Vermont Western Corridor
Transportation Management Plan

FINAL REPORT

February 2010

Prepared For:

Vermont Agency of Transportation
Chittenden County Metropolitan Planning Organization
Addison County Regional Planning Commission
Bennington County Regional Commission
Chittenden County Regional Planning Commisssion
Northwest Regional Planning Commission
Rutland Regional Planning Commission

Prepared By:

PB PARSONS BRINCKERHOFF

in association with

Cambridge Systematics, Inc.
Stantec, Inc.
Fitzgerald & Halliday, Inc.

Disclaimer Statement

The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

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1 Introduction

1.1 Purpose of the Study

The Vermont Agency of Transportation (VTrans), the Chittenden County Metropolitan Planning Organization (CCMPO), and the five Regional Planning Commissions (RPCs) along western Vermont partnered to develop a multimodal Transportation Management Plan for the western corridor, spanning from the Massachusetts to the Canadian border. The five Regional Planning Commission partners are Addison County RPC, Bennington County RC, Chittenden County RPC, Northwest RPC, and Rutland RPC.

Development of a multimodal Plan was deemed necessary by the state and its regional partners, to determine the most effective ways to improve the infrastructure and operations as well as maximize the efficiencies of the transportation system in western Vermont thus improving the economic opportunities of the region.

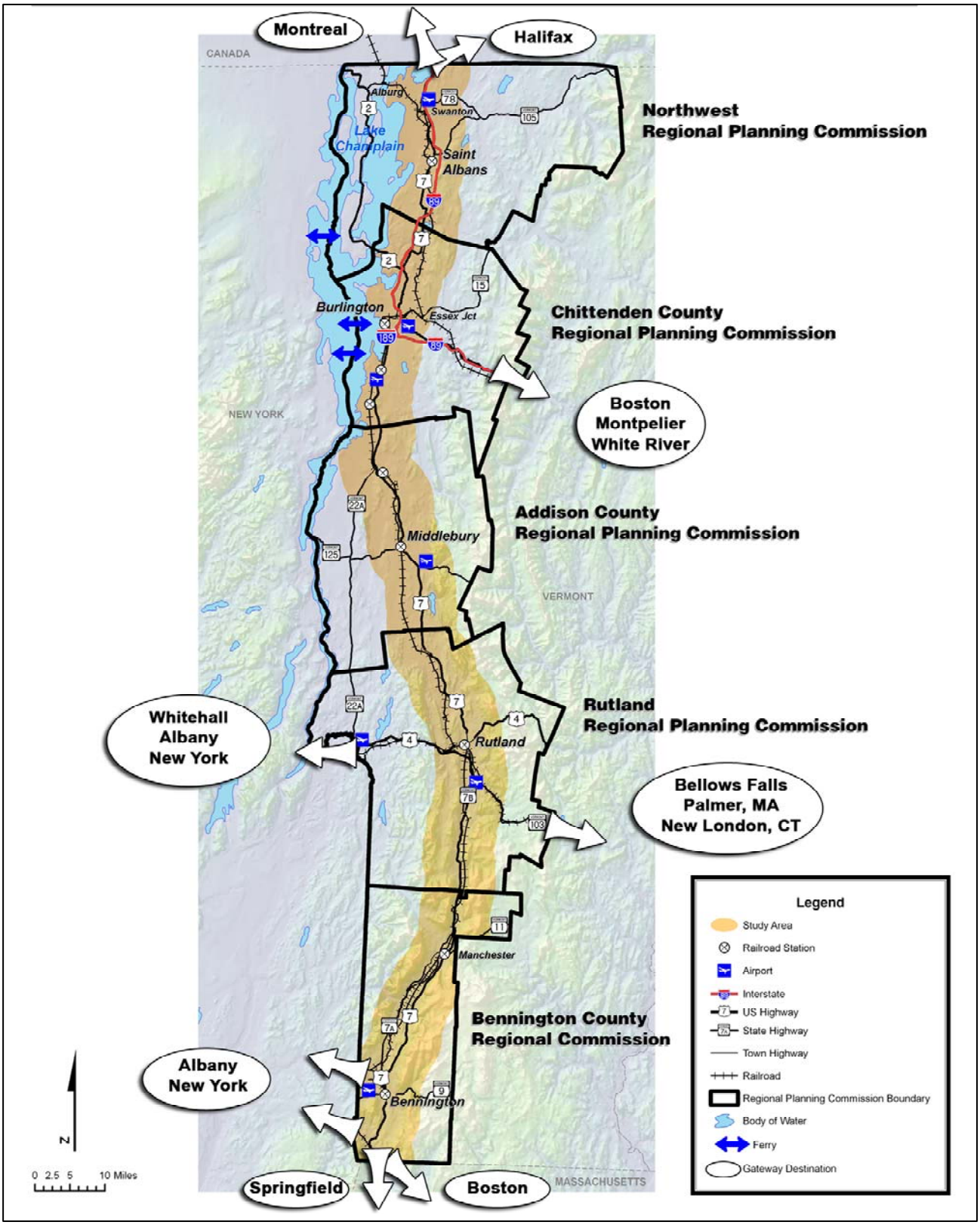
The purpose of this study is to evaluate transportation, land use and related conditions and create a Transportation Management Plan that presents a unified, long-term vision for managing and improving the transportation network in western Vermont. As an initial effort to coordinate planning over a vast study area, the plan presents a broad vision and a framework for transportation improvements, investment policies and strategies. The plan also identifies transportation system deficiencies and offers examples of possible solutions but it does not recommend specific projects, especially as it addresses highway deficiencies in the study area. Continuing the ongoing collaboration among the study partners, through a systematic planning process, will be key to developing and implementing specific projects and programs consistent with the recommendations of this plan. As all responsible parties continue to maintain and improve the western corridor, the information contained in this report and each of its appendices should be used to develop projects to overcome bottlenecks, upgrade the transportation system, improve safety and travel times along the corridor in a manner consistent with local land use policy.

