	4,700	5,300	6,956	C	C	C
	Irasville (north of Route 17)	6,500	7,600	9,620	C	C	D
	Waitsfield Vill (at Bridge Street)	8,700	7,600	12,876	D	C	D
	between Waitsfield & S Duxbury	7,100	7,000	10,508	C	C	D
	between S Duxbury and Route 2	3,600	3,800	5,328	C	C	C
Vt. Route 100 (north)	Waterbury Village	12,000	13,300	17,760	D	D	E
	between Waterbury Vill and Waterbury Ctr	14,900	14,500	22,052	D	D	F
	Waterbury Center	12,300	11,800	18,204	D	D	E
	between Waterbury Center and Stowe	10,200	9,600	15,096	D	D	D
Vt. Route 100B	between Route 100 and Moretown	3,200	3,600	4,736	C	C	C
	between Moretown and Middlesex	2,900	3,000	4,292	C	C	C
Vt. Route 110	south of Washington Village	780	860	1,131	A	A	A
	between Washington Vill and E Barre	2,400	3,000	3,480	B	C	C
	East Barre Village	5,000	5,000	6,900	C	C	C
Vt. Route 214	between Routes 2 and 14	1,400	1,100	1,988	A	A	B
Vt. Route 232	between Groton and Marshfield	650	520	923	A	A	A
Montpelier St Hwy	I-89 Exit 8 to Montpelier	12,800	13,100	14,720	A	A	A
Montpelier Jct. St Hwy	Mplr St Hwy to Berlin	1,700	1,400	1,955	A	B	B
Berlin State Hwy	between Routes 62 and 302	7,100	7,600	9,798	A	A	A
Middlesex St Hwy	I-89 Exit 9 to Route 2	4,100	4,800	6,396	C	C	C

Capacity Analysis - Level of Service

As stated in the 2000 Highway Capacity Manual, "the concept of *levels of service* uses qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. The descriptions of individual levels of service characterize these conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

State highways carry not only locally-generated traffic, but also traffic originating from intersecting corridors, and from external through traffic. The land use and development patterns of the neighboring communities contribute to the levels of demand and congestion along these routes, not just those located where the congestion occurs. The demand created by these communities has produced a need for capacity improvements as described below in the corridor recommendations. Sustainable land use development and transportation facility improvements need to be balanced.

Congestion Management Strategies

Strategies designed to address congestion can be placed into demand and supply management categories. Demand management strategies attempt to reduce congestion by changing demand for single occupant vehicles by shifting travel to off-peak periods or to other modes. Supply management strategies are designed to address congestion through operational and physical changes to the transportation system's infrastructure.

Demand Management Strategies

- Land Use Policies and Regulations. Land use polices that encourage concentrated, mixed-use development patterns that are served by transit and a network of local streets, sidewalks, and bike paths could reduce the number and the length of vehicle trips helping to reduce congestion.

- Transportation Demand Management Programs. A variety of TDM programs are appropriate for the Central Vermont Region and are discussed in a later section.

- Increase Transit Ridership. Shifting travel from single occupant vehicles to transit may help reduce some congestion.

- Increase Use of Bicycle and Pedestrian Facilities. Shifting travel from single occupant vehicles to bicycle and pedestrian travel may help reduce some congestion.

- Improving Intermodal Connections. TDM programs, transit service, intercept parking lots, and bicycle and pedestrian networks will be most effective at reducing congestion if they are fully integrated.

Supply Side Congestion Management Strategies

- Optimizing Isolated Intersection Signal Timings. Retimed traffic signals, with no changes in hardware, generally reduce travel time by 12%. When new hardware is installed that allows for a wider variety of phasing plans, travel times may be reduced by as much as 25%3.

- Coordinating Traffic Signals Along Arterials. When traffic signals are spaced at less than ½ mile, coordination of the timing plans should be evaluated. Traffic signal coordination has the

3 "Improving Traffic Signal Operations A Primer"; US Department of Transportation Federal Highway Administration; 1995.

potential to reduce travel time by as much as 25%4 for through traffic on the main arterial. Coordination also reduces the number of stops, which in turn, may result in less rear end collisions.

- Minor Intersection Geometric Improvements. Small, low cost modifications such as minor widening to accommodate left or right turn lanes.

- Intersection Turn Restrictions. Provide intersection turn restrictions, which could be limited to peak travel periods, to reduce conflicts and increase overall intersection performance.

- Reversible Lanes. In locations where there is a heavy percentage of in-bound traffic in the morning, and a heavy percentage of outbound traffic in the evening, lane designations at intersections could be changed to accommodate the changes in traffic flows.

- Access Management. Reduce delays to through traffic caused by turning vehicles and "side friction" from driveways. If access management is planned for and incorporated into new roads or reconstruction projects, the cost is low. The cost to implement access management techniques for existing arterials can be high if development is dense and roadway improvements are restricted by limited right-of-way.

- Incident Management, Detection, Response & Clearance. In Central Vermont, congestion may not appear to be a problem until an incident that creates a disruption in the traffic flow occurs. Examples include an accident, temporary closure for road construction, or bad weather, Traveler radio, traveler alert notification (via email, fax, etc), and general public outreach to enhance incident related information could help reduce delays cause by these disruptions.

- Addition of Truck Climbing Lanes and Shoulder Widening. For rural principal and minor arterials such as US 2, strategic placement of truck climbing lanes can help eliminate bottlenecks. Widening of shoulders also improves operations and safety.

- Major Intersection Capacity Modifications. When traffic signal optimization or minor lane changes are not effective at eliminating congestion, major intersection reconfiguration should be considered. The reconfiguration could include new turn lanes on most of the approaches or adding through lanes. Roundabouts should also be considered whenever major reconstruction of an intersection appears to be necessary.

- Add Capacity to Highway Segments. Increase road capacity by adding through lanes.

Central Vermont Interstate Exit Build-Out Traffic Impact Assessment

Table 24 summarizes the results of the interstate exit build-out analysis conducted for all six exits in the Central Vermont Region as part of the long range plan update. The table presents the total estimated build-out land use for the influence area around each exit and the estimated number of vehicle trips generated. LOS analyses have not been prepared for each of the intersections and road segments in the influence areas. Rather, the table presents LOS projections for 2020 without build-out traffic and makes qualitative assessments about the potential impact should build-out traffic be added. The key findings are:

4 "Improving Traffic Signal Operations A Primer"; US Department of Transportation Federal Highway Administration; 1995.

- Exit 10 in Waterbury and Exit 7 in Berlin have the largest potential build-out in the Region. Therefore, these two areas also have the largest potential traffic impacts. Exits 10 and 7 have the greatest potential problems of the six I-89 exits in the Central Vermont Region

- Congestion problems are projected for surrounding intersections at Exit 10 in Waterbury and Exit 7 in Berlin. In Waterbury, build-out land use will exacerbate projected congestion problems on VT 100 between US 2 and Waterbury Center. In Berlin, build-out traffic will push the major intersections beyond acceptable levels of performance. The build-out traffic estimated in Berlin for this analysis will generate more traffic than was estimated as part of Berlin's New Town Center Concept because it is based on existing zoning rather than revised zoning as envisioned. The Town of Berlin is reconsidering the location of the new town center. Recommendations on improvements near Exit 7 will depend upon the final allowable intensity and location of development to be determined, as Berlin continues to work on a revised town center concept.

- At Exit 10 in Waterbury, unacceptable performance is projected for the stop-controlled intersections of the off-ramps with VT 100, and will become worse with build-out traffic. Of the exits evaluated, Exit 10 is the only location where poor performance is projected at off ramp/arterial intersections.

- Exit 5 and Exit 9, in Williamstown and Middlesex respectively, are the only other locations with off-ramp intersections controlled by stop signs. Although no LOS analysis is available for the Exit 5 or Exit 9 ramp intersections, the road segments are estimated to perform at LOS C in 2020 and the estimated build-out traffic is relatively low. Therefore, performance at the Exit 5 or Exit 9 ramp intersections will probably remain within acceptable limits without requiring major reconfigurations

- There appears to be reserve capacity at Exit 8 in Montpelier, and Exit 6 in Berlin to accommodate traffic generated by the potential land use build-out. Congestion problems could probably be addressed with minor modifications to the intersections or surrounding road segments.

Table 24. Assessment of Potential Traffic Impact from Build-Out Land Use at Central Vermont I-89 Exits

Municipality	Exit	Potential Build-Out Land Use	Additional Daily Traffic Generated (Vehicle trips [per day)	Projected Level of Service in 2020 with Background Growth Only (Build-Out Traffic Not Included)	Qualitative Assessment of Build-Out Traffic Impact on the Highway System in Proximity to the Exit
Waterbury	10	120,000 sf commercial	3,500	• VT 100/Blush Hill: LOS E • VT 100/Shaws: LOS D • VT 100/Guptil Road: LOS F • I-89 Exit 10 SB Off Ramp/VT 100: LOS F • I-89 Exit 10 NB Off Ramp/VT 100: LOS F • VT 100 Road Segment Waterbury to Waterbury Center: LOS F	Poor LOS is projected even without build-out traffic. Additional traffic generated from the estimated build-out land use will accelerate LOS deterioration. in Level of Service. Highway improvements will be necessary along VT 100 from US 2 to Waterbury Center to accommodate background growth and traffic from build-out.
Middlesex	9	175,000 sf commercial.	5,000.	• US 2 Road Segment in Middlesex: LOS C • Middlesex State Highway Road Segment: LOS C	Route 2 is projected to operate at LOS C in 2020 and therefore has reserve capacity to accommodate additional traffic above background growth
Montpelier: Berlin: Total:	8	96,100 sf commercial 333,750 sf commercial 429,850 sf commercial	5,965 3,340 9,305	• Montpelier State Hwy/National Life: LOS C • US 2/Bailey Avenue: LOS C • US 2/Taylor Street: LOS C • US 2/Main St/VT 12: LOS F • Montpelier State Highway Road Segment: LOS A	With the exception of US 2/Main Street/ VT 12, projected LOS is within acceptable ranges suggesting that the intersections and road segments would have reserve capacity to accommodate the traffic generated by build-out land use.
Berlin	7	460 Residential Units 705,000 sf commercial 705,000 sf industrial	36,300	• VT 62/Payne Turnpike: LOS E • VT 62/Berlin Mall: LOS D • VT 62: Fisher Rd/Berlin State Highway: LOS E • Fisher Road/Berlin Mall/Hospital: LOS C • VT 62 Road Segment Exit 7 to BSH: LOS B • VT 62 Road Segment BSH to 302: LOS E • BSH Road Segment VT 62 to US 302: LOS D	Improvements to the highway system will be required to accommodate the build-out land use. Improvements have been identified in the VT Route 62/Barre Montpelier Road Corridor Study and the VT 62/Fisher Rd./Airport Rd/Berlin State Highway Study. These studies included traffic from Berlin's New Town Center concept.
Berlin	6	100 Residential Units 112,500 Commercial	7,600	• VT Route 63 Road Segment I-89 Exit 6 to VT 14: LOS C	Route 63 is projected to operate at LOS C in 2020 and therefore has reserve capacity to accommodate additional traffic above background growth.
Williamstown	5	5 Residential Units 495,000 Commercial	7,350	• VT Route 64 Road Segment I-89 to VT 14: LOS B • VT Route 64 Road Segment I-89 to VT 14: LOS C	Route 64 is projected to operate at LOS B or C in 2020 and therefore has reserve capacity to accommodate additional traffic above background growth.

Safety Analysis

Safety Analysis

One of the key considerations in the assessment of the transportation system is its capability to provide safe travel for motorists, transit patrons, pedestrians, and bicyclists. A safe transportation system is expected by all users of the region's transportation system. At the individual level, this concern for transportation system safety has primarily to do with the costs associated with accidents (e.g., medical, auto repair, loss of time from work and possibly income). However, this concern over safety has region-wide implications as well. It has been estimated by the Federal Highway Administration that over half of all motorist delay in urban areas is a direct result of incidents. Some of these incidents consist of traffic flow during roadway maintenance or reconstruction or during special events, but the majority of incident delay derives from accidents. Therefore, any safety improvements will result not only in reduced medical, liability, and loss time costs, but also in improved mobility and potentially reduced air pollutant emissions in the region.

VTrans High Crash Locations

VTrans analyzes the number of crashes occurring along road segments and at intersections and compares the frequency and severity to statewide averages for similar facilities. The crashes included in these analyses involve injuries or fatalities, or result in at least $1,000 of property damage. Any intersection or road section (0.3 mile section) that 1) has at least 5 crashes over a 5-year period and 2) has an actual crash rate (number of crashes per million vehicles) that exceeds the state's critical crash rate1 is then classified as a High Crash Location.

VTrans summarizes the HCLs in its High Crash Location Report. The most current version is based on crashes which occurred between 2001 and 2005. The report indicates that there are a total of 52 HCLs in the Central Vermont region **(Figure 19)** inluding 12 intersections **(Table 25)** and 40 road segments **(Table 26)**.

1 The critical crash rate is based on the average crash rates of similar roadways in the state and is related to the functional class of the highway and whether it is located in an urban or rural area.

Figure 19. High Crash Locations

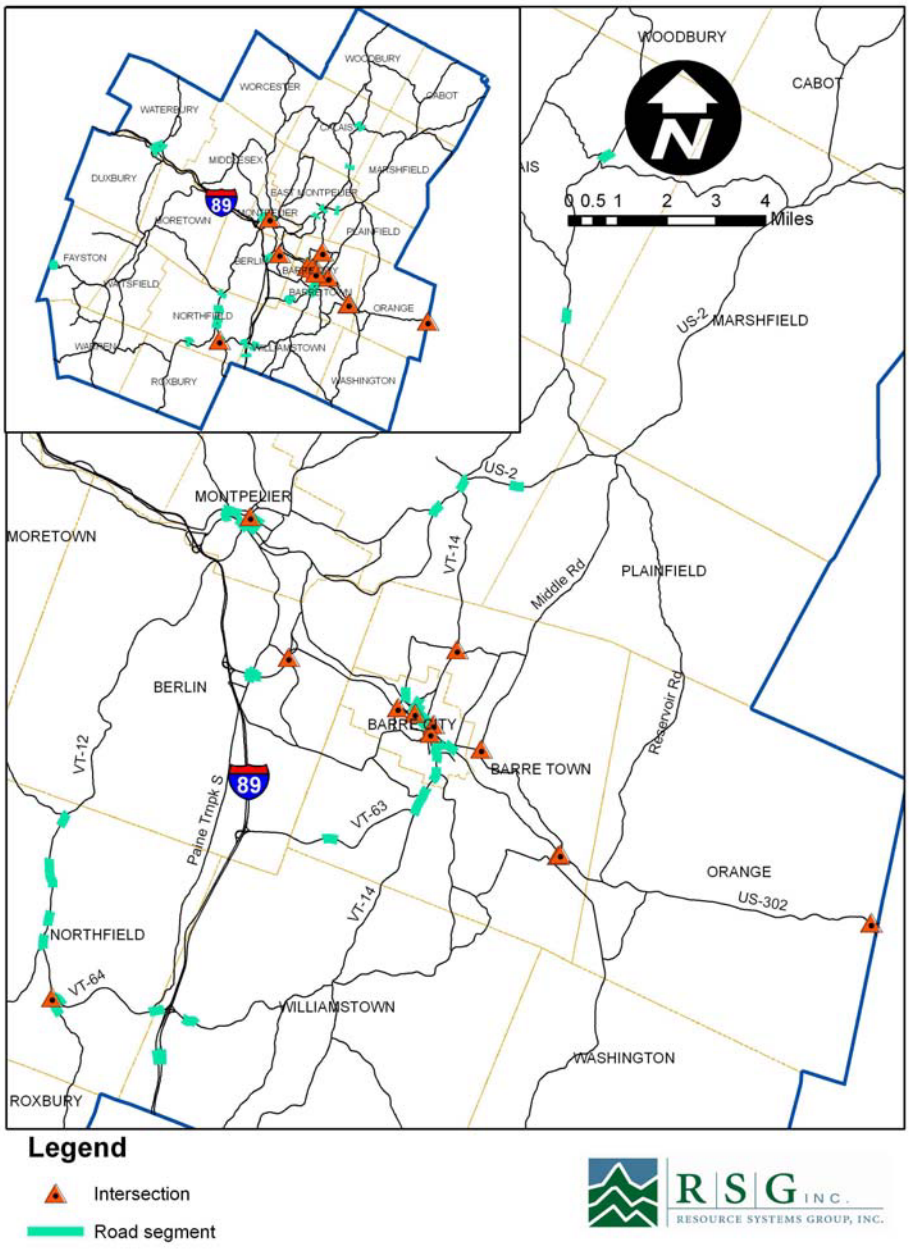


Table 25. Intersection High Crash Locations in Central Vermont

Route	System	Town	Mileage	ADT	Years	Crashes	Fatalities	Injuries	PDO Crashes	Critical Rate	Actual Rate	Ratio Actual/Critical	Severity Index ($/accident)	Identified HCL in 2003 Plan?[1]
Intersections														
COBBLE HILL ROAD, BARRE TOWN, WINDYWOOD ROAD, BARRE TOWN, HILL ST.,	Urban Collector (u)	Barre Town	1.040 - 1.050	4100	5	13	0	8	8	0.872	1.737	1.991	$33,046	N
US-302, VT-110, TOWN ROAD 0030	Minor Arterial (r)/Major Collector (r)	Barre Town	2.450 - 2.650	7836	5	25	1	23	12	1.023	1.748	1.708	$90,596	N
VT-12, VT-64	Major Collector (r)	Northfield	1.980 - 2.080	4930	5	13	0	8	7	0.867	1.444	1.665	$32,415	Y
SUMMER ST., BARRE CITY, ELM ST., BARRE CITY, FRANKLIN ST, BARRE CITY	Urban Collector (u)	Barre City	0.430 - 0.440	9500	5	20	0	4	17	0.714	1.153	1.615	$16,070	Y
US-302, VT-25	Minor Arterial (r)	Orange	5.960 - 6.160	3505	5	8	0	3	5	0.873	1.250	1.431	$22,188	N
VT-14, PINE HILL ROAD, BARRE TOWN, TOWN ROAD 0019	Minor Arterial (u)/Urban Collector (u)	Barre Town	2.970 - 3.070	5125	5	12	0	11	5	0.921	1.282	1.392	$45,125	N
VT-62, BERLIN STATE HIGHWAY, FISHER RD., BERLIN	Freeway/Expressway (u)/Minor Arterial (u)	Berlin	1.280 - 1.400	22120	5	45	0	26	26	0.812	1.114	1.372	$31,027	Y
US-302, VT-62, VT-14	Freeway/Expressway (u)/Principal Arterial (u)	Barre City	1.640 - 1.660	26135	5	44	0	16	32	0.684	0.922	1.347	$22,509	Y
VT-110, FAS 0206, <T0125>, TOWN ROAD 84	Major Collector (r)	Barre Town	1.020 - 1.110	5269	5	10	0	3	8	0.853	1.039	1.218	$20,210	N
VT-14, PROSPECT ST., BARRE CITY	Minor Arterial (u)/Urban Collector (u)	Barre City	1.120 - 1.140	15750	5	25	0	7	20	0.721	0.869	1.206	$19,300	N
VT-12, EAST STATE ST., MONTPELIER	Minor Arterial (u)/Urban Collector (u)	Montpelier	0.970 - 0.980	8550	5	14	0	1	13	0.818	0.897	1.096	$10,864	Y
VT-62, BERLIN ST., BARRE CITY	Freeway/Expressway (u)/Minor Arterial (u)	Barre City	1.150 - 1.250	14516	5	24	0	11	17	0.875	0.905	1.035	$26,663	N

[1]Intersection crash data used in 2003 plan were from 1998 to 2000. Segment crash data were from 1996 to 2000.

Table 26. Segment High Crash Locations

Route	System	Town	Mileage	ADT	Years	Crashes	Fatalities	Injuries	PDO Crashes	Critical Rate	Actual Rate	Ratio Actual/Critical	Severity Index ($/accident)	Identified HCL in 2003 Plan?[1]
Segments														
VT-63	Minor Arterial (r)	Barre Town	0.709 - 1.009	4641	5	34	0	43	12	2.609	13.380	5.127	$60,438	N
VT-12	Major Collector (r)	Northfield	4.053 - 4.353	5788	5	29	0	9	21	2.485	9.151	3.681	$20,059	Y
VT-17	Major Collector (r)	Fayston	0.363 - 0.663	1000	5	5	1	6	0	3.880	9.132	2.353	$278,600	N
VT-14	Minor Arterial (u)	Barre City	1.105 - 1.405	7619	5	46	0	16	36	4.732	11.030	2.330	$22,243	N
HILL ST., BARRE CITY	Urban Collector (u)	Barre City	0.000 - 0.300	3593	5	22	0	7	16	5.239	11.180	2.134	$20,441	N
VT-12	Major Collector (r)	Northfield	1.653 - 1.953	1522	5	6	0	3	4	3.496	7.200	2.059	$28,217	N
MONTPELIER (BR US-2)	Minor Arterial (u)	Montpelier	0.300 - 0.600	8775	5	42	0	2	40	4.605	8.742	1.898	$9,976	Y
US-2	Minor Arterial (r)	Waterbury	3.890 - 4.190	11583	5	25	0	2	24	2.102	3.942	1.874	$11,512	Y
VT-64	Major Collector (r)	Williamstown	0.453 - 0.753	1800	5	6	0	3	4	3.349	6.088	1.817	$28,217	N
VT-64	Major Collector (r)	Northfield	0.000 - 0.300	3700	5	10	0	0	10	2.780	4.936	1.775	$8,200	N
US-302	Principal Arterial (u)	Barre City	1.828 - 2.128	17295	5	87	0	23	69	5.218	9.187	1.760	$18,532	Y
VT-14	Major Collector (r)	Barre Town	1.624 - 1.924	11304	5	23	0	14	12	2.127	3.716	1.746	$31,974	N
BARRE ST., MONTPELIER	Urban Collector (u)	Montpelier	0.000 - 0.300	5170	5	23	0	8	20	4.827	8.125	1.683	$22,957	N
EAST STATE ST., MONTPELIER	Urban Collector (u)	Montpelier	0.000 - 0.300	2530	5	13	0	0	13	5.696	9.385	1.647	$8,200	N
VT-12A	Major Collector (r)	Northfield	1.003 - 1.303	1651	5	5	0	3	3	3.424	5.531	1.615	$32,220	N
BECKLEY ST., BARRE CITY	Urban Collector (u)	Barre City	0.000 - 0.300	1470	5	8	0	0	8	6.528	9.940	1.522	$8,200	N
FAS 0201-Paine Turnpike	Major Collector (r)	Berlin	1.700 - 2.000	2900	5	7	0	2	5	2.959	4.408	1.489	$18,857	N
VT-12	Major Collector (r)	Northfield	4.353 - 4.653	5200	5	10	0	5	6	2.551	3.512	1.376	$27,670	Y
VT-100	Minor Arterial (r)	Moretown, Waterbury	1.187 - 0.260	4800	5	9	0	1	8	2.587	3.424	1.323	$12,344	Y
US-2	Principal Arterial (r)	East Montpelier	3.925 - 4.225	7200	5	9	0	6	5	1.727	2.283	1.321	$34,889	N
US-2	Principal Arterial (r)	East Montpelier	2.725 - 3.025	10889	5	12	0	8	5	1.561	2.012	1.288	$33,750	N
BROOK ST., BARRE CITY	Urban Collector (u)	Barre City	0.000 - 0.300	1572	5	7	0	0	7	6.417	8.133	1.267	$8,200	N
VT-12	Major Collector (r)	Northfield	3.553 - 3.853	6600	5	11	0	4	8	2.407	3.044	1.264	$22,509	N
US-2	Principal Arterial (u)	Montpelier	2.010 - 2.310	14924	5	54	0	22	39	5.333	6.608	1.239	$24,459	N
US-2	Major Collector (r)	Waterbury	3.590 - 3.890	7641	5	12	0	1	11	2.325	2.868	1.233	$11,308	N
VT-14	Minor Arterial (u)	Barre Town	1.924 - 2.224	11387	5	32	0	11	22	4.390	5.132	1.169	$21,278	N
VT-12	Major Collector (r)	Northfield	5.653 - 5.953	4910	5	8	0	1	7	2.588	2.975	1.149	$12,863	Y
US-302	Principal Arterial (u)	Barre City	2.528 - 2.828	7931	5	29	0	11	19	5.921	6.678	1.127	$22,631	Y
SUMMER ST., BARRE CITY	Urban Collector (u)	Barre City	0.000 - 0.300	7203	5	20	0	2	18	4.503	5.071	1.126	$11,930	N
VT-12	Major Collector (r)	Northfield	3.053 - 3.353	5935	5	9	0	0	9	2.470	2.769	1.121	$8,200	Y
VT-62	Minor Arterial (r)	Berlin	0.200 - 0.500	12810	5	16	1	5	13	2.057	2.281	1.108	$90,881	N
VT-100	Minor Arterial (r)	Waterbury	0.460 - 0.760	13879	5	17	0	5	14	2.022	2.237	1.105	$20,135	N
VT-64	Major Collector (r)	Northfield,	2.400 - 0.153	3700	5	6	0	9	3	2.780	2.961	1.065	$72,350	N
VT-14	Minor Arterial (u)	Barre City	0.505 - 0.805	13743	5	34	0	7	27	4.250	4.518	1.063	$15,879	N
I-89	Interstate Rural (u)	Williamstown	41.800 - 42.100	13800	5	8	0	5	5	1.001	1.058	1.057	$33,563	N
US-2	Minor Arterial (u)	Montpelier	1.510 - 1.810	8771	5	23	0	4	20	4.605	4.789	1.039	$15,043	N
VT-14	Minor Arterial (r)	Calais	4.399 - 4.699	3069	5	5	0	2	3	2.899	2.975	1.026	$23,120	N
VT-14	Minor Arterial (u)	Barre City	0.105 - 0.405	12490	5	30	0	19	22	4.320	4.387	1.015	$34,830	N
VT-14	Minor Arterial (r)	Calais	0.699 - 0.999	4000	5	6	0	8	1	2.709	2.739	1.011	$62,033	N
US-2	Principal Arterial (r)	East Montpelier	1.925 - 2.225	10260	5	9	0	6	6	1.583	1.602	1.011	$35,800	N

[1]Intersection crash data used in 2003 plan were from 1998 to 2000. Segment crash data were from 1996 to 2000.

The CVRPC High Crash Location report lists all locations where the actual rate to critical rate is 1.0 or greater. The critical rate is the rate which on average should be observed for a particular roadway under consideration. Therefore, a ratio of 2.0 would indicate a site has twice as many accidents as would be expected. These generally occur in urbanized areas and at intersections of major corridors. The Commission recommends these locations be investigated for feasible safety improvements. See Appendix A, for a detailed analysis. The Commission also recommends VTrans continue developing the Strategic Highway Safety Plan, and implement the Highway Safety Improvement Program, Road Safety Audit Reviews, and the High Risk Rural Road Program.

Access Management

An essential component of the management of the region's highway system is the complementary management of access along each highway corridor. How access management principles can and should be applied in the Central Vermont Region are described below.

Local and state management of access between arterial roads and adjacent property is primarily a land-use-oriented series of techniques that can, over time, help realize benefits in safety, mobility, accessibility to and from roadside businesses, neighborhood character, and visual quality. Access management measures control the interaction between a classified arterial and adjacent property by limiting and separating conflict points and by efficiently separating through-traffic from local traffic. By distinguishing between roads' functions of mobility and land access, access management is a key means of protecting the carrying capacity of an arterial while also reducing the potential for traffic accidents.

VTrans has developed access management guidelines to assist VTrans, zoning administrators and planning commissions in making permitting, planning, and development decisions based on design standards for different classifications of roadways or roadway segments. The Agency's classification system is based upon "critical attributes" of the roadway. Such attributes include the following examples: change in AADT (Average Annual Daily Traffic), change in functional classification (Major Collector, Minor Arterial, etc.), change in speed limit, number of accesses (i.e. curb cuts) per mile, current land use, current zoning, HCLs (High Crash Locations), number of lanes, whether or not there is a median, and finally, if there are any considerations or projects for future development. Following an analysis of attributes by regional planning commissions, roads, or segments thereof, may be placed into one of the six categories of access control **Figure 20**. Each category has specific design standards developed to ensure that the highway will continue to function at the level (category) assigned.

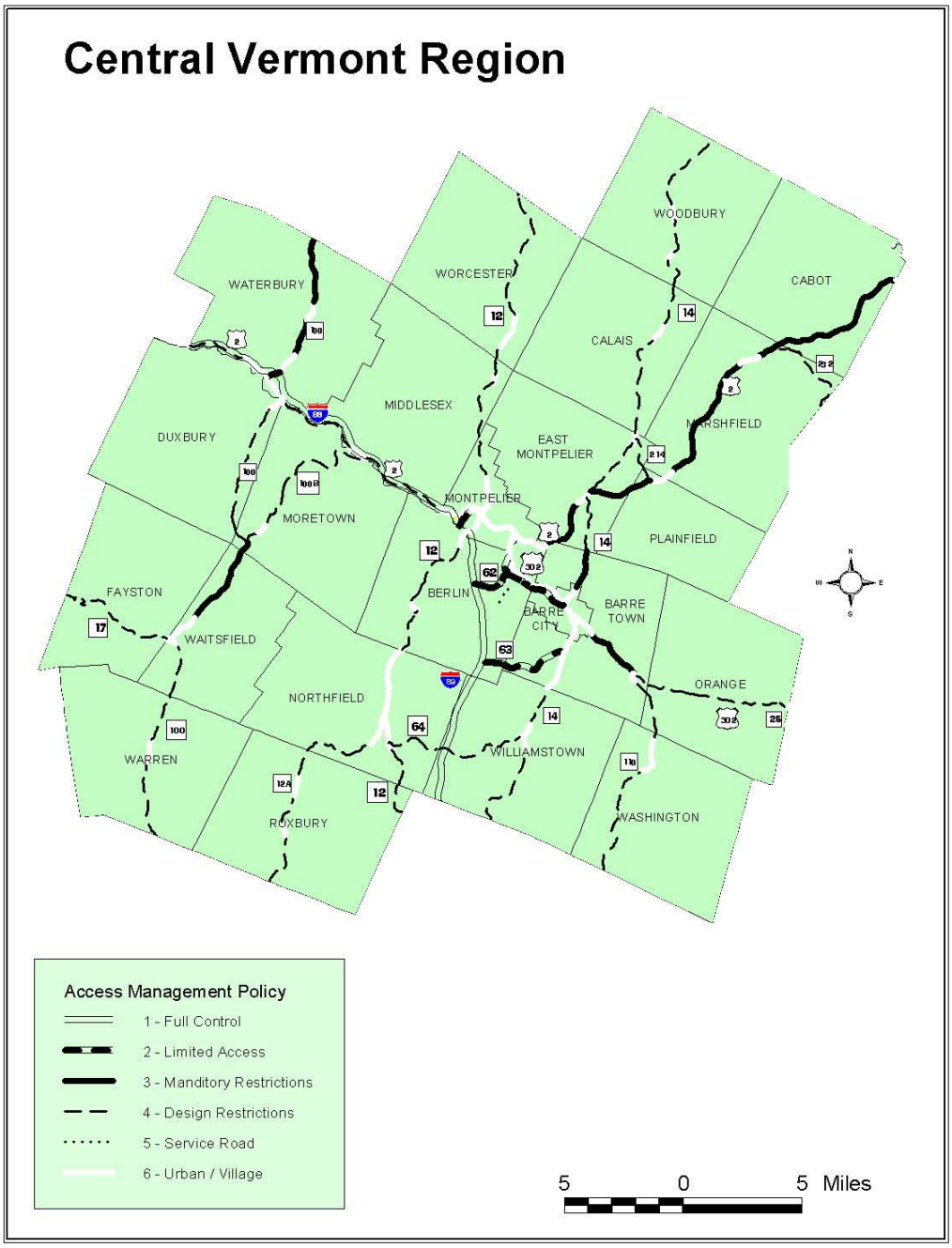
The following is a summary of the differences between the six categories along with the access management guidelines recommended by VTrans:

- **Category 1** highways are basically the Interstate, where high speed and high traffic volume capacity is needed. No access is allowed except at interchanges with public highways.
- **Category 2** highways are Other Principal Arterials and Limited Access Major Collectors such as Vermont Route 62 in Berlin and Vermont Route 63 in Berlin and Barre. These highways carry high volumes of traffic at medium to high rates of speed. Private access is generally not permitted unless access to the property was reserved when the limited access facility was established.
- **Category 3** highways are Principal Arterials, Minor Arterials, and Non-Limited Access Major Collectors on State Highway & Class 1 town Highways with a high traffic volume. Access is generally restricted if other reasonable access from a side street is available. Temporary access is allowed until side street access is available. Each parcel is limited to one access, and if a large

parcel is subdivided each new parcel will use the existing access. Another important design feature of category 3 highways is the ¼ to ½ mile spacing of new streets.

- **Category 4** highways are Minor Collectors, Minor Arterials on State Highways or Class 1 town highways, and Non-Limited Access Major Collectors on State Highway & Class 1 Town Highways with a low traffic volume. Category 4 highways allow one access on State routes for abutting parcels, and may allow additional access if the Agency determines that the additional access would not be detrimental to the safety and operation of the highway. Category 4 highways also require ½ to ¼ mile spacing of new public highway intersections.
- **Category 5** highways are highways that are designated as frontage or service roads. Direct property access is allowed, but signal spacing can be no less than 500 feet.
- **Category 6** highways are "urban" and village sections of highways. The restrictions on these highways are similar to Category 3 highways, where direct access to the highway can be denied and turning movements are restricted, requiring connection of future properties, and combining access points. However, one additional design feature requires access by a side street if access density is over 60 curb cuts per mile within a Category 6.

Figure 20


Central Vermont Region
WOODBURY
WATERBURY
WORCESTER
CABOT
CALAIS
MIDDLESEX
DUXBURY
EAST MONTPELIER
MARSHFIELD
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
BARRE TOWN
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
WASHINGTON
ROXBURY
Access Management Policy
1 - Full Control
2 - Limited Access
3 - Manditory Restrictions
4 - Design Restrictions
5 - Service Road
6 - Urban / Village
5 0 5 Miles

CVRPC has conducted a preliminary assessment/classification of roadways in Central Vermont, taking into account not only road attributes but local plans and zoning.

Some access management standards are more appropriate to residential development, some to nonresidential development, some equally to both. The following are some specific standards that are commonly addressed as part of an access management program:

- minimum sight distance at a driveway or street intersection
- maximum number of driveways per lot
- minimum distance between driveways
- minimum distance between a driveway and nearest street intersection
- mandatory access to a minor road, such as a frontage/service road or a common internal street
- mandatory location of access to corner lots
- mandatory shared driveways
- mandatory connections (immediate or future) to adjacent property
- minimum and maximum driveway width
- minimum driveway (throat) length
- corner turning radius
- left-turn or right-turn ingress lane
- driveway turnaround area (for small existing lots fronting the corridor)
- minimum or maximum on-site parking supply, shared-parking, and parking design
- minimum area and/or bays for loading and unloading
- landscaping and buffers to visually define and enhance access points

Specific actions could also include left-turn prohibitions, signalization, minor widening or realignment, median construction, and purchase of access rights.

Accessibility to and from roadside businesses is necessary for the economic vitality of many of the region's community centers. This access must however be balanced with the need for motorists, pedestrians, bicyclists, and other users of the roadway system to travel in safety and with sufficient mobility. Access to and from businesses as well as neighborhoods (especially difficult left turns), safety at specific intersections, excessive curb cuts, pedestrian facilities along the corridors, and visual quality of commercial strips are all important articulated concerns and could potentially be addressed by a corridor access management program.

On a regionwide scale, the Commission strongly encourages that VTRANS and each member jurisdiction adopt and adhere to consistent and comprehensive access management policies on their respective facilities. The VTRANS Long-Range Transportation Plan supports this need and also calls for local and regional measures to assist in the implementation of access management programs. VTRANS has adopted Access Management Guidelines which is used in the access permit process. Many of the standards would be adopted by the town's zoning regulations and site plan/subdivision regulation.

Traffic Calming

Physical traffic calming measures might be considered in cities, villages, and other growth areas in order to better control traffic speeds, improve pedestrian safety, and improve the overall environment. These measures could include speed humps or tables, chicanes, neck downs, narrow vehicle travel lanes, wider sidewalks, textured cross walks, pavement markings, medians, bulb- outs, roundabouts, gateways, plantings, and street furniture. VTrans has developed Traffic Calming Standard Drawings in which construction details for these treatments have been based on Vermont conditions. All of these actions must be carried forward by the VTRANS and local officials, with proper concern and sensitivity for the

needs and requirements of each individual community. VTrans has developed a draft "Traffic Calming Study and Approval Process for State Highways" that will help a community assess the problem, organize a steering committee, formulate a public participation process, create a traffic calming plan, and develop an implementation plan.

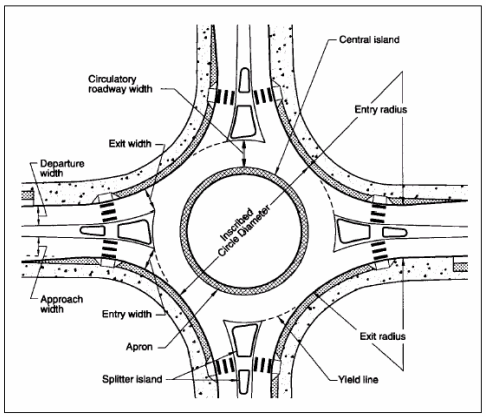
One form of traffic calming that has received a lot of attention lately is the modern roundabout, see **Figure 21**. It is a circular intersection design that, in certain circumstances, could be used instead of traffic signals. On appearance it resembles a traffic rotary, but is actually much smaller. Vehicles maneuver through it at very slow speeds, and entering vehicles must yield to vehicles in the circle. This creates a traffic control that is safer for vehicles and pedestrians, keeps vehicles moving efficiently, and can be landscaped to form an attractive gateway. There are three basic principles that distinguish a roundabout from a traffic circle:

Yield at Entry: At roundabouts the entering traffic yields the right-of-way to the circulating traffic. This yield-at-entry rule prevents traffic from locking-up and allows free flow movement;

Deflection: The entry and center island of a roundabout deflects entering traffic to slow traffic and reinforce the yielding process; and

Flare **:** The entry to a roundabout often flares out from one or two lanes to two or three lanes at the yield line to provide increased capacity.