The plan is being coordinated with the Vermont Agency of Transportation's ongoing project development efforts in the corridor, across all transportation modes.

1.2 Study Area

The term "Western Corridor" refers to the project study area (Figure 1-1), which stretches approximately 200 miles between the Massachusetts and the Quebec borders. Centered on highway US 7, the study area extends approximately five miles to the east and five miles to the west of the railroad-highway axis. While this area is the primary focus of the study, consideration is also given to parallel routes (e.g. VT 22A) and regional connections beyond the 10-mile wide study area. US 7 is the primary highway corridor through most of the study area, except north of Burlington where I-89 runs parallel to US 7. While I-89 was not a major focus of this study, its role in providing regional and interstate connections and accommodating truck traffic was considered in developing strategies that could be applied in the corridor.

Figure 1-1: Study Area and Regional Connections



Near Vergennes, VT 22A branches to the west of US-7, while in southern Vermont VT 7A provides a local alternate route through Manchester and communities to the south. Several highways provide east-west connections through the study area, notably US 4, VT 9 and US 2. The Vermont Rail System and New England Central Railroad both operate rail services in the corridor.

The Burlington International Airport and Rutland Southern Vermont Regional Airport offer commercial air service, and several smaller general aviation airports are located throughout the corridor.

Larger communities along the Western Corridor include: Swanton, St Albans, greater Burlington area, Middlebury, Brandon, Rutland, and Bennington. A number of smaller towns and villages line the corridor as well, with the highest concentrations of population and development in Chittenden County.

1.3 Study process

The study process involved the following major elements;

- Existing and Future Conditions
- Corridor Vision, Goals and Objectives
- Candidate Strategies and Actions
- Implementation Plan

A Steering Committee consisting of representatives from VTrans, CCMPO, participating RPCs, and the Federal Highway Administration (FHWA) guided the plan's development whereas a Study Advisory Committee with representation from the study partners, railroads, economic development and other interested parties provided policy guidance throughout this effort. Public participation and comment informed all elements of the plan.

1.3.1 Existing and Future Conditions

Existing Conditions

The initial study efforts focused on documenting and analyzing existing conditions in the study area to establish a clear understanding of the corridor issues and concerns. Excerpts from the *Existing Conditions* report are presented in *Chapter 2, Overview of Corridor Conditions*, and the comprehensive report is included in *Appendix A*. The consultant team in close collaboration with the Steering Committee convened several topic-specific Focus groups (see section 1.3.6, *Public involvement*), who provided input into this effort.

The existing conditions analysis provides an overview of the operational characteristics of existing transportation infrastructure and services, including highway, trucks, rail, public transit, intercity bus, airports, water, and bicycle and pedestrian facilities. Highway and rail facilities external to the study area that serve as gateways to regional, national, and international transportation networks are considered as well.

Additionally, the existing conditions analysis included a thorough review of demographics for each of the six counties and larger communities in the study area; land use conditions including development patterns, densities, zoning and major trip generators; environmental constraints in relation to topography, wetlands and water resources, visual/aesthetic characteristics; and economic trends, including regional strengths and weaknesses with respect to economic development.

Projected Future Conditions

The study next considered how economic, demographic, land use and transportation conditions in the Western Corridor might change over time. Excerpts from the *Future Conditions* report are included in *Chapter 2, Overview of Corridor Conditions*, and the comprehensive report on projected conditions in the corridor for the year 2030 is included in *Appendix B*.

The conditions described in the report represent a "no action" situation in which no new transportation improvements are presumed other than four major projects that are already planned for implementation. The projects are: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans. The report includes a discussion of future trends in freight transportation and the projected future of the truck and rail industries. It places particular emphasis on freight movements and associated trucking and railroad operations, which have emerged as key concerns for this corridor. The report also includes analyses of traffic operating conditions for major highway segments and intersections under forecast peak traffic conditions in 2030.

1.3.2 Study Vision, Goals, and Objectives

Following evaluation of corridor conditions, the study team worked with the project's Steering Committee and Study Advisory Committee to develop a shared vision for the western corridor that encompasses desired future characteristics. The vision is not strictly limited to transportation considerations. Instead it constitutes a sweeping statement that includes aspirations relating to quality of life, economic vitality, the environment and community character.

The study team also developed specific goals and objectives to support the corridor vision. Goals describe the primary means to achieve the corridor vision, while objectives identify specific elements relating to each study goal. These corridor goals and objectives formed the basis for analyzing the overall benefits of each management strategy, as described in the following section.

These elements are presented in *Chapter 3, Vision, Goals and Objectives*.

1.3.3 Candidate Strategies and Actions

Strategy Development

A broad range of strategies and actions were developed to address transportation needs that were identified through evaluation of existing and future corridor conditions, participation of the steering and study advisory committees, and consultation with the study focus groups. These candidate strategies were broadly defined actions that targeted a diverse range of corridor issues, including:

- Traffic and truck operations and safety on highways;
- Rail freight operation and market share;
- Public transportation and intercity travel;
- Land use;
- Traveler information and travel demand;
- Pedestrian, bicycle and other travel modes; and,
- Environmental and community impacts.

Descriptions of all strategies considered are presented in *Appendix C, Evaluating Strategies*.