Figure 21. Roundabout Design Features



Vermont Design Standards

In 1997, VTrans adopted Vermont State Standards for the design of roads and bridges. These standards provide a clear direction for designers. They provide for access, mobility, and safety in transportation projects, while being sensitive to the social/environmental context of Vermont. The standards vary based on functional classification, traffic volume, and speed. Exceptions can be made in areas with historic/archaeological, natural, recreational, and scenic resources. Special considerations are also given in villages, cities, and economic areas. The region supports these standards, but recommend that the minimum combined single lane and shoulder width be 15 ft. where possible. See **Figures 22 and 23** for existing road widths and future road widths.

Figure 22

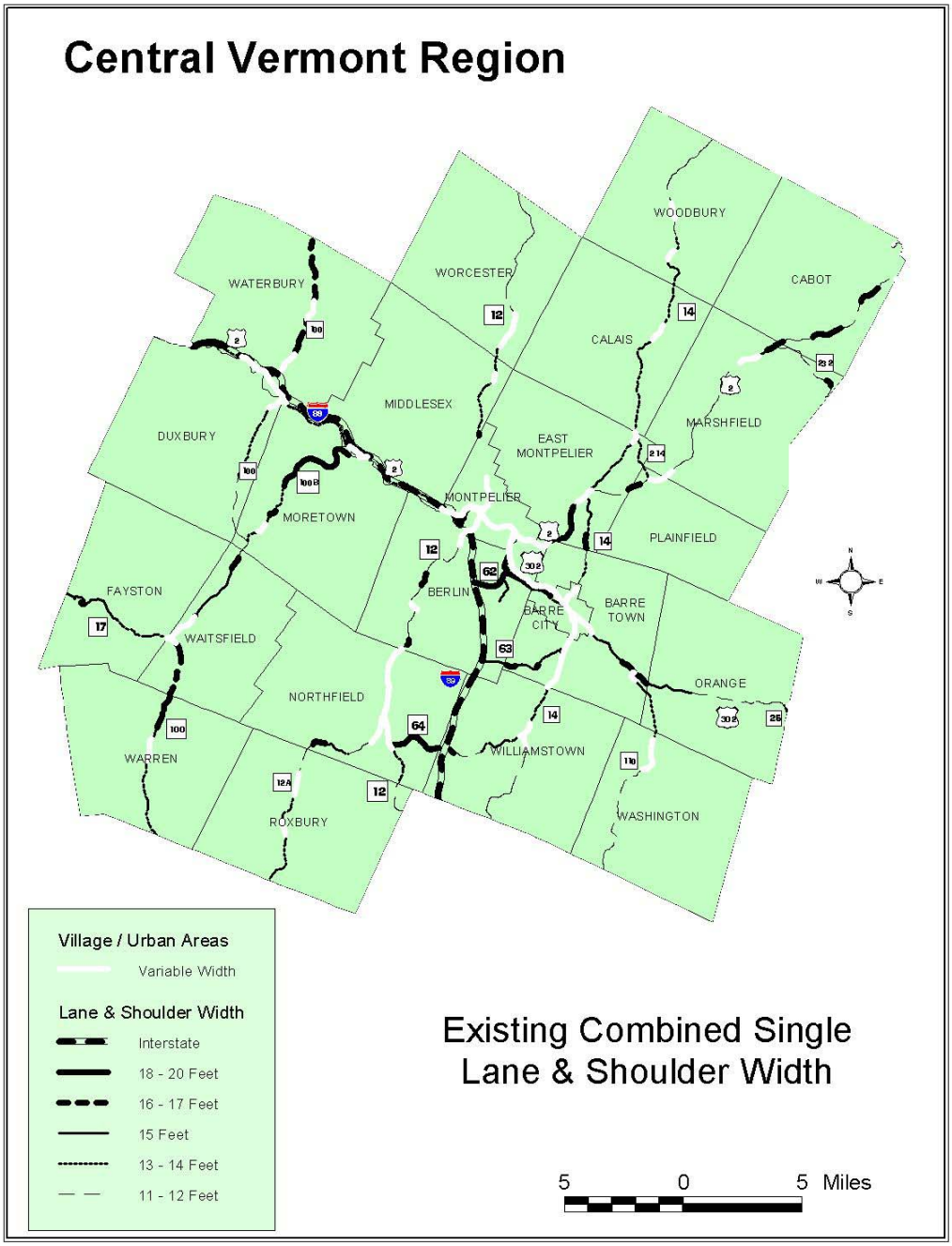
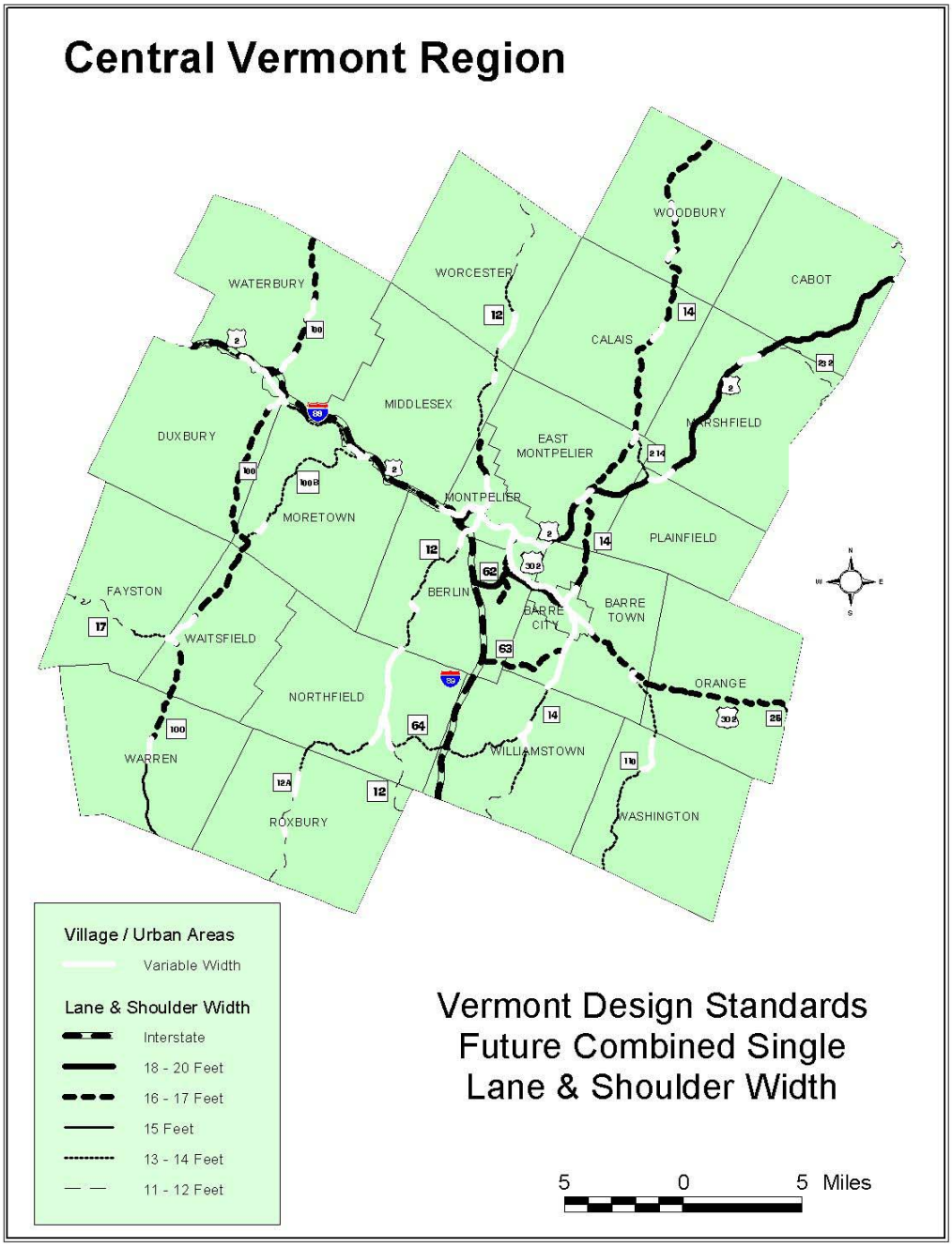

Central Vermont Region
WOODBURY
WORCESTER
CABOT
WATERBURY
CALAIS
MIDDLESEX
MARSHFIELD
DUXBURY
EAST MONTPELIER
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
BARRE TOWN
WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
ROXBURY
WASHINGTON
Village / Urban Areas
Variable Width
Lane & Shoulder Width
Interstate
18 - 20 Feet
16 - 17 Feet
15 Feet
13 - 14 Feet
11 - 12 Feet
Existing Combined Single Lane & Shoulder Width
5 0 5 Miles

Figure 23


Central Vermont Region
WOODBURY
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WATERBURY
CALAIS
MIDDLESEX
DUXBURY
EAST MONTPELIER
MARSHFIELD
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WAITSFIELD
ORANGE
NORTHFIELD
WILLIAMSTOWN
WARREN
ROXBURY
WASHINGTON
Village / Urban Areas
Variable Width
Lane & Shoulder Width
Interstate
18 - 20 Feet
16 - 17 Feet
15 Feet
13 - 14 Feet
11 - 12 Feet
Vermont Design Standards
Future Combined Single
Lane & Shoulder Width
5 0 5 Miles

Vtrans has also expanded the types of bridge railings available in bridge design. Designers consider factors such as speed, and setting when making the selection. In areas with high speeds, very strong railings such as concrete and Box Beam are necessary. In lower speed village settings aesthetic aluminum, paneled concrete, or stone form lined concrete railings are an option. Historic lighting and other decorative features can be added.

Highway Sufficiency Ratings

VTrans uses an analytical method of evaluating the roadway system called the Highway Sufficiency Rating. A rating for a particular section of roadway is developed by assigning point values to three categories (structural condition, safety, and service) according to how well the section meets a pre-defined standard. Scoring for each category is based on American Association of State Highway and Transportation Officials (AASHTO) standards and on those used by the VTrans. A roadway segment that meets all standards is given a score of 100. If a deficiency is found in a particular category for the roadway segment, the sufficiency rating is reduced using a calculation based on the degree of inadequacy when compared to the standards.

Roadway segments with a sufficiency rating of less than 60 are considered by VTrans as requiring some action. For roadways with sufficiency ratings which fall between 40 and 60, the roadway is considered to be in Poor condition and rehabilitation should be sufficient. For roadways with sufficiency ratings of less than 40, the roadway is considered to be in Bad condition and reconstruction is probably warranted and should be investigated.

- VTrans conducted a comprehensive highway sufficiency rating update, including a complete field evaluation in 2001.

The following communities have sections of roadway that are considered to be in bad condition. The Highway Sufficiency Rating is in parentheses:

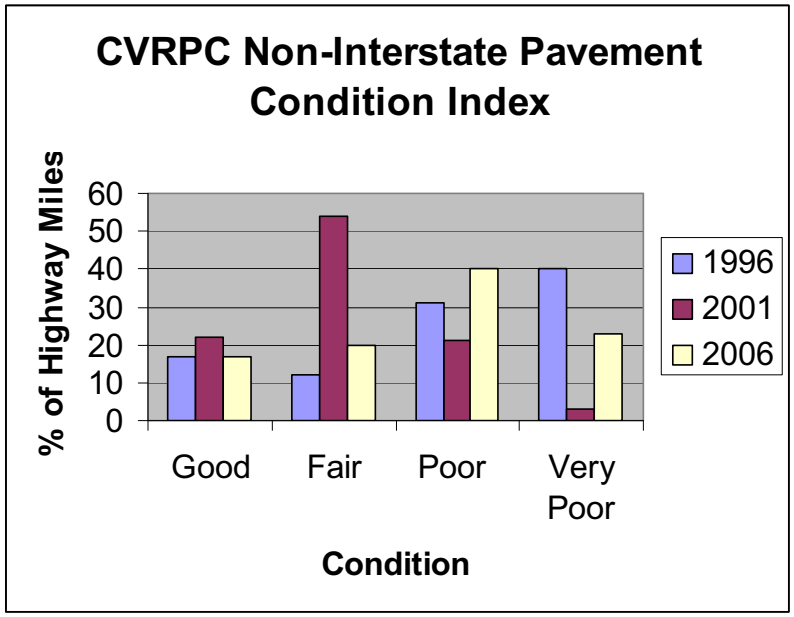
US 2 East Montpelier (32.2);
US 2 Plainfield (33.2);
US 2 Marshfield (35.9 & 21.0);
US 2 Cabot (34.5);
VT 12A Northfield (38.4);
VT 12A Roxbury (32.4);
VT 14 East Montpelier (39.9);
VT 100 Moretown (35.9);
VT 100 Duxbury (36.5);
US 302 Berlin (38.9).

VTrans has been using "heavy" paving techniques to address reconstruction need on the region's roads. Heavy paving involves removing the existing paved surface and replacing it with a thicker layer. This approach is more effective than simply applying an overlay, but does not necessarily address problems that may exist with the sub-base. These paving projects often include guide rail replacement and other safety improvements.

Roadway Pavement Ratings

Figure 24, summarizes the miles of highway in the Region under these four condition categories for 1996, 2001, and 2006. From 1996 to 2001 the percentage of miles in poor or very poor condition in the Central Vermont Region dropped from 70% to 24%. This improvement is the result of an emphasis by VTrans on system preservation during that time period. After 2001, reductions in the Paving Program have resulted in sliding back to the 1996 conditions. If the current finding level for the pavement program is not increased, the condition of the highways will deteriorate. **Figure 25** illustrates 2006 pavement conditions on state highways in the Region using the VTrans rating methodology of good, fair, poor, or very poor.

Figure 24.



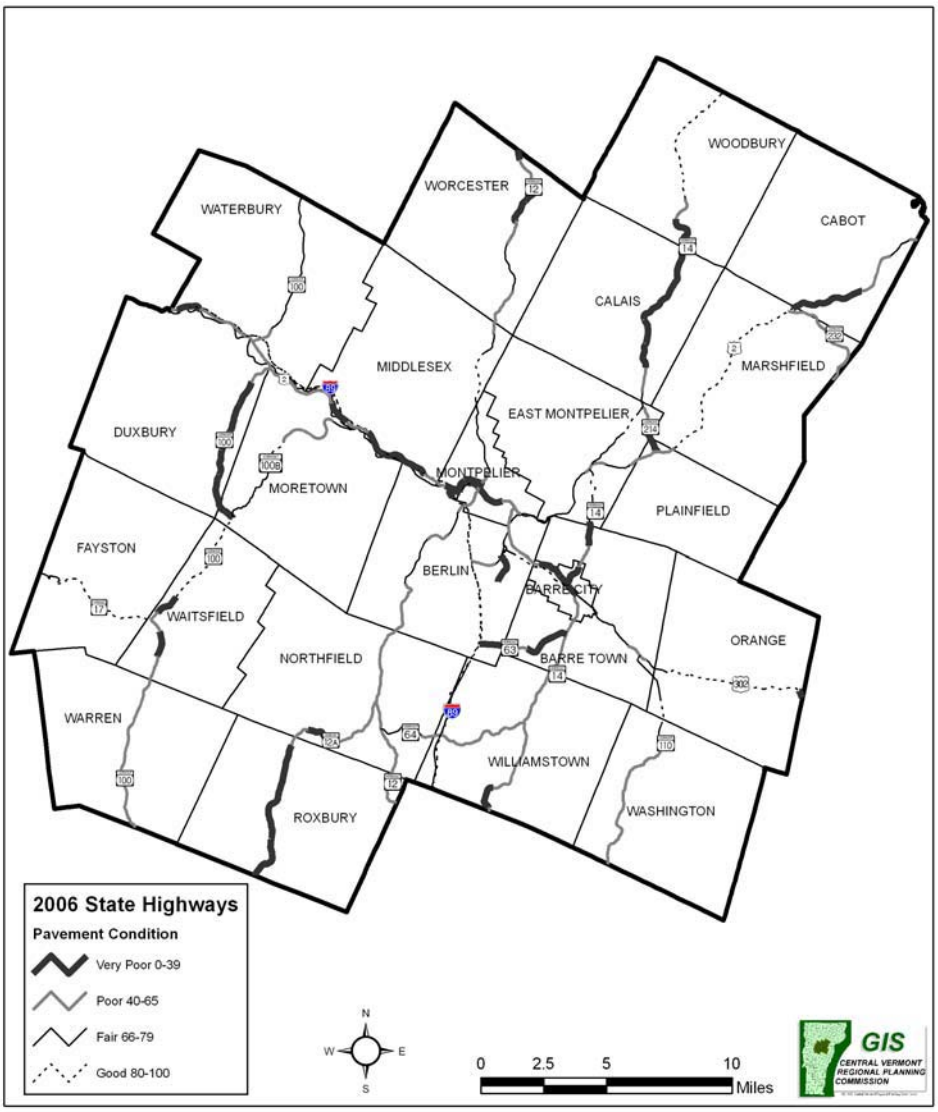
VTrans goal for the percentage of roads in very poor condition is no more than 25%.

Average Non-Interstate Pavement Condition Index:

	Region	State
1996	49.0	52.0
2001	70.6	69.9
2006	56.2	54.8

Figure 25

Central Vermont 2006 Pavement Condition



Pavement Management

Roadway maintenance continues to grow in importance as federal and state emphases shift toward maintaining existing roads instead of building new ones. VTRANS has developed and implemented a standardized method for evaluating, prioritizing, and allocating funds for these maintenance activities. VTRANS tests interstate roadways, state system roadways, Class I roadways and Class II roadways (that are on the federal aid system). When doing the testing, the data is taken every tenth of a mile. VTRANS tests each road for roughness, cracking, rutting, and texture, and uses these data to produce a Pavement Serviceability Rating for each section of the road from best to worst. This list is further modified with information from the Traffic & Safety Division on High Accident Locations. It is recommended that VTRANS make paving a priority and continue to maintain a favorable proportion of good to poor pavement conditions.

A pavement management system is an effective tool for maintaining local street networks as well. It can provide a method to organize, analyze, and prioritize an improvement strategy for both paved and gravel roads. The results of the system will allow town officials to compare strategies and select a road improvement that will yield the longest extended life and be most cost effective.

Similarly to the VTRANS process, all the roads in a town would be segmented (< 1 mile) and surveyed for surface distresses (paved roads - various types of cracking, potholes, drainage, roughness and rutting; gravel roads - cross section, drainage, corrugations, dust, potholes, ruts, and loose aggregate). Along with traffic volumes, the survey would be entered into a computerized data base.

Once the survey results are in the computer, the pavement management system can evaluate the severity of the problems for each segment and suggest a repair strategy (e.g. defer maintenance, routine maintenance, preventative maintenance, rehabilitate, or reconstruct). Then based on locally derived parameters, weights, and repair techniques, the pavement management system can present reports that can prioritize segments, display all repair options, repair options that provide the maximum duration, repair options that provide the best duration to cost ratio, repair options in a constrained budget, and estimates costs. Selectmen and road foremen can use this information to plan a improvement program for the current and future years. Barre City, Barre Town, Montpelier, East Montpelier, Waterbury, and Northfield have used pavement management surveys. A pavement management system program, with technical assistance, is available from CVRPC and the Vermont Local Roads Program.

Guardrails and Bridge Railing

In 1997, the legislature directed VTrans to study alternative guardrail types for performance, maintenance and life cycle information, and to include compatibility with aesthetics and non-motorized users. Three guardrail types were recommended as suitable for Vermont state highways; W-Beam, Box Beam, and Three Cable. Many factors are considered when selecting guardrail type such as; speed, volume, shoulder width, and deflection space available. The study recommends that areas identified as having significant foreground scenery and/or in a village setting, it is appropriate to use Box Beam or Three Cable. Regional Planning Commissions are to be consulted as to whether scenery and village settings are significant. If the highway is considered bicycle & pedestrian friendly (low volume ADT<2000 or wide shoulders >=3 ft.) wide posted W-Beam guardrails can be used. If the highway is not considered bicycle & pedestrian friendly, narrow posted W-Beam, Box Beam, or Three Cable is appropriate. Wood, stone, or weathering steel guardrails may be considered in special cases such as designated scenic highways, covered or historic bridges, historic areas, state/national forests, state/national wildlife areas, and state/national parks. The study concluded that a ten year trial period be established. Highways due for paving or maintenance projects will be considered for this trial.

Bridges

There are a total of 251 individual bridges of lengths greater than 20 feet located within the Central Vermont region. Of these 251 bridges, 102 are State-owned and 149 are owned by the local town or city in which it is located. Of these 251 bridges, 12 are included on the National Register of Historic Places, one is eligible for inclusion on the Register, and 17 are considered possibly eligible for inclusion on the Register. In Central Vermont, 17 are truss bridges and 9 are covered bridges.

Bridge Sufficiency Ratings

VTrans rates bridges on both structural and functional standards. Bridges are rated from 0 to 100 under both categories. The evaluation of bridges by VTrans typically starts with the computation of a Federal Sufficiency Rating (FSR). The rating is based on three factors: (1) structural adequacy (i.e. deck, superstructure, and substructure); (2) a compared inventory rating (i.e. its standing truck load rating); and (3) serviceability and functional obsolescence (i.e. geometry, width of bridge compared with amount of traffic). Another element that is considered in the FSR is the length of detour and how much time it would take to travel the detour if the bridge were to be closed.

All local and state highway system bridges with spans greater than twenty feet are inspected every one to two years (depending on condition). The bridge sufficiency ratings are developed from data collected in the field. As indicated in **Table 27**, approximately 33% of the Region's long-span bridges are either structurally or functionally deficient. With the State and Town emphasis on bridge repairs, Regional bridge conditions have been improving. A complete list of bridges with spans greater than twenty feet is contained in Appendix H**,** and locations of these bridges are identified in **Figure 26**.

Table 27. Deficiency Status of Central Vermont Bridges with Spans Equal to or Greater Than 20 Feet

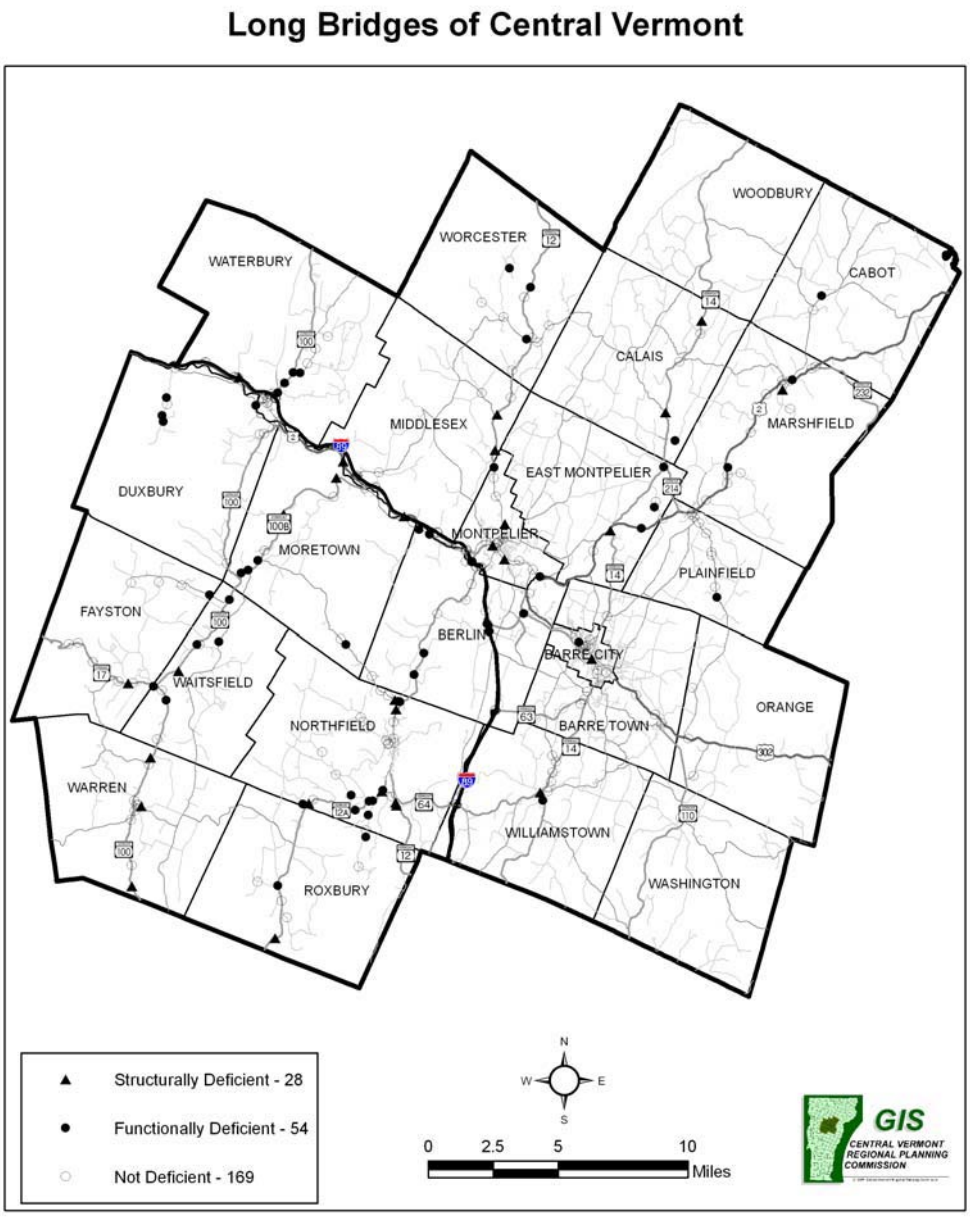
1995 Average Sufficiency Rating – 60.6
2001 Average Sufficiency Rating – 66.3
2006 Average Sufficiency Rating – 74.3

1995 Not Deficient – 113 (45%)
2001 Not Deficient – 149 (59%)
2006 Not Deficient – 169 (67%)

1995 Functionally Deficient – 51 (21%)
2001 Functionally Deficient – 54 (22%)
2006 Functionally Deficient – 54 (22%)

1995 Structurally Deficient – 86 (34%)
2001 Structurally Deficient – 48 (19%)
2006 Structurally Deficient – 28 (11%)

Figure 26


Long Bridges of Central Vermont
WOODBURY
WORCESTER
WATERBURY
CABOT
CALAIS
MIDDLESEX
MARSHFIELD
EAST MONTPELIER
DUXBURY
MONTPELIER
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
BARRE CITY
WAITSFIELD
ORANGE
NORTHFIELD
BARRE TOWN
WARREN
WILLIAMSTOWN
WASHINGTON
ROXBURY
Structurally Deficient - 28
Functionally Deficient - 54
Not Deficient - 169
N
W
E
S
0
2.5
5
10
Miles
GIS
CENTRAL VERMONT
REGIONAL PLANNING
COMMISSION

Historic Metal Truss Bridge Preservation Plan

In 1998, VTrans completed a comprehensive study of all the state and town owned truss bridges. The purpose of the study was to assess each bridge for structural condition, geometric dimensions, and historical significance. The study concluded that the state could not afford to save all the bridges. As a result, the Federal Highway Administration (FHWA), the Vermont Agency of Transportation. (VTrans), and the Vermont State Historic Preservation Office (VSHPO) agreed to categorize each bridge based on its characteristics. The categories range from rehabilitation at the existing site for highway use, to preserving the bridge for adaptive use (such as a bike path), or removal and possible destruction. Bridges in this last category are in bad condition and have little historic significance. It is the policy of the Region to encourage restoration or preservation of historic bridges. The Region acknowledges that towns may differ with the State's Preservation Plan.

The following truss bridges should be preserved for limited highway use.

Berlin, No. 27 * (Lovers Lane)
Berlin, No. 29 * (Three Mile Bridge Rd.)
Berlin, No. 67 s (Route 12)
Montpelier, No. 5 (Taylor St. to be rehabilitated in 2009)
Montpelier, No. 17 e (Granite St.)
Moretown, No. 41 (Bridge Rd.)
Moretown, No. 42* (near Town Hall)
Northfield, No. 65 (Rabbit Hollow Rd.)
Waterbury, No. 31 (Winooski Ave.)

* Recently rehabilitated
e Exceptional historic significance
s State-owned

The following truss bridges have been modified for continued limited or unlimited highway use. The trusses have been retained for their ascetic appearance, but no long support the modern deck.

Montpelier, No. 10 (School St.)
Montpelier, No. 11 (Langdon St.)

The following truss bridges should be preserved and adapted to alternative transportation use at their existing sites.

Middlesex, No. 50 c (Route 2, questionable whether adapted use on site is needed)
Moretown, No. 40 (Lovers Lane)
Northfield, No. 84 e (Vine St. Pedestrian Bridge)

c These projects involve the retention of an historic bridge in

close proximity to a replacement bridge. There may be difficult and/or potentially irresolvable environmental issues associated with these proposals.

e Exceptional historic significance

The following truss bridges, currently in storage , should be relocated and preserved for limited highway use or for alternative transportation use.

Berlin, No. 72 (formally Route 12, in storage)
Montpelier, No. 6 (formally Pioneer St., in storage, to be used for the Central Vermont Regional Path)
Waitsfield, No. 22 (formally Butternut Hill Rd. in storage)

The following truss bridges will be documented and removed. Storage in anticipation of future loss of bridges in other categories is permissible but will not be required as part of any permit proceeding.

Barre City, No. 11 (Granite St.)
Warren, No. 173 (Route 100, Kingsbury Bridge, Town requests a new truss bridge be built.)
Waterbury, No. 25 (near Little River Rd.)

Maintaining the Existing System

The existing highway system is by far the most used and most costly aspect of our transportation system. Because of our low population densities and rural character, significant portions of the region are dependent on the automobile for work, shopping, and social trips. Our resident population and employment base has grown and spread throughout the region increasing the demand on the highway system. This demand along with increasing costs have caused the highway system to deteriorate faster than it can be maintained.

When considering improvement strategies, the two extremes are either (1) to defer and eventually rebuild, and (2) to provide preventive maintenance. The defer and rebuild strategy allows the transportation facility condition to deteriorate, for maybe twenty years, until reconstruction is necessary. Reconstruction involves building a new foundation, drainage, and surface for roads. Bridge reconstruction would involve building new deck and abutments.

The preventive maintenance strategy applies corrective measures more frequently thereby keeping the facility at a more constant level of condition. Preventive maintenance includes such items as overlay paving, crack sealing, drainage cleaning, and bridge painting. Over the life time of the facility, preventive maintenance costs can be as little as a third of reconstruction costs.

Rehabilitation lies between these two strategies in both costs and amount of work needed for the improvement. Rehabilitation usually addresses only part of the facility and can include structural paving, deck work, minor widening, and improving problem spots.

Clearly preventive maintenance is the most cost effective, and the Commission recommends and supports the Vermont Agency of Transportation attempts to emphasize this strategy. However, there is a significant number of roads and bridges that have deteriorated beyond maintenance. Which strategy is appropriate for any of our region's particular needs will have to be decided during scoping and project development. Current conditions, costs, life cycle factors, function within the highway system, and the corridor as a whole will have to be considered in developing an improvement program.

Public Transit Service

Public transportation is an important component of the transportation system in Central Vermont. It provides basic mobility to residents that cannot own or operate vehicles. Public transit provides access to jobs, medical and social services, education, childcare, shopping, recreation, and other essential services. Public transportation also provides an alternative to using private automobiles, reducing congestion, air pollution, parking needs, and need for highway improvements. A wide variety of public transit services are provided within the Central Vermont Region, including local, regional, and inter-regional services. Information contained in this section is based on data and input from the Green Mountain Transit Agency, VTrans staff, and the Vermont Public Transportation Policy Plan. It will be expanded upon and further updated when the 2008 Short Range Public Transportation Plan for the Central Vermont Region is completed

INTRA-REGIONAL TRANSIT

The Green Mountain Transit Agency (GMTA) is the primary public transit provider for the Central Vermont Region. GMTA is a full service public transportation provider offering such services as fixed route, deviated fixed route, demand response, commuter route, shopping shuttle, Medicaid transportation and transportation services for the elderly and disabled. GMTA also provides door-to-door transportation service for those who meet the established criteria for the following programs: Ticket to Ride voucher system, Medicaid, Council on Aging non-Medicaid medical transportation, and institutional reimbursed transit. In compliance with the Federal Americans with Disabilities Act (ADA), GMTA provides door-to-door transportation services for those who are unable to use the non-commuter fixed route bus service. **Graph 1** shows the historic public transportation ridership over the past twelve years (Note: Data was not available for all years, so the trend line is an estimate.).

GMTA is a non-profit agency, created in 2003 after Wheels Transportation Services, the prior transit provider for Central Vermont, was forced to file for bankruptcy. GMTA receives funding from the State of Vermont, the Federal Government and local money from municipalities and businesses in the service area. GMTA was created as a subsidiary organization of and is managed by the Chittenden County Transportation Authority (CCTA), Vermont's largest and only public transportation authority. However, in 2005, GMTA became a totally independent agency governed by its own Board of Directors. The Board of Directors is composed of members representing the City of Montpelier, City of Barre, Town of Stowe, Lamoille Regional Planning Commission, the Mad River Valley Planning District, one member of the Regional Elderly and Disabled Program Advisory Committee and members appointed by the municipalities receiving and providing funding for public transportation services within the service area of Washington County and the three towns of Washington, Orange and Williamstown of Orange County.

GMTA services are operated out of three individual locations, which are referred to as the Capital District, Mad Bus, and Stowe/Lamoille. The Capital District and Mad Bus services all occur within the Central Vermont Region as defined as Washington County plus the towns of Washington, Orange, and Williamstown. One route operated in the Stowe/Lamoille service area serves Waterbury and is therefore outlined below. In terms of transit routes, GMTA operates deviated fixed route, fixed route and commuter route services. Deviated fixed routes follow a base fixed path and serve specific stops, but also have the flexibility to deviate off route on request to offer service to a greater geographic area. Fixed routes follow a distinct and consistent path and serve specific stops at set times. Commuter routes are similar to fixed routes, but tend to serve longer distances, fewer stops, and are operated during peak commuting times. The following sections summarize the transit routes that are operated in the Central Vermont Region.

Capital District - Fixed-Route and Deviated Fixed Route Service

A number of intra-regional, deviated fixed-route, and commuter-route bus services are currently operated in the Capital District portion of the Central Vermont Region. The following is a summary of the current services:

- The City Commuter and the City Route Mid-Day serve the downtown areas of Montpelier, Barre City, and commercial and residential areas along Route 302 in Berlin. The services operate Monday through Saturday. Total ridership on these routes in FY2007 was 57,344 boardings.
    - The City Commuter route operates during the morning and evening peak periods with two buses, with a frequency of every half hour. On weekdays, the City Commuter service runs from 5:25 a.m. through 9:55 a.m. and from 3:25 p.m. through 7:30 p.m. On Saturdays, the City Commuter runs from 7:55 a.m. through 9:55 a.m. and from 3:25 p.m. through 7:30 p.m. Ridership on the City Commuter in FY2007 was 34,235 boardings.
    - The City Route Mid-day operates during the midday period with one bus, with a frequency of every 75 minutes. The route will deviate upon request. On both weekdays and Saturdays, the City Route Mid-day runs from 9:25 a.m. to 3:40 p.m. Ridership on the City Route Mid-day in FY2007 was 23,109 boardings.

- The Capital Shuttle is a seasonal service that operates in downtown Montpelier during the State Legislative Session (Jan – May). The shuttle operates using two loops, one traveling in the clockwise direction and the other in the counter-clockwise direction (Loop A and Loop B, respectively), and will deviate upon request. One bus operates on each loop from 7:30 a.m. to 6:30 p.m., on a frequency of every 23 minutes. Service is provided Tuesday through Friday from January through mid-April, and Monday through Friday from mid-April through mid-May. The shuttle does not operate on holidays or during Town Meeting Week. The ridership for the Montpelier Shuttle was 9,620 boardings in FY2007. One of the primary purposes of the shuttle is to encourage the use of remote parking by long-term parkers to free up some short-term spaces in the downtown retail area. Another important purpose is to provide a convenient connection between State offices at the National Life complex and the State House, as well as encourage workers from National Life and the State offices to patronize the downtown retail area during the midday. The route is free and open to the public.

- The Barre Hospital Hill route provides deviated fixed-route service from Barre City to the Central Vermont Medical Center, the Berlin Mall, and other medical and professional offices. The schedule allows time during each run for previously-scheduled door-to-door pick-ups or drop-offs. The service operates Monday through Saturday with one cutaway bus on an hourly frequency. On weekdays, the route runs from 6:55 a.m. through 6:00 p.m., while on Saturdays the route runs from 7:55 a.m. through 6:00 p.m. Ridership on the Barre Hospital Hill route in FY2007 was 22,417 boardings.

- The Montpelier Hospital Hill route provides deviated fixed-route service from Montpelier to the Central Vermont Medical Center, the Berlin Mall, and other medical and professional offices, in a similar fashion to the Barre Hospital Hill route. On weekdays, the route runs from 7:16 a.m. through 6:21 p.m., while on Saturdays the route runs from 8:16 a.m. through 6:21 p.m. Ridership on the Montpelier Hospital Hill route in FY2007 was 22,791 boardings.

- The Waterbury Commuter route provides commuter-route service between Waterbury and Montpelier operating Monday through Friday in the morning and evening peak periods. The service is provided by one cutaway van on an hourly frequency, from 6:50 a.m. to 9:50 a.m. and from 3:00 p.m. to 6:05 p.m. There is room in the schedule for some additional stops in

Waterbury Village after stopping at the State Office Complex in Waterbury (such as Green Mountain Coffee Roasters), and the route will serve the National Life building in Montpelier on request. Ridership on the Waterbury Commuter route in FY2007 was 8,480 boardings.

- The Montpelier LINK Express is jointly operated by GMTA and CCTA and provides commuter-route service between downtown Montpelier and downtown Burlington operating Monday through Friday in the morning and evening peak periods. The service is provided by three buses on a 45 to 55 minute frequency, from 6:15 a.m. to 8:55 a.m. and from 4:02 p.m. to 7:30 p.m. Ridership on the Montpelier LINK Express in FY2007 was 37,512 boardings.

- The Snow Cap Commuter route provides commuter-route service between Montpelier, Middlesex, Mad River Glen and Sugarbush on weekends and holiday weeks during the ski season. Two round trips per day are provided by one bus. One round trip is provided in the morning (leaving Montpelier High School at 8:15 a.m. and arriving at Sugarbush-Mount Ellen at 9:13 a.m. before returning to Montpelier) and one in the afternoon (leaving Montpelier High School at 3:15 p.m. and arriving at 4:17 p.m. at Sugarbush-Mount Ellen before returning to Montpelier.) Ridership on the Snow Cap Commuter route in FY2007 was 1,194 boardings.

- The Hannaford Shopping Special route provides deviated fixed-route service between a number of residential areas in Barre and the Hannaford supermarket in Barre. The shuttle runs on Tuesdays only, and is free and open to the public, with funding provided by Hannaford in Barre. Drivers help passengers with loading and unloading of groceries, and the route will deviate upon request. Service runs from 9:45 a.m. through 1:25 p.m., making a number of pick-ups and drop-offs at Hannaford and various housing complexes during that period. Ridership on the Hannaford Shopping Special route in FY2007 was 1,881 boardings.

Mad Bus - Deviated Fixed Route Service

In the Mad Bus service area of the Central Vermont Region, a number of deviated fixed-route services are provided. These services all operate only during the ski season (December through early April) and are all free services. Ridership levels on these routes are quite weather-dependant as the routes are tied closely to skiing conditions. In addition to serving a number of fixed stops, Mad Bus routes will also pick up passengers who request pickup by flagging down the bus while standing in a safe location or request a deviation in advance. The following is a summary of the services:

- Mountain Condos operates between Lincoln Peak and the mountain condominiums with service on weekdays from 8:00 a.m. to 11:30 a.m. on 30-minute headways. Service on weekends and holidays is provided by two buses on 15 minute frequencies from 8:00 a.m. to 11:30 p.m., with one drop-off trip starting at 5:30 p.m. On both weekdays and weekends, the afternoon service is provided on a Dial-a-Ride basis, which is outlined below under "Demand Response." Ridership on the Mountain Condos route in FY2007 was 4,274 boardings.

- Access Road operates between Lincoln Peak and the Sugarbush Access Road lodges with service on weekdays from 8:00 a.m. to 11:30 a.m. on 30-minute headways. Service on weekends and holidays is provided by two buses on 15 minute frequencies from 8:00 a.m. to 11:30 p.m., with one drop-off trip starting at 5:30 p.m. On both weekdays and weekends, the afternoon service is provided on a Dial-a-Ride basis, which is outlined below under "Demand Response." Ridership on the Access Road route in FY2007 was 5,405 boardings.

- Valley Floor Shuttle operates between Lincoln Peak at the Sugarbush Ski Resort, Warren

Village, Waitsfield Village, and the Mad River Park. The route operates with one bus Monday – Sunday, 6:00 a.m. – 6:00 p.m. at 60 minute intervals. Ridership on the Valley Floor Shuttle in FY2007 was 5,850 boardings.

- Saturday Evening Service operates between Lincoln Peak, a portion of Warren near the intersection of Route 100 and the Sugarbush Access Road, and Waitsfield Village. The service operates only on Saturday evenings from December through March, plus New Year's Eve. Service is provided by one bus on an hourly frequency from 6:00 p.m. through 2:30 a.m, with an on-demand function after11:00 p.m. Ridership on the Saturday Evening Service in FY2007 was 667 boardings.

- Mount Ellen operates between Lincoln Peak and Mount Ellen at the Sugarbush Ski Resort. The service operates with one vehicle on half-hourly frequency Monday through Sunday from 8:00 a.m. to 6:00 p.m. Ridership on the Mount Ellen in FY2007 was 22,381 boardings.

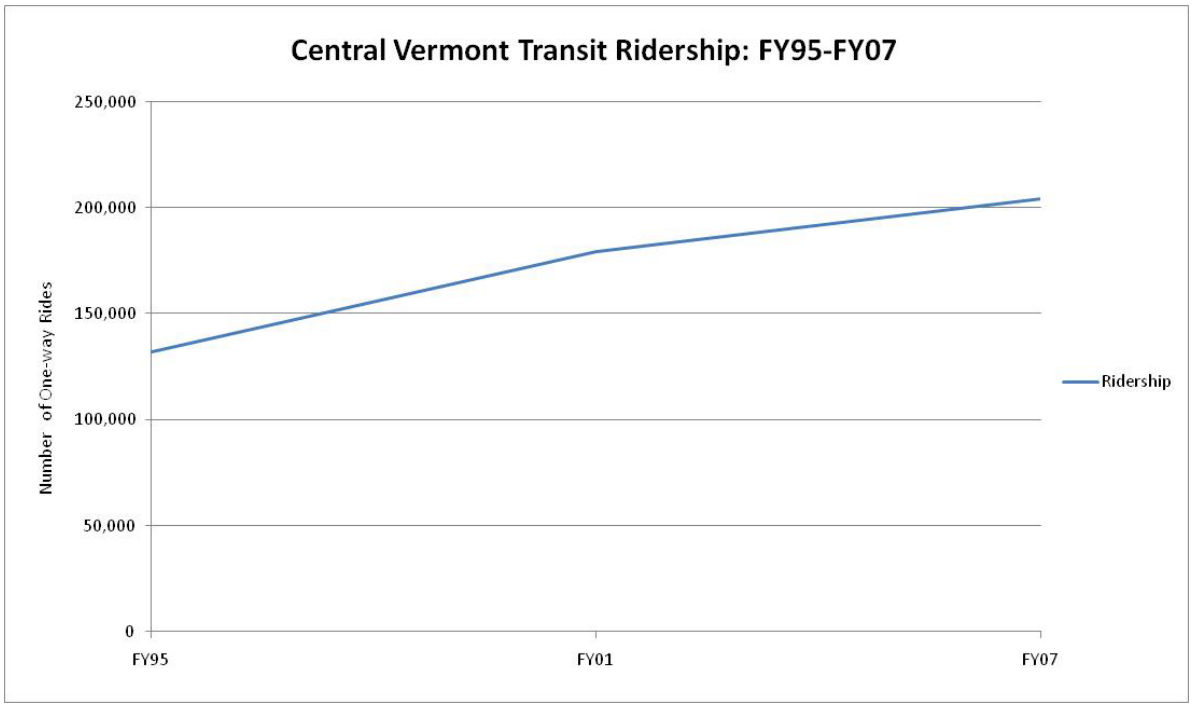
- Harwood Freerider shuttle operates between the Harwood Union Middle School/High School in Duxbury and the Mount Ellen at the Sugarbush Ski Resort. The service is open to the public and operates on Tuesdays and Thursdays from mid-December through mid-March. One trip is operated, picking up at Harwood Union at 2:50 p.m. and dropping off at Mount Ellen at 3:10 p.m. Ridership on the Harwood Freerider shuttle in FY2007 was 328 boardings.

Stowe/Lamoille – Fixed Route Service (Service within Washington County only)

- Route 100 Commuter operates between Morrisville and Waterbury. The service operates on weekdays with two buses on approximately 55 minutes frequencies from 5:45 a.m. – 8:20 a.m. and 4:23 p.m. -7:15 p.m. Ridership in FY2007 was 6,151 boardings.

Graph 1 highlights the upward trend in ridership over the past 12 years. A combination of factors, including rising fuel prices, an aging population, and greater transit geographic coverage have contributed to the increased transit ridership.

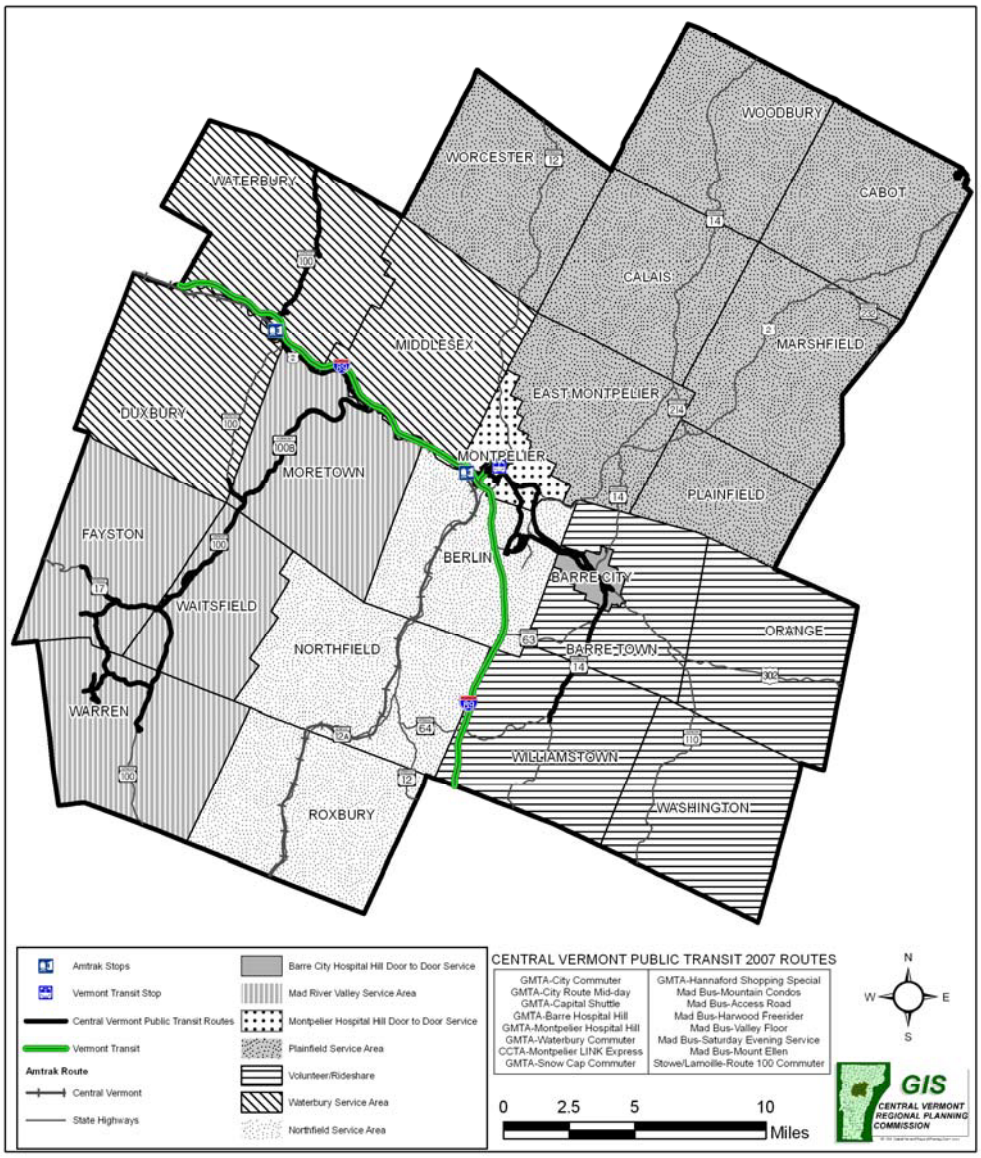
Graph 1



These figures include ridership on public transit routes operated in the Central Vermont region, including routes that travel between Washington County and other counties, including Chittenden and Lamoille.

Figure 27

Central Vermont Public Transit System 2007



Central Vermont Region Public Bus Transportation Profile - Deviated Fixed Route and Commuter Route Services

Service Name	Service Type and Location	Hours of Service	Days of Service	Season	Frequency of Service	
					Peak	Off-Peak
Vermont Transit	Urban Interstate Route	3:30am - 10:20pm (Montpelier)	Mon-Sun	All	Varies	Varies
GMTA-City Commuter	Commuter-Fixed Route Montpelier, Berlin, Barre City	Weekdays 5:25am - 9:25 am, 3:25pm - 7:30pm; Saturdays 7:55am - 9:25 am, 3:25pm - 7:30pm	Mon-Sat	All	30 min	n/a
GMTA-City Route Mid-day	Small Town-Deviated Fixed Route Montpelier, Berlin, Barre City	9:25am - 3:25pm	Mon-Sat	All	n/a	75 min
GMTA-Capital Shuttle	Small Town-Deviated Fixed Route Montpelier	7:30am - 6:30pm	Tues-Fri (Jan-mid-April); Mon-Fri (mid-April-mid-May)	Winter, Spring	23 min	23 min
GMTA-Barre Hospital Hill	Small Town-Deviated Fixed Route Barre City, Berlin	Weekdays 6:55am - 6:00pm; Saturdays 7:55am - 6:00pm	Mon-Sat	All	60 min	60 min
GMTA-Montpelier Hospital Hill	Small Town-Deviated Fixed Route Montpelier, Berlin	Weekdays 7:16am - 6:21pm; Saturdays 8:16am - 6:21pm	Mon-Sat	All	60 min	60 min
GMTA-Waterbury Commuter	Commuter-Fixed Route Waterbury to Montpelier	6:50am - 9:50am, 3:00pm - 6:05pm	Mon-Fri	All	60 min	n/a
CCTA/GMTA-Montpelier LINK Express	Commuter-Fixed Route Montpelier to Burlington	6:15am - 8:55am, 4:02pm - 7;30pm	Mon-Fri	All	45 to 55 min	n/a
GMTA-SnowCap Commuter	Commuter-Fixed Route Montpelier to Mad River Valley	8:15am - 10:14 am, 3:15pm - 5:15pm	Sat-Sun (plus Mon-Fri during holiday weeks)	Winter	One round trip per peak	n/a
GMTA-Hannaford Shopping Special	Small Town-Deviated Fixed Route Barre City	9:45am - 1:25pm	Tuesdays	All	n/a	Varies
Mad Bus-Mountain Condos	Tourism-Deviated Fixed Route Warren	Weekdays 8:00am - 11:30am Weekends 8:00am - 11:30am Weekdays/Weekends Dial-a-ride 11:30am - 5:50pm	Mon-Sun plus weekends late March to mid-April	Winter	Wkdy 30 min Wknd 15 min	Wkdy 30 min Wknd 15 min
Mad Bus-Access Road	Tourism-Deviated Fixed Route Warren	Weekdays 8:00am - 11:30am Weekends 8:00am - 11:30am Weekdays/Weekends Dial-a-ride 11:30am - 5:50pm	Mon-Sun plus weekends late March to mid-April	Winter	Wkdy 30 min Wknd 15 min	Wkdy 30 min Wknd 15 min
Mad Bus-Valley Floor	Tourism-Deviated Fixed Route Warren to Waitsfield	6:00am - 6:00pm	Mon-Sun plus weekends late March to mid-April	Winter	60 min	60 min
Mad Bus-Saturday Evening Service	Tourism-Deviated Fixed Route Warren to Waitsfield	6:00pm - 2:30am	Saturdays	Winter	n/a	60 min
Mad Bus-Mount Ellen	Tourism-Deviated Fixed Route Warren to Fayston	8:00am - 6:00pm	Mon-Sun plus weekends late March to mid-April	Winter	30 min	30 min
Mad Bus-Harwood Freerider	Tourism-Deviated Fixed Route Warren, Fayston, Waitsfield	2:50pm - 3:10pm	Tues, Thurs	Winter	n/a	One trip
Stowe/Lamoille-Route 100 Commuter	Commuter-Fixed Route Morrisville to Waterbury	5:45am - 8:20am, 4:23pm - 7:15pm	Mon-Fri	All	50 min	One trip

Central Vermont Region Public Bus Operating Statistics - FY06 - Fixed Route and Deviated Fixed Route Services							
Service Name	Service Type and Location	Annual Ridership (boardings)	Annual Revenue Hours	Annual Revenue Miles	Annual Fare Revenue	Annual Operating Cost	Annual Net Operating Cost
GMTA-City Commuter	Commuter-Fixed Route Montpelier, Berlin, Barre City	60,776	6,893	103,327	$43,148	$300,076	$256,928
GMTA-City Route Mid-day	Small Town-Deviated Fixed Route Montpelier, Berlin, Barre City						
GMTA-Capital Shuttle	Small Town-Deviated Fixed Route Montpelier	6,126	1,520	15,200	$0	$66,350	$66,350
GMTA-Barre Hospital Hill	Small Town-Deviated Fixed Route Barre City, Berlin	20,770	3,357	41,408	$14,547	$147,590	$133,043
GMTA-Montpelier Hospital Hill	Small Town-Deviated Fixed Route Montpelier, Berlin	23,256	3,357	33,668	$16,220	$147,590	$131,370
GMTA-Waterbury Commuter	Commuter-Fixed Route Waterbury to Montpelier	7,301	1536	43,008	$11,622	$78,775	$67,153
CCTA-Montpelier LINK Express	Commuter-Fixed Route Montpelier to Burlington	31,873	2,725	93,242	$115,225	$162,432	$47,207
GMTA-Snow Cap Commuter	Commuter-Fixed Route Montpelier to Mad River Valley	1,128	220	6,721	$1,760	$10,687	$8,927
GMTA-Hannaford Shopping Special	Small Town-Deviated Fixed Route Barre City	2,182	191	2,340	$0	$7,416	$7,416
Mad Bus-Mountain Condos	Tourism-Deviated Fixed Route Warren	10,356	909	6,318	$0	$69,182	$69,182
Mad Bus-Access Road	Tourism-Deviated Fixed Route Warren	11,085	933	6,669	$0	$71,143	$71,143
Mad Bus-Harwood Freerider	Tourism-Deviated Fixed Route Waitsfield	364	7	221	$0	$1,309	$1,309
Mad Bus-Valley Floor	Tourism-Deviated Fixed Route Warren to Waitsfield	5,928	1,383	32,343	$0	$95,369	$95,369
Mad Bus-Saturday Evening Service	Tourism-Deviated Fixed Route Warren to Waitsfield	713	131	2,160	$0	$8,879	$8,879
Mad Bus-Mount Ellen	Tourism-Deviated Fixed Route Warren to Fayston	17,295	999	16,676	$0	$68,697	$68,697
Stowe/Lamoille-Route 100 Commuter	Commuter-Fixed Route Morrisville to Waterbury	7,166	2,453	80,011	$5,839	139,154	133,315

Notes:

-Operating statistics for Vermont Transit are not available.

-This table presents operating statistics for Fiscal Year 2006 because that is the most recent year for which complete data are available.
Fiscal Year 2007 ridership statistics are available and are reported in the route descriptions at the start of this chapter.

-Data for the GMTA City Commuter and City Route Mid-day are collected and reported together as one route.

Demand Response Service

Van Service GMTA operates vans under contract to several agencies, including most prominently Project Independence and the Central Vermont Council on Aging. Van trips for these agencies and other parties accounted for more than 14,000 passenger trips in FY07. Trip purposes include medical, meals, and shopping, among others.

GMTA offers a limited amount of "scheduled" Demand Response service between Montpelier and Waitsfield. One vehicle picks up passengers on the way to the Evergreen Senior Center in the late morning, and returns passengers home in the afternoon, also accommodating some shopping trips in the midday. This vehicle is open to any other passengers with a 2-day advance reservation depending on available capacity in the vehicle and the specifics of the requested trip. In FY07, some 900 passengers called in to ride on these trips.

Volunteer Drivers GMTA managed a volunteer driver program to meet the transportation needs of residents that can't use other scheduled services. This service reached all 23 towns in the Region. Volunteer drivers travelled over 1.2 million miles in FY07, more than twice as much as the fixed and deviated fixed-route services. Volunteer drivers must be arranged in advance.. In FY2007, volunteer drivers provided 38,230 rides.

Taxi In 2007, there were three taxi services in Central Vermont that worked with GMTA to provide transportation: Payless Taxi (Barre City), C&L Taxi (Mad River Valley), and KC Taxi (Barre City). For each private taxi company, the service areas and hours of operation are variable. By working with GMTA to provide nonscheduled, off-hour and emergency rides, taxis provided 5,321 public transit rides in FY07.

Special Public Transit Programs

Ticket to Ride Program Persons with disabilities and people over age 60 are eligible for transportation services that may not be covered by other programs. These trips are typically not for medical or shopping purposes, but for errands, personal business, or social reasons. GMTA and the Central Vermont Council on Aging managed this program. In FY07, approximately 12,000 trips were provided, most of which occurred on GMTA's deviated fixed routes.

Medicaid GMTA arranged trips for eligible residents. In FY07, 43,206 trips were provided. Most of these were accommodated using volunteer drivers, with just over 4,000 on vans (though the contract with Project Independence) and 4,700 on taxis.

Project Independence is a program for seniors and persons with disabilities or dementia, that provides health care, meals, transportation, socialization, and respite. GMTA provided door to door service to the Project Independence facility in East Barre from Barre City, Barre Town, Berlin, Montpelier, Northfield, and Williamstown. About 9,500 trips were provided in cooperation with Project Independence

Central Vermont Council on Aging Transportation was provided by GMTA connecting surrounding towns to senior citizen activity, mealsites and local stores in Northfield, Plainfield, Waitsfield, and Waterbury. Non-Medicaid medical trips, and excursion/shopping trips were also provided. A total of 9,000 trips were provided, mostly through volunteer drivers and vans.

Vermont Association for the Blind and Visually Impaired VABVI assists blind and visually impaired residents with transportation by purchasing service or providing volunteer drivers.

Washington County Mental Health Services provides a variety of programs at treatment centers in Barre City, Barre Town, Montpelier, and Waterbury and provides transportation services for clients.

Vocational Rehabilitation is a state program to assist persons with disabilities in becoming successfully employed. Transportation services are purchased for clients.

INTER-REGIONAL TRANSIT

Vermont Transit provides intercity bus service to Montpelier scheduling four round-trips per day between Montreal and Boston. Northbound buses leave Montpelier at 3:30 am, 2:05 pm, 6:25 pm, and 10:20 pm. Southbound buses leave Montpelier at 8:15 am, 11:30 am, 3:30 pm, and 7:15 pm. Connecting service to New York City is provided at White River Junction. On average, the Montpelier Station experiences 40 daily boarding and alightings (14,500 annually).

Amtrak's Vermonter Service operates in the Central Vermont Region. The service is two-way with a northerly endpoint in St. Albans, Vermont and the southerly endpoint in Washington, D.C. (via Brattleboro, Vermont; Hartford, Connecticut; and New York City). The Amtrak stations in the Central Vermont Region are in Berlin (named the Montpelier Junction station) and in Waterbury.

The southbound train stops in Waterbury (9:28 a.m.) and Montpelier (9:42 a.m.). The schedule has been designed to provide one-daytime trip from Vermont to reach New York City in the late afternoon. The northbound train stops in Montpelier (8:02 p.m.) and Waterbury (8:16 p.m.). In FY2007, the Montpelier Station had 4,713 boardings or alightings (monthly average of 393), and the Waterbury Station had 3,276 boardings or alightings (monthly average of 273). This amount of ridership is up significantly over FY2006 totals, with 830 more Montpelier boardings/alightings and 610 more Waterbury boardings/alightings; however, ridership is lower than experienced in the 1990s before the introduction of JetBlue service from Burlington to New York in September 2000.

The passenger rail system in Central Vermont is in many ways dependent upon the future of Amtrak, which saw an increase in overall statewide ridership in 2006 (Table 28). The FY 2005-2009 Amtrak Strategic Plan indicates a number of Amtrak route segments at risk as a result of "infrastructure condition, potential downgrade or abandonment." The segments at risk include all Amtrak service in Vermont.

Table 28 Amtrak Ridership in Vermont

Boardings and Alightings						
City Ridership	**2004**	**%**	**2005**	**%**	**2006**	**%**
White River Junction	13,180	22.0%	11,871	20.8%	12,798	19.8%
Rutland	12,949	21.6%	12,986	22.7%	15,931	24.6%
Brattleboro	9,597	16.0%	8,558	15.0%	9,393	14.5%
Essex Junction	8,113	13.6%	6,907	12.1%	10,053	15.6%
Montpelier	**4,818**	**8.0%**	**4,553**	**8.0%**	**4,150**	**6.4%**
Bellows Falls	3,128	5.2%	2,718	4.8%	3,113	4.8%
Waterbury	**2,732**	**4.6%**	**2,462**	**4.3%**	**2,809**	**4.3%**
St. Albans	2,436	4.1%	4,138	7.2%	2,750	4.3%
Fair Haven	1,099	1.8%	1,276	2.2%	1,806	2.8%
Randolph	991	1.7%	1,071	1.9%	1,123	1.7%
Windsor-Mt. Ascutney	817	1.4%	581	1.0%	721	1.1%
Total Vermont Ridership	**59,860**		**57,121**		**64,647**	

To address the escalating costs of passenger train service in Vermont and the use of over-sized equipment based on ridership demand, Amtrak and the State of Vermont are considering a Diesel Multiple Unit (DMU) demonstration project. The current proposal is to use DMU's on the Vermonter, which are smaller, more efficient, and cleaner than the current equipment. The progression towards this demonstration project will be affected by the State's ability to fund the purchase the DMU's and the transition to the new system.

A Diesel Multiple Unit being considered for use on Amtrak's Vermonter service between St. Albans, VT and New Haven, CT.

UNMET TRANSIT NEEDS

One way of identifying unmet needs is to create maps showing areas that have concentrations of people who are typically dependent on public transportation and then comparing those areas to the service areas of existing fixed routes and deviated fixed routes. Data from the 2000 Census was compiled and ranked by blockgroup for youths, elderly, disabled, poverty status, and autoless households, the five categories defined in Vermont statutes as being associated with transit dependency. **Figure 28** is a map of relative need for transportation based on the percentage of the population having high need characteristics. With the exception of Barre Town (South Barre) and Northfield, existing GMTA routes do reach the areas where there is a high percentage of the population that is transit dependent. When looking at the percentage of the population with some level of need, the goal is to define some type of service that could begin to address that need. Yet there are many areas, particularly in rural areas, where the percentage of the population with transportation needs is high, but the actual number of persons may be too low to make traditional transit service cost-effective. For that reason, we need to look at **Figure 29** which is a map of relative need based on the number of persons per square mile. This map displays the areas where more frequent service is likely to be feasible. Again, GMTA routes link together several of these areas, however, there are still areas (Barre Town and Northfield) in the region that are not served. Northfield did receive commuter service in the past, but it was eliminated at the beginning of 2005 due to low ridership. With those areas being more dispersed in terms of trip generators and population than currently served areas, it is unlikely that additional fixed route general public service will be cost effective. Increased demand-response service may be the best means of addressing these unmet needs.

The Central Vermont Regional Planning Commission completed a survey of Central Vermont residents in 2005 to gauge unmet public transportation needs. In this telephone survey, 270 randomly sampled residents were asked questions that fell into five main categories; area of residence, current travel patterns, current public transportation use, preferences and opinions of public transportation use, and demographic questions. Findings related to unmet public transportation need included:

- Nearly 20% of survey respondents reported no access or limited access to public transportation
- Increased geographic coverage of GMTA services was the most popular potential service improvement among all survey respondents
- Increased frequency of bus service was the preferred service improvement of those who are currently regular riders of GMTA

In addition to the analysis of Census data and survey data, unmet needs have been identified through the development of a statewide Human Service Transportation Coordination Plan. VTrans worked with the Central Vermont Regional Elders and Persons with Disabilities Public Advisory Committee in the summer of 2007 to create a list of unmet needs in the region. Below is a list of recommendations based on the areas of need identified by the group:

General needs

- Expanded service area, especially outside of the Barre- Montpelier corridor: Roxbury, Berlin, Middlesex, Northfield, Williamstown, Barre town, East Montpelier, Plainfield
- **Increased service hours: evening and weekend, especially 6- 9pm**
- **Local service within Berlin, Barre, Montpelier**
- **Service to South Barre**
- **Mad River Valley service during summer and fall**

Employment-related needs

- **Commuter service from surrounding towns to Montpelier**
- **Service outside of traditional commuting hours**
- **Connection to Northfield**
- **Connection from Mad River Valley to Montpelier**

Human service-related needs

- **Expanded demand response service, especially for those in wheelchairs who are unable to access current service is most important**
- **People who live between senior centers in Waitsfield and Hancock and use GMTA to access services are restricted to using the one in their region, rather than going to the nearest one. Because the centers have a dovetailed schedule, seniors who cannot get to the centers on their own do not make use of both centers.**
- **Door-to-door service**
- **More volunteer drivers**

Figure 28

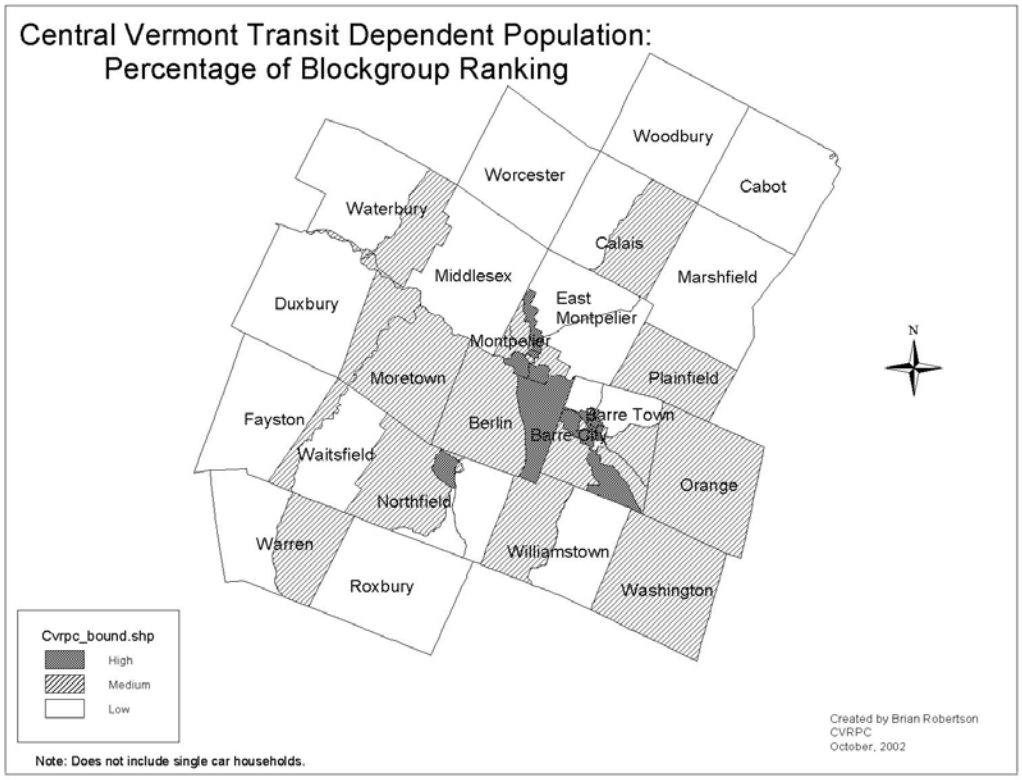
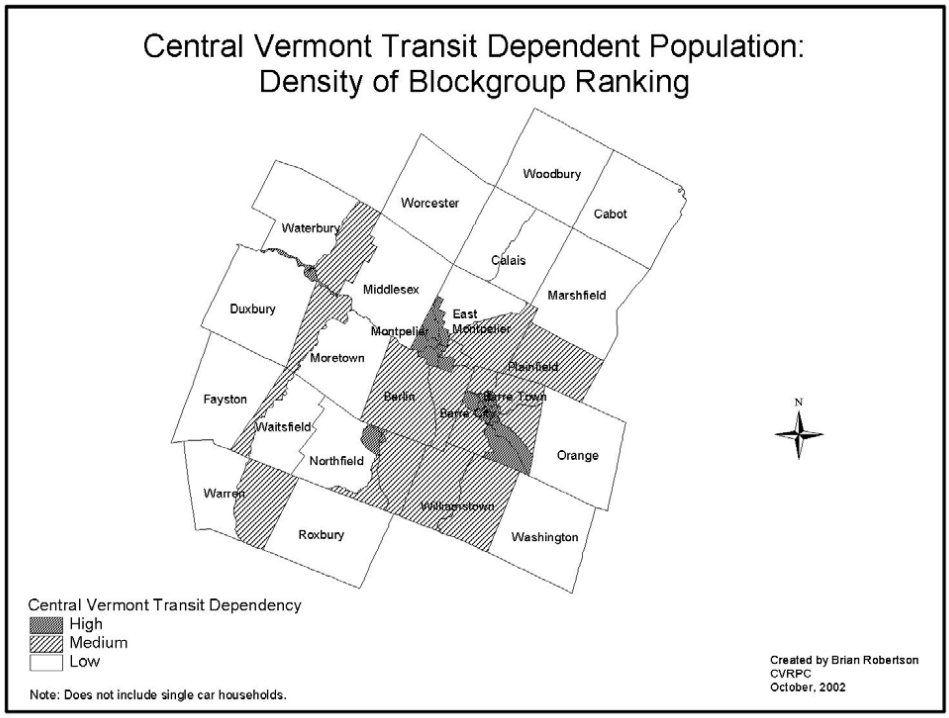

Central Vermont Transit Dependent Population:
Percentage of Blockgroup Ranking
Woodbury
Worcester
Cabot
Waterbury
Calais
Middlesex
Marshfield
Duxbury
East
Montpelier
Montpelier
Moretown
Plainfield
Fayston
Berlin
Barre Town
Barre City
Waitsfield
Orange
Northfield
Warren
Williamstown
Roxbury
Washington
N
Cvrpc_bound.shp
High
Medium
Low
Created by Brian Robertson
CVRPC
October, 2002
Note: Does not include single car households.

Figure 29


Central Vermont Transit Dependent Population:
Density of Blockgroup Ranking
Woodbury
Worcester
Cabot
Waterbury
Calais
Middlesex
Marshfield
Duxbury
East
Montpelier
Montpelier
Moretown
Plainfield
Fayston
Berlin
Barre Town
Barre City
Waitsfield
Orange
Northfield
Warren
Williamstown
Roxbury
Washington
N
Central Vermont Transit Dependency
High
Medium
Low
Note: Does not include single car households.
Created by Brian Robertson
CVRPC
October, 2002

MULTI-MODAL FACILITIES RECOMMENDATIONS

The City of Montpelier continues to plan the development of a Multi-Modal/Visitors Center on the Carr Lot (current location of the Vermont Transit Station) in downtown Montpelier. This facility would provide a destination to integrate Vermont Transit, GMTA, bicycle path users, a Welcome Center for tourists and tour buses, and potential retail and commercial tenants. The center would be the major transfer hub for regional coach buses, inter-regional commuter transit, and satellite parking lot shuttles for downtown employees and visitors as part of the larger parking policy.

The development of this site has been complicated by the environmental contamination of the Carr Lot, but the Montpelier City Council has reaffirmed its interest in moving forward with the project nonetheless. An RFP for a Project Manager to assist with project implementation as well as an RFQ for appraisal services were drafted and circulated during fiscal year 2006. At the outset, this is a brownfields remediation project, which will require the development of a plan to bring the Carr Lot up to environmental and health standards before construction can begin.

The benefits of such a Multi-Modal a facility for the Central Vermont region are quite apparent. Clean, safe, and comfortable waiting areas are essential for the growth of public transportation usage, especially in order to capture the "choice rider" market. Additionally, to serve a broad geographic area, transfers among routes and even among modes will be necessary. Providing a hub for this sort of activity will make transit easier to use and more attractive to broader portion of the population.

PUBLIC TRANSIT RECOMMENDATIONS

It appears that to a large extent, existing routes and services adequately provide for the public transportation needs in the areas of Central Vermont Region with the highest transit dependent populations. These existing services however, could be expanded or improved to better serve all residents of the region, including those who are not transit dependent, but rather are seeking an alternative to automobile transportation for a variety of reasons.

Recommendations to improve public transit services in the region are provided in three categories:

1. Recommendations of a public policy nature
2. Recommendations to continue specific, particularly important services
3. Recommendations to expand existing services and introduce new services if supported by increased demand

It is important to note that VTrans will be working to revise all of the state's Short Range Public Transportation Plans during calendar year 2008. Thus, all of the recommendations shown below will be reviewed, updated, and revised through that process.

<u>1. Recommendations of a public policy nature</u>

- Advocate for funding for the expansion of Demand-Response services throughout Washington County and Washington, Orange and Williamstown in Orange County.

- Emphasis on service coordination should continue in order to extract the greatest transportation value out of the existing dollars.
- Advocate for funding to expand volunteer driver programs
- Advocate for the funding an expansion of the Ticket to Ride Program (a travel voucher program to enable riders to purchase transportation, including evening, weekend, and out-of-area trips)

2. Recommendations to continue specific, particularly important services

- Maintain existing service levels for all GMTA Capital District, Mad Bus, and Stowe/Lamoille routes.
- Low fares for transit patrons should be maintained to the extent possible within the financial capacity of transit agencies
- Advocate for the implementation of such alternatives as flex schedules and telecommuting that not only reduce commuter traffic but also can free an employee to assist with home care and transportation when required.

3. Recommendations to expand existing services if supported by increased demand

- Commuter Service between Chittenden County and Waterbury – To address the needs of employers and employees in Waterbury, institute a commuter route between Chittenden County and the employment areas in Waterbury.
- Montpelier Circulator – This route could connect downtown Montpelier (State Street and Main Street areas) with Vermont College/CCV/NECI and Barre Street, which, in addition to housing the Montpelier Senior Center and the nearby Hunger Mountain Co-op, has seen a great deal of residential growth recently.
- Develop a Mad River Valley public transit connection to Montpelier or Waterbury.
- Year-round Capital Shuttle Service – When the Legislature is not in session, the route could operate with only one bus. It could offer connections between the DET and downtown Montpelier to help reduce parking pressure in the downtown area.
- Reinstitute Northfield Service – With the increase in the price of fuel, a commuter-oriented service between Northfield and Montpelier may be more attractive than it was when last operated in 2004.
- Barre City to Williamstown Service – South Barre and Williamstown are areas that are growing but have no current service. This service should connect to the City Route at Bob's Store in Barre. The route could be designed to include Wilson Industrial Park and Rock of Ages

Finishing Plant in Graniteville.

- US Route 2 Service – Another important commuter corridor stretches to the east from Montpelier through East Montpelier to Plainfield, and perhaps as far north as Marshfield and Cabot. A potential alignment would take the route via 14 and 214 through North Montpelier in order to serve Goddard College and avoid traffic congestion on the westbound US 2 approach to East Montpelier.

Finally, it is critical that the public transit services (whether intra-regional or inter-regional) be designed in conjunction with the feeder and access systems serving either end of the transit trip. Pedestrian systems feeding transit stops should have continuity and be complete. Park-ride lots should have direct access to and from the highway system and should be laid out to facilitate passenger access to the transit service.

INTER-REGIONAL TRANSIT RECOMMENDATIONS

Vermont Transit There is a need to maintain intercity bus service in Montpelier as a vital link to other metropolitan areas, particularly Boston and New York. This service is essential to segments of the population. It is unlikely that Vermont Transit will provide connections to other parts of Vermont not directly located on interstate highways, as the company's strategy has evolved to focus on expressways and park-and-ride lots rather than town centers. The 2007 Public Transportation Policy Plan included recommendations for intercity bus service, and it will also be an element in an ongoing study of regional connections in the state.