"Visioning" Exercise

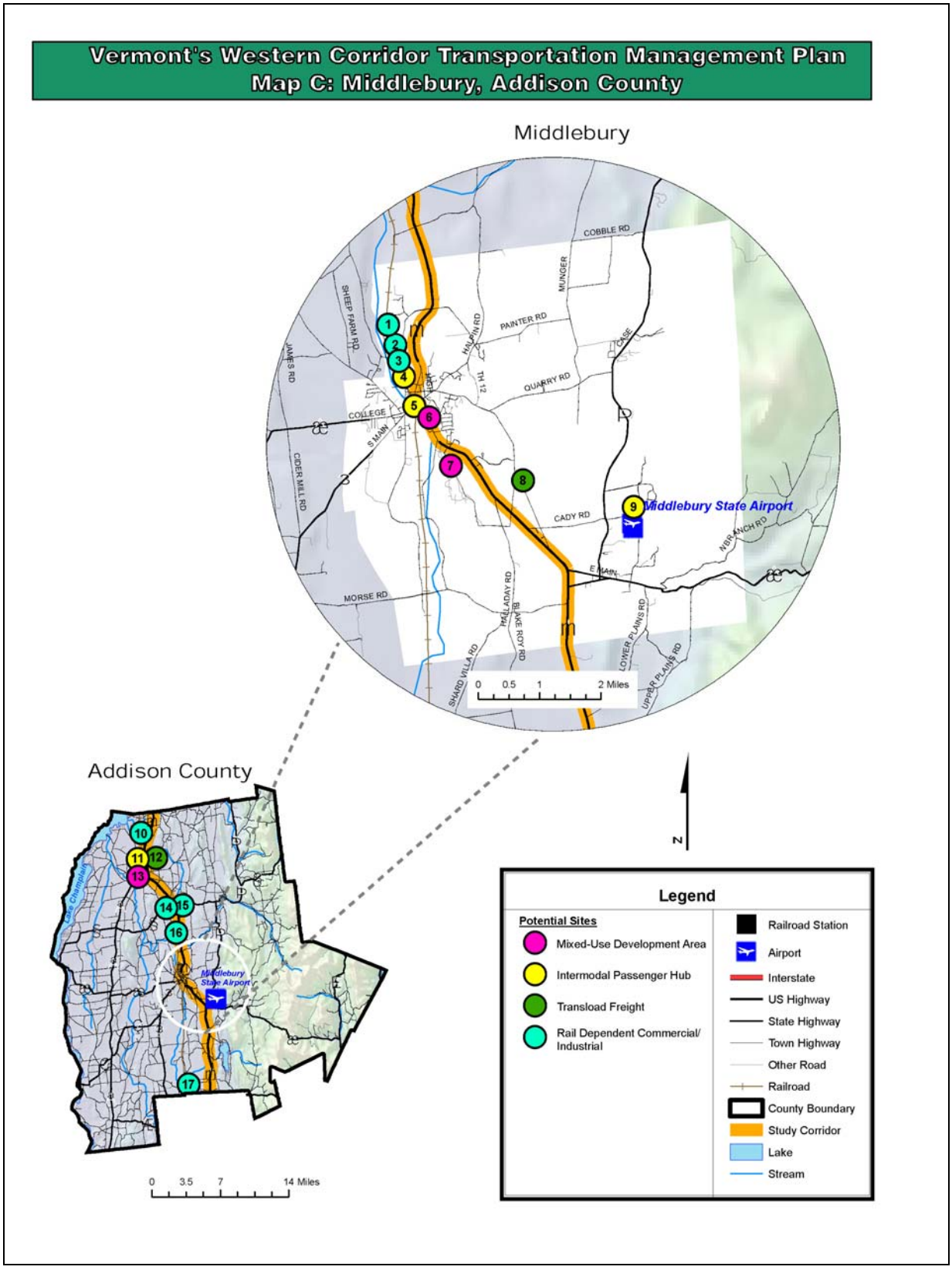
Steering committee members and other stakeholders participated in a "Visioning" exercise that served both to provide valuable input into strategy development for the study and to enable committee members to gain a better understanding of the unique characteristics and interdependencies of several of the strategies under consideration.

Initially, the exercise involved an unconstrained discussion of potential corridor solutions that could help achieve the study vision. A follow-up session focused on more specific consideration of opportunities to identify potential areas to develop the following:

- Mixed-use growth centers in towns and villages that are conducive to residential and mixed-use growth from both land use and transportation perspectives;
- Intermodal centers (Passenger Hubs) to provide convenient and comfortable access to transit services and rail passenger service as well as improve transfer opportunities between different modes of travel;
- Transload facilities, to facilitate the transfer of freight between trucks and trains; and,
- Locations suitable for rail-dependent industrial/commercial locations.

Appendix D, Corridor Visioning, documents this process. Figure 1-2, illustrates the "visioning" exercise outcome for Addison County—see *Appendix D* for visioning maps for the other participating regions. The results of this effort helped shape corridor strategies presented in Chapter 4, *Implementation and Action Plan*. Outcomes of the *"Visioning exercise"* could be used by planning agencies as a starting point for subsequent detailed evaluation of these concepts.

Figure 1-2: "Visioning" Map for Addison County



Evaluating Strategies

Strategies recommended in the Implementation and Action Plan (Chapter 4) were evaluated with the participation of the Steering Committee, Study Advisory Committee and various focus groups. An evaluation process helped inform the selection of recommended strategies and actions. This process involved evaluating the candidate strategies against a diverse range of criteria to highlight potential benefits and impacts. Because the candidate strategies under consideration vary in specificity, the process relied to a large extent on qualitative evaluations that made use of professional judgment and available quantifiable data.