Amtrak Periodically, the status of Amtrak service in Vermont is reconsidered due to low ridership numbers, service characteristics, and increasing costs. As of this writing, VTrans is in the final stages of negotiations with the manufacturer of diesel multiple unit (DMU) cars to substitute for the existing conventional trainset that operates the Vermonter. These new cars would reduce operating expenses while allowing for an increase in service frequency. Assuming that these new cars are put into service and ridership increases as a result, the occasional calls for the elimination of the Vermonter should subside.

Chittenden to Washington County Commuter Service: The Montpelier-Burlington Link Express has proved to be a successful service, and CCTA has already expanded the number of trips operated. As demand grows and funding becomes available, this service should expand into a more frequent route that runs all day, not just during commuting hours.

Boston- Montreal High Speed Rail In 2000, the Federal Rail Administration designated the Northern New England High Speed Rail Corridor which includes Massachusetts, New Hampshire, Vermont, and Quebec. A feasibility study envisions an Accelerail service with non-electrified trains operating at 60-110 mph along existing corridors. Track conditions were assessed, and ridership estimates were developed, with Montpelier considered as a potential stop. Total corridor annual ridership estimates for 2025 ranged from 213,276 to 683,667 based on different speed and cost per passenger scenarios. The study concluded that high speed rail could compete with other modes (auto, bus, plane), and a more detailed feasibility study should be conducted.

Ridesharing/Travel Demand Management

In rural areas, where densities do not support traditional transit service, ridesharing and vanpools offer individuals an alternative to the single occupancy vehicle. There are active ridesharing (also known as carpooling) and vanpooling groups within the Central Vermont region.

The vast majority of rideshare arrangements are created on an informal basis (i.e., without the benefit of outside facilitation). Carpoolers typically represent co-workers who live in the same general vicinity or family members who work in proximate locations. In some cases, however, introduction of potential rideshare partners may be necessary in order for a carpool or vanpool to be created. In most carpool arrangements, each passenger is picked up at or near their place of residence. In some cases, it may be necessary for a rideshare passenger to drive to a park-and-ride lot to meet the carpool or vanpool.

RIDESHARE PROGRAM

Vermont Rideshare is a free carpool and vanpool program that offers computerized matching services for individuals and employers. In 2005, the Vermont Rideshare Program was redesigned and coordination of these activities throughout the state was divided among three transit agencies. Advance Transit (AT) coordinated Orange, Windsor, and Windham Counties, CCTA coordinated Chittenden, Addison, Washington, Franklin, and Grand Isle Counties, and Rural Community Transportation (RCT) coordinated Caledonia, Orleans, Essex, Lamoille, Rutland, and Bennington Counties.

As of this writing, the Agency of Transportation will be re-considering the Rideshare Program throughout the remainder of state fiscal year 2008 and intends to implement several significant changes. By the end of SFY08, it is unlikely that the three transit agencies mentioned above will continue to coordinate the Rideshare Program in their respective areas. Rather, the state is drafting an RFP to obtain bids from private third party vanpool providers and the current carpool website will be improved. The goal of these program changes is to decrease overhead and increase the marketing, outreach, and education components of the Rideshare Program.

VANPOOL PROGRAM

As part of Rideshare, CCTA (as the Washington County Rideshare Program coordinator) facilitates three vanpools between Chittenden and Washington Counties as well as within Washington County. Additionally, there is a long-standing vanpool operating between Caledonia and Washington County.

These four registered vanpools carrying passengers to/from and within Washington County are:

- Waitsfield to Barre
- South Burlington to Waterbury
- Essex to Waterbury
- St. Johnsbury to Montpelier

PARK & RIDE LOTS

The function of a park and ride lot is to provide a safe and secure location for motorists to park their vehicle while they share a ride with another motorist or on a transit bus. Its spin-off impacts can include reducing gasoline consumption and air-pollutant emissions, reducing traffic volumes in major business areas, lengthening the life of vehicles, and reducing commuting costs. Statewide, the typical Vermont park and ride commuter lives in a small town, travels about fifteen minutes to a lot, moves into another automobile with one or two other people, and travels around forty minutes to their job in a larger town located off I-89 or I-91. There are twelve facilities located in the Central Vermont Region. The location, capacity, and usage of these lots are noted in **Table 29**. These locations are shown in **Figure 30.**

Existing Conditions

In October 2007, a park and ride lot condition survey was conducted **Table 30**. Surface conditions at the majority of lots remain good and all but the East Barre lot have lighting. Additional capacity has been added with new lots it Roxbury, Orange, Plainfield, and Warren. **Table 29** shows the results of the 2007 usage survey and **Graph 2** shows the growth in use of the regions park and ride lots over time.

Potential Future Park & Ride Lots

The potential development of park and ride lots has been supported by an Agency of Transportation program that was instituted in 2004, known as the Municipal Park & Ride Grant Program. This program provides funding to municipalities for the development (engineering and construction) of small municipally-owned park and ride facilities. The region has investigated where potential future park and ride lots could be located when the opportunity presents itself. Consideration was given to sites where major intersections occur, on state or town owned ROW, co-location with existing businesses, villages, and the type of use. **Figure 30 and Table 31** show these locations.

Table 29 FY 2007 Park & Ride Lots in Central Vermont Region

Jurisdiction	Location	Capacity	Average Usage
Montpelier	Montpelier Junction State Highway (near Montpelier State Highway and Exit 8)	55	31
Montpelier	Montpelier Department of Employment and Training	170	49
Berlin*	Intersection of Route 62 and Payne Turnpike (near Exit 7)	76	51
Barre Town	Intersection of Route 14 and Route 63 (near Exit 6)	27	16
East Barre	Intersection of Route 302 and Route 110 (Town owned and maintained)	15	3

Waterbury	Center Brook Road near Route 100 interchange with I-89 (near Exit 10)	60	43
Middlesex	Route 2 near Middlesex State Highway interchange with I-89 (near Exit 9)	28	17
Williamstown*	Route 64 near I-89 Exit 9	24	19
Warren **	Main St. Warren Village	12	2
Roxbury **	At the Town Garage	5	0
Plainfield **	Lower Village, near the Town Office	22	0
Orange **	At the Town Offices/Town Hall	30	1

* These Park & Ride Lots have experienced near and over capacity usage surveys.
** New Park & Ride Lots since 2003 Regional Transportation Plan

Graph 2

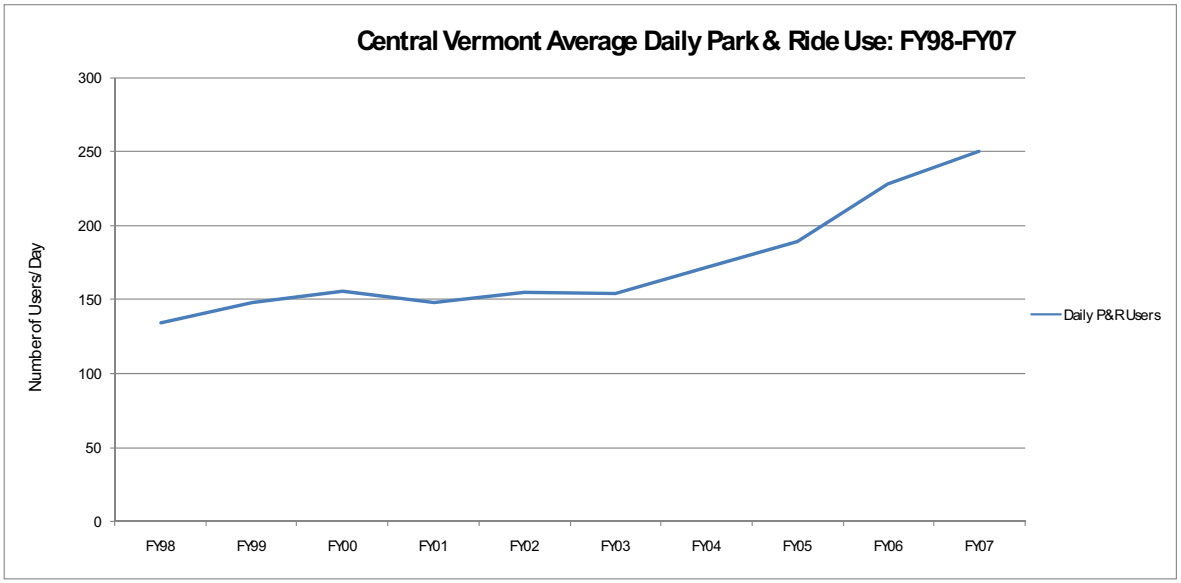

Central Vermont Average Daily Park & Ride Use: FY98-FY07
Number of Users/ Day
300
250
200
150
100
50
0
FY98
FY99
FY00
FY01
FY02
FY03
FY04
FY05
FY06
FY07
Daily P&R Users

Figure 30

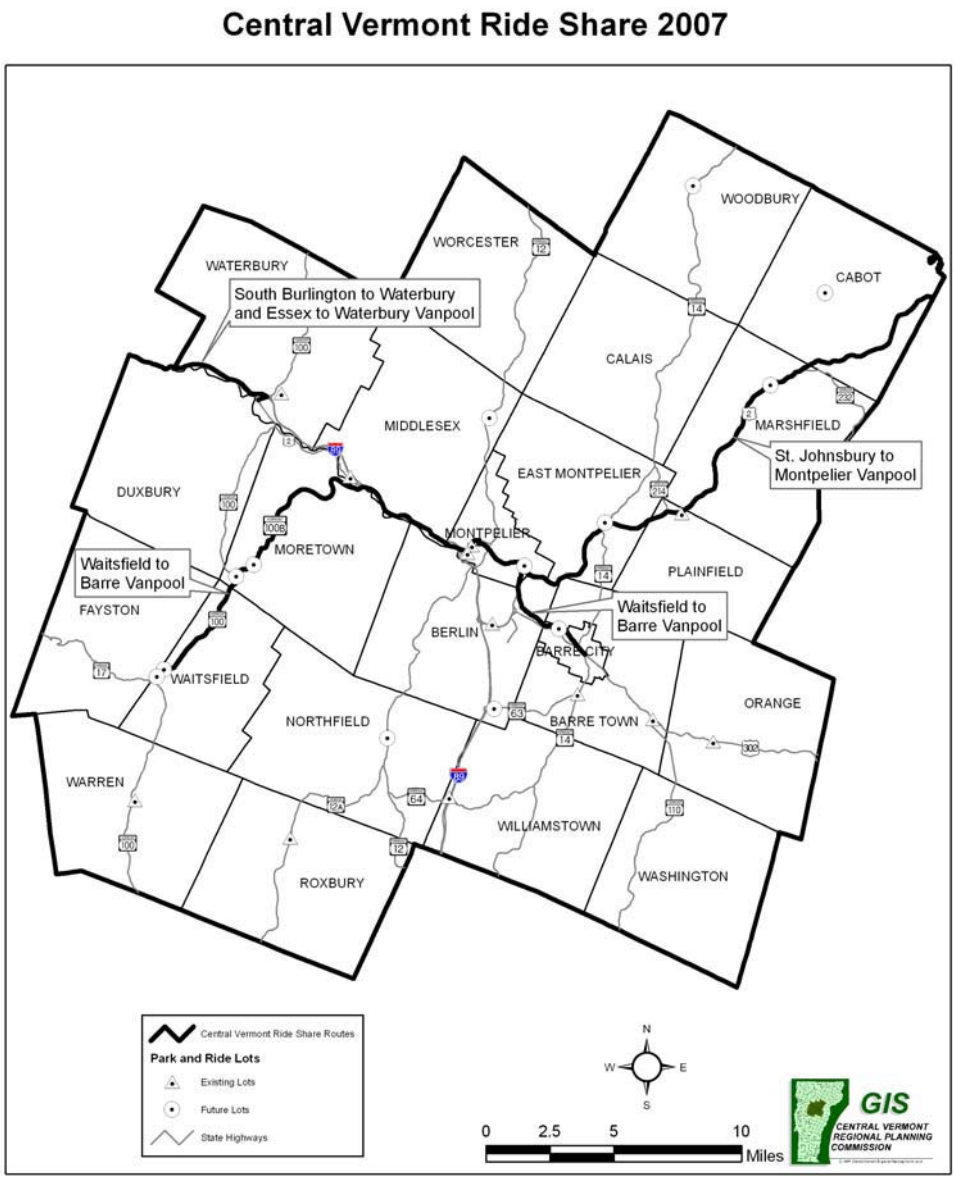

Central Vermont Ride Share 2007
WOODBURY
WORCESTER
WATERBURY
South Burlington to Waterbury and Essex to Waterbury Vanpool
CABOT
CALAIS
MIDDLESEX
MARSHFIELD
St. Johnsbury to Montpelier Vanpool
EAST MONTPELIER
DUXBURY
MONTPELIER
MORETOWN
Waitsfield to Barre Vanpool
PLAINFIELD
Waitsfield to Barre Vanpool
FAYSTON
BERLIN
BARRE CITY
WAITSFIELD
ORANGE
NORTHFIELD
BARRE TOWN
WARREN
WILLIAMSTOWN
ROXBURY
WASHINGTON
Central Vermont Ride Share Routes
Park and Ride Lots
Existing Lots
Future Lots
State Highways
N
W
E
S
0
2.5
5
10
Miles
GIS
CENTRAL VERMONT REGIONAL PLANNING COMMISSION

Table 30

Central Vermont Park and Ride Lot Condition Survey 8/02											
Lot	**Available Spaces**	**Surface/ Condition**	**Signage Size/location**	**# of Lights**	**Fence**	**Shelter**			**Potential Modal Connections**	**Expansion Potential**	**Improvement Plans**
Montpelier DET	170	paved/good	small/on approach	7	yes	yes			bus, train, bike, ped	yes (into DET lawn)	
Montpelier MJSH	55	paved/good	large/on approach	8	no	yes			bus, train, bike, ped	limited (west of site)	
Waterbury	60	paved/poor	large/on approach	2	no	no			bus, bike, ped	yes (toward river)	
Middlesex	28	paved/good	small/on approach	3	no	no			train, bus	limited (toward homes)	
Berlin	76	paved/good	small/at entrance	6	yes	yes			bus	yes	
Barre Town	27	paved/good	large/at entrance	0*	no	no			bus,bike, ped	limited (shopping center)	
Williamstown	24	paved/good	small/at entrance	2	yes	no			no	yes (at VTrans garage)	
East Barre	15	gravel/poor	small/inside lot	0*	no	no			no	none	East Barre Study recommends moving to across the street
* Street lights provide some illumination											
Central Vermont Park and Ride Lot Condition Survey 10/07											
Lot	**Available Spaces**	**Surface/ Condition**	**Signage Size/location**	**# of Lights**	**Fence**	**Shelter**	**Bike Rack**	**Phone**	**Potential Modal Connections**	**Expansion Potential**	**Improvement Plans**
Montpelier DET	170	paved/good	small/on approach	7	yes	yes	no	no	bus, train, bike, ped	yes (into DET lawn)	needs line painting
Montpelier MJSH	55	paved/good	large/on approach	8	no	yes	yes	yes	bus, train, bike, ped	limited (west of site)	
Waterbury	60	paved/poor	large/on approach	2	no	yes	yes	no	bus, bike, ped	yes (toward river)	needs line painting
Middlesex	28	paved/good	small/on approach	3	no	no	no	no	train, bus	limited (toward homes)	
Berlin	76	paved/good	small/at entrance	6	yes	yes	yes	no	bus	yes	
Barre Town	27	paved/good	large/at entrance	5	no	no	no	no	bus,bike, ped	limited (shopping center)	
Williamstown	24	paved/good	small/at entrance	2	yes	no	no	no	no	yes (at VTrans garage)	
East Barre	15	gravel/poor	small/inside lot	0*	no	no	no	no	no	none	to be moved to US 302 west of Village
Roxbury	5	gravel/good	small/at entrance	1	no	no	no	no	no	limited	
Orange	30	gravel/good	small/at entrance	1	no	no	no	no	no	limited	
Plainfield	22	paved/good	small/at entrance	1	no	no	no	no	bike, ped	none	
Warren	12	paved/good	small/at entrance	1	no	no	no	no	bike, bus	none	
* Street lights provide some illumination											

Table 31

Future Park & Ride Sites To Be Considered when Conditions Warrant			
Town	**Type**	**Route**	**Location**
East Montpelier	Rural Commuter	US2/VT 14	Village, Near Town Hall
Berlin	Interstate	VT 63/I-89	At Exit 6 Ramp
Northfield	Rural Commuter	VT 12	Existing Space in Northfield Village
Moretown	Rural Commuter	VT 100/VT 100B	Snow Plow Turn Around
Marshfield	Rural Commuter	US2/Rt 215	Village, Marshfield Commons
Moretown	Rural Commuter	VT 100B	Village, Municipal Lot
Waitsfield	Rural Commuter	VT 100	Irasville, Existing Commercial Lots
Middlesex	Rural Commuter	VT 12	Wrightsville Recreation Area/Dam
Barre City	Urban Shuttle	US302	North End, Jones Brothers Site
Montpelier	Urban Shuttle	US2/US302	Grossman's/Gallison Hill Road
Montpelier	Urban Shuttle	VT 12	Econo Lodge
Waitsfield	Rural Commuter/Ski Shuttle	VT 100	Kenyons, Telecom, Movie Theater, Fiddler's Green
Cabot	Rural Commuter	Rt 215	Lower Cabot Village
Woodbury	Rural Commuter	VT 14	Village

TRAVEL DEMAND MANAGEMENT

Throughout many areas in the United States, travel demand management (TDM) is used to encourage efficiency in the transportation system. In many situations, travel demand is managed by an entity known as a Transportation Management Association (TMA). Although Transportation Management Associations (TMAs) have been around for quite some time, there are no TMAs in the Central Vermont region. A TMA recognizes that employers and developers play an important role in an area's transportation system and works to create partnerships between employers, developers, and the local government. TMAs help to build local consensus, raise funds, implement specialized programs/services, and manage travel demand. In Burlington, the Campus Area Transportation Management Association (CATMA) creates a forum for the American Red Cross, Champlain College, Fletcher Allen Health Care, the University of Vermont and the City of Burlington to proactively address transportation issues and opportunities. Some examples of services provided by CATMA include:

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Conducting an annual survey of UVM and Champlain College students to obtain feedback and comments from to the community on what types of transportation services they would use if they were available

Operating carpool matching programs,

Running its own shuttle service,

Negotiating transit subsidies so that members can ride Chittenden County Transportation Authority (CCTA) buses for free, and

Running an Emergency Ride Home and a biking/walking reward program.

There is potential for a TMA in Central Vermont. In Montpelier, a TMA could involve the State of Vermont (as the largest employer in the area) and other large employers in a partnership with the city government and transit provider on transportation issues. A TMA in downtown Montpelier might organize the downtown businesses to address parking issues and congestion during peak hours. A TMA could expand on services already provided such as Green Mountain Transit Agency's (GMTA's) ridesharing and emergency ride home programs. The GMTA Ticket-to-Ride Program reflects an informal TMA because it is an example of a partnership between a local community agency and GMTA. A more formal TMA could implement employer-based transportation demand management elements.

The region might implement employer-based TDM measures on a voluntary basis. The region has several large employers like the State of Vermont, who might be well-suited to implement these programs. The TDM measures might include such in-house programs as:

- Job-site transit service information/designated staff person to distribute transit information
- Preferential parking for carpools and vanpools;
- Incentives for carpools and vanpools;
- Parking Cash Out
- Alternative Work Formats
    - Flexible schedules to accommodate carpools and the use of transit
    - Tele-commuting (see below)
    - Compressed work weeks
    - Staggered hours/off-peak shifts
- Sale of discounted transit passes through payroll deduction (see Eco-Pass section below)
- Commuter fringe benefit

Tele-Commuting:
Tele-commuting, also known as telework, is one alternative work format with a particularly impressive mix of potential benefits for employers, employees, and communities. Tele-commuting involves an employee completing work tasks from a remote location, usually his or her home, using various forms of communication. As the speed and availability of internet connections has grown, so has the feasibility of tele-commuting. However, barriers to wide-spread use of tele-commuting remain.

> Benefits: Employer benefits of tele-commuting include improved staff morale, recruitment/retention enhancements, increased worker productivity, and establishing a framework for continued operation in the face of an emergency. Employee benefits include reduced commute times, reduced commute stress, reduced commute expense (gas, wear and tear, parking, and depreciation), and an improved life/work balance. Community benefits of tele-commuting include fewer emissions and improved environmental quality, less congestion, and less parking demand (less land needed for parking).
>
> Costs and Barriers: Many employers and organizations remain hesitant to establish tele-commuting options for their employees. Two large causes of this hesitation are a fear of losing control over workers and concerns about decreased productivity. Other potential barriers to the growth of tele-commuting include concerns about misinterpretations and lost nuances without face-to-face communication and data corruption using off-site technology and work stations.

Given the relative low cost of permitting employees to tele-commute and the full spectrum of benefits it offers, tele-commuting stands out as potential source of great improvement to the transportation system in Central Vermont.

Eco-Pass:
As of this writing, GMTA is considering the feasibility of an "Eco-Pass" program similar to a program offered in the Boulder, Colorado area. The concept involves marketing a transit pass to employers which they could provide to employees (for free or at a discounted rate) that specifically calls attention to the environmental benefits of public transportation.

Federal Tax Transit Benefits

Employer-paid benefits An employer can pay for their employees to commute by transit or van pool, up to a limit of $110 per month (according to 26 CFR Section 132). With this arrangement, employees get up to $110 in a tax free transportation benefit. Employers get a tax deduction for the expense. Employers have found that providing transportation benefits offers significant savings over offering the equivalent dollar value to employees in the form of a salary increase.

Employee-paid benefits Employers can allow employees to elect to exchange up to $110 per month in taxable salary for a tax-free transit or vanpool benefit. Employers save money overall since the amount exchanged is not subject to payroll taxes. Employees save money too, since the amount of an employee's salary exchanged for transportation benefits is not subject to income tax.

Commuter Fringe Benefit Program

A commuter fringe benefit is a payment or incentive paid by employers to a daytime employee who commutes to work in the downtown area without using a parking space. VTrans conducted a Commuter Fringe Benefit Feasibility Study in 2000. As part of the study, a survey of 1,044 downtown Montpelier workers was performed to estimate interest in not utilizing a downtown parking space and traveling to work in a non-auto mode. The following are some of the results, which indicate the interest in a Commuter Fringe Benefit Program.

If an incentive in the range of $25-$40 per month were available for full-time participation in the Commuter Fringe Benefit Program:

27.7% indicated they would park at a remote lot and shuttle in (289 daily or 71,961 annual use);
26.5% indicated they would rideshare;
11.5% indicated they would take a bus;
17.2% indicated they would walk or bike;
21.7% indicated they would change their work schedule (telecommute or compressed work week).

Way to Go Montpelier

In May 2007, the City of Montpelier began its own Way to Go program in support of alternative means of transportation. The Way to Go Montpelier event is modeled after the Chittenden County-wide Way to Go Week. Individuals interested in participating in the event are asked to commit to using various types of alternative modes of transportation. Participants sign up on a website, either as individuals or as part of a group, and can estimate pounds of carbon dioxide saved through using alternative transportation.

Way to Go Montpelier 2007 was a month-long event which brought together the separate efforts of several groups including the Montpelier Downtown Community Association, community schools, bike and pedestrian groups, and the Green Mountain Transit Agency. Some results of Way to Go Montpelier 2007 were:

- 298 Central Vermont participants (1,900 participants state-wide)
- Of those, 91 were new to trying alternatives to the single occupancy vehicle:
  - 112 biked to work
  - 80 used public transportation (bus)
  - 146 carpooled
  - 27 tele-commuted
  - 101 walked
- Total miles saved: 105,731
- Total gallons of gas saved: 4,699
- Total pounds of CO2 saved: 90,929

Current plans indicate that future Way to Go Montpelier events will aim to coordinate with several large employers in the area, including National Life, the State of Vermont, and Blue Cross & Blue Shield of Vermont. Updates to the event website are planned along with extensive business outreach.

PEDESTRIAN AND BICYCLE FACILITIES

EXISTING PEDESTRIAN AND BICYCLE SYSTEM

Bicycle and pedestrian facilities are a vital piece of the transportation system. These facilities are very important to the safety and convenience of both bicyclists, pedestrians and vehicle traffic. Bicycle and pedestrian facilities provide improved circulation and access in cities, villages, and other densely developed growth areas. These facilities are especially important to people with mobility limitations. The ability to walk or bike to your destinations reduces the need for vehicles, use of fossil fuel, pollution, supports public transit services, facilitates traffic calming, and provides health benefits. The economic benefits are also readily apparent. Tourists are more likely to visit an area with a good sidewalk network. Bicycle touring is very popular on Vermont's scenic highways.

Bicycling and walking are increasingly used for commuting purposes. This is demonstrated by reviewing 2000 Census journey-to-work data shown previously in Chapter Three. For example, for Montpelier residents who work in Montpelier, nearly 15% percent of these commuters (or roughly 653 people) walk to work. In Northfield, the intra-village commuters who walk to work is less, but still substantial -- (431 persons or 15 percent of the intra-village commuters).

There is a variety of bicycle and pedestrian facilities that can be found in Central Vermont:

Sidewalks and crosswalks are common in a number of cities and villages. Although there are exceptions the minimum width suggested in Vermont Design Standards is five feet. The following communities have sidewalks: Barre City, Barre Town, Marshfield, Montpelier, Moretown, Northfield, Plainfield, Waitsfield, Warren, Waterbury, and Williamstown.

Paved shoulders are the most common facility in rural areas. The Region recommends a minimum 15 ft. combined single lane and shoulder width be provided on state highways where possible (11 ft. lane & 4 ft shoulder, or 12 ft. lane & 3 ft. shoulder). **Figure 31** illustrates highway segments with suitable shoulder widths.

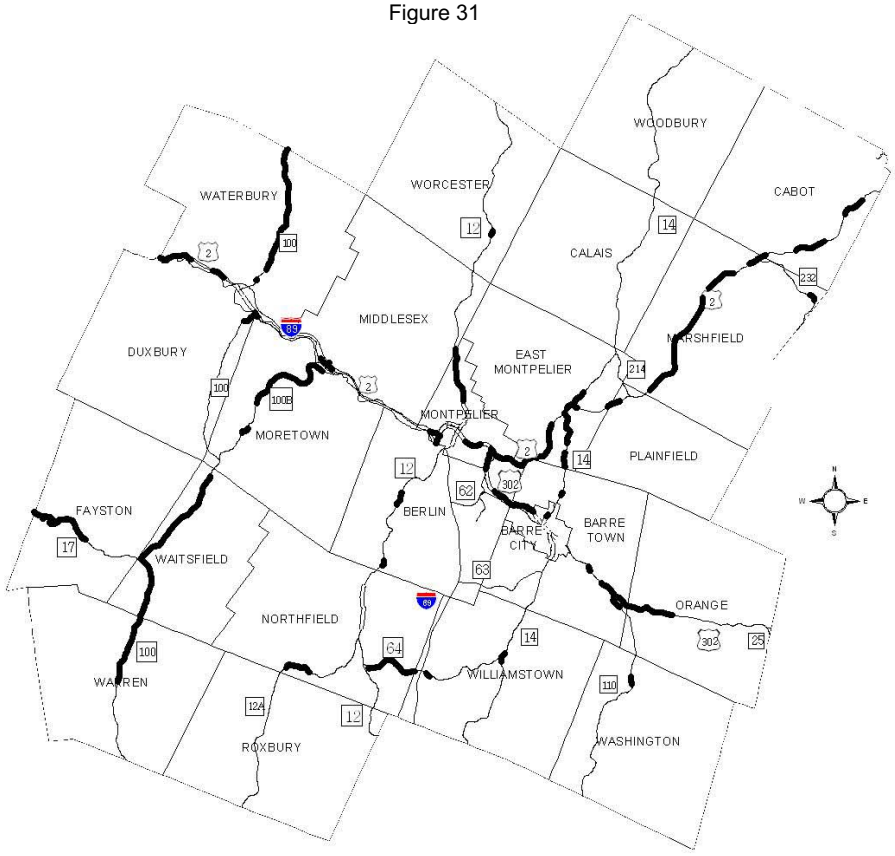
Bicycle lanes are designated shoulders for the preferential or exclusive use by bicyclists. They require pavement lines, markings and signs. The minimum width is 4 ft., but wider lanes are recommended in areas with high speed or volume traffic, on street parking, and drainage grates. There are existing bicycle lanes on VT 100 between Warren Village and Irasville.

Shared use lanes are appropriate in village and urban areas where traffic speeds are low and there is no room for a wider facility. Examples can be found in Barre City, Montpelier, Northfield, and Waterbury.

Separated shared use paths are off road facilities for bicyclists and pedestrians with an improved surface. This type of facility is useful to make connections between destinations, when the existing road network isn't suitable (narrow widths) or as a short cut. A variation of this is a rail trail, where a rail bed that is inactive, abandoned or railbanked is used for a shared use path. The minimum

Central Vermont Region

Figure 31



Combined Lane and Shoulder Width

- Less Than 15 ft.
- 15 ft. or Greater
- Shared Use Lane

I-89, VT 62, VT 63, & Berlin State Highway are limited access highways that don't allow bicycle or pedestrian use

5 0 5 Miles

width is 8 ft., but wider widths are suggested if high volume use is expected. Examples are sections of the Central Vermont Regional Path in Montpelier, Barre City, and Barre Town.

Trails are typically unpaved, not built to stringent standards, use the existing terrain, and although frequently are recreational facilities, they can provide a transportation function. The Mad River Greenway, and sections of the Cross Vermont Trail are regional examples.

Bicycle Routes are not considered a facility, but are just designations on existing roads, paths, and trails. Guide books, maps, and signs are necessary to assist users. The Central Vermont Chamber of Commerce and CVRPC produce a Back Road Bike Tours guide book that includes maps and descriptions of bicycle routes. State and local highways are used. The Cross Vermont Trail also has a designated bicycle route in Waterbury Village.

Use

There isn't a lot of data on usage of bicycle and pedestrian facilities. By observation, it is well known that VT 100 and 100B is well used by local bicycle clubs and touring groups. Vtrans has purchased automatic counters, so we have begun expanding our knowledge on use. There is a permanent counter installed on the west side of Main St. (near Capitol Stationers) in Montpelier. Between Nov. 06 and Nov. 07 there were 835,244 pedestrians, for an average of 2,288 per day. We have also done some spot counts at the following locations:

Central Vt Regional Path Montpelier – summer midday – 60 pedestrians & 34 bicyclists;
Central Vt Regional Path Barre Town Athletic Field – summer late afternoon 47 peds & 22 bikes;
VT 100/17 Intersection Waitsfield – summer late afternoon – 66 bicyclists;
Waterbury Main St. in front of the park – summer midday – 199 pedestrians;
Barre City Main St. at the Community Bank – 95 pedestrians; and
Mad River Green Way Waitsfield at Meadow Rd. – summer late afternoon – 2 bikes, 78 peds, & 32 dogs.

Deficiencies

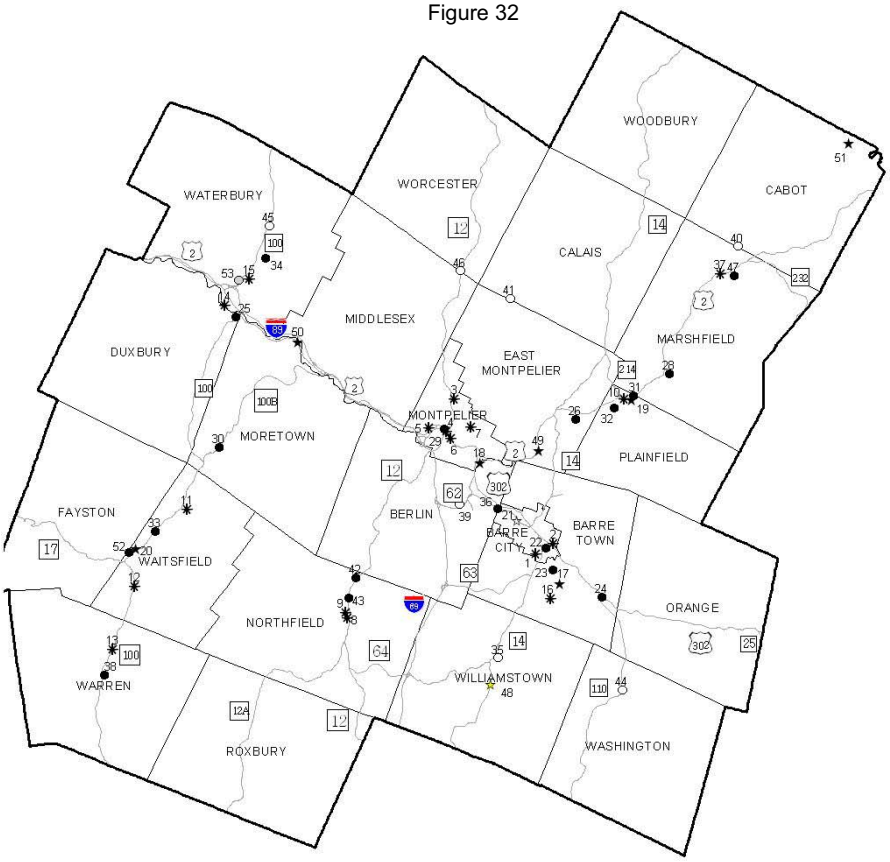
There are a number of factors to consider when evaluating the suitability of a highway for bicycle and pedestrian use. These include width, volume, grade, speed limit, pavement condition, and number of curb cuts. In urban and village settings, bicyclists have to share the lane with motorized vehicles. In busy commercial areas, such as the Barre-Montpelier Road, high volume, high speeds, and multiple turning movements create a environment only suitable for the most experienced bicyclist.

As can be seen in **Figure 31**, there are many segments of the State Highway System that have deficient combined lane and shoulder width (less than 15 ft.) for bicycle and pedestrian use. Areas with suitable widths are fragmented which limits their use for longer distance trips and as a regional system. For example, VT 100 is heavily used by bicycle touring groups. The lack of a suitable shoulder in Duxbury is exasperated by the steep grades and winding curves of VT 100. Touring groups struggling uphill are slow moving, spread out, and in the travel lane. This creates a uncomfortable and dangerous situation for the bicyclists and vehicles attempting to pass. This situation may occur on other narrow shoulder highways such as US 2, US 302,VT 14, VT 12, VT 12A, VT 17, VT 110.

Sidewalk networks exist in a number of the Region's cities and villages. There is a constant need to maintain these facilities. In certain areas the sidewalks are undersized, or have been neglected, which diminishes their usefulness. There are other villages and developed areas that have no pedestrian facilities. Shoppers on the Barre-Montpelier Rd. in Berlin need to use their vehicles to get from one store to another because there are no sidewalk connections. Expanding development is occurring in Berlin's Hospital and Mall area without connecting bicycle and pedestrian facilities. Many schools in the Region lack bicycle and pedestrian facilities, which increases the need for busing or parental driving.