Evaluation criteria were developed in relation to the specific goals and objectives for the study (see Chapter 3, *Vision, Goals and Objectives*). Candidate strategies received scores ranging from +5 (strongly beneficial) to -5 (strongly negative) for each of the identified criteria.

Strategies also received an overall evaluation rating in relation to each of the corridor's five goals. These ratings are based on the individual criteria scores weighted to reflect their relative importance with regard to achieving the corresponding goal. Goal ratings are presented in a range of up to five pluses (+) or minuses (-) to simplify comparison.

Appendix C, Evaluating Strategies, documents the results of the evaluation process.

1.3.4 Implementation and Action plan

The Implementation and Action Plan is presented in Chapter 4. This Plan details the strategies recommended by the study and identifies both near and longer-term actions needed to advance them. These actions generally involve planning and other activities that will result in the development and implementation of specific projects and programs throughout the corridor.

In many ways, the Implementation and Action Plan is a toolbox of potential actions that provide a framework for addressing transportation and related issues in the corridor. Selection and development of discrete strategies will be the responsibility of individual agencies (VTrans, RPCs/CCMPO, Railroads, etc.), but this plan identifies those families of actions that best meet goals and objectives established for the corridor as a whole.

Recommendations in the Implementation and Action Plan are presented in relation to the study goals and objectives that they support. Recommendations in some cases are based on broad support for several study goals, while in other cases target a single, specific corridor objective.

1.3.5 Study Development and Oversight

A consultant team led by Parsons Brinckerhoff (PB) was hired to assist with the development of the Western Corridor Transportation Management Plan. Other consultant firms working on the plan were Cambridge Systematics, Inc., who led efforts in the areas of economic analysis and freight assessment; Fitzgerald & Halliday, Inc., who coordinated the public involvement process; and Stantec, Inc., who conducted traffic operations analyses.

Steering Committee

A study Steering Committee met on a monthly basis to guide the plan development, coordinate public involvement and other outreach activities, review draft study material and to provide guidance to the project manager and the consultant team. Members of the Steering Committee included representatives of each of the regional planning commissions (RPCs), the Chittenden Country Metropolitan Planning Organization (CCMPO), the Vermont Agency of Transportation (VTrans) and Federal Highway Administration (FHWA).

Study Advisory Committee

A Study Advisory Committee also met at key points during the study process to review and comment on study material. The committee was made up of representatives from the Steering Committee along with railroads, freight operators and economic development representatives. Study Advisory Committee meetings were held at critical junctures of this multiyear project: shortly after project initiation to work on visioning and identify issues; several months into the study to further discuss issues and possible solutions; and to review the prioritization measures and strategies.

1.3.6 Public Involvement

The consultant team worked closely with the Steering Committee to initiate a broad-based public involvement effort to inform and to seek input from the communities located in the Western Corridor. The principal components of the public involvement effort included holding focus group meetings, regional forums, development of a project website, and the circulation of project newsletters. In addition, the CCMPO and RPCs briefed committees and community members on study efforts, and conducted surveys to gather input concerning the development of various aspects of the plan. Details of the public outreach efforts are provided in *Appendix G*—some highlights are discussed below.

Newsletters and Website

A study website was developed for the western corridor study and can be accessed at www.vtwesterncorridor.org . The website includes an overview of the study, project documents and updates, meeting notes, and a comment form. In addition, project newsletters have been developed at critical junctures of the study and are available on the website. The newsletters provided updates on the study effort and publicized upcoming study activities.

Focus Groups

Two series of focus group meetings were held to explore and provide feedback on key issues, needs and possible solutions. The initial focus group meetings were held in April 2008 and June 2008 and concentrated on the following key issue areas: rail freight, economic development, livable communities, and freight trucking. Participants voiced some common themes. They said more effective communication, coordination, and leadership is needed at all levels of government to improve mobility for people and goods, promote economic vitality and provide mode choices in the Western Corridor. Most groups agreed that maintenance and upgrade of the existing transportation infrastructure is crucial to Vermont's economic health and global competitiveness. More than one group was eager to see projects in the pipeline completed as quickly as possible.

Many thought the general public, business and community leaders and political leadership need a better understanding of transportation issues, particularly the importance of transportation to the overall health and economy of Vermont. Truckers wondered if people in communities that placed restrictions on truck travel understood that these restrictions can lead to higher prices and less efficient delivery. Others expressed frustration that funding for transportation is inadequate and communities have few options for getting money other than the property tax.

Mobility and choice of transportation modes were considered important in groups organized around the topics of economic development and livable communities. Social service providers said mobility enables people to be integrated into community life; lack of mobility leads to isolation. Transit needs to be easily and frequently available. Sidewalks and bicycle facilities should be put in place for people to get around by means other than cars—especially in villages and downtown areas.

Focus groups comprised of freight interests had specific improvements they'd like to see in the Western Corridor. They said transportation priorities should be focused on bringing Vermont's rail track and bridges up to the national weight standard. Preservation of rail frontage should also be a priority, they felt, just as water frontage is preserved for "best and highest use"; and highway improvements should be concentrated where trucks have problems in the Western Corridor – between Rutland and Shelburne, especially in Middlebury, and south of Rutland where Route 7 has not been improved.

A common theme among the groups was that the corridor needs a balanced transportation system that supports all modes of travel.

A second set of focus group meetings were held in April 2009. Preliminary plan recommendations were discussed at these meetings, with focus group members participating in the refinement and ultimate selection of recommended strategies.

Public Meetings

During May and June of 2009 the study team held a series of public meetings in each of the regional planning areas and in Montpelier at the Vermont Rail Advisory Council meeting, to present and review the plan strategies being considered and the evaluation process. While feedback at these meetings showed a range of diverse opinions, common themes heard included;

- Recognition of the value of collaborative planning effort by partner agencies;
- Interest in preserving and enhancing various quality of life aspects;
- Interest in emphasizing safety;
- Interest in limiting traffic impacts to communities, particularly in regard to trucks; and
- Support for improved regional and interstate connections, whether by bus or rail.

2 Overview of Corridor Conditions

This chapter summarizes key findings from the *Existing Conditions* report and *Future Conditions* report for the Vermont Western Corridor. The full reports are included in *Appendix A* and *Appendix B* respectively.

2.1 Existing Conditions

Vermont's Western Corridor spans approximately 200-miles between the Massachusetts and the Canadian border, centering on US 7 and encompassing the north-south rail lines. The study area is illustrated in Figure 1-1.

Demographics

The population of the counties that comprise the Western Corridor is estimated at 343,600 (2006), or slightly more than 50% of the state's population. Chittenden County is by far the most densely populated, with 150,100 residents and a population density of 272 persons per square mile.

Demographic trends generally mirror national trends in many regards. Average household size in the corridor is decreasing, a result of smaller family sizes and higher percentages of single-person households. Vermont's population is aging, both in terms of average age and number of elderly residents.

Median home prices range from $162,000 in Rutland County to $240,100 in Chittenden County. 93 percent of corridor households own one or more motor vehicles.

Economic Characteristics

Overall, the Western Corridor has a relatively robust economy, with unemployment rates lower than the national average in most locations and employment growth in recent years consistent with national trends. However, some parts of the corridor are clearly experiencing stronger economic conditions than others. Addison and Chittenden Counties show the strongest economic growth, while Bennington and Rutland Counties the weakest.

Consistent with nation trends, the Western Corridor has seen strong job growth in service industries, and a slight decline in manufacturing jobs since 1990. In 2005, service sector jobs accounted for 41 percent of employment in the corridor.

Land Use

Land uses vary considerably along the corridor. Corridor-wide, eight (8) percent of land is developed, 25 percent is used for agriculture, and the remaining majority of land is forested, wetland, or water. Agricultural uses are particularly prevalent in Addison and Franklin counties, with predominately forested lands in Bennington and Rutland counties.

The corridor includes fifteen large communities of 5,000 persons or more; Burlington, South Burlington, Colchester, St. Albans, Essex, Milton, Shelburne, Williston, Winooski, Middlebury, Vergennes, Rutland and Bennington.

Environment

Much of the land in the Western Corridor is undeveloped forests, wetlands and water. Views along U.S. Route 7 range from open views across fields, to views of farm houses and barns within the rural landscape, distant views of the Adirondacks, Green Mountains and Lake Champlain, and forested areas. Route 7 is one of Vermont's most scenic roadway corridors, and sections of the highway are designated as part of the Lake Champlain Scenic Byway.