2008 Bicycle & Pedestrian Project Status

Figure 32



Central Vermont Region

Bicycle & Pedestrian Facilities

- Completed
- Design & Construction Funded
- Design Funded
- Candidates for Design & Construction
- Conceptual Alignment Study Underway
- Candidates for Conceptual Alignment Study

5 0 5 Miles

Central Vermont Region Bicycle and Pedestrian Projects (changed status in bold) Table 31

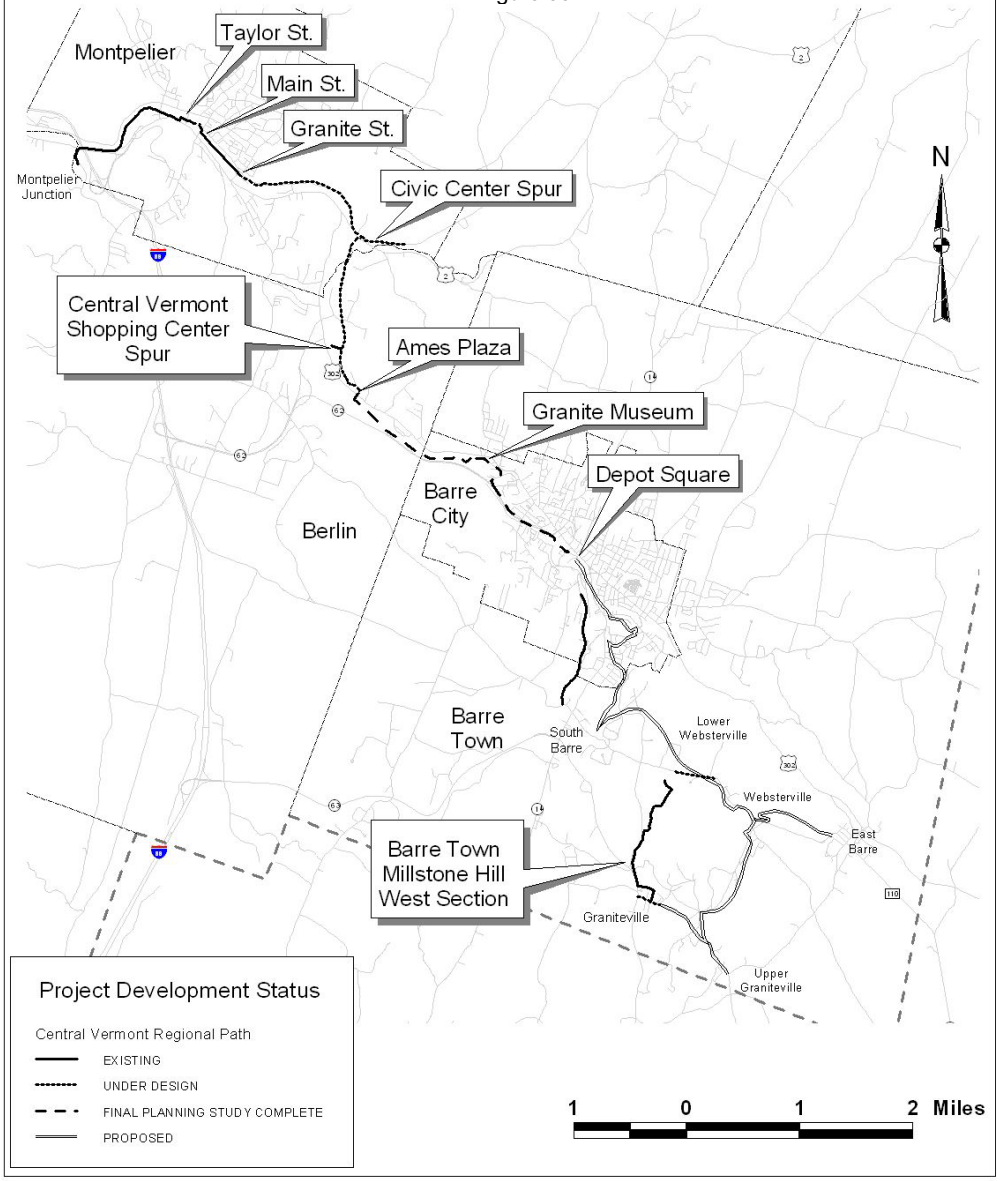
MAP ID	TOWN	ROUTE	SOLUTION	LOCATION
COMPLETED				
1	BARRE CITY/BARRE TOWN	VT 14	RECONSTRUCT BIKE PATH	BARRE CITY TO SOUTH BARRE
2	BARRE CITY & BARRE TOWN	TROW HILL ROAD	SIDEWALK	TROW HILL ROAD
3	MONTPELIER	VT 12	REHABILITATE FOOT BRIDGE	NORTH BRANCH RECREATION AREA
4	MONTPELIER	BUS US 2	SIDEWALK & PLAZA	CITY HALL
5	MONTPELIER	US 2	BIKE PATH	GREEN MTN DRIVE TO TAYLOR ST
6	MONTPELIER	US 2	BIKE PATH	STONE CUTTERS WAY
7	MONTPELIER	TOWNE HILL ROAD	CONSTRUCT SIDEWALKS	MAIN ST TO GRANDVIEW TER
8	NORTHFIELD	VT 12	REHABILITATE PARK	VILLAGE
9	NORTHFIELD	VT 12	CONSTRUCT SIDEWALKS	WITHIN VILLAGE
10	PLAINFIELD	US 2	RECONSTRUCT SIDEWALK	VILLAGE
11	WAITSFIELD	VT 100	BIKE PATH	TREMBLY RD TO MEADOW RD
12	WAITSFIELD	VT 100	ROAD MARKING	SOUTH OF VILLAGE
13	WARREN	VT 100	ROAD MARKING	NORTH OF VILLAGE
14	WATERBURY/MORETOWN/DUXBURY	US 2/VT 100	BIKE PATH	STATE OFFICE COMPLEX, RIVER RD, VT 100
15	WATERBURY	VT 100	BIKE PATH	VILLAGE TO GUPTIL RD
16	BARRE TOWN	GRANITEVILLE RD.	BIKE PATH MILLSTONE HILL WEST	WEBSTERVILLE RD TO GRANITEVILLE
37	**MARSHFIELD**	**US 2**	**SIDEWALK**	**VILLAGE**
DESIGN AND CONSTRUCTION FUNDED				
17	BARRE TOWN	WEBSTERVILLE RD &	SIDEWALKS	LOWER WEBSTERVILLE & LOWER GRANITEVI
18	MONTPELIER/BERLIN	US 2/US 302	CONSTRUCT BIKE PATH	GRANITE ST. TO AMES PLAZA
19	PLAINFIELD	MAIN & BROOK STS.	SIDEWALKS	LOWER VILLAGE
20	WAITSFIELD	VT 100	RECONSTRUCT SIDEWALK	IRASVILLE/WAITSFIELD VILLAGE
48	**WILLIAMSTOWN**	**VT 14**	**SIDEWALKS**	**SOUTH VILLAGE**
49	**EAST MONTPELIER**	**US 2**	**CROSS VT TRAIL**	**OLD ROUTE 2**
50	**REGION**	**US 2**	**CROSS VT TRAIL SIGNS**	**REGION**
51	**CABOT**	**LVRR**	**BIKE PATH**	**LAMOILLE VALLEY RR BED**

DESIGN FUNDED				
21	BARRE CITY	US 302	DESIGN BIKE PATH SECTIONS 2-8	GRANITE MUSEUM TO DEPOT SQUARE
CANDIDATES FOR DESIGN AND CONSTRUCTION				
22	BARRE CITY	US 302/VT 14	BIKE PATH	CENTRAL VERMONT REGIONAL PATH
23	BARRE TOWN	LOCAL	BIKE PATH	CENTRAL VERMONT REGIONAL PATH
24	BARRE TOWN	VT 110	SIDEWALK	EAST BARRE VILLAGE
25	DUXBURY/MORETOWN/WATERBURY	VT 100	SIDEWALK & PATH	CROSSETT BROOK SCHOOL AREA
26	EAST MONTPELIER	US 2	BIKE PATH	MONTPELIER TO WELLS RIVER RAILBED
28	MARSHFIELD	US 2	BIKE PATH	MONTPELIER TO WELLS RIVER RAILBED
29	MONTPELIER	US 2	CONSTRUCT BIKE PATH	TAYLOR ST. TO STONECUTTERS WAY
30	MORETOWN	VT 100B	SIDEWALKS	VILLAGE
31	PLAINFIELD	US 2	SIDEWALKS	VILLAGE
32	PLAINFIELD	US 2	BIKE PATH	MONTPELIER TO WELLS RIVER RAILBED
33	WAITSFIELD	VT 100 (North)	ROAD MARKING	NORTH OF VILLAGE
34	WATERBURY	VT 100	BIKE PATH	GUPTIL RD TO CENTER
36	BERLIN/BARRE CITY	US 302	CONSTRUCT BIKE PATH	AMES TO GRANITE MUSEUM
38	WARREN	MAIN & BROOK STS.	CONCEPTUAL ALIGNMENT STUDY	VILLAGE
42	NORTHFIELD	VT 12	SIDEWALKS	NORTHFIELD FALLS
43	NORTHFIELD	VT 12	BIKE PATH	NORWICH UNIV. TO NORTHFIELD FALLS
47	**MARSHFIELD**	**VILLAGE**	**SIDEWALKS**	**SIDESTREETS TO US 2**
52	**WAITSFIELD**	**VT 100**	**SIDEWALKS**	**WEST SIDE OF VILLAGE**

CONCEPTUAL ALIGNMENT STUDY UNDERWAY				
53	**WATERBURY**	**VT 100**	**SIDEWALKS**	**COLBYVILLE**
CANDIDATES FOR CONCEPTUAL ALIGNMENT STUDY				
35	**WILLIAMSTOWN**	**VT 64**	**SIDEWALKS**	**VILLAGE**
39	BERLIN	VT 62	SIDEWALKS	PAINE TPK TO FISHER RD
40	CABOT/MARSHFIELD	RT 215	BIKE PATH	MARSHFIELD TO CABOT VILLAGE
41	CALAIS/EAST MONTPELIER/MONTPELIER	COUNTY RD	BIKE PATH	MAPLE CORNER TO MONTPELIER
44	WASHINGTON	VT 110	BIKE PATH	VILLAGE TO CARPENTER PARK
45	WATERBURY	VT 100	SIDEWALKS & TRAFFIC CALMING	WATERBURY CENTER
46	WORCESTER/MIDDLESEX	VT 12	BIKE PATH	WORCESTER VILLAGE TO WRIGHTSVILLE BEACH

Central Vermont Regional Path Status - 10/12/08

Figure 33



BICYCLE AND PEDESTRIAN PROJECTS

Since 1995, there has been a significant progress in the planning and implementation of bicycle and pedestrian facilities in Central Vermont. The following is a description of these facilities, and their status in the project development process. **Table 31** provides a summary, and **Figure 32** illustrates the project location.

Regional Bicycle and Pedestrian Facilities

These facilities involve multiple towns, and have organizations or citizen committees that oversee their development. They include the Central Vermont Regional Path, the Cross Vermont Trail, and the Mad River Path.

The Central Vermont Regional Path (CVRP) is a proposed 14.5 mile separated shared use facility which will extend from Montpelier through Berlin, Barre City to Barre Town utilizing a former railroad bed and paralleling the Winooski River. When completed, the CVRP will connect numerous residential areas with city downtowns (Montpelier, Barre City), commercial & employment areas (Ames Plaza, Central Vermont Shopping Plaza, Wilson Industrial Park), tourist attractions (State Capital Building, Granite Museum, Rock of Ages Quarry), schools (Montpelier High School, Spaulding High School, St. Michael's Elementary School, Barre City Elementary School, Barre Town Elementary School), recreation facilities (Dog River Recreation Area, Montpelier Civic Center, Barre Town Recreation Area), and other paths (Cross Vermont Trail, Vermont Association of Snow Travelers (VAST) Snowmobile Trails). See **Figure 33**.

The primary purpose of the proposed Central Vermont Regional Path is to provide a safe, convenient and inviting way for all ages of bicyclists and pedestrians to traverse the central portion of State between Barre Town and Montpelier. An additional purpose of the Central Vermont Regional Path is to provide additional recreational opportunities for residents and visitors to the area and to promote tourism and economic development.

- Section 1 is completed and begins at Junction Rd. Montpelier, near the Dog River Recreation Area and proceeds east to the Department of Employment and Training Park and Ride Lot, Montpelier High School, and past the State Office Complex to Taylor St.

- Section 2 has a conceptual plan to begin at Taylor St.(with sidewalk and streetscape improvements along Taylor St. connecting to Main St.) crossing the Carr Lot, the North Branch, and Main St. to Stone Cutters Way.

- Section 3 is completed and begins east of Main St. Montpelier on Stone Cutters Way and proceeds east past office buildings and the Hunger Mountain Food Cooperative to Granite St.

- Section 4 is under design and continues east from Granite St. running along Barre Street, and then crossing to the north side of Barre Street by Ibey's Garage. It continues along the river on the old railroad bed to Route 2. Just past the Elks Club the path will split. One leg will connect to the Civic Center on Gallison Hill Road. The other leg will cross Route 2 and runs along Cassela's Waste and Recycling Center to a bridge over the Winooski River. In Berlin, the path continues along the railroad bed to Ames Plaza and US 302. Within this section, a spur has been planned to connect to the Central Vermont Shopping Center.

- Section 5 has a conceptual plan to cross US 302 at the Ames Plaza signal, cross the Stevens Branch, proceed along an old railroad bed and along the fill slope of VT 62, entering Barre City. Continuing, the path crosses the Stevens Branch to the Vermont Granite Museum of Barre.

- Section 6 has an advanced conceptual plan to proceed from the Granite Museum across the Stevens Branch to the fill slope of VT 62. At Berlin St. the path would become an on road bike lane on Berlin St., Smith St., and Blackwell St.(crossing under VT 62). On the south side of VT 62, the bike lane would return to a separated share use path, cross the Steven's Branch into the Barre City Railyard, and continue to Depot Square in Downtown Barre City.

- A potential spur to the CVRP is completed and runs from Fairview Street in Downtown Barre City to the Park Side Terrace Elementary School and Recreation Area, to Bridge St. in South Barre.

- Section 7 is proposed to follow the railroad line through the central business district where it meets and runs parallel to the Stevens Branch to the Spaulding High School, travels overland to the Washington County rail line near Thunder Road, entering Barre Town. The path then parallels the active rail line to Barre Town Elementary School.

- Section 8, known as the Millstone Hill West Section, is complete, and runs from the elementary school using the Barre Town Recreation Area trails to the Graniteville Rd. The path continues adjacent to the Graniteville Rd. past the Rock of Ages Finishing Plant to Graniteville.

- Section 9, known as the East Barre Section, is proposed to start at the elementary school proceed through Websterville, and end in East Barre.

- Section 10, known as the Millstone Hill East Section runs between Websterville and Graniteville along the east side of Millstone Hill along an abandoned rail right-of-way.

The Cross Vermont Trail (CVT) is a multi-season, multi-use facility that, when completed, would extend 75 miles from Wells River on the Connecticut River, to Burlington on Lake Champlain. About half of the CVT is on a historic abandoned railroad bed, the former Wells River - Montpelier Line. Land owner issues and physical constraints have created fragmented sections and a variety of facility types. The CVT Association is installing signage for the entire trail.

- Marshfield - 1.5 miles of designated CVT currently exist on Agency of Natural Resources land in Groton State Forest. West of the State Forest boundary the CVT continues on "Railroad Bed East" town road for 2 miles. At the west end of Railroad Bed East road the CVT follows town roads (Lower Depot Road and School Street) to Marshfield Village, and then follows Rte 2 west to the boundary with Plainfield. The remaining 5.5 miles of the former railbed that exists in Marshfield is used and maintained by VAST. The Cross Vermont Trail Association is working with the Town and land owners to designate more of the trail.

- Plainfield - The Cross Vermont Trail Association is working with the Town and landowners to designate the former railbed as the CVT. The railbed in Plainfield is currently used by recreationists on an informal basis, in particular by students for off-road access to the Twinfield Union School from the Town of Plainfield. The development of the Cross Vermont Trail has been identified as a priority of the Town of Plainfield in their recent Town Plan. CVTA

purchased a portion of the railbed, donated the land to the Town, and retained an trail easement. This property includes the railbed from Country Club Road west to the Plainfield/East Montpelier town line; trail distance is 0.44 mi.

- East Montpelier - There is a 1.5-mile completed section of the CVT in East Montpelier from the Plainfield/E. Montpelier town line west to Route 14. CVT trail markers have been installed in this section and the trail is open to walking, biking, skiing and snowmobiling. In the summer of 2001, VAST, East Montpelier Trails, Inc., and the East Montpelier Gully Jumpers snowmobile club purchased an easement on a .6-acre parcel off of Rte 14 which is now a designated trailhead for the CVT. CVTA is working with landowners to explore possible routes for the trail from VT 14 to US 2. Between Rte 2 and the East Montpelier/Montpelier town line (including very short pieces that cross into Barre Town and Berlin) CVTA is working with Vermont Department of Fish and Wildlife, Winooski Hydroelectric Company, U-32 Central School, and Vermont Agency of Transportation to finalize a trail route and engineer designs for the construction of the trail including a new bike/ped bridge over the Winooski River. The development of the Cross Vermont Trail has been identified as a priority of the Town of East Montpelier in their recent Town Plan.

- Montpelier- From the Winooski One Hydro bridge, the CVT proceeds west adjacent to the access road to Gallison Hill Rd. From this point, the CVT will co-locate with the Central Vermont Regional Path until Bailey Ave. The CVT will be an on road bicycle route following Bailey Ave, US 2, and Graves Street to the Monpelier/Middlesex town line. The CVT would have continued on the CVRP to the Montpelier/Berlin Town Line, but Berlin has been reluctant to designate the Junction Rd. as part of the Trail.

- Middlesex - The CVT will be an on-road bicycle route on Three Mile Bridge Road to the Middlesex/Berlin town line.

- Berlin - CVT will be an on-road bicycle route following River Road.

- Moretown - The CVT will be an on-road bicycle route on River Road, then 100B to Lover's Lane, and then it will follow US 2 to the Waterbury Line.

- Waterbury - The CVT will be an on road bicycle route on US 2 to the State Office Complex. The CVT enters the complex and co-locates with the Waterbury/Duxbury Recreation Path, and then joins Winooski Street, ending at the Duxbury Town Line on the Winooski St. Bridge.

- Duxbury - The Cross Vermont Trail Association has worked with the Town to designate the River Rd. to the Bolton Town Line. (This road has been designated in Bolton and Richmond.)

The Mad River Path (MRG) is a multi-season, multi-use facility, envisioned to connect Moretown Village, Waitsfield Village, Irasville, Fayston, and Warren Village parallel to Route 100 and the Mad River. Land owner issues and physical constraints have created fragmented sections and a variety of facility types.

- Section 1 proposed from Moretown to Waitsfield. The Mad River Path Association (MRPA) is working to create a separated path or trail in this section.

- Section 2 is a completed trail in Waitsfield, beginning on the east side of the Mad River south of the Moretown Line. The trail continues south along the Mad River, crossing Meadow Rd. ending at Trembley Rd. At Meadow Rd. a parallel trail proceeds south on the west side of the Mad River, looping back along VT 100 around a field to Meadow Rd.

- Section 3. is a proposed bicycle lane from Trembley Rd. along VT 100 to Waitsfield Village. The MRPA is working to create a separated path or trail in this section.

- Section 4 is a bicycle lane and sidewalk reconstruction under design from Waitsfield Village to Irasville. The existing sidewalks are in poor condition or consist of a gravel path. A trail network has been established to connect businesses within Irasville.

- Section 5 are various paths along VT 17 and the German Flats Rd. from Irasville to the Fayston Elementary School.

- Section 6 is an existing bicycle lane along VT 100 south between Irasville and Warren Village. The MRPA is working to create a separated path or trail in this section. A short segment of this separated trail exists at the Sugarbush snow making pond. The VT 100 Kingsbury Bridge reconstruction design will include a bicycle and pedestrian underpass, to connect this trail to the Warren Riverside Park. Another section of this separated trail, known as the Warren Recreation Path, exists from Warren Village to the elementary school and extends north into a wooded area.

Lamoille Valley Rail Trail is a multi-use path utilizing a former rail-bed. It travels from St. Johnsbury to Swanton, with 2 miles in the northeast corner of Cabot. Much of the Trail is in use, but there are sections and bridges undergoing rehabilitation.

Local Projects

Barre City has reconstructed sidewalks in the downtown and outlying areas including; Hill St., Ayers St. and VT 14 Intersection. The Main St. Reconstruction under design includes sidewalk, crosswalk, and streetscape improvements in the downtown. There was a joint project with Barre Town to extend sidewalks up Hill St.,north of US 302.

Barre Town is designing new sidewalks along Websterville Rd. connecting the Town Office and residential neighborhoods to the elementary school and recreation area. Sidewalks are also being designed in Graniteville to connect neighborhoods to the church, post office, store, and park/playground. Sidewalks in East Barre Village are planned to be reconstructed and extended. There was a joint project with Barre City to extend sidewalks up Hill St.,north of US 302.

Berlin envisions bicycle and pedestrian facilities which would connect residential areas around with employment and shopping areas located along Route 62 in what is known as the "New Town Center". Sidewalks and a streetscape are envisioned along the Barre-Montpelier Rd (US 302) to connect commercial developments.

Cabot/Marshfield Bicycle and Pedestrian Path is envisioned to include a Cabot Village sidewalk and a connection between Cabot Village, Lower Cabot, and Marshfield Village (where it ultimately connects into the Cross Vermont Trail).

Calais envisions a bicycle facility to connect Maple Corner to Montpelier and to provide a pathway along Route 14;

Duxbury plans a joint project with Waterbury and Moretown to connect the sidewalk network in Waterbury Village to the Crossett Brook Middle School. This project involves sidewalks and bicycle lanes south of the US 2/VT 100 intersection, changing to a separated shared use path north of Main St. Duxbury. This project would build upon the existing Waterbury/Duxbury Recreation Path. Which is a designated multi-use trail/bicycle route within the State Office Complex that proceeds to the Winooski St. Bridge, River Rd/Main St. in Duxbury to VT 100, and then returns to Waterbury Village along US 2.

Marshfield has planned reconstructing and extending sidewalks along US 2 and roads feeding into the Village to make connections between a school, residential areas, Town Office/Library/Recreation field, and commercial developments.

Montpelier has reconstructed sidewalks in the downtown and outlying areas including upper Main St., Towne Hill Road, City Hall Park, and VT 12. Streetscape amenities and bulbouts have been constructed on Main St., State St., and East State St. Sidewalk reconstruction has occurred on State St. west of Main St. There are plans to construct a Winooski River Walk between the Langdon St. Bridge and the State St. Bridge.

The North Branch Path, in Montpelier, is approximately one mile long extending from Cummings Street to Route 12 (Elm Street). This Path follows the North Branch River and includes pedestrian bridges crossing the river to the Montpelier Recreation Fields and to the northern terminus at the Vermont Institute of Natural Science Nature Center.

Moretown has planned sidewalk reconstruction and extensions through the Village. There is a joint project planned with Duxbury and Waterbury to connect the sidewalk network in Waterbury Village to the Crossett Brook Middle School. This project involves sidewalks and bicycle lanes south of the US 2/VT 100 intersection, changing to a separated shared use path north of Main St. Duxbury. This project would build upon the existing Waterbury/Duxbury Recreation Path. Which is a designated multi-use trail/bicycle route within the State Office Complex that proceeds to the Winooski St. Bridge, River Rd/Main St. in Duxbury to VT 100, and then returns to Waterbury Village along US 2.

Northfield Village has reconstructed sidewalks in Depot Square and connecting the commercial center to nearby residential areas and the town school complex. Sidewalks are proposed in Northfield Center (connecting residential and commercial areas along Route 12 as well as the Norwich University campus), and a path is proposed between Northfield Village and Northfield Falls paralleling Route 12;

Plainfield Village has constructed sidewalk along US 2 connecting Goddard College to the Village Center. Additional sidewalks are being designed in the lower Village along Main St. and Brook St. The Town intends to replace sidewalks along US 2 to Marshfield.

Waitsfield Village has conducted a planning study to build sidewalks on the west side of VT 100 for the length of the historic village.

Warren Village has conducted planning for sidewalks which connects the elementary school to the commercial area of town and civic center (library, town offices, town hall);

Washington envisions bicycle and pedestrian path to connect the village area to Carpenter Park (with the

potential to eventually connect to the Central Vermont Regional Path).

Waterbury has reconstructed sidewalks on US 2 (Main St.). The Main St. Reconstruction Project under design includes sidewalk, crosswalk, and streetscape improvements in the downtown. There is a joint project planned with Duxbury and Moretown to connect the sidewalk network in Waterbury Village to the Crossett Brook Middle School. This project involves sidewalks and bicycle lanes south of the US 2/VT 100 intersection, changing to a separated shared use path north of Main St. Duxbury. This project would build upon the existing Waterbury/Duxbury Recreation Path. Which is a designated multi-use trail/bicycle route within the State Office Complex that proceeds to the Winooski St. Bridge, River Rd/Main St. in Duxbury to VT 100, and then returns to Waterbury Village along US 2. The Waterbury Section is also designated as the Cross Vermont Trail.

Waterbury has designated a multi-use trail from Waterbury Village to Guptil Rd. Future plans are to continue this facility to Waterbury Center. Waterbury is conducting conceptual plan for sidewalks and a multi-use path in Colbyville, extending the Village sidewalks to Blush Hill Road to Ben and Jerry's. Other connections would be made to the Best Western Motel, a housing development, Shaws, and the park and ride. Waterbury also intends to plan sidewalks along VT 100 in Waterbury Center.

Williamstown has a conceptual plan that needs updating to extend existing sidewalks in and near the village center, and design is underway to extend the sidewalks south of the Village along VT 14, to the Recreation Area Access Rd.

Worcester envisions a bicycle and pedestrian path which includes a sidewalk in the village and a pathway along Route 12 connecting the village to Wrightsville Beach.

The Safe Routes to School (SR2S) Program is a new program VTrans offered in 2006, and consists of a sustained efforts by parents, schools, community leaders and local officials to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school. The Central Vermont schools which have participated are:

Union Elementary-Montpelier;
Main Street Middle School-Montpelier;
Barre Town Middle and Elementary School;
Williamstown Elementary School; and
Northfield Elementary and Middle School.

Some of the accomplishments of the first year were, establishing SR2S Teams in each Town, conducting parent & classroom surveys, and identifying priority needs. During Walk to School Week in October, in Northfield, Montpelier, and Barre Town there was significant participation by students in special walking events. During Way to Go Month in May, there were special efforts to promote alternatives to driving students to school.

Over the winter and spring School Travel Plans were developed, which assessed the current levels of walking and biking, identification of barriers, and strategies to overcome these barriers. In Williamstown, the County Sheriff was hired to do targeted speed enforcement in May and June. In early summer, bicycle rack applications were submitted and awarded to the Barre Town, Montpelier, and Northfield schools.

Throughout the year more significant infrastructure projects were planned and applied for. Barre Town sought to connect the Websterville Road Sidewalk Project with their new shared use path. Montpelier applied for bulb-outs, sidewalk extensions, improved signage, and a feasibility study. Northfield desires to extend sidewalks on VT 12 north of the Village. Williamstown applied for improved signage, and constructing sidewalks from the Village, along VT 64 & Brush Hill Road to the Elementary School.

In the second year, there was more encouragement activities. Also there was school staff training to incorporate bicycle and pedestrian safety into the curriculum. Many of the activities and strategies of the Safe Routes to School Program could be extended to town-wide planning of bicycle and pedestrian facilities.

RECOMMENDATIONS

Inclusion of bicycle and pedestrian facilities and accommodations should be considered in all VTrans, Town, and new private development projects in villages, cities, and other growth areas.

CVRPC recommends a minimum 15 ft. combined single lane and shoulder width be provided on state highways where possible (11 ft. lane & 4 ft shoulder, or 12 ft. lane & 3 ft. shoulder).

Guardrail installation can have a negative effect on bicycle safety and comfort in areas with narrow shoulders. Fill should be considered to reduce slopes instead of guardrail.

Highways should be swept to remove sand and debris after winter.

CVRPC supports the completion of the Central Vermont Regional Path, the Cross Vermont Trail, the Mad River Path, and the Lamoille Valley Rail Trail.

Bicycle and pedestrian facilities should be coordinated with adjacent regions.

Public transit vehicles should be able to accommodate bicycles.

Accommodations should be provided for bicycles at logical termini (i.e. bike racks at all public parking areas, park and rides etc.)

Schools should consider locating in areas conducive to bicycle and pedestrian activity, and include facilities in their capital improvements. They should also consider participating in the Safe Routes to School Program.

Town planning for bicycle and pedestrian facilities should consider including education, encouragement, engineering, enforcement, and evaluation activities and strategies, patterned after the Safe Routes to School Program.

AIR TRANSPORTATION

The information contained in this section is based on information provided in the VTrans Airport Directory (2007), VTrans staff, Airport Operators, the Vermont Airport System and Policy Plan (2007), and the Airport Capital Facility Program FY 2007 – 2011.

EXISTING AIR TRANSPORTATION SYSTEM

Aviation provides an important contribution to the State's transportation system. The two airports located in the Central Vermont Region are mapped in **Figure 34**: the Edward F. Knapp State Airport and the Warren-Sugarbush Airport. Burlington International Airport is the closest commercial service airport. Burlington is served by a number of airlines including; US Airways, United, Continental, Delta, Northwest, and jetBlue with non-stop service to Boston MA; Pittsburgh PA; Chicago IL; Plattsburgh NY; Philadelphia PA; Washington D.C; New York City NY; and Newark NJ. Other commercial service airport options available to residents of Central Vermont include the Southern Vermont Regional airport in Rutland, the Plattsburg International Airport in New York, and the Lebanon Airport and Manchester-Boston Regional Airport in New Hampshire. Vermont Transit service is available to the Manchester-Boston Regional Airport from Montpelier.

The State's public-use airports provide economic benefits to the Central Vermont Region. However, airports' contributions to their communities are not limited to their roles as economic engines. Each also contributes to the health, safety, security, recreation, and general quality-of-life in the communities they serve in ways that cannot be stated in dollar terms. These qualitative benefits are:

- *Public access to the National Airspace System* **– (Knapp, Warren-Sugarbush)**
- *Freight/Cargo Activity* – businesses of all sizes throughout Vermont rely on airports in order to ship and receive products and materials to and from all over the world**. (Knapp)**
- *Emergency Medical Aviation* – airport serve as a base of operations for the transport of critical care patients to emergency rooms, as well as those suffering from chronic disease flying to treatments in metropolitan centers ("Angel flights" for cancer patients, for example) **. (Knapp)**
- *Search and Rescue* – airports are used as a base of operations for lost individuals or downed aircraft**. (Knapp)**
- *Corporate or Business Aircraft Activity* – business executives rely on airports throughout the State to reduce overall transit time. **(Knapp, Warren-Sugarbush)**
- *Recreational flying or parachuting* – airports provide facilities to support aircraft ownership by individuals and organizations with a love of flying and parachuting. **(Knapp, Warren-Sugarbush)**
- *Flight Training* – airports provide facilities for flight instruction programs for individuals who seek to learn to fly. **(Knapp, Warren-Sugarbush)**

- *Career Training and Education* – airports provide facilities for training programs in aircraft maintenance, avionics, and allied disciplines. The State of Vermont sponsors annual Aviation Career Education (ACE) camps at various airports in the State. **(Knapp, Warren-Sugarbush)**

- *Police and Other Law Enforcement Use* – State and Federal law enforcement officials use local airports as a base of operations for surveillance**. (Knapp)**

- *Staging Area for Community Events* – as airports often encompass large tracts of open space, this open space is sometimes used to host large community events that are too big for other common-use land in a city or town. . **(Knapp, Warren-Sugarbush)**

- *Aerial Photography or Surveying* – airports serve as a base of operations for businesses and state agencies regularly engaged in aerial photography or surveying**. (Knapp)**

- *Aerial Inspections* – pilots use airports as ground coordination points for power line inspections and other aerial inspections**. (Knapp)**

- *Environmental Patrol* – airports serve as a base of operations for State and publicly supported environmental agencies wishing to achieve close-in inspection of natural terrain; examples include environmental monitoring vegetation for the effects of acid rain and wildlife counts for research projects**. (Knapp)**

- *Aerial Advertising* – airport serve as a base of operations for businesses that engage in aerial advertising. **(Warren-Sugarbush)**

- *Promotional Activities* – airports offer open houses, air shows, and other educational activities designed to highlight the importance of aviation in life. **(Knapp, Warren-Sugarbush)**

- *Model Aircraft Flying* – airports provide a resource and space for those engaged in the hobby of model aircraft flying. **(Warren-Sugarbush)**

- *Shipping of Perishable Goods* – certain businesses in Vermont import and/or export perishable goods that need specific cargo facilities**. (Knapp)**

- *Military* – access to airports are available to the military if needed, but primary military use is for enlistment promotion. **(Knapp)**

Figure 35 shows the area of Vermont residents that live within a 60-minute drive of a public use airport with commercial service. The majority of the Central Vermont Region can be serviced within the 60-minute criteria by Burlington International Airport, with a significant portion of the region serviced by Lebanon Municipal Airport in New Hampshire as well. There is a very small area in the Northeast corner of the region that requires a drive of greater than 60 minutes.

Figure 36 shows the area of Vermont residents that live within a 30-minute drive time of a public use airport with a 5000 ft. runway. Edward F. Knapp Airport is the primary airport providing this service to the Central Vermont Region. Burlington International provides overlap service to a small portion of

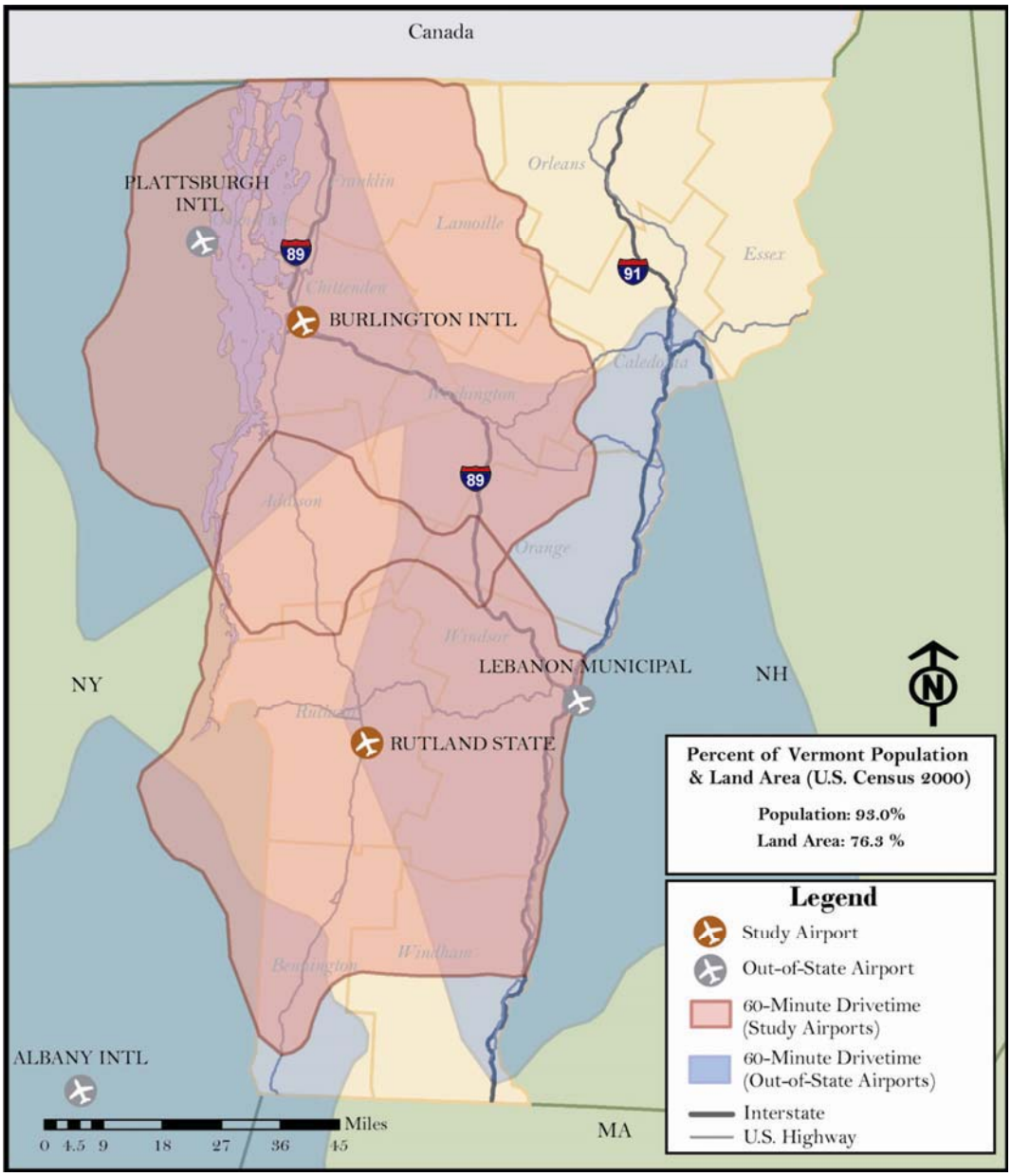
the region. Small areas of the region in the Northeast and Southwest are not serviced by a public use airport within these criteria.

Figure 17 shows that the entire Central Vermont Region can be serviced by an airport within 30 minutes.

Figure 34

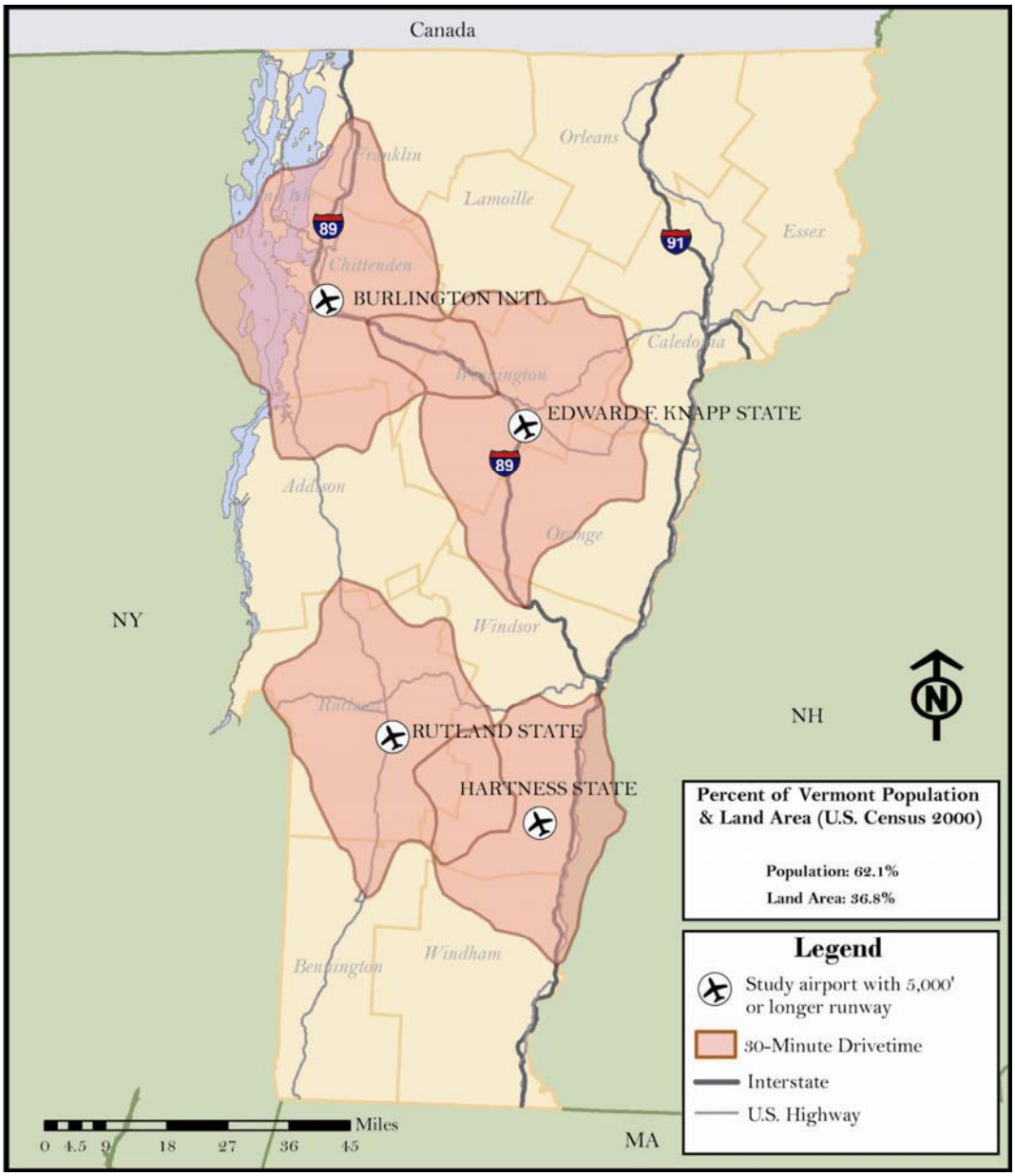
Vermont's Public Use Airports

Figure 35 Radius of Service: 60 Minutes to a Public Use Airport with Commercial Service6



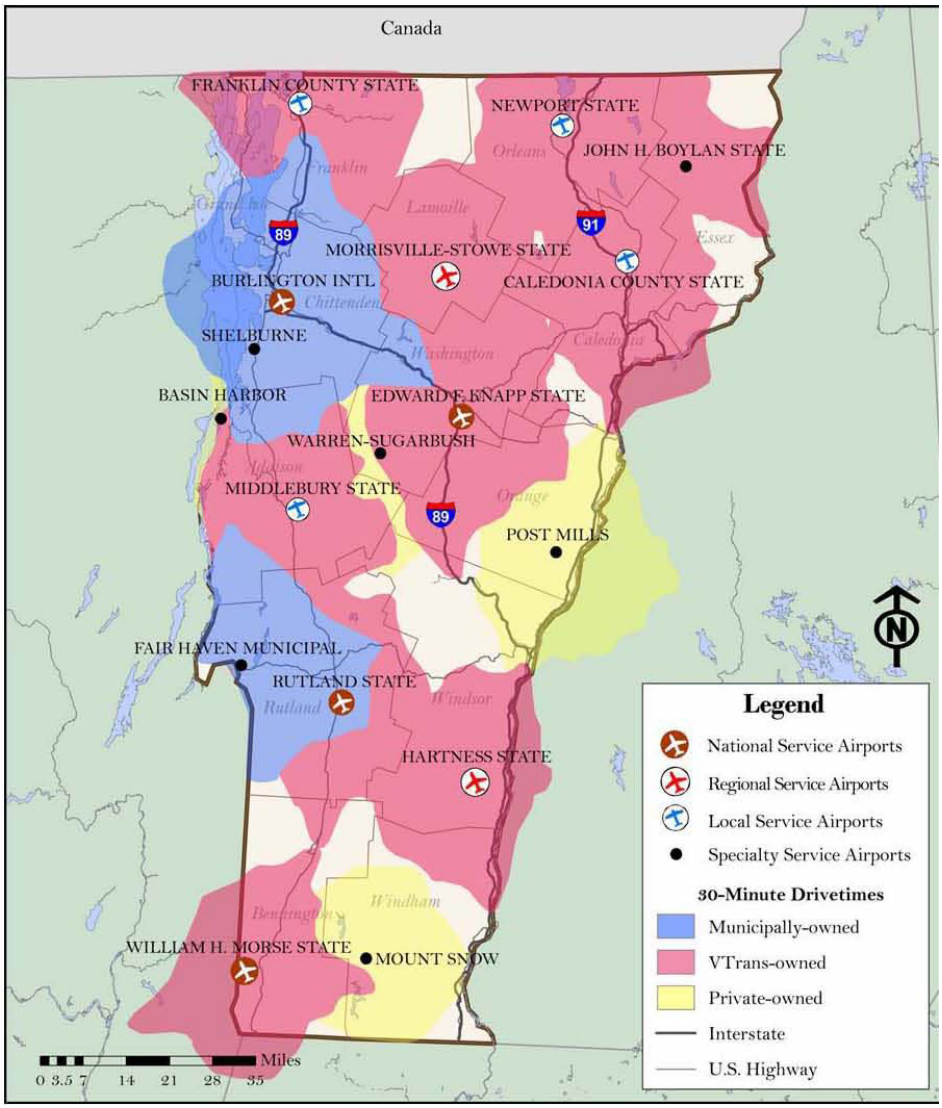
6 Vermont Airport System and Policy Plan, VTrans, 2006

Figure 36 Radius of Service: 30 Minutes to a Public Use Airport with Commercial Service7



7 Vermont Airport System and Policy Plan, VTrans, 2006

Figure 17 Airport Ownership, Roles, and 30-Minute Drive Times8



8 Vermont Airport System and Policy Plan, VTrans, 2006

Edward F. Knapp State Airport

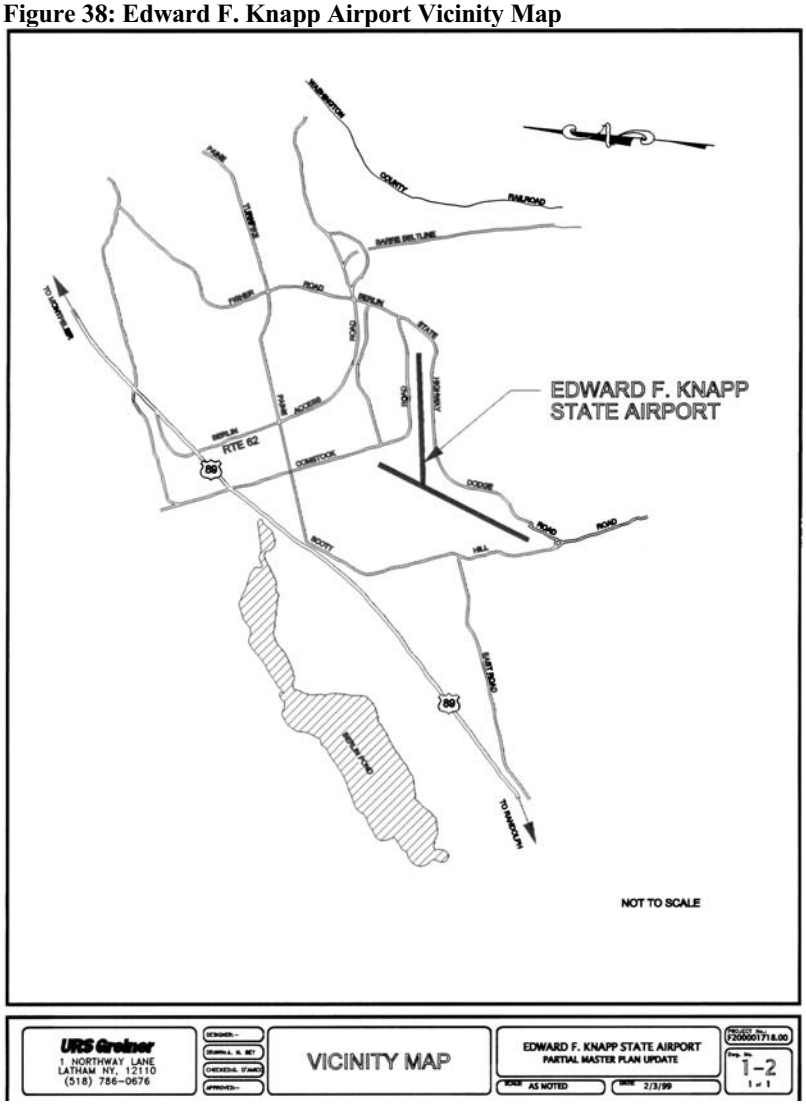
1. Airport Background and Location

Edward F. Knapp State Airport is located in the Town of Berlin, Vermont in the central portion of the State. The airport is located centrally between Montpelier and Barre, within five miles of both cities. The airport's proximity to both the State capital, Montpelier, and the population center of the Montpelier-Barre area accounts for a large portion of its usage.

Access to Edward F. Knapp State Airport is via Berlin State Highway, which is easily accessible off of Route 62 (see **Figure 38)**. The market area for the Edward F. Knapp State Airport centers on the Montpelier-Barre area. However, the airport is reported to also be used frequently by citizens from the Waitsfield, East Montpelier and Randolph areas. An important portion of the usage of the airport is related to State government activities. Employees of the State of Vermont may use the airport to travel to other areas of the State or to travel out of the State. Representatives from companies wishing to do business in Vermont often fly into the airport to meet with State government officials in Montpelier. Edward F. Knapp State Airport facilitates traffic to and from Montpelier which saves time and money for both the State and businesses. Additionally, the Knapp State Airport is used frequently by insurance industry officials who travel in and out of the airport for business purposes.

Access to the Montpelier-Barre area, as well as the Town of Berlin and the Edward F. Knapp State Airport is dominated by Interstate 89. In interviews with the airport manager and other users of this airport, it was indicated that the area's access to I-89 has both positive and negative effects for the potential usage of Edward F. Knapp State Airport. In terms of passenger service, the access that I-89 provides to both Burlington and Lebanon, New Hampshire draws potential scheduled air passenger service customers from the airport. In terms of business and corporate aircraft travel, I-89 provides more direct access from the rest of Vermont to the Randolph and Waterbury areas, thereby further encouraging the use of Knapp State Airport.

Figure 38: Edward F. Knapp Airport Vicinity Map



2. Facilities and Activity

The E.F. Knapp Airport has two runways. Runway 17-35 is the primary runway, lies in the north/south direction, and is 5,000 feet in length. The runway is equipped for night operations with Medium Intensity Runway Lights (MIRLS). A medium intensity approach lighting system with runway alignment lighting (MALSR) and a precision approach path indicator (PAPI) are available for Runway 17. There is a set of Runway End Identifier Lights (REILS) available on Runway 35. Runway 17 has a precision instrument approach with minimums of one mile visibility and 300 ft. ceiling. Runway 35 has three separate navigational

aid approaches with minimums ranging from 1.25-1.5 miles visibility and 900-1,600 ft. ceiling. Runway 17-35 is designed for aircraft with gross weights up to 68,000 lbs, and is in excellent condition.

Runway 5-23 lies in the northeast/southwest direction, is 4,020 feet in length, and is also in excellent condition. This runway is not equipped with MIRLS, and does not perform night operations. Runway 5-23 is not used during the winter as it is not routinely plowed.

There are six taxiways that access tie-down aprons, hangars, and provide partial parallel runway taxiing. There is a terminal apron for transient aircraft, and two tie-down aprons with a total of 28 spaces. The Fuel Farm provides Avgas and jet fuel. Knapp Airport has eleven on-site hangars and a Terminal Building. The Terminal Building has a briefing room, restaurant, lounge, and restrooms. In addition to serving those that are arriving and departing from the airport, the restaurant also attracts a large number of people from the local community to the airport to dine. Roughly 76 vehicle parking spaces are provided at the airport terminal. Transient traffic at the airport is served by an Enterprise Rental Car agency, located less than one mile from the airport. Taxi service is also available at the airport through a call to the taxi company. The airport does not have an on-site control tower. Vermont Flying Service is the Fixed Base Operator (FBO) providing air taxi, flight instruction, fueling, and aircraft maintenance service.

The airport has a sizeable aircraft population, totaling 60 fixed-wing aircraft, nearly all of which are single-engine pistons. There are several categories of operations (an operation is a take-off or landing) at E.F. Knapp Airport: general aviation (local and itinerant); military; and air taxi (this is defined as providing public transportation of persons and property on-demand). Commuter service was discontinued in 1990 (these operations are on a fixed schedule for transporting passengers, cargo or mail for revenue). Knapp Airport serves primarily small turbo-prop, single and twin engine aircraft, and occasional business jet traffic. Approximately 31,000 local operations were counted in 2005. Included in this number are 13,000 itinerant general aviation operations. Total operations are forecast to increase to 34,600 in 2025. Based aircraft is forecasted to increase annually, with a 2025 estimate of 67 aircraft.

Knapp State Airport had a history of scheduled passenger service through the late 1980's. At present, however, none is available. There have been discussions that CommuteAir could provide commuter service in the future from Knapp to other airports in New England and New York. If commercial service is reinstated, there would need to be secure areas to screen passengers & baggage, and an additional secure apron to maintain, load, and unload the plane.

The airport does receive regular cargo flights from Wiggins Airways, which provides feeder services for UPS and FedEx. UPS flies freight in 4 times a week from Manchester N.H. In 1998, air cargo totaled 250 tons. Air cargo is projected to increase to 882 tons in 2018.

Recent improvements to the airport include:

2002 Total reconstruction of primary runway 17-35
2005 Self-serve aviation gas
2005 Privately constructed aircraft hangars (two 4-bay hangars)
2005 FAA installed precision approach path indicator (visual approach lighting aid)
2006 Pilot weather computer system upgrade
2006 FAA acquired snow removal equipment (loader/blower/plow blades)
2006 New security fencing
2006 Parking lot repaving

2007	Obstruction (tree) removal
2007	Civil Air Patrol (CAP) and Fixed Based Operator (FBO) aircraft ramp reconstruction
2007	Terminal/restaurant upgrades
2007	Automated gates

Knapp is now considered a National Service Airport **Figure 39.** To be granted this title, an airport should provide commercial cargo and passenger service (not required to be scheduled passenger service) both within and outside of the state (including international connections). Additionally, a National Service Airport should have the ability to serve larger general aviation aircraft, and potentially even serve substantial business and military aviation activity. Fueling facilities, AvGas, and aircraft maintenance should also be available, as well as pilot and passenger facilities. Runway requirements stipulate that the minimum length should be 5,500 ft long and 100 ft wide.

Table 32 below lists the detailed minimum objectives for qualification as a National Service Airport. Knapp Airport meets the minimum objective for thirteen out of twenty categories. The categories in which Knapp does not meet the minimum objective include: runway length, full parallel for primary taxiway, approach ceiling and visibility minimums, lighting, covered storage, fencing, and auto parking.

Figure 39 Vermont Airport Functional Roles9

9 Vermont Airport System and Policy Plan, VTrans, 2006

Table 32 Minimum Facility and Service Objectives for a National Service Airport

Category	Minimum Objective	Knapp Meets	Knapp Does not Meet	Notes
ARC (Airport Reference Code)	C-II	X		
Runway Length	Minimum of 5,500 Ft. for primary		X	5,000 Ft
Runway Width	100 Ft for primary	X		
Runway Strength	Minimum 60,000 lbs for primary	X		
Taxiway	Full Parallel for primary		X	Partial Parallel
Approach	Published precision Approach with Ceiling Minimums of 200 feet or Less and Visibility Minimums of 1/2 Mile or Less		X	Ceiling Min: 300 ft; Visibility Min: 1 mile
NAVAIDs	ILS, ALS, REILs, Rotating Beacon, Lighted Wind Indicator/Segmented Circle	X		
Lighting	HIRL, MITL		X	MIRL, LITL
Weather	ASOS/AWOS and a PWBS	X		
Ground Communications	Public Phone, GCO or RCO	X		
Covered Storage	70% of Based Aircraft		X	40,515 Sq Ft Covered Storage (approx 45%)
Aircraft Apron	30% of Based Aircraft Plus and Additional 75% for Transient Users	X		
GA Terminal / Administration Building	2,500 Sq. Ft.	X		
Fencing	Entire Airport		X	50% Fenced
Auto Parking	1 Space for Each Based Aircraft Plus 50% for Employees/Visitors		X	60 based aircraft; 76 parking spaces
Fuel	Selve-Service AvGas & Jet A	X		
FBO	Full Service	X		
Maintenance	Full Service	X		
Ground Transportation	Rental Car Available	X		
Other	Building for Airport Maintenance Equipment	X		

3. Airport Related Economic Uses

Review of the E.F. Knapp airport indicates that the airport serves the needs of local businesses in several ways. Some local businesses base aircraft at the airport to facilitate travel to customers and suppliers. Many other local businesses and the State of Vermont regularly have customers and suppliers fly in to meet with them. Members of the local insurance industry are also frequent airport users, and often come from companies with large numbers of employees and equally large financial holdings. Insurance companies in the Central Vermont region that frequently use the Knapp airport include National Life Insurance Company, Union Mutual Insurance Company, Blue Cross and Blue Shield of Vermont, Vermont Insurance Management Inc., Concord Group Insurance, USA Risk Group, and Huntington National Bank.

UPS is another important business user of this airport. UPS operates a distribution center on land that abuts the airport. The ability to quickly and efficiently shuttle cargo from the airport to the distribution center was an important factor in the decision to locate and maintain the UPS distribution center in Berlin.

Perhaps one of the most important impacts that the airport has had on the region is the instrumental role it played in accessing technical support for startup companies such as Bombardier and Vermont Castings. These startups have either left the region or have grown to such a size that they no longer need to regularly operate an aircraft at the airport. However, the proximity to Knapp was instrumental in the initial phases of the businesses, and for smaller area companies in Montpelier and Randolph the airport continues to have a large impact on business.

4. Other Airport Benefits

Edward F. Knapp adds in several ways to the market area's standard of life. Local pilots offer charity rides to children from a local hospital and to children associated with the Washington County Mental Health Agency. Community events are also held at the airport including fly-ins and business expositions. Twice each year, a pancake breakfast/open house is held at the airport. These breakfasts have a dual purpose; to educate the community as a whole about the Edward F. Knapp State Airport and to educate children about aviation-related career opportunities. Norwich University frequently flies speakers in and out of the airport. The Vermont Agency of Forest and Parks uses the airport to conduct aerial surveys, and the Vermont State Police use the airport to conduct drug enforcement operations.
Knapp is the closest airport to skiing at major destinations like Sugarbush (Warren-Sugarbush Airport is closed in the winter). The airport is also a convenient point of access for those wishing to enjoy warm-weather outdoor activities in the area.

Warren-Sugarbush Airport

1. Airport Background and Location

Warren-Sugarbush is located in the town of Warren. The airport is a privately-owned public access airport. Access is limited to small aircraft.

2. Facilities and Activity

The airport has sailplane rides, instruction, and rental, as well as airplane instruction, aerobatics, banner

towing, tie-downs, and avgas sales. The airport consists of a single runway, 2,575 feet in length, which is in good condition. There is a briefing room, restaurant, lounge, restrooms, and public hangar space. Taxi and car rental arrangements are available. The site has approximately 15 on-site parking spaces. Seventy aircraft are based at the airport (50 gliders and 20 airplanes). Based aircraft is forecasted to increase annually, with a 2025 estimate of 82 aircraft. Estimated annual operations for the year 2005 totaled 22,500 (mostly glider flights which consist of four operations per flight). Total operations are expected to increase annually, reaching 26,400 by 2025. The Warren-Sugarbush Airport is open only during the spring, summer, and fall. There are no night operations. Recently two hangars were constructed and the runway was repaved. During the winter, the airport is used as a cross-country ski center.

3. Airport Related Economic Uses

Soaring is the most important activity at the Warren-Sugarbush airport. On any given weekend with good gliding weather, fifty or sixty people can be found at the airport. The Sugarbush Soaring Association numbers about seventy-five members, and reports total club revenues in the neighborhood of $200,000. A biannual soaring competition is hosted by the club at the Warren-Sugarbush airport, drawing an attendance of hundreds to the local area.

4. Other Airport Benefits

The airport restaurant is open for lunch daily, and breakfast and lunch on weekends throughout the summer months. The glider flight school and commercial ride business during the spring, summer and fall, along with the cross-country ski center in the winter, bring hundreds of visitors to the area throughout the year.

EXISTING AND FUTURE DEFICIENCIES

Edward F. Knapp State Airport

The FY 2007 – 2011 VTrans Airport Capital Facilities Program and VTrans staff identified the following project needs for the future. They are broken down into short-term, intermediate-term, and long-term projects.

The short-term (within 5 years) projects are:

1. Phase I – Parallel taxiway to runway 17/35
    a. Construct parallel runway on north end of runway 17/35
    b. Construct terminal apron expansion
    c. Reconfigure west end of runway 5/23.

2. Phase II – Parallel taxiway to runway 17/35/R
    a. Construct new parallel taxiway for southern end of runway 17/35
    b. Reconstruct runway 5/23.

3. Construct approximately 4,500 square feet of apron area pending Airport Layout Plan (ALP) update.

4. New Global Positioning System (GPS) instrument approach (precision approach) for runway 17.

5. Additional privately-owned hangar development.

6. Development of Airport Business Plan by VTrans (Currently underway).

The intermediate-term (5-10 years) projects are:

1. Additional security fencing

2. GPS precision instrument approach for runway 35

3. VTrans Operations Center/Civil Air Patrol (CAP) Wing Headquarters - Design new VTrans Operations Center/CAP Wing headquarters building with replacement hangar. The Vermont Wing of the CAP has relied on low-rent space in the residential housing units that the Burlington International Airport (BIA) has acquired for various safety and expansion projects. This has necessitated repeated, disruptive moves as BIA has moved forward with its expansion plans. The new Wing GQ, planned to be jointly located with the VTrans Operations Center at Knapp State Airport will provide a permanent, secure and centralized location for CAP's Vermont WING HQ.

The long-term (10-20 years) projects are:

1. Additional hangar development

2. Additional aircraft tie-down ramp

3. Land acquisition and/oror new aviation easements

4. Runway reconstruction

5. Runway lighting

Additionally, there is a statewide Airport Pavement Management & Maintenance Program that will provide for the assessment of all statewide airport pavements and an update to pavement condition database. The project will prioritize three years of pavement maintenance and develop bid documents for pavement maintenance projects through 2007.10

Sugarbush-Warren Airport

Sugarbush-Warren Airport, a privately owned facility, doesn't receive Federal or State funding. Maintenance of the existing facilities is an on-going need.

10 The Status of Airport Projects for the Web 2006, http://www.vermontairports.com/airproj.htm

FREIGHT

Freight Flows

According to the Vermont Statewide Freight Study completed by VTrans in 2001, 90% of freight tonnage in, out, and through Vermont is moved by truck, 7% by rail, and 3% by air.11 Vermont receives approximately 2.5 times more freight than it ships out. Washington County receives about 2 times as much freight as it sends out. As shown in **Figure 40**, of the fourteen counties in the state, Chittenden County is the largest shipper/receiver of freight and Washington County is the 5th.

Figure 40. Annual Total Commodity Flows by Weight and County (2001)

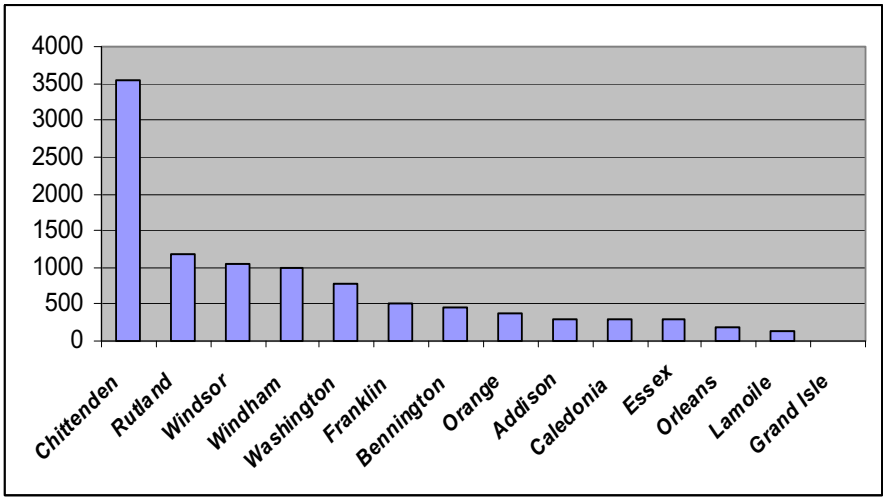


Table 33 (on the following page) shows the destinations of freight exported by truck from Washington County. The important commodities transported from the region are specialty and dairy food products, granite, and wood.

T**able 34** shows the origins of freight imported by truck into Washington County. Although **Tables 33 and 34** do not include freight shipped by rail, they do help identify the major trading partners for Washington County. Washington County's largest trading partner is the rest of Vermont. Seventy-five percent of the County's exports and 41% of its imports have destinations or origins within Vermont. The highest percentage of freight exported outside of Vermont from Washington County to a single state has destinations in Maine. Outside of Vermont, the state of New Hampshire and the Province of Quebec are also important trading partners. Washington County imports 12% of its freight from the state of New Hampshire and 11% from the Province of Quebec.

11 The commodity flow analysis was based on weight rather than value. If value was the proxy used, the contribution of air operations to freight movement in Vermont would increase, but it would still represent an insignificant portion of the freight in Vermont.

Table 33. Destination of Freight Exported by Truck from Washington County
(2001 VT Statewide Freight Study)

Destination	Annual Total Tonnage	Percent of Total
VT: Addison, Caledonia, Chittenden, Franklin, Grand Isle, Lamoille, Orleans, Rutland, Washington Counties	556,085.93	53.83%
VT: Essex, Orange, Windham, Windsor Counties	180,017.27	17.42%
Mid-Atlantic USA	65,822.63	6.37%
VT: Bennington County	42,737.83	4.14%
Maine	41,694.00	4.04%
Province of Quebec	35,565.19	3.44%
Midwest USA	29,568.62	2.86%
NY Rest of State	25,264.39	2.45%
New Hampshire	20,158.17	1.95%
Southeast USA	10,850.25	1.05%
West USA	8,311.10	0.80%
Western Canada	6,370.51	0.62%
Eastern MA	6,187.20	0.60%
Connecticut	2,761.24	0.27%
NY Albany Area	566	0.05%
Western MA	334.33	0.03%
Rhode Island	334.41	0.03%
Eastern Canada	334.43	0.03%
NY Adirondacks	138.08	0.01%
Totals	1,033,101.60	100.00%

Table 34. Origins of Freight Imported by Truck into Washington County
(2001 VT Statewide Freight Study)

Origin	Annual Total Tonnage	Percent of Total
VT: Addison, Caledonia, Chittenden, Franklin, Grand Isle, Lamoille, Orleans, Rutland, Washington Counties	232,002.34	28.38%
New Hampshire	127,416.49	15.59%
Province of Quebec	87,034.10	10.65%
VT: Essex, Orange, Windham, Windsor Counties	83,160.29	10.17%
NY Rest of State	64,337.09	7.87%
Maine	49,132.59	6.01%
Eastern MA	35,316.17	4.32%
Southeast USA	33,708.85	4.12%
Mid-Atlantic USA	23,468.96	2.87%
VT: Bennington County	20,263.13	2.48%
Midwest USA	17,344.56	2.12%
West USA	15,529.67	1.90%
Western Canada	9,315.83	1.14%
Connecticut	7,444.04	0.91%
Western MA	4,043.28	0.49%
NY Albany Area	3,437.58	0.42%
Eastern Canada	2,302.24	0.28%
NY Adirondacks	1,971.99	0.24%
Rhode Island	123.96	0.02%
Total	817,353.16	100.00%

Trucks

Over 90% of freight by weight is transported in, out, and through Vermont on trucks. It is critical, therefore, that adequate highways be provided to support safe and efficient truck travel because trucking is important to the economic vitality of the region. The routes that currently, and in the future, carry even modest numbers of trucks must be constructed and maintained for the safe movement of both people and goods.

The Vermont Truck Network, as shown in **Figure 41** was designated by state statute in 2000 (Title 23 Section 1432c). The Vermont Truck Network consists of all interstate routes and segments of US and Vermont State routes. I-89, US 2, and US 302 in the Central Vermont Region are part of the Vermont Truck Network. There is no overall length limit on the interstate. For US and VT routes that are part of the Vermont Truck Network, the total length of a truck and trailer may not exceed 72 feet without a permit.

Title 23 sections 1391 to 1393 of the Vermont Statutes define the weight, size and load limitations for vehicles using roads in the State. The following is a brief synopsis and simplification of the regulations; the regulations are complex and the reader is referred to the statute for definitive information. Towns also may post their own weight limits for town roads and bridges, which are subject to the approval of the Secretary of Transportation.

State law generally limits gross vehicle weights to 80,000 pounds. Limits also apply to axle loadings. Single axle loads on State highways are limited to 22,400 pounds with an allowed 10% tolerance. Tandem axle loads are limited to 36,000 pounds and also allow a 10% tolerance. On the Interstate Highways (in the Central Vermont Region, Interstate 89) single axle loads are limited to 20,000 pounds with no tolerance allowed and tandem axle loads are limited to 34,000 pounds with tolerances allowed by permit. The weight limit for bridges with a wood floor is 16,000 lbs, unless otherwise posted; and 24,000 lbs upon a class 2, 3, and 4 town highway or bridge.

Table 35

	2 axles	3 axles	4 axles	5 axles	6 axles	7 axles
Max Weight Limits	40,000	60,000	70,000	80,000	80,000	80,000

(These data were tabulated using Title 23 Section 1392 of the Vermont Statutes, and they only show the absolute maximum weight limit based on number of axles. Due to the fact that it also accounts for the distance between axles, State law is more complicated, and weight limits may be less for some trucks.)

Additionally, the laws provide annually permitted categorical exemptions for "unprocessed forest products," "unprocessed milk products" and "unprocessed quarry products." Under these annual permits, a maximum gross weight of 99,000 pounds is allowable on State and town highways, but weights on the Interstate system are still confined to 80,000 pounds, which is why heavy trucks frequently travel through towns when the Interstate would seem to be a more sensible route. The volume of this class of truck traffic is difficult to quantify but may represent an important use of the Region's roads. The laws allow further weight exemptions in excess of these but only for specially permitted uses.12

Table 36 summarizes the daily truck trips for various road segments in the Region, and these data are displayed graphically in terms of truck traffic volume ranges in **Figure 42** and **Figure 43**.

12 Windham Regional Transportation Plan, Page 22.

The highest numbers of daily truck trips in the Central Vermont Region (2,200 to 3,000 trucks per day) are found on the interstate, where trucks account for 9-15% of the total traffic stream. The number of daily truck trips drops significantly off the interstate system. US 2 in Montpelier carries the largest volume of trucks (784 trucks per day) for non-interstate roads in the Region. VT 100 in Waterbury has the second highest number of daily truck trips (760 trucks per day), and VT 14 in Barre City has the third highest (744 trucks per day). The number of daily truck trips on most of the non-interstate system roads in the region is below 400 per day.

Daily truck trips more than doubled on VT 14 in Woodbury between 1998-2001 and the 2003-2006 data collection periods. Truck trips grew by more than 45% during the same time period on US 2 in Montpelier, Marshfield, and Plainfield.

Table 37 shows the breakdown of medium versus heavy trucks traveling on road segments in Central Vermont. The percent of heavy trucks traveling on I-89 ranges from five to eleven, and is significantly higher than any other road in the region. US 2 and VT 14 have the second highest percent of heavy trucks, ranging from two to four percent. Specifically, VT 14 in Williamstown is one of the most lightly traveled road segments in the region, with only 105 daily truck trips. However, this road segment has one of the highest percents of heavy trucks (3.22%), or 39 heavy trucks. The remaining road segments in the region are dominated by medium weight trucks. These data are displayed graphically in **Figure 44**.

Existing and Future Truck Deficiencies

Corridor and site-specific roadway deficiencies described previously in the Highway Section of this chapter have direct impacts on truck travel. Because most of the existing and future truck traffic is on the region's arterials, adequate shoulders, bridge widths, and truck climbing lanes are important considerations for arterial improvements, in combination with other needs (such as bicycles) of the road network.

The movement of goods by trucks is an economic necessity of the Central Vermont Region. Frequently, however, the needs of industry and commerce are in conflict with the residential environment. Truck traffic can cause vibrations which may damage private property, can generate noise and air pollution in residential neighborhoods, can damage streets not sufficiently designed for truck traffic (particularly due to the added weight on the road network), and can present a safety problem for pedestrians and other vehicles.

Figure 41: State of Vermont Truck Network (VTrans, 2002)

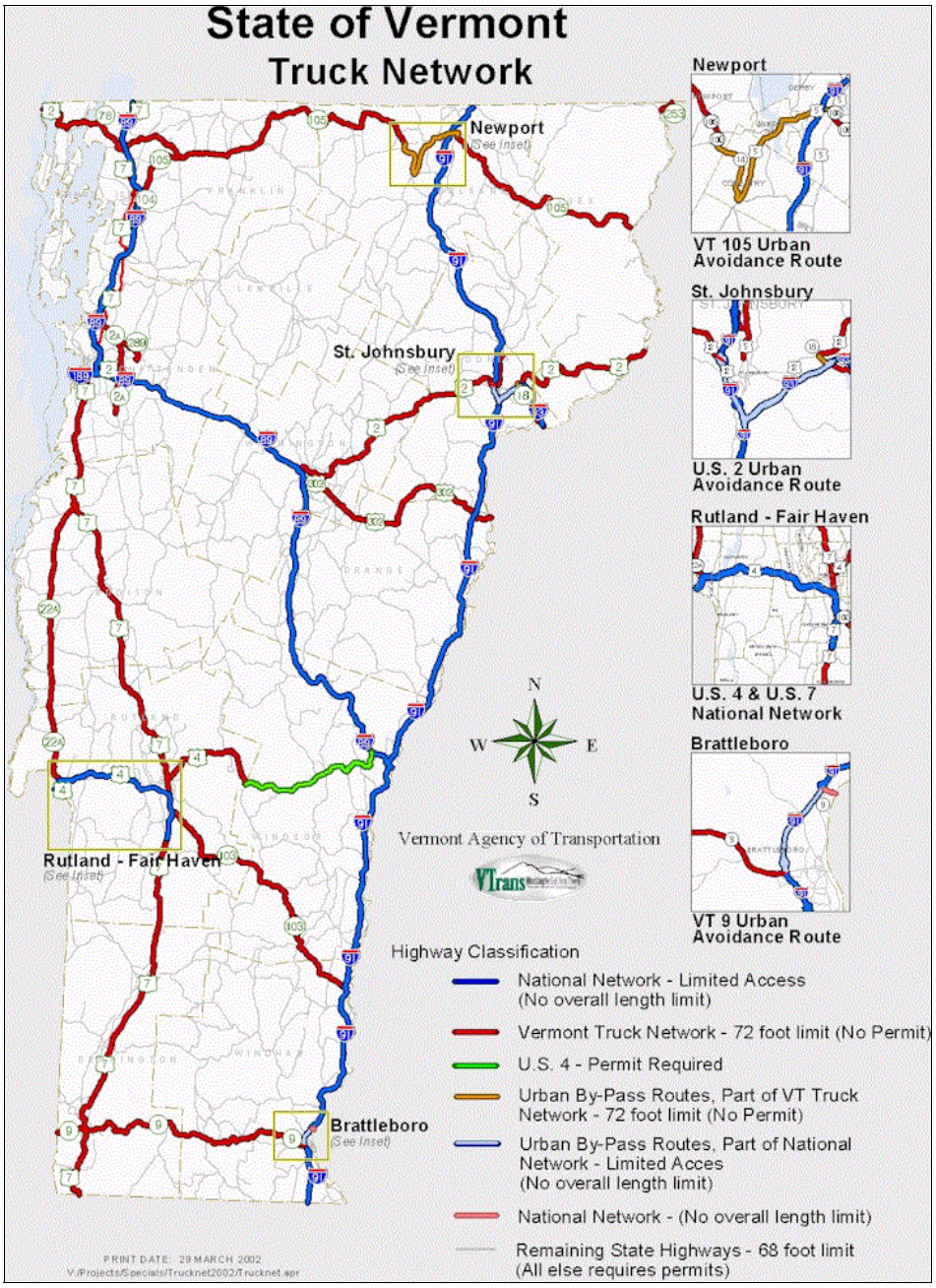
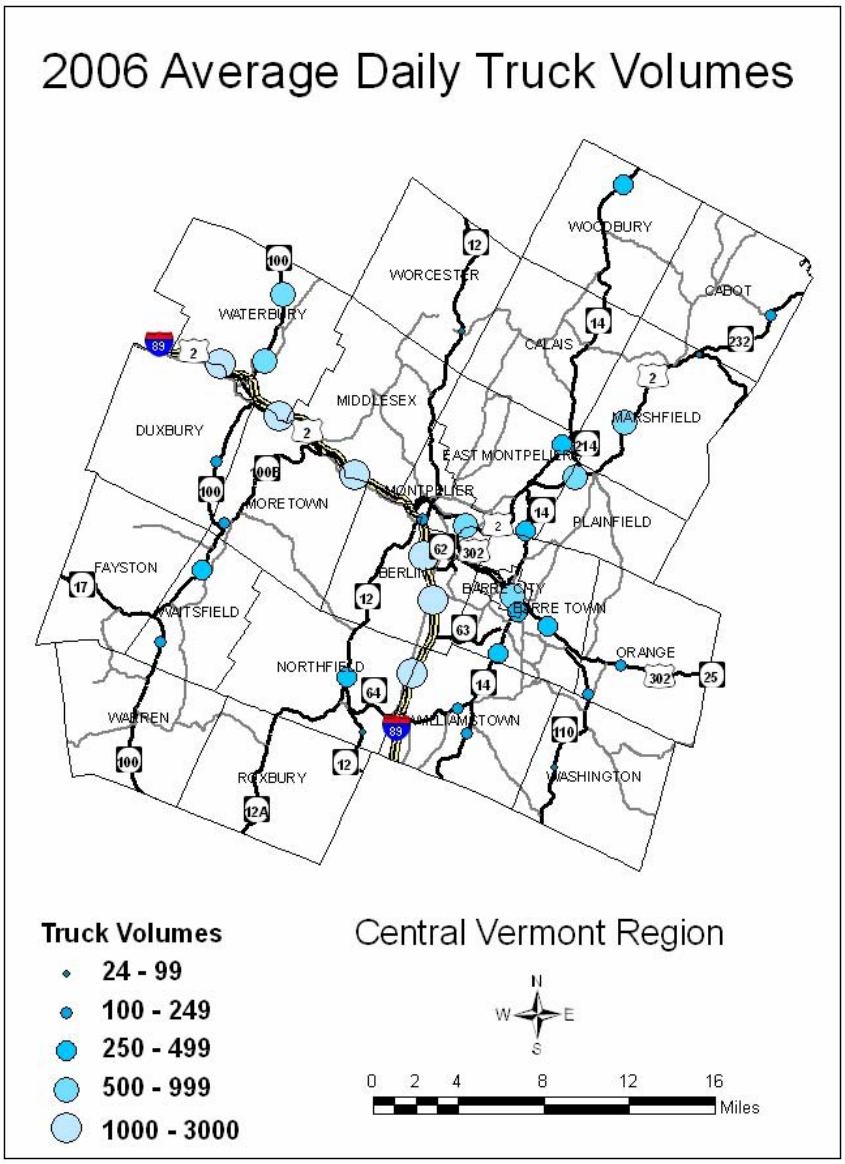


Table 36. Daily Truck Trips (1998-2006)[13]

Site ID	Municipality	Road Name	1998 - 2001 Data		2003 - 2006 Data		Change in Daily Truck Trips	
			Trucks per Day	% of Total Daily Traffic	Trucks per Day	% of Total Daily Traffic	Absolute	Percent
S6W089	Waterbury	I89	2,673	11.28	2,939	11.57	266	9.94
S6W002	Berlin	I89	2,356	11.96	2,898	13.48	542	23.01
S6W034	Middlesex	I89	2,616	11.89	2,875	12.13	259	9.89
S6W032	Berlin	I89	2,298	14.73	2,577	15.34	279	12.15
S6N003	Williamstown	I89	2,461	15.10	2,495	15.40	34	1.37
S6W088	Middlesex	I89	2,271	8.77	2,144	8.97	-127	-5.60
S6W341	Berlin	Berlin State Hwy	411	5.48	NA	NA	NA	NA
S6W173	Montpelier	US2	532	5.12	784	7.13	252	47.42
S6W036	Waterbury	VT100	629	4.22	760	5.24	131	20.79
S6W152	Barre City	VT14	936	5.96	744	5.72	-192	-20.56
S6W081	Waterbury	VT100	509	4.67	657	6.84	148	29.01
S6W104	Marshfield	US2	425	7.87	630	11.89	205	48.28
S6W103	Plainfield	US2	372	5.64	563	8.28	191	51.35
S6W123	East Montpelier	VT14	317	6.33	430	9.14	113	35.51
S6W139	Waitsfield	VT100	325	4.71	400	5.64	75	23.21
S6W108	Barre Town	US302	323	4.90	399	5.87	76	23.58
S6W109	Woodbury	VT14	155	6.47	348	12.01	193	124.70
S6W126	Barre Town	VT14	229	4.68	330	8.06	101	44.31
S6W114	East Montpelier	VT14	212	5.43	296	6.73	84	39.68
S6W030	Cabot	US2	281	9.06	275	9.49	-6	-2.06
S6W112	Calais	VT14	193	6.22	NA	NA	NA	NA
S6W155	Barre City	Quarry St	435	9.46	265	6.46	-170	-39.11
S6N109	Orange	US302	204	6.37	239	7.23	35	16.96
S6W197	Montpelier	VT12	186	5.17	235	5.59	49	26.23
S6W138	Moretown	VT100	159	5.14	217	6.04	58	36.75
S6W003	Waitsfield	VT100	205	4.36	213	4.64	8	4.12
S6W211	Waterbury	US2	385	3.74	NA	NA	NA	NA
S6W364	Duxbury	VT100	219	6.07	196	5.17	-23	-10.29
S6W455	Northfield	VT12	180	2.73	256	4.07	76	42.45
S6N190	Williamstown	VT14	86	6.58	105	8.72	19	21.67
S6W191	Montpelier	Main St	136	4.87	NA	NA	NA	NA
S6N126	Orange	VT110	91	3.94	126	5.49	35	38.76
S6W008	Warren	VT100	71	6.43	NA	NA	NA	NA
S6N020	Williamstown	VT64	96	5.05	106	5.32	10	10.83
S6W121	Northfield	VT12A	70	4.39	NA	NA	NA	NA
S6W129	Worcester	VT12	72	5.52	71	5.04	-1	-2.00
S6N127	Washington	VT110	44	5.58	61	7.12	17	39.16
S6W133	East Montpelier	VT214	58	7.72	50	5.95	-8	-13.83
S6W182	East Montpelier	US2	388	5.24	NA	NA	NA	NA
S6W119	Northfield	VT12	41	4.12	40	4.37	-1	-1.94
S6W132	Marshfield	VT232	32	4.90	24	4.67	-8	-24.11

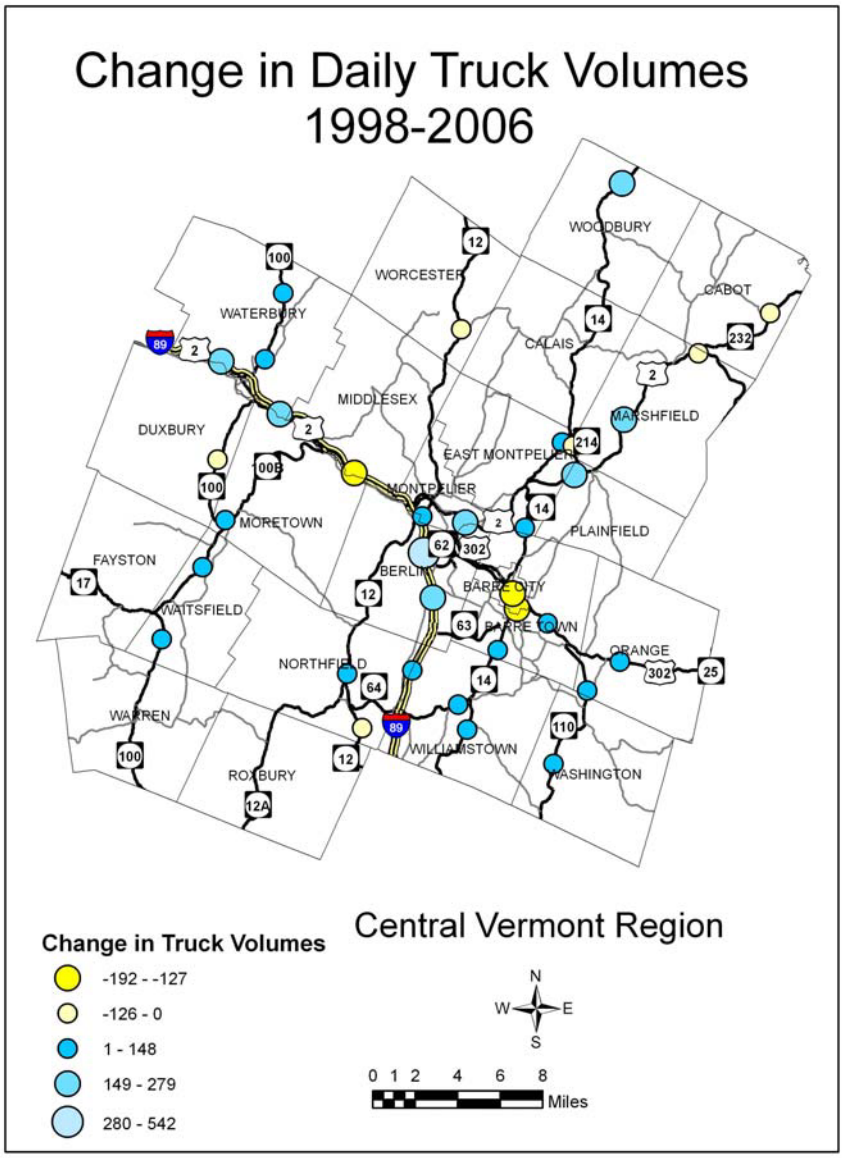
13 Automatic Vehicle Classification Report, Vermont Agency of Transportation, Policy and Planning Division, Traffic Research, 2006 and 2001 Reports.