By contrast, within village and town centers, there are relatively dense clusters of commercial and residential development. The corridor's long history of agricultural use and its pattern of densely settled small towns and villages in a rural setting contribute to its distinctive character. In recent decades, however, commercial and residential development stretching out from existing settlement areas has begun to erode this traditional settlement pattern and encroach upon natural and agricultural areas. With this increased development, the visual integrity and contrast between rural and developed has also begun to blur. Many of these new developments are more spread out and have very little relationship to each other or landscape buffer.

Highways

The primary north-south highway facilities within the Western Corridor are US Route 7 (US 7), Vermont Routes 7A and 22A, (VT 7A and VT 22A) and Interstate 89 (I-89) north of Burlington. US 7 is the only highway facility that operates for the entirety of the Western Corridor. All but I-89 have a primary function of providing access to adjacent properties while also serving as the principal arterial through the urban centers. There are some exceptions to these general characterizations: US 7 as it traverses the Green Mountain National Forest is a median divided limited access highway between Bennington and Manchester with VT 7A serving as the principal urban arterial and alternate intercity highway. Immediately south of Rutland through Clarendon, US 7 provides limited access and is median divided with at-grade intersections. From Burlington north to the Canada border, Interstate I-89 is the primary inter-city highway as US 7 retains the property access, urban arterial, and alternate intercity. Other major highways that connect the Western Corridor to the rest of the region including Vermont routes 9, 11, 103, 125, 15, 78, and 105 and US routes 4 and 2 (see Figure 1.1)

Level of Service (LOS) analyses were conducted to assess traffic operations for contiguous highway segments outside of town/village centers for US 7, VT 7A and VT 22A. In addition, a number of major intersections (typically where two state highways meet) were assessed in downtowns and villages. Due to the length of the western corridor, varied geometry and character of the highways as well as the number of intersections in the study area, it was decided at the onset of the project to consolidate rural segments and select a manageable number of major intersections to study. There are several additional intersections in urban/town centers and growth areas that experience congestion and should be evaluated at a more micro-corridor analysis level. *Appendix A* provides detail information on highway segments and intersections selected for LOS analyses.

Under peak conditions, signalized intersections selected for analysis were found to operate with overall favorable level of service (LOS) throughout the corridor. The most congested

intersection locations operate at LOS D (moderate congestion) in Rutland at both US 7 intersections with US 4, and also in Bennington at the US 7 intersections with VT 7A and VT 9. The Winooski "Circulator" also presents various operational problems that are not easily assessed. It is important to note that an overall good LOS (≥ C) does not necessarily mean that all approach legs of the intersection operate at that level. More detail analyses are needed for intersections that experience congestion on specific approach legs. Especially in urban settings where queues and approach capacities of closely spaced intersections are the deciding factors in the overall operation and safety of an intersection.

Several highway segments throughout the corridor operate under congested conditions (LOS E) during peak periods. Lack of passing opportunities and moderate posted speed limits (40 mph to 45 mph) affect traffic flow on these segments. See *Appendix A* for details.

Appendix F, High Crash Locations, identifies locations on the corridor where crash rates are among the highest in the state of Vermont. Thirteen highway segments and fifteen intersections in the Western Corridor are among the top 100 locations statewide for each category in terms of crash frequency and severity.

Trucks and Freight

Trucks move 86 percent of the freight tonnage in Vermont, amounting to just over 40 million tons annually and worth $35.7 billion[1]. This mode share is higher in Vermont than in nearby states such as Maine where trucks carry 70 percent of cargo by weight. Contributing factors to the high truck percent might include substandard railroad infrastructure (below National standard), Vermont's landlocked status (lack of ports) and the easy access—within a days drive—to intermodal terminals in neighboring states and Canada.

Aside from the Interstate, the highest truck volumes on corridor roadways (over 1,000 trucks per day) are on U.S. 7 south of Burlington and through Rutland, U.S. 4 west of Rutland, and VT 9 west of Bennington. Most of the rest of U.S. 7 shows volumes ranging between 500 and 1,000 trucks per day.