Figure 42. 2006 Average Daily Truck Volumes[14]



14 Automatic Vehicle Classification Report, Vermont Agency of Transportation, Policy and Planning Division, Traffic Research, 2006 Reports.

Figure 43. 1998-2006 Change in Average Daily Truck Volumes[15]



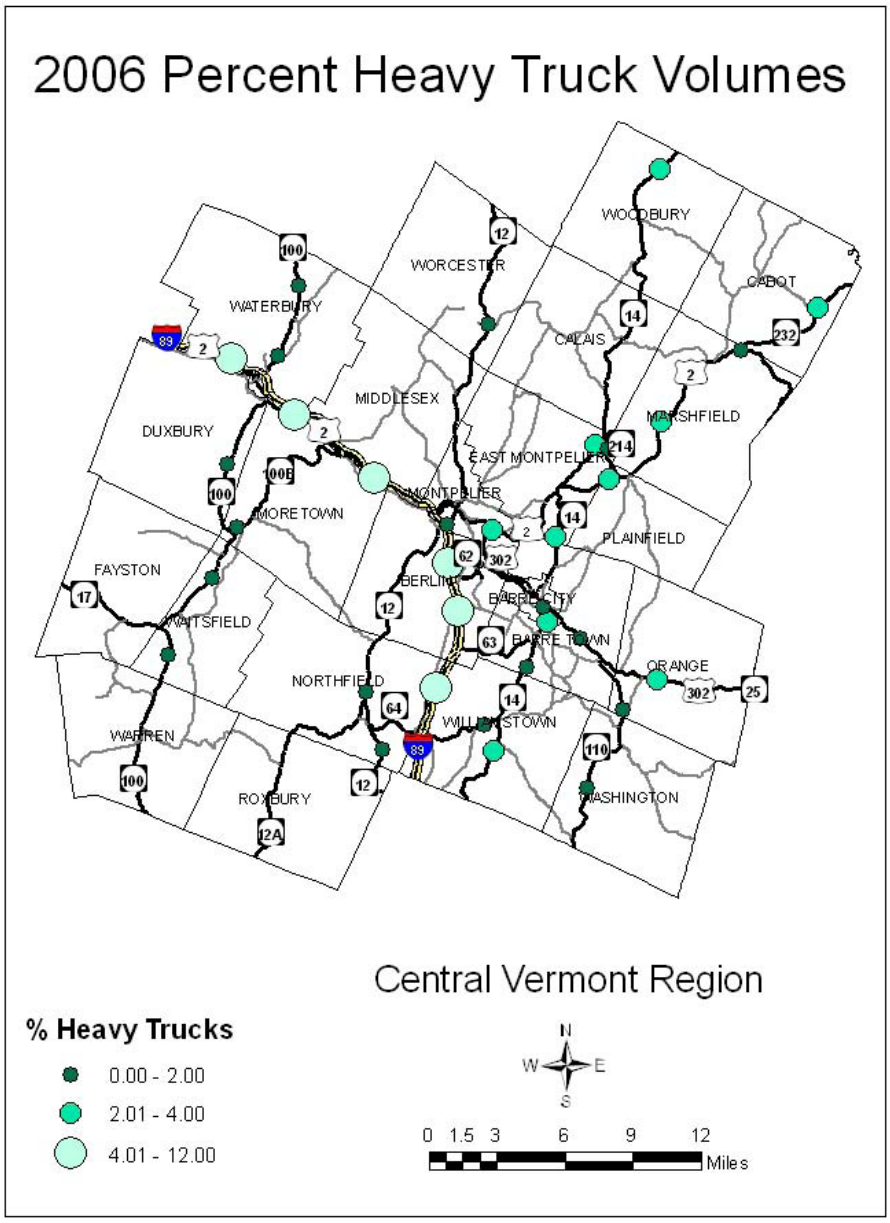
15 Automatic Vehicle Classification Report, Vermont Agency of Transportation, Policy and Planning Division, Traffic Research Reports.

Table 37. Medium vs. Heavy Truck Volumes16

Site ID	Municipality	Road Name	2003 - 2006 Data					
			Trucks per Day	% Trucks	Medium Trucks	% Medium	Heavy Trucks	% Heavy
S6N003	Williamstown	I89	2495	15.40	816	5.04	1677	10.35
S6W032	Berlin	I89	2577	15.34	1043	6.21	1536	9.14
S6W002	Berlin	I89	2898	13.48	1183	5.50	1716	7.98
S6W034	Middlesex	I89	2875	12.13	1097	4.63	1780	7.51
S6W089	Waterbury	I89	2939	11.57	1181	4.65	1760	6.93
S6W088	Middlesex	I89	2144	8.97	982	4.11	1162	4.86
S6W030	Cabot	US2	275	9.49	167	5.77	108	3.73
S6N190	Williamstown	VT14	105	8.72	66	5.50	39	3.22
S6W104	Marshfield	US2	630	11.89	470	8.86	161	3.03
S6W173	Montpelier	US2	784	7.13	479	4.35	306	2.78
S6W109	Woodbury	VT14	348	12.01	268	9.25	80	2.76
S6N109	Orange	US302	239	7.23	158	4.78	81	2.45
S6W103	Plainfield	US2	563	8.28	405	5.96	158	2.33
S6W114	East Montpelier	VT14	296	6.73	198	4.50	98	2.22
S6W155	Barre City	Quarry St	265	6.46	175	4.26	90	2.20
S6W123	East Montpelier	VT14	430	9.14	328	6.98	101	2.15
S6W108	Barre Town	US302	399	5.87	289	4.25	110	1.62
S6N127	Washington	VT110	61	7.12	47	5.50	14	1.62
S6W152	Barre City	VT14	744	5.72	540	4.15	204	1.57
S6W081	Waterbury	VT100	657	6.84	512	5.33	145	1.51
S6W197	Montpelier	VT12	235	5.59	174	4.14	61	1.45
S6W129	Worcester	VT12	71	5.04	51	3.61	20	1.43
S6W126	Barre Town	VT14	330	8.06	276	6.73	55	1.33
S6W138	Moretown	VT100	217	6.04	174	4.84	43	1.20
S6W139	Waitsfield	VT100	400	5.64	322	4.54	78	1.10
S6W036	Waterbury	VT100	760	5.24	608	4.19	152	1.05
S6W003	Waitsfield	VT100	213	4.64	170	3.70	43	0.94
S6W133	East Montpelier	VT214	50	5.95	42	5.01	8	0.94
S6N020	Williamstown	VT64	106	5.32	88	4.40	18	0.92
S6W364	Duxbury	VT100	196	5.17	162	4.26	35	0.91
S6W132	Marshfield	VT232	24	4.67	20	3.88	4	0.80
S6W119	Northfield	VT12	40	4.37	33	3.60	7	0.78
S6N126	Orange	VT110	126	5.49	108	4.71	18	0.78
S6W455	Northfield	VT12	256	4.07	208	3.30	49	0.77

16 Automatic Vehicle Classification Report, Vermont Agency of Transportation, Policy and Planning Division, Traffic Research Reports.

Figure 44. Percentage of Heavy Trucks in the Traffic Stream17



17 Automatic Vehicle Classification Report, Vermont Agency of Transportation, Policy and Planning Division, Traffic Research Reports.

Provision of truck routes is an important element in the management of truck travel demand in the region. There are generally two types of truck routes: through truck routes and local truck routes. The primary intent of a through truck route is to direct trucks passing through the region along the best available route. To the extent possible, these trucks should be able to follow routes that by-pass areas of intense congestion. The Vermont Truck Network serves through truck travel.

Management of local truck routes is generally accomplished by placing restrictions on truck use of roadways. Common reasons for restricting truck travel include elimination of the need to construct all streets to support heavy truck volumes, improvement in the roadway demand/capacity relationship, and environmental and aesthetic concerns. Currently, the only designated truck route in the region is located in Barre City. In addition, several towns have weight restrictions and truck prohibitions on many of their local streets.

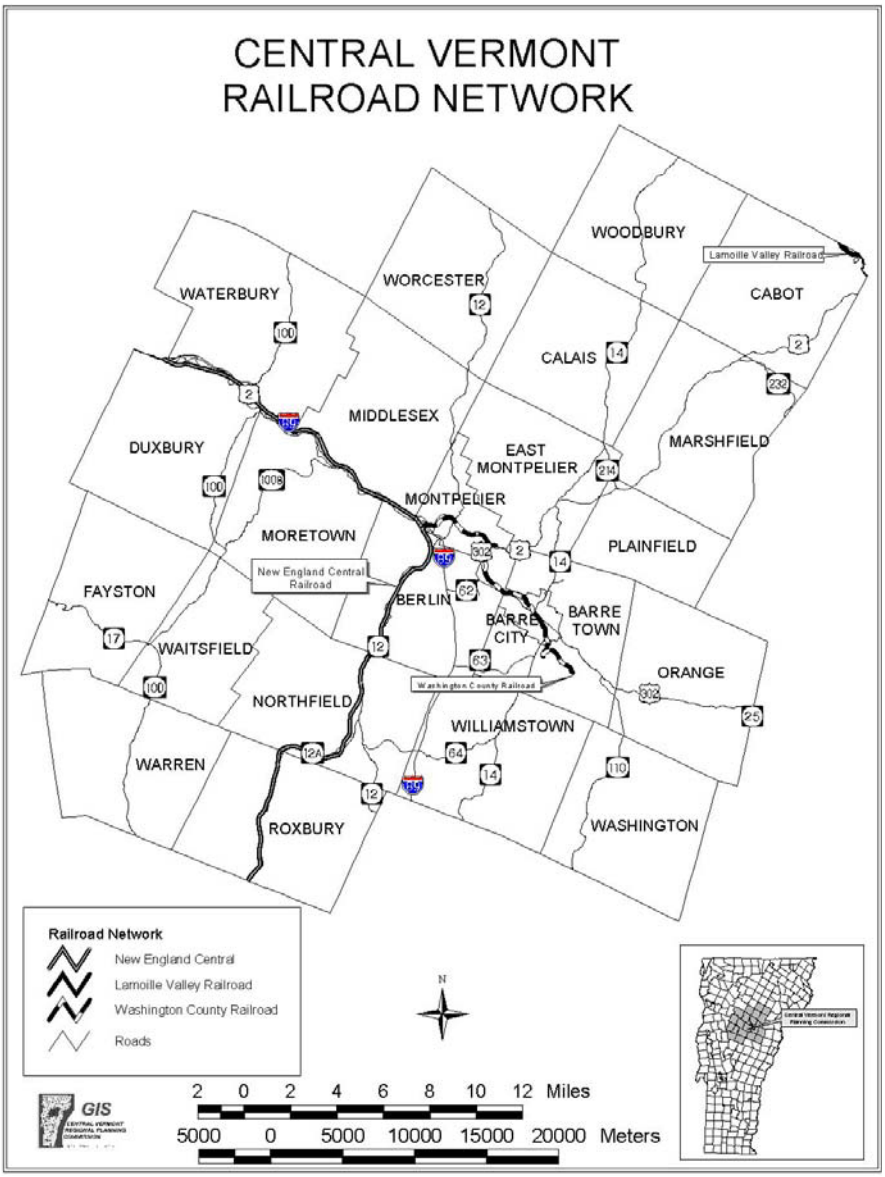
During interviews conducted as part of the Vermont Statewide Freight Study in 2001, the need to improve east-west travel for trucks was identified. US 2 in the north was specifically mentioned, as well as US 4 in Central Vermont. US 302 may also be an issue for truck travel because it passes through small community centers, and has narrow shoulders and steep inclines. These deficiencies result in reduced safety, increased travel time for freight, and impacts on the quality of life in these small communities. All of these highways are part of the Vermont Truck Network and play an important role in serving the Region's freight movement needs**.**

The variation in local road postings was also identified as an issue in the Vermont Statewide Freight Study. Truckers must sometimes acquire multiple permits to deliver off of the state truck network. This situation creates efficiency and cost issues for freight movements. However, it also generates revenue and provides localities some control over truck access to roadways. Regional cooperation could address these issues to ease the difficulties for freight movement in the region.

Rail

Current rail services in the Central Vermont Region are illustrated in **Figure 45**. New England Central Railroad operates the trackage which follows the Route 12A corridor through Roxbury and Northfield, the Route 12 corridor through Northfield and Berlin, and the I-89/Route 2 corridor to the Burlington area. Freight service is operated over this line in addition to Amtrak passenger rail service. Amtrak has stations in Berlin (Montpelier Junction) and in Waterbury. This rail line is an important link between Canada and Southern New England. The major commodities transported are pulp/paper, lumber/wood, non-metallic minerals, glass, and stone. New England Central serves a salt shed in Middlesex, a fuel depot in Montpelier Junction, and picks up freight transferred from the Washington County Railroad, also at Montpelier Junction. Otherwise, the majority of the freight traffic on the New England Central is considered overhead, or through traffic, and does not impact the Central Vermont region.

Figure 45. Central Vermont Railroad Network



The rail spur between Montpelier Junction and the Rock of Ages Granite quarry in Barre is owned by the State of Vermont and is known as the Washington County Railroad (WACR). The Washington County Railroad is a private operator that leases the line from the State. WACR handles originating and terminating traffic including petroleum products, calcium chloride, lumber, and stone. Between Montpelier and Barre, WACR operates two local freight trains per month.

Passing through the northeast corner of the region in Cabot was the Lamoille Valley Railroad. Along that line, freight service was once provided between St. Johnsbury and Morrisville. In 2005, the rail infrastructure was removed. Since then, the right-of way has been leased to the Vermont Association of Snow Travelers (VAST) for multi-season trail use.

From 1992 to 2002, freight rail traffic that originated and terminated in Vermont declined by 21 percent. Freight that originated in Vermont, however, increased from 430,000 tons in 1992 to 764,360 tons in 2002, which is primarily attributable to the increase in shipments from Omya, Inc. in Florence. It is projected that freight rail tonnage will increase between 44 and 55 percent between now and 2020 or approximately 2.4 percent annually during the next five years18.

Existing and Future Deficiencies (Rail)

The New England Central Line is a Federal Railroad Administration (FRA) Class 3 Railroad, which allows freight use operating at speeds up to 40 miles per hour, and passenger use operating at speeds up to 60 miles per hour. The tracks were upgraded in the late 1980's, and currently are one of the few rail lines with a preventative maintenance program. To preserve public investment in the upgrade, this preventative maintenance program should continue.

The Washington County Railroad's 13-mile long track between Montpelier Junction and Barre Town is a Federal Railroad Administration (FRA) Class 1 Railroad, which means the train travel is restricted to a maximum speed of 10 miles per hour for freight use, and 15 miles per hour for passenger use. This track was upgraded in the mid-1990s to Class 1. Prior to that time, it was classified as an exempt line (meaning it had speeds less than 10 mph, no passenger service, could not carry hazardous material, and did not need FRA inspections).

According to the Vermont State Rail & Policy Plan, published in 2006, there are three industry trends that are expected to have significant impact on Vermont's current rail system. They are:

- 286,000 Pound Rail Cars – The current standard is 263,000. Current rail conditions in Vermont are not able to support the heavier cars.
- Growth of Intermodal Rail– There has been significant growth of intermodal traffic, primarily trailers and containers, which has caused increased need for double stacking cars. This trend has been limited by vertical clearance throughout the state. The recent enhancements to the underground tracks in Bellows Falls will allow for increased height cars to access the state.
- Growth of Short Lines and Regional Railroads – these lines are less financially viable than Class 1 railroads, and therefore have fewer funds available for system improvements.

Additionally, the Vermont Statewide Freight Study identifies the lack of transload facilities as an obstacle

18 VT State Rail & Policy Plan 2006, Executive Summary, page 4.

to increasing rail's share of freight movement in the state. A transload facility allows for the transfer of bulk commodities between truck and rail. One of the main advantages trucks have over rail is that they can deliver and pick up freight at the destination or origin, unlike rail. Over the years, many of the private rail sidings have been eliminated in Vermont making it impossible for rail to provide this same level of service. Although not as efficient as private rail sidings, a transload facility in the Central Vermont Region could make rail more competitive for some commodities. Duke Propane operates a transload facility in Montpelier Junction, and at one point there was discussion of a salt distribution facility in downtown Barre City. With little and inconsistent business, the railroad is looking out for business opportunities.

There are four system initiatives identified in response to the above trends and observations that will support the future of the Vermont rail system. These initiatives are:

- Bridge and track upgrades to maintain and improve railcar loading capability to Vermont railroads.
- Clearance improvements
- Transload freight facilities
- Passenger rail system enhancements

The rail carload capacity project, which is meant to improve the ability of Vermont's rail system to handle 286,000 pound cars, has been divided into two priority routes. There are no rail segments in Central Vermont that will be affected by this project.

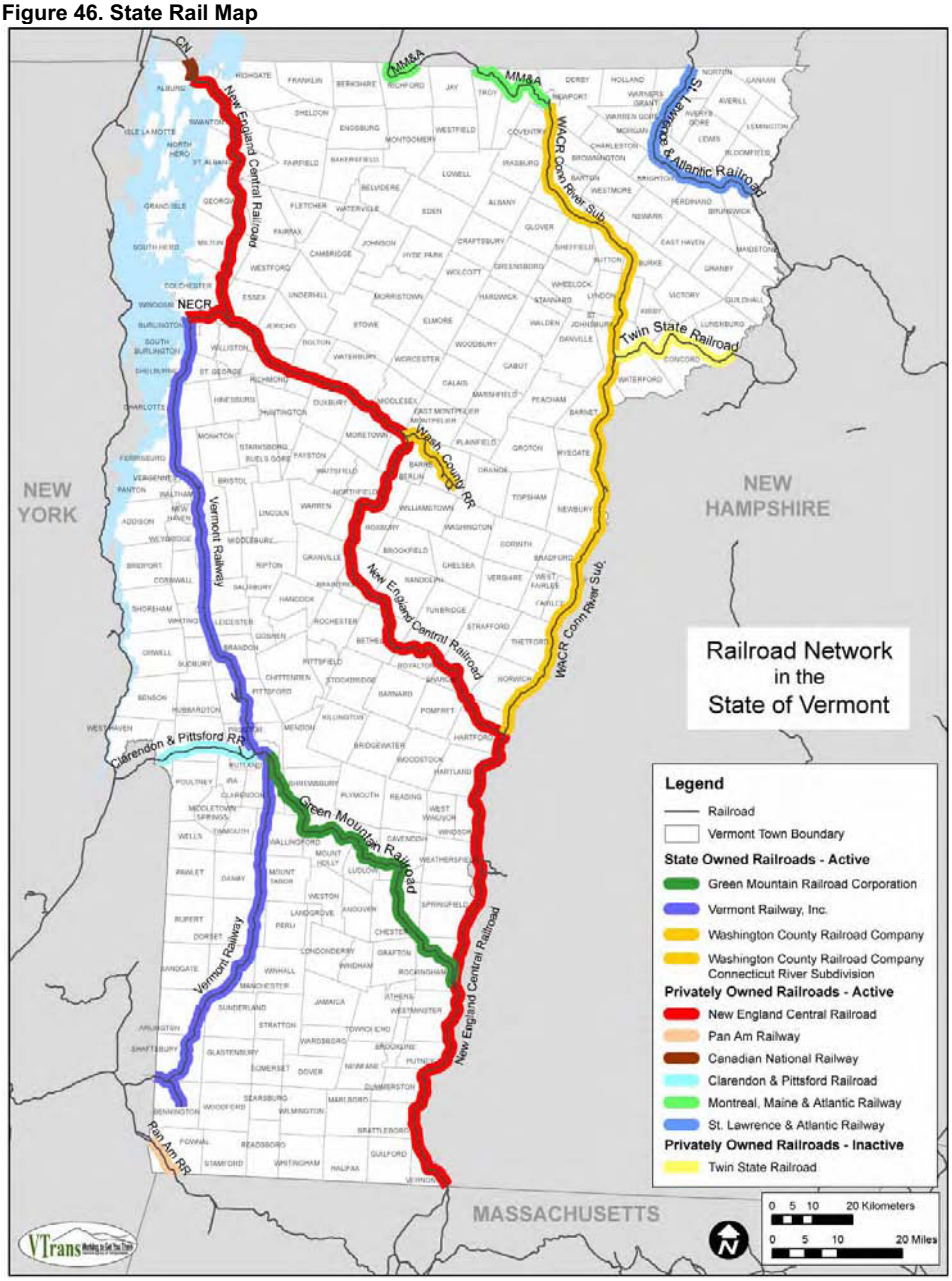
The clearance improvement project has determined, via the 1997 Railway Clearance Survey, that there are no clearance restrictions on the WACR between Montpelier and Barre. On the NECR, the underground tunnel in Bellows Falls was identified as a substantive impediment to development of intermodal traffic on Vermont rail lines. However, VTrans, in partnership with NECR and FHWA, has recently completed a significant project to increase clearance at that location which will support increased intermodal traffic19. Although Bellows Falls is not in Central Vermont, this project is worth noting for potential impact to the region. It will allow automobiles and semi-double stack containers to be carried on the New England Central Rail line, potentially offering greater access to the Central Vermont region.

In response to the need for transload freight facilities, VTrans has stated that they will "…consider supporting improvements to, or creation of, transload facilities that provide increased traffic on rail lines, spur economic development, and are compatible with local interests."20 At this time, this initiative has not identified specific locations for improvement.

Lastly, in September 2007, the Senate approved over $7 Million to replace or rehabilitate structurally deficient bridges in Vermont. According to a recent publication by VTrans, 16% of Vermont's bridges are structurally deficient. This additional funding will increase Vermont's bridge replacement and rehabilitation funding by nearly 20%.

19 VT State Rail & Policy Plan 2006, Chapter 5, page 49.
20 VT State Rail & Policy Plan 2006, Chapter 5, page 13.

Figure 46. State Rail Map



REGIONAL AND CORRIDOR RECOMMENDATIONS

Chapter Five

REGIONWIDE RECOMMENDATIONS

Regional Planning

The Commission strongly encourages the involvement of all 23 member jurisdictions in resolving regional transportation planning issues and the continued participation of the Commission in all state-level forums on transportation planning issues. The Commission further recommends that member municipalities develop plans which address the relationships between their patterns of development and their local transportation system needs.

This Plan represents the continuing effort towards the analysis of multi-modal approaches to solving transportation problems in the Central Vermont Region. The Commission recommends that this analysis be treated as an ongoing duty of CVRPC and its member communities. For example, the Commission, through its Regional Plan and as supported in the Transportation Plan, encourages future development in the Region to be concentrated in identified growth areas, all of which should have adequate transportation facilities to accommodate transportation system demands.

The Commission recommends that transportation system improvements be encouraged at locations where they will or can serve growth areas. The Commission further recommends that transportation and commerce links that are vital to the economic health of the region be fostered.

The Commission encourages the continued development of statewide project priorities through the Regional List of Transportation Projects. The Commission further encourages its member communities to submit project scoping candidates for consideration by the Commission.

Project Development

The Commission fully supports adherence to the VTRANS Project Development process which includes
as an integral component the full consideration of local perspectives and needs in the development of project implementation parameters. The Commission encourages its member communities to monitor the progress of individual project implementation. This monitoring will help maintain local interest in the projects and will potentially help shorten the current extended backlog of programmed projects through the removal of undesired or infeasible projects.

The VTRANS Project Development process requires full consideration of all environmental issues early in the project planning process. The Commission (through the VTRANS Project Development Process) also suggests that both direct and indirect costs and benefits be considered by VTRANS and any other implementing agency.

The Commission recommends that the project development process give due consideration to the region's desire for visually attractive and durable infrastructure, for high architectural standards, for retaining design parameters when historic bridges are replaced, for enhancing the built and natural environment, and for any improvements to be contextually appropriate.

CORRIDOR RECOMMENDATIONS

Details on the need for these recommendations and status of projects and facilities can be found in **Chapter 4**.

I-89 CORRIDOR

I-89 passes through Williamstown, Berlin, Montpelier, Middlesex, and Waterbury. I-89 is functionally classified as an interstate highway. It serves as the primary transportation connection between the Central Vermont Region and Canada, Burlington to the north, and I-91 and New Hampshire to the south. I-89 has been included as part of the **National Highway System** because of its importance in carrying inter-regional and inter-state trips and goods. I-89 is part of the Vermont Truck Network. Within the region, key access points to I-89 are VT 100, VT 100B, VT 12, US 2, VT 62, VT 63, and VT 64.

Segment-Level Recommendations

South of Exit 5 (Route 64)

A High Crash Location has been identified on this section.

Exit 5 Interchange Area (Route 64)

The existing park and ride lot needs to be expanded.

Between Exit 5 (Route 64) and Exit 6 (Route 63)

No deficiencies have been identified on this section.

Exit 6 Interchange Area (Route 63)

A new park and ride lot should be considered at the end of the exit ramps.

Between Exit 6 (Route 63) and Exit 7 (Route 62)

No deficiencies have been identified on this section.

Exit 7 Interchange Area (Route 62)

Bridges 37 and 38 have been identified as functionally deficient.

Between Exit 7 (Route 62) and Exit 8 (Montpelier State Highway)

Bridge 40 is under design for rehabilitation (it is listed as an I-89 Project but the bridge actually carries Route 2 over the interstate).

Exit 8 Interchange Area (Montpelier State Highway)

Bridge 41 has been identified as functionally deficient.

Between Exit 8 (Montpelier State Highway) and Exit 9 (Route 2)

Bridge 44 is structurally deficient, and is under design for rehabilitation.

Exit 9 Interchange Area (Route 2)

No deficiencies have been identified on this section.

Between Exit 9 (Route 2) and Exit 10 (Route 100)

No deficiencies have been identified on this section.

Exit 10 Interchange Area (Route 100)

Both the northbound and southbound exit ramps experience Level of Service F. The southbound ramp is at a critical level, in that traffic frequently backs up into the Interstate shoulders. The entire ramp was expanded to two lanes, and a traffic signal is under design.

The Waterbury park-ride lot off the Route 100 corridor needs paving and improved overhead lighting.

North of Exit 10 (Route 100)

No deficiencies have been identified on this section.

ROUTE 2 CORRIDOR (Montpelier East)

Corridor-Level Recommendations

Highway System Recommendations

Route 2 is functionally classified as a principal arterial. Route 2 is included as part of the National Highway System (NHS) because of its importance in carrying inter-regional and inter-state trips and goods. However, the Regional Transportation Plan recommends that there be flexibility in the design standards applied to NHS corridors through village centers such as those along the Route 2 corridor (e.g., East Montpelier, Plainfield, and Marshfield). Route 2 is part of the Vermont Truck Network.

As an arterial corridor, Route 2 carries not only locally-generated traffic but also traffic originating from intersecting corridors (i.e. RT 12, RT 302, RT 14), and from external through traffic. The land use and development patterns of all these communities contribute to the levels of demand and congestion along this corridor, not just those located where the congestion occurs (e.g., Montpelier). This demand is created by all of these communities, and produce a need for capacity improvements as described below. Sustainable land use development and transportation facility improvements need to be balanced. Access Management, providing turn lanes, shoulder widening are needed to address existing and future congestion problems.

Corridor Public Transit System Recommendations

Secure funding to restore the City Route service levels at 30 minute headways.

Initiate US Route 2 Service – Being an important commuter corridor, service should be coordinated with rideshare and commuter choice initiatives to alter established travel patterns. This service should be designed with 1 ½ hour headways between Montpelier and Marshfield Village. If necessary, the service could be cut back to just Montpelier to Plainfield Village.

Corridor Pedestrian and Bicycle System

There are current plans to construct extensive regional paths called the Central Vermont

Regional Path and the Cross Vermont Trail

Segment-Level Recommendations

Route 2 from Bailey Avenue to Main Street

The intersection of Memorial Drive (Route 2) and Main Street/Northfield Street (Route 12) is currently operating at an unacceptable Level of Service F. A roundabout is currently being studied as a long term improvement. It is recommended that signal timings and coordination with adjacent signals be regularly checked and optimized.

A High Crash Location Segment exists from the State St./Bailey Ave. intersection to the intersection of Memorial Drive (Route 2) and Main Street/Northfield Street (Route 12). The City of Montpelier and VTrans should monitor accident patterns in this area.

The Taylor St. truss bridge at the intersection of Route 2 is under design for rehabilitation.

The Capital City Welcome and Multimodal Center is under design for Taylor St.

Route 2 from Main Street (Route 12) to Route 302

Although the analysis indicates acceptable levels of service, the City of Montpelier has observed congestion problems at the following intersection:

- US 2/Berlin St./Granite Street;

Between Pioneer Street and Route 302, reconstructing Route 2 with extra turn lanes at Pioneer Street is under design. Pedestrian walkways and crosswalks would be extended to the Route 2/Route 302 Intersection.

The intersection of Route 2 and Route 302 will be addressed by conversion to a single lane roundabout, currently under design. If warranted in the future, the roundabout will be able to convert to a two lane roundabout.

Route 2 between Route 302 and the East Montpelier Village Center

For the Route 2 roadway to function properly, access points for other arterial and collector streets should not impose delay or safety restrictions. The key access points along this segment are Gallison Hill Road in Montpelier and Towne Hill Road in East Montpelier (both major collectors).

There is a High Crash Location Segment on Route 2 around Towne Hill Road.

Bridge 62 needs joint replacement, fabric drains, drainage hopper / scuppers, membrane, rehabilitation of the back walls and repaving.

Bridge 64 is structurally in good condition but the deck does not have a membrane, the pavement repeatedly breaks up indicative of sub-surface concrete deterioration, and the joint is leaking.

East Montpelier Village Center

The intersections of Route 14 with Route 2 west of the village center and the intersection of Route 2, Route 14, and Quaker Hill Road at the village center have unacceptable levels delay during peak periods (LOS F at the stop controlled approaches). Traffic signals and turn

lanes are being designed to address this problem. The eastern intersection is being relocated east to form a "T" intersection. This section of US 2 has a Highway Sufficiency Rating that is considered Bad.
There is a High Crash Location Segment within the Village.

Gateways, traffic calming, and pedestrian system improvements should be considered for the East Montpelier village center.

VTrans is seeking a location to establish a formal park-ride lot along Route 2 in East Montpelier.

In the short-term, the recommendations described above are considered essential to maintaining the viability of the East Montpelier Village Center. In the long-term, it may become necessary to provide bypass roadways which will accommodate thru traffic demands at the same time local vitality and health is enhanced. With a bypass in place, the need for the traffic controls will be diminished and perhaps be removed. However, because implementation of the total corridor upgrade will be many years into the future, intersection improvements should be pursued immediately.

Segment between East Montpelier Village Center and Plainfield Village Center

There is a High Crash Location Segment around the "Carpet Barn" bridge in East Montpelier, and is currently under design for replacement.

Plainfield Village Center

There are safety problems through out the Village due to sharp curves, poor lines of sight, narrow shoulders and the lack of sidewalks. This section of US 2 has a Highway Sufficiency Rating that is considered Bad. The Commission recommends that Route 2 be reconstructed through the Plainfield Village Center to Hollister Hill Road in Marshfield including the intersection with Bridge Street. The reconstruction should also be designed to incorporate safety, traffic calming measures, parking, and to provide gateways to the village center.

Pedestrian system improvements (i.e., sidewalks, crosswalks) are recommended for east of the village center in conjunction with improvements to the Route 2 corridor. Sidewalks are under design to connect the Route 2 to the Lower Village.

This road segment and the intersection of Route 2/Route 214 will have an unacceptable Level of Service of D by 2020.

In the short-term, the recommendations described above are considered essential to maintaining the viability of the Plainfield Village Center. In the long-term, it may become necessary to provide bypass roadways which will accommodate thru traffic demands at the same time local vitality and health is enhanced. Even if a bypass is ultimately constructed, the traffic calming, gateway, and intersection reconfiguration recommendations will all still be beneficial to the community.

Segment from Plainfield Village Center to Marshfield Village Center

No deficiencies have been identified on this section, although there is a long term project to reconstruct the road to National Highway Standards.

Marshfield Village Center

The Route 2 Bridge 81 in Marshfield over the Winooski River is functionally deficient.

A conceptual alignment study recommends sidewalks along Route 2 and the local feeder

roads within the Village. Access control at the General Store should be considered to improve safety.

The Route 2/Route 215 intersection should be considered for reconfiguration as a "T" intersection or a roundabout. The reconstruction should also be designed to incorporate traffic calming measures and to provide gateways to the village center.

Consideration should be given to establishing a park-ride lot in Marshfield Village.

A bicycle and pedestrian path should be planned between Cabot Village, Lower Cabot, and Marshfield Village (where it would connect to the Cross Vermont Trail).

In the short-term, the recommendations described above are considered essential to maintaining the viability of the Marshfield Village Center. In the long-term, it may become necessary to provide improvements which will accommodate thru traffic demands and enhance local vitality.

Segment east of Marshfield Village Center

This section of US 2 has a Highway Sufficiency Rating that is considered Bad. Three sections of Route 2 in Cabot are under design for reconstruction.

ROUTE 2 CORRIDOR (Montpelier West)

Corridor-Level Recommendations

Highway System Recommendations

West of Montpelier, Route 2 passes through Middlesex, Moretown, Duxbury, and Waterbury where it is classified as a major collector. Along this section, Route 2 serves as an alternate to I-89, primarily for local access and to collect traffic from roadways without direct access to I-89 (e.g., Route 100B, Route 100).

Corridor Transit System Recommendations

Continue the commuter services along Route 2.

Corridor Pedestrian and Bicycle System

There are current plans to construct an extensive regional path called the Cross Vermont Trail

Segment-Level Recommendations

Bailey Ave Extension to Montpelier City Line

Bailey Ave. Bridge #60 needs a new membrane & deck repairs.

Montpelier to Middlesex Village

Bridge 40 over I-89 that is structurally deficient, and is under design.

Middlesex Village Center

Provision of sidewalks should be considered. Measures which provide a gateway to the village center and which "calm" traffic through the village should be considered.

Route 2 between Middlesex Village and Waterbury Village

The Route 2 Bridge 50 between Middlesex and Moretown over the Winooski River is under design for replacement. The truss bridge is possibly eligible for the National Register of Historic Sites and Structures. Although the VTrans Truss Bridge Preservation Plan recommends the bridge remain on site for alternative use, relocation or destruction are being considered.

Waterbury Village Center

Route 2 in the Waterbury Village Center carries not only locally-generated traffic, but also traffic originating from intersecting corridors (e.g. RT 100, I-89), and from external through traffic. The land use and development patterns of the neighboring communities contribute to the levels of demand and congestion along this corridor, not just those located where the congestion occurs (e.g., Waterbury). The demand created by these communities has produced a need for capacity improvements as described below. In particular development of an alternate route network throughout the village should be seriously considered and pursued. Sustainable land use development and transportation facility improvements need to be balanced.

The easterly unsignalized intersection of Route 2 and Route 100 in Moretown imposes significant delay for southbound Route 100 motorists (LOS - F, for left turns onto RT 2). VTrans has proposed installing a four way stop. Turn lanes could be added on Route 100. The Crossett Brook School Area study long term recommendation was for a traffic signal or roundabout to be installed.

The westerly unsignalized intersection of Route 2 and Route 100 in Waterbury imposes significant delay for southbound Route 100 motorists (LOS - F, for left turns onto RT 2). A roundabout is currently under design.

The Waterbury Village Circulation Study assessed traffic circulation through Waterbury Village and recommended developing alternative routes be established to relieve the congestion on Route 2 (Union St., Railroad St., Park Row, and Demeritt Place).

North and South Main S. through the Village is in poor condition including pavement, storm drainage, sidewalks, and water & sewer mains. Plans have been developed for reconstructing the street including sidewalks, bulbouts, underground placement of utilities, and other streetscape improvements. The intersection of Park Row and South Main Street needs to be reconstructed to allow improved truck access to and from Pilgrim Industrial Park including the Green Mountain Coffee Roaster facility.

Segment from Waterbury Village Center West

No deficiencies have been identified on this section.

ROUTE 302 CORRIDOR

Corridor-Level Recommendations

Highway System Recommendations

The corridor is functionally classified as a principal arterial roadway in Barre City, Berlin, and Montpelier. East of Barre City, the roadway is classified as a minor arterial. Route 302 is part of the Vermont Truck Network.

As an arterial corridor, Route 302 carries not only locally-generated traffic but also traffic originating from intersecting corridors (e.g. RT 62, RT 2, RT 14), and from external through traffic. The land use and development patterns of all these communities contribute to the levels of demand and congestion along this corridor, not just those located where the congestion occurs (e.g. Barre City). This demand is created by all of these communities, and produce a need for capacity improvements as described below. Sustainable land use development and transportation facility improvements need to be balanced. Access Management, providing turn lanes, shoulder widening are needed to address existing and future congestion problems.

Corridor Transit System Recommendations

Secure funding to restore the City Route to service levels at 30 minute headways.

The "high transit-dependency" areas of Barre City are currently served by the City and Hospital Hill Routes. The primary enhancements to current transit services would be more frequent buses (i.e., shorter headways as mentioned above), greater penetration of the City's residential neighborhoods with transit service, and potentially a downtown shuttle bus.

Initiation of a downtown shuttle in Barre City (similar to the Capital Shuttle) should be considered. The shuttle would help relieve traffic congestion in downtown Barre City by providing access to City neighborhoods and to potential remote parking lots. The shuttle concept should be attempted at least during the Main Street reconstruction project.

Corridor Pedestrian and Bicycle System Recommendations

There are current plans to construct a large regional path called the Central Vermont Regional Path.

Segment-Level Recommendations

Route 302 from Route 2 to Vermont Shopping Center in Berlin

The intersection of Route 2 and Route 302 will be addressed by conversion to a single lane roundabout, currently under design. If warranted in the future, the roundabout will be able to convert to a two lane roundabout. This section of US 302 has a Highway Sufficiency Rating that is considered Bad.

The Barre Montpelier Road Corridor Study, recommended that access management measures such as combining curb cuts and establishing service road connections between businesses. The study also recommended an improved streetscape including sidewalks, street trees, and street lighting.

Route 302 from Vermont Shopping Center in Berlin to Route 62

This section of US 302 has a Highway Sufficiency Rating that is considered Bad. There is a High Crash Location at the intersection of US 302 and VT 62. Beckley and Berlin Streets also have unacceptable Level of Service E and F respectively.

A bus stop should be constructed at the Route 302/Ames Dr. intersection, and the signal should include a pedestrian phase, and a sidewalk to the shopping center.

The Barre Montpelier Road Corridor Study, recommended access management measures such as combining curb cuts and establishing service road connections between businesses. The study also recommended an improved streetscape including sidewalks, street trees, and

street lighting.

Barre City Center

Route 302 is a High Crash Location between the Route 14 intersections, and east of Hill St. This segment also contains two signalized intersections which maybe approaching unacceptable levels of delay during peak commuting periods:

Route 302 (Main Street), Route 62, and Route 14
Route 302 (Main Street) and Elm Street in Barre City;

The reconstruction of Main St. is in design. This project includes signal upgrades, streetscape, bulbouts, and sidewalk reconstruction. Options which have been considered include (1) removal of some on-street parking to provide additional thru traffic capacity; (2) identification of alternative parallel travel paths and their subsequent improvement to accommodate the additional traffic; (3) initiation of TDM measures to reduce peak period traffic demand; and (4) provide more efficient traffic control at the RT 62/302 and the RT 302/Elm St. intersections. Turn lanes and signal timing changes were made to the Route 302/Hill St. intersection.

The Barre City Circulation Study recommended developing alternative routes. Summer St. Enterprise Alley, and Merchants Row are currently used in this manner. Traffic (including trucks) uses Summer and Elm Streets to bypass the congested Route 302 corridor.

Enterprise Alley and Merchants Row which currently provide access to parking areas, could be reconfigured to improve traffic flow and operate as a southern bypass of Main St.. Other suggestions have been made to provide a direct connection from these roads to Route 62 and Route 14. Another bypass idea involved using Center St., River St., and Burnham St.

Route 302 from Barre City to East Barre Village

There are no identified deficiencies.

East Barre Village

Within this section of the corridor, there is a High Crash Location at the intersection of Route 302 (Orange Road), Route 110 (Waterman Street), and East Cobble Hill Road in Barre Town. A roundabout is currently under design. The park and ride lot will be relocated to the west side of the intersection.

Route 302 from East Barre Community Center to Orange Village

Long term improvements should consider truck climbing lanes.

Orange Village

There are no identified deficiencies. A park and ride lot was recently constructed at the Town Office

East of Orange Village

There is a High Crash Location at the US 302/VT25 intersection. Long term improvements should consider truck climbing lanes.

BUSINESS ROUTE 2 CORRIDOR

Business Route 2 is State Street extending from Bailey Avenue to Main Street (Route 12), and then Main Street (Business Route 2) to Memorial Drive (Route 2) in downtown Montpelier. The corridor is classified as a minor arterial. Business Route 2 (State Street) carries two travel lanes with on-street parking on both sides of the street with separate turn lanes at a few of the downtown intersections.

Transit System Recommendations

Secure funding to restore the City Route service levels at 30 minute headways.

Initiate a re-routed year-round Capital Shuttle - using two buses that operate on ten minute headways, in opposite directions, on the same linear route between National Life, Downtown, Statehouse, and the DET Lot. Off the Legislative Session, the route could operate with only one bus. The shuttle service needs to be coordinated with other services in downtown Montpelier to facilitate transfers.

Pedestrian and Bicycle System

Pedestrian and bicycle pathways are critical in this corridor as the site of the region's greatest concentrations of employment and residential areas. There are existing sidewalks and crosswalks through out the corridor with a notable exception being Taylor Street which connects Business Route 2 with a large parking lots.

Sections of the Central Vermont Regional Path exist or are under design.

Highway System Recommendations

There is significant congestion during peak periods throughout this corridor. There are three traffic signals in the Business Route 2 corridor:

State Street (Business Route 2) and Bailey Avenue (Route 2) – LOS D;
State Street (Business Route 2) and Main Street (Route 12) – LOS F;
Main Street (Business Route 2) and Memorial Drive (Route 2) – LOS F.

The signal timings should be checked and optimized regularly. The intersecting streets of Taylor and Elm function at LOS F and E respectively. A major contributing factor to these low levels of service is pedestrian movements. Recent studies of traffic volumes at the State Street intersections with Taylor Street and Elm Street indicate traffic signals are warranted. In order to keep Montpelier pedestrian friendly the City will postpone installing signals, but agrees that improvements to these intersections should prepare them for future installation (e.g. wiring conduits).

There are High Crash Locations throughout the segment (see appendix for recommendations). The Capital District Master Plan envisioned extending Barre St. to the west. Signalization or a roundabout have been suggested as possible long term improvements to this intersection and the Main St. Memorial Dr. intersection.

The Rialto Bridge # B2-1 has severe concrete abutment spalling and deck problems. It needs extensive rehabilitation to address abutment, deck and curtain wall concrete scaling and deterioration and correct section loss of 6”-8” depth.

ROUTE 12 CORRIDOR (South)

Corridor-Level Recommendations

In Montpelier, Route 12 is functionally classified as a minor arterial roadway. Outside Montpelier, Route 12 is classified as a major collector.

Corridor Transit System Recommendations

Restore Commuter Services along Route 12.

Segment-Level Recommendations

Route 12 south of Northfield Village Centers

The VT 12/VT 64 intersection is a High Crash Location, see appendix for recommendations.

Lovers Lane, a unpaved short cut between Route 12 and 12A, is extensively and severely potholed from this popular short cut use.

Bridges 56 and 67 are structurally deficient.

Northfield Village Centers

There is a traffic signal currently operating along this segment of the Route 12 (south) corridor: at Route 12 and Vine Street. The signal is in place because of sight distance restrictions at the intersection and the number of pedestrians crossing the street. There are High Crash Locations throughout Northfield Villages.

Near the Northfield/Berlin Town Line there is poor line of sight and storm water flows into Route 12 from Moody Lane.

Partly in response to the 1994 VTRANS request for proposals from local jurisdictions to conduct technical assessments of bicycle and pedestrian pathway feasibility, Northfield has proposed a series of pedestrian pathways which include a Northfield Center sidewalk (connecting residential and commercial areas along Route 12 as well as the Norwich University campus), and a Northfield Falls pathway along Route 12.

There are some unguarded rail crossings in densely developed areas of Northfield Village that have posed safety hazards.

Route 12 from Northfield Village Centers to Riverton Village

Sections of Route 12 are in need of paving.

Riverton Village

VTrans Truss Bridge Preservation Plan indicate the Route 12 bridge over the Dog River should be preserved for limited highway use, even if it is functionally deficient. This bridge is potentially eligible to be included in the National Register of Historic Places and Structures.

There also is an at-grade rail/highway crossing which needs to be monitored to determine whether upgrading is necessary.

Throughout Riverton, sidewalk improvements and traffic calming should be considered.

Route 12 from Riverton Community Center to Montpelier

The traffic at Main/Northfield Street (Route 12) and Memorial Drive/Berlin Street (Route 2) is operating at LOS F. There is also a High Crash Location Segment at the Route 2 intersection. The City has changed the phasing and lane configuration to address the safety problems, and a roundabout is currently under study.

In the long-term, Dog River Road might be reconstructed to tie directly into Montpelier State Highway and its I-89 interchange. This would allow traffic between Route 12 and I-89 to bypass the congested Northfield Street and its intersection with Route 2. The potential to relocate Route 12 to Montpelier State Highway and Dog River Road from Northfield Street should then be investigated

ROUTE 12 CORRIDOR (North)

Corridor-Level Recommendations

In Montpelier, Route 12 is functionally classified as a minor arterial roadway. Outside Montpelier, Route 12 is classified as a major collector.

Segment-Level Recommendations

Route 12 in Montpelier

The traffic signal at Main Street and State Street (Business Route 2) is operating at LOS F. There is significant congestion during peak periods throughout this corridor. The intersection is also a High Crash Location (see appendix for recommendations). Route 12 has a two-lane cross-section with separate turn lanes at a few of the downtown intersections.

Route 12 from Montpelier Business District, through Middlesex, to Worcester Village

Bridge # 16 is functionally deficient. The Route 12 bridges 77 & 78 are structurally deficient and under design for replacement.

Worcester Village

It is recommended that traffic calming measures be implemented and that landscaping along the Route 12 corridor through Worcester Village be improved. The product should be a safer roadway with slower traffic speeds. The potential for acquisition of scenic property along Route 12 should also be pursued.

It is recommended that a pathway be established, including a sidewalk in the village and a pathway along Route 12 connecting the village and Wrightsville Beach area.

Route 12 from Worcester Village Center North

VTrans bridge sufficiency ratings indicate the Route 12 bridge # 84 over Hancock Brook in Worcester requires repair or replacement due to functional deficiencies.

ROUTE 12A CORRIDOR

Route 12A is functionally classified as a major collector. The Roxbury Town Plan has recognized scenic qualities for Route 12A, these qualities should be considered during corridor improvements. In particular, there is concern over the siteing of power lines

adjacent to the roadway.

Route 12A south of Roxbury Village

Based on VTrans bridge sufficiency ratings, the Route 12A bridge # 15 in Roxbury over the 3rd Branch of the White River is structurally deficient and under design for replacement. Bridge # 21 in this segment is functionally deficient. This section on VT 12A has a Highway Sufficiency Rating that is considered Bad.

Roxbury Village

Sidewalks along the Route 12A corridor should be considered through the Roxbury Village.

Route 12A from Roxbury Village to Northfield Center

This section on VT 12A has a Highway Sufficiency Rating that is considered Bad.
Based on VTrans bridge sufficiency ratings, bridges 32, 35, and 36 in Northfield over the Dog River that are functionally deficient.

Lovers Lane, a unpaved short cut between Route 12 and 12A, is extensively and severely potholed from this popular short cut use.

ROUTE 14 CORRIDOR (South)

Corridor-Level Recommendations

Highway System Recommendations

From Route 63 northward into Barre City, the roadway is functionally classified as a minor arterial roadway to the south of Route 302; south of Barre City in Barre Town and Williamstown, Route 14 is classified as a major collector.

Transit System Characteristics, Usage, and Recommendations

Create Barre City to Williamstown Service – South Barre and Williamstown are areas that are growing, but have limited service. This service should develop a transfer point with the City Route. Possibly a route could be designed to include Wilson Industrial Park and Rock of Ages Finishing Plant.

Segment-Level Recommendations

Route 14 South of Williamstown Village

Just south of Chelsea Road, the Route 14 road grade needs to be raised and/or drainage provided through a wetland. During wet seasons, water is at the roadway edge weakening the structure.

Williamstown Village Center

A Route 14 bridge south of the Village is functionally deficient. This section of Route 14 needs paving.

Key access to the interstate system from Williamstown Village Center and the route 14 corridor is provided by Route 64. However, thru trucks are not recommended to use the corridor thereby creating a circuitous route to/from the town's commercial and industrial centers. As described below, development of an alternate path should be considered.

There is only a limited supply of pedestrian facilities currently in the village center. Pedestrian walkways could be improved along Route 14 and crosswalks provided in the Williamstown village center. Consideration should be given to extend existing sidewalks from Mill Village along Route 14 to the village center, then along Route 64 to the town school complex. There is a sidewalk project under design on Route 14 from existing sidewalks in the village south to the commercial/business center.

Segment between Williamstown Village Center and South Barre

Reconstruction of Falls Bridge Road to accommodate heavy trucks should be considered as a potential means of providing alternative access to I-89 from Williamstown village (rather than via Route 64 which is not recommended for trucks year-round) and as an alternate path to the Montpelier area in combination with I-89 (rather than via Route 14 into Barre City). The assessment of potential impacts of a Falls Bridge Road improvement should consider the effect of additional traffic on the intersection of Route 63 and Miller Road in Barre Town (a section of roadway classified as a High Crash Location).

South Barre Community Center

The segment in the vicinity of the intersection of Route 14 and Route 63 is a High Crash Location. Left turn lanes and access management were added, and the signal timing changed to add a protected turn phase. Pedestrian improvements were also recommended. The Route 14 and Bridge Street intersection is another area of concern, with a Level of Service of F for Bridge St. Limited sight distance from Bridge Street creates a hazardous location. A scoping study recommends the intersection be signalized and turn lanes added to Route 14. The sight distance can be improved at the current intersection if the hill crest to the north is cut down. In close proximity to the intersection problem area is the Bridge Street/Morrison Road bridge over Stevens Branch. The bridge is to be replaced

The absence of pedestrian walkways in the built-up sections of this segment creates a hazardous situation for area pedestrians. Sidewalks/pathways should be improved along Route 14 in Barre Town.

Segment between South Barre and Route 302 in Barre City

Two traffic signals have recently been installed at Route 14 and Parkside Terrace, and Route 14, Hill Street, and Ayers Street. The Hill/Ayers Street is a High Crash Location, and should be monitored to determine if the problems have been addressed. Signals and turn lanes are being designed for the Route 14 and Quarry St intersection to address congestion and truck access issues. The Route 14 and Prospect Street intersection is also a High Crash Location. Turn lanes should be added at the intersection. The upgrade of the signal at Prospect St. is included with the Main St. Reconstruction Project.

The sections of the sidewalk on Route 14 (South Main Street) from Prospect Street to the City/Town Line needs replacement along the entire westerly side and along portions of the easterly side in the vicinity of Circle Street.

ROUTE 14 CORRIDOR (north)

Corridor-Level Recommendations

Highway System Recommendations

Within Barre City and Barre Town, the roadway is functionally classified as a principal arterial to the north from Route 302; from East Montpelier, through Calais and Woodbury it

is classified as a minor arterial.

Segment-Level Recommendations

Barre City Downtown

The key intersecting roadways along this segment are Route 302, Summer Street, and Seminary Street. The Route 302 intersection will be upgraded as part of the Main St. Reconstruction. During reconstruction, Summer St. will be used as the detour route. Traffic signals and turn lanes will be added. The absence of pedestrian walkways along several sections of Route 14 in Barre City creates a hazardous situation for area pedestrians. Sidewalks/pathways should be improved along Route 14 in Barre City. To address safety concerns, the Route 14/Merchant St. Intersection is to be realigned.

Segment from Barre City Downtown to East Montpelier Village

There is a High Crash Location at the Route 14/Pine Hill Rd. intersection (see appendix for recommendations). Sections in East Montpelier has Highway Sufficiency Ratings that are considered Bad.

East Montpelier Village Center

There are two intersections with safety problems in East Montpelier --- one at the intersection of Route 14 with Route 2 west of the village center and one at the intersection of Route 2, Route 14, and Quaker Hill Road at the village center. These two intersections also have unacceptable levels delay during peak periods (i.e. LOS F at the stop controlled approaches). Traffic signals and turn lanes are currently under design.

The Route 14 bridge over the Winooski River in East Montpelier is under design for replacement due to structural deficiencies. The Village should consider sidewalks and traffic calming elements in the design of these facilities

Segment from East Montpelier Village to North Montpelier Village

The Sodom Brook Bridge is under design for replacement.

North Montpelier Village

The Route 14 bridge # 71 over the Kingsbury Branch is under design for replacement due to functional deficiencies.

Segment from North Montpelier Village to East Calais Village

It is recommended that the intersection of Route 14, Lightning Ridge, and Max Gray Road be regraded and/or relocated to improve sight distance and motorist safety.

East Calais Village Center

The lack of pedestrian walkways in the East Calais village center produces undesirable conflicts between vehicular traffic and pedestrian traffic. Sidewalks and traffic calming should be considered.

The Route 14 intersections with Marshfield Road, and Moscow Woods Road should be reconstructed.

Consideration should be given to establishing a park-ride lot on Route 14 in Calais.

Segment from Calais Village to South Woodbury Village Center

VTrans bridge sufficiency ratings indicate the Route 14 bridge # 82 over Kingsbury Brook is structurally deficient.

South Woodbury Village Center

Traffic calming measures should be investigated for the summer camp area and the village center in conjunction with pedestrian system improvements.

Limited park-ride lot space may be available at the Woodbury town offices, designation should be considered.

Segment from South Woodbury Village Center to Woodbury Village Center

No needed transportation system improvements have been identified for this segment.

Woodbury Village Center

Traffic calming measures should be investigated for the village center in conjunction with pedestrian system improvements.

Segment north of Woodbury Village Center

No needed transportation system improvements have been identified for this segment. Existing roadside picnic areas provided by the VTRANS are well used and should continue to be maintained.

ROUTE 17 CORRIDOR

Corridor-Level Recommendations

Highway System Characteristics, Usage, and Recommendations

The Route 17 traverses the Green Mountains via the Appalachian Gap and provides the only year-round crossing of the Green Mountain range between I-89 and Middlebury Gap. Route 17 is signed for "no trucks" during the winter months due to its steep grades and potential for road closure in winter storms. Route 17 is functionally classified as a major collector. The Fayston Town Plan has recognized scenic qualities for Route 17, these qualities should be considered during corridor improvements.

Transit System Characteristics, Usage, and Recommendations

When demand warrants, increase frequency of the Mad Bus – Mad River Glen Shuttle, and extend into the Village.

Segment-Level Recommendations

Irasville

The principal intersection in Irasville is with Route 100. The intersection produces significant delays for eastbound Route 17 motorists, especially during the winter months at ski area closing times, during summer events, and during Columbus Day weekend. Traffic Control Officers are used to address delay during peak periods. There are safety problems at

the intersection and on the Mill Brook bridge, due to sharp curves, poor lines of sight, steep grades and inadequate bridge width.

The Route 17 bridge over Mill Brook in Waitsfield needs to be replaced because of functional deficiencies in the existing structure. In conjunction with that project, relocation and realignment of the Route 17 intersection with Route 100 should be undertaken to improve safety. VTrans has evaluated a roundabout alternative. Waitsfield and Fayston have a difference of position on a solution..

Segment between Irasville and German Flats Road

This section of Route 17 should be designated as a bicycle route.

West of German Flats Road

No deficiencies have been identified for this section.

Segment West of Mad River Glen

No deficiencies have been identified for this section. There is a High Crash Location near the top of the Appalachian Gap. Improved signage warning traveler of the dangers of this road should be considered.

ROUTE 25 CORRIDOR

The Route 25 corridor has only a short segment within the Central Vermont Region. Route 25 is classified as a minor arterial. The intersection with US 302 is a High Crash Location.

ROUTE 62 CORRIDOR

Corridor-Level Recommendations

Highway System Characteristics, Usage, and Recommendations

The Route 62 corridor traverses the region starting in Berlin at an interchange with I-89 and ending at Route 302 in Barre City. The corridor is functionally classified as an expressway.

Pedestrian and Bicycle System

The Town of Berlin has proposed pedestrian improvements around the Mall area, to link residential, employment and shopping areas proposed to be developed with a New Town Center.

Segment-Level Recommendations

Route 62 from I-89 to Berlin State Highway

Within this segment of the Route 62 corridor, there is a High Crash Location at the intersection of Route 62 with Berlin State Highway and Fisher Road. Signal timing improvements have been made in recent years which may have mitigated the safety problems. The intersection is currently undergoing a traffic study. Accident patterns should be monitored to determine if the safety problems have been effectively reduced. If accident problems persist, one of the spot improvements which should be thoroughly considered is the reduction in the Route 62 speed limit. Another High Crash Location has been identified at the Route 62 Paine Turnpike intersection.

The 2001 Route 62 Corridor Study quantified traffic impacts if dense development occurs around Berlin Corners. The study recommended that in order to accommodate this development, turn lanes would need to be added to the signalized intersections, or two lane roundabouts be constructed. The Town is now planning for a "New Town Center" adjacent to the mall. VT 62 should continue to be monitored, and improvements made to preserve its function. The District 5 Commission will require all existing and new major developments to contribute to traffic improvements. Consideration should made to develop a Transportation Management Association.

Pedestrian walkways should be improved/constructed in the vicinity of the Hospital, Berlin Mall, Berlin Corners, and other development nodes along this section of the Route 62 corridor.

Route 62 from Berlin State Highway to Route 302

The uphill merge of Berlin State Highway and Route 62, creates a hazardous situation. A current study has considered removing an uphill lane of Route 62, building a jug-handle at the Route 62/Fisher Rd. Intersection, or a roundabout. The Route 62/Berlin St. intersection is a High Crash Location (see appendix for recommendations). The Route 62, Route 302, Route 14 intersection will be upgraded as part of the Barre City Main St. reconstruction project.

ROUTE 63 CORRIDOR

The Route 63 corridor extends from I-89 in Berlin into Barre Town where it terminates at Route 14. The roadway is functionally classified as an minor arterial.

The Route 63/14 intersection has been upgraded to include turn lanes, signal retiming, and crosswalks.

The intersection of Route 63 in Barre Town with Miller Road is considered a High Crash Location. Improvements should be pursued to address the safety problems. Most of the accidents involved crossing/turning traffic from Miller Road in which sight distance was obstructed or there was misjudgment on the speed of oncoming traffic. VTrans has relocated guardrail and sign posts that might be contributing to this problem. The long term solution is to construct a grade separated diamond interchange. A park and ride lot should be considered near the I-89 exit ramps

Reconstruction of Falls Bridge Road should be considered as a potential means of providing alternative access to I-89 from Williamstown village rather than via Route 64 which is not recommended for trucks year-round due to steep grades and sharp curves and rather than the circuitous path via Route 63. This new roadway would also serve as an alternate path to the Montpelier area in combination with I-89 (rather than via Route 14 into Barre City, then the congested Route 302). The assessment of potential impacts of a Falls Bridge Road improvement should consider the effect of additional traffic on the intersection of Route 63 and Miller Road in Barre Town.

ROUTE 64 CORRIDOR

Corridor-Level Recommendations

Highway System Characteristics, Usage, and Recommendations

The Route 64 is functionally classified as an major collector. Reconstruction of Falls Bridge Road should be considered as a potential means of providing alternative access to I-89 from Williamstown village (rather than via Route 64 which is not recommended for trucks year-

round due to steep grades and sharp curves) and as an alternate path to the Montpelier area in combination with I-89 (rather than via Route 14 into Barre City, then the congested Route 302). The assessment of potential impacts of a Falls Bridge Road improvement should consider the effect of additional traffic on the intersection of Route 63 and Miller Road in Barre Town (a High Crash Location).

Segment-Level Recommendations

Route 64 from Route 12 in Northfield to I-89

The Route 64/12 intersection (see appendix for recommendations), and the area around Paine Turnpike South are High Crash Locations.

Route 64 between I-89 and Williamstown Village Center

VTrans has indicated a need to reconstruct Route 64 in Williamstown from Ferno Road to Route 14. If the Falls Bridge Road improvement concept is developed, reconstruction of Route 64 may not be required.

Wil liamstown Village Center

The Route 64 bridge west of the intersection with Route 14 is under design for reconstruction. Sidewalks will be included on the bridge. Within the Village Center, consideration should be given for additional pedestrian pathways, in particular between the Village Center and the High School.

ROUTE 100 CORRIDOR (south of Waterbury)

Corridor-Level Recommendations

Highway System Recommendations

Route 100 (South) is functionally classified as a minor arterial. The Waitsfield, Moretown, and Duxbury Town Plans have recognized scenic qualities for Route 100, these qualities should be considered during corridor improvements.

The land use and development patterns of all the corridor communities contribute to the future levels of demand and congestion along this corridor. This demand produces a need for capacity improvements as described below. Sustainable land use development and transportation facility improvements need to be balanced. Access Management, providing turn lanes, shoulder widening are needed to address future congestion problems.

Transit System Recommendations

Develop a public transit connection between the Mad River Valley, Montpelier, Waterbury, and/or Burlington. Extend Mad Bus - Valley Floor Shuttle to Moretown Village and Harwood Union High School.

Pedestrian and Bicycle System

There are current plans to construct a regional path called the Mad River Path.

Segment-Level Recommendations

Route 100 south of Warren Village

Bridge # 166 is structurally deficient.

Segment between Warren Village Center and Waitsfield Village & Irasville Center

Consideration should be given to reconfiguring the northern Route 100/Main St. intersection to a "T" intersection.

The Route 100 truss bridge # 173 over the Mad River in Warren is under design for replacement. The VTrans Truss Bridge Preservation Plan recommends the bridge be documented and removed. The Town has requested a new truss bridge be built. VTrans will build a bicycle and pedestrian underpass as part of the abutment. Bridge # 177 south of Irasville is functionally deficient.

Waitsfield Village & Irasville Center

In general, there is congestion along the corridor at Route 17, at the shopping centers, and during "event" days (i.e. ski area closing time, summer concerts, and Columbus Day Weekend). Traffic Control Officers are used to address the problem. In conjunction with a Route 17 bridge reconstruction, VTrans will consider designing intersection improvements. A roundabout relocated to the south of the existing intersection is being considered.

Turn lanes should be considered at the shopping centers in order to facilitate traffic movement. Sidewalks, crosswalks, traffic calming, and gateways should be provided to facilitate pedestrian movement.

Segment from Waitsfield Village Center to South Duxbury

The Route 100 bridge # 181 north of Waitsfield Village, and bridge # 186 over Shepard's Brook, are functionally deficient. Consideration should be given to establishing a park-and-ride lot near the intersection of Route 100/100b and in Waitsfield Village.

South Duxbury

Provision of pedestrian facilities and institution of traffic calming measures should be considered for South Duxbury due to the activity Harwood Union High School generates.

Segment from South Duxbury to Route 2

Truck climbing lanes should be considered along appropriate steep grades in this segment, the next time it is reconstructed

The easterly unsignalized intersection of Route 2 and Route 100 in Moretown imposes significant delay for northbound Route 100 motorists (LOS - F, for left turns onto RT 2). VTrans has proposed installing a four way stop. Turn lanes could be added on Route 100. The Crossett Brook School Area study long term recommendation was for a traffic signal or roundabout to be installed.

ROUTE 100 CORRIDOR (Waterbury)

Corridor-Level Recommendations

Highway System Characteristics, Usage, and Recommendations

Route 100 north of Route 2 is functionally classified as a minor arterial.

The final report for the Vermont Route 100 Access Management Study recommends the following: "access control policies are required along with proper land use planning and growth management. The correction of spot safety problems, primarily at intersections, is recommended for implementation in the short-term. For the intermediate-term, Route 100 should be upgraded with turn lanes and shoulder widening. The long-range improvements include the addition of climbing lanes on Shutesville Hill..." Specific recommendations are described below in their appropriate segments.

The Waterbury Town Plan has recognized scenic qualities for Route 100 north of Waterbury Center, these qualities should be considered during corridor improvements.

Pedestrian and Bicycle System

Waterbury has proposed the Route 100 Corridor Alternate Transportation Path from Waterbury Center to Waterbury Village which will serve as an option to the heavily-trafficked Route 100 and which will eventually connect to the Stowe bike path.

Segment-Level Recommendations

Waterbury Village

The westerly unsignalized intersection of Route 2 and Route 100 in Waterbury imposes significant delay for southbound Route 100 motorists (LOS - F, for left turns onto RT 2). A roundabout is currently under design.

The Waterbury Village Circulation Study assessed traffic circulation through Waterbury Village and recommended developing alternative routes be established to relieve the congestion on Route 2 (Union St., Railroad St., Park Row, and Demeritt Place).

North and South Main S. through the Village is in poor condition including pavement, storm drainage, sidewalks, and water & sewer mains. Plans have been developed for reconstructing the street including sidewalks, bulbouts, underground placement of utilities, and other streetscape improvements. The intersection of Park Row and South Main Street needs to be reconstructed to allow improved truck access to and from Pilgrim Industrial Park including the Green Mountain Coffee Roaster facility.

The I-89 south bound exit ramp currently experiences a Level of Service F. VTrans is designing a signal to improve the situation. The I-89 north bound exit ramp is also Level of Service F. The Route 100/Blush Hill Rd/Stowe St. intersection has been recently signalized. The park and ride lot needs paving and lighting.

The following are recommended specific actions:

upgrade Route 100 between Blush Hill Road/Stowe Street and Colbyville;
streetscaping in Colbyville;
pedestrian facilities between Colbyville and the Ben & Jerry's site;
installation of traffic signals when warranted at the intersections of Route 100 and Laurel Lane.

Segment between Waterbury Village and Waterbury Center

The Route 100/Guptil Road intersection currently has a Level of Service F. The entire segment will experience Level of Service F by the year 2020.

The following are recommended specific actions:

- widened shoulders between Colbyville and Waterbury Center along Route 100;
- a new town road (parallel to Route 100) linking Stowe Street and Guptil Road to provide an alternate route network to relieve traffic congestion on Route 100;
- installation of traffic signals when warranted at the intersection of Route 100 with Guptil Road; and
- northbound right turn lane at intersection of Route 100 and Guptil Road.

Waterbury Center

This segment of Route 100 will have an unacceptable Level of Service E by the year 2020.

The following are recommended specific actions:

- sight distance improvements at Route 100 intersection with Howard Road;
- reconstruction of Hollow Road approach to Route 100 intersection; and
- consider one-way streets for Hollow Road and Howard Ave.

Traffic calming and sidewalks should be considered for Waterbury Center.

Segment between Waterbury Center and Stowe Town Line

This segment currently has an unacceptable Level of Service D.

Truck climbing lanes should be considered on the northbound and southbound approaches to Shutesville Hill.

ROUTE 100B CORRIDOR

Corridor-Level Recommendations

Highway System Characteristics, Usage, and Recommendations

Route 100B is functionally classified as a major collector. The Moretown Town Plan has recognized scenic qualities for Route 100B on either side of the Village, these qualities should be considered during corridor improvements.

Transit System Characteristics, Usage, and Recommendations

Extend Mad Bus - Valley Floor Shuttle to Moretown Village and Harwood Union High School. Develop a public transit connection between the Mad River Valley and Montpelier.

Segment-Level Recommendations

Route 100B from Route 100 to Moretown Village Center

The two Route 100B bridges south of the Village are functionally deficient.

Moretown Village Center

The Mountain Road intersection with Route 100B should be improved to provide sufficient

sight distance for all motorists.

Provision of sidewalks in the village center and institution of traffic calming measures to slow traffic should be considered. Pedestrian facilities/bike lanes should be established in order to provide a link to Waitsfield and eventually to Harwood Union School in South Duxbury. Consideration should be given to establishing a park-and-ride lot in Moretown Village.

Route 100B between Moretown Village Center and Middlesex Village

No deficiencies have been identified.

Middlesex Village

Sidewalks and traffic calming have been identified for the Village.

ROUTE 110 CORRIDOR

Corridor-Level Recommendations

Highway System Characteristics, Usage, and Recommendations

Route 110 is functionally classified as a major collector.

Pedestrian and Bicycle System

Washington has proposed the Washington Bicycle and Pedestrian Path which is planned to connect the village area to Carpenter Park (with the potential to eventually connect to the Central Vermont Regional Path).

Segment-Level Recommendations

Segment south of Washington Village

No deficiencies have been identified.

Washington Village Center

A bicycle and pedestrian path should be planned to connect the village area to the Palmer Recreation Field (with future consideration to extend to the Central Vermont Regional Path). Sidewalks and traffic calming should be considered.

Segment between Washington Village and East Barre

No deficiencies have been identified.

East Barre Village Center

The intersection of Route 110 (Waterman Street) with Route 302 (Orange Road) and East Cobble Hill Road in Barre Town is a High Crash Location. High speed traffic and confusing turning movements contribute to the problem. A roundabout is under design. Traffic calming and sidewalks were also recommended.

ROUTE 214 CORRIDOR

Route 214 is a major collector. No deficiencies have been identified.

ROUTE 232 CORRIDOR

Route 232 is a major collector. No deficiencies have been identified.

MONTPELIER STATE HIGHWAY

Montpelier State Highway is limited access, no direct development is permitted. Montpelier State Highway is functionally classified as an expressway. It is part of National Highway System as the facility which connects I-89 and Route 2.

There is a traffic signal in operation at the intersection of Montpelier State Highway and National Life Drive. The signal was installed primarily to enable vehicles to safely exit the National Life complex onto the state highway system. The intersection operates well within capacity and does not currently require any improvement.

MONTPELIER JUNCTION STATE HIGHWAY

Montpelier Junction State Highway is classified as a local road although it is maintained by the state.

Recommendations to improve Dog River Road in Berlin will have a direct impact on Montpelier Junction State Highway. Any improvements to Dog River Road should be accompanied by complementary upgrades to Montpelier Junction State Highway. In the long-term, Dog River Road might be reconstructed to tie directly into Montpelier Junction State Highway, Montpelier State Highway, and the I-89 interchange. This would allow traffic between Route 12 and I-89 to bypass the congested Northfield Street (Route 12) intersection with Route 2. The potential to relocate Route 12 to Montpelier Junction State Highway and Dog River Road from Northfield Street, and other possible alternatives should be investigated.

BERLIN STATE HIGHWAY

Berlin State Highway is partly limited access, no direct development is permitted north of Route 62. Berlin State Highway is functionally classified as a minor arterial.

There are two traffic signals currently operating along the Berlin State Highway corridor: (1) at the intersection of Berlin State Highway and Route 302; (2) at the intersection of Berlin State Highway and Route 62.

The Route 302 and Berlin State Highway signal has been upgraded including a protected phase for turning movements. Accident patterns should be monitored, to determine if the improvements have addressed the safety problems.

The is a High Crash Location at the intersection of Route 62 with Berlin State Highway and Fisher Road. Signal timing improvements have been made in recent years which may have mitigated the safety problems. The intersection is currently undergoing a traffic study. Accident patterns should be monitored to determine if the safety problems have been effectively reduced.

The Town is now planning for a "New Town Center" adjacent to the mall. VT 62/Berlin

State Highway should continue to be monitored, and improvements made to preserve its function. The District 5 Commission will require all existing and new major developments to contribute to traffic improvements. Consideration should made to develop a Transportation Management Association.

Pedestrian walkways should be improved/constructed in the vicinity of the Hospital, Berlin Mall.

Berlin State Highway from Route 62 to Route 302

The uphill merge of Berlin State Highway and Route 62, creates a hazardous situation. A current study has considered removing an uphill lane of Route 62, building a jug-handle at the Route 62/Fisher Rd. Intersection, or a roundabout.

MIDDLESEX STATE HIGHWAY

Middlesex State Highway is functionally classified as a major collector. No deficiencies have been identified.