Railroads – Freight and Passenger

The railroad infrastructure in the Western Corridor includes the 122-mile route between North Bennington and Burlington, owned by the State of Vermont and operated as part of the Vermont Rail System (VRS), a privately-owned company. The line connects with two other VRS-operated routes – the Green Mountain railroad traveling to the southeast toward Bellows Falls and the Clarendon & Pittsford traveling west to New York State at Rutland and with Pan Am Railways west of Bennington. Rail service to the northern portion of the study area is provided by the privately-owned New England Central Railroad (NECR) which links up with the VRS via a connection from Essex Junction to Burlington (identified as the Winooski Branch).

[1] FHWA's Freight Analysis Framework 2, 2006, *http://ops.fhwa.dot.gov/freight/freight_analysis/faf/index.htm*.

NECR travels north to East Alburg where it connects directly to Canadian National Railway (CN), a major Class I railroad and with CSX in Massachusetts.

Most rail freight traffic in Vermont serves a diverse range of business enterprises and is interstate in nature, either traveling into, out of or through Vermont. Common types of commodities transported via rail include: agricultural products; lumber and building materials; petroleum products for residential/commercial use; mining, quarrying, and earth products; cement; marble and granite; sodium and calcium chloride; and newsprint and a variety of chemical products for manufacturers.

Based on FHWA's Freight Analysis Framework 2 data for Vermont, freight moving by rail in 2006 accounted for 6 million tons valued at $5.4 billion, representing approximately 13 percent of all the freight moving in the state by weight.

The most significant rail issue in the Western Corridor is that rail weight limits are lower than the national standard and it does not allow for fully loaded 286,000 pound railcars to travel in this corridor. Other important issues include track condition and classification that affect operating speeds on some track segments as well as some clearance restrictions.

Amtrak intercity rail passenger service operates in the Western Corridor via two routes that each operate a pair of trains daily (one northbound and one southbound). The *Ethan Allen Express (Trains 290/291)* operates from New York City to Rutland via Whitehall, NY using the tracks of the Clarendon & Pittsford Railway to serve Castleton, Fair Haven and Rutland. The *Vermonter (Train 54/55)* operates from Washington, DC via New Haven, CT, Springfield, MA, and White River Junction. The Vermonter traverses the state entirely on NECR trackage, stops at Essex Junction – serving the greater Burlington area - and terminates at St Albans.

Intermodal and Other Transfer Facilities

Containers on flatcars (COFC) and trailers on flat cars (TOFC) represent the most common type of intermodal freight movement. TOFC/COFC is currently carried on Vermont rail lines, although there currently are no termination or origination points in the state. Vermont's shippers and receivers access TOFC/COFC services via terminals in the region. The closest ramps are located in New York (Albany), Quebec (Montreal), and Massachusetts (Worcester and Palmer).

There are a number of facilities in Vermont that support non-TFC/COFC "intermodal" transfers from rail to truck or storage and truck or storage to rail. These facilities are principally related to the bulk handling of material. Significant commodities handled by these facilities, include lumber, salt, fuel oil, gasoline, propane, steel products, bricks, plastics, and chemicals. There is no single comprehensive listing of bulk transfer, transload, or warehousing facilities, as most of these are privately owned and operated.

Public Transit

Bus service is provided by regional transit operators;

- Green Mountain Transit Agency (GMTA) in Franklin County;
- Chittenden County Transportation Authority (CCTA) in Chittenden County;
- Addison County Transit Resources (ACTR) in Addison County;

- Marble Valley Regional Transit District (MVRTD "The Bus") in Rutland County; and,
- The Green Mountain Community Network, Inc., ("Green Mountain Express") in Bennington County

Services typically include routes that provide local connections between communities within the regions and circulation within the larger towns. While it is possible to traverse the corridor using public transit services, schedules, hours of operation and transfer arrangements make longer, inter-regional trips difficult.

Intercity Bus

Though provided historically throughout the corridor, currently there is no intercity bus serving the entire Western Corridor. Intercity service in the state is provided by Greyhound (formerly Vermont Transit Lines service) and it serves only Burlington via the I-89 corridor, Montpelier, White River Junction, Bellows Falls and Brattleboro. Yankee Trails also operates a service between Bennington and Albany, NY via Hoosick Falls four days a week.

Airports

Air movements currently account for less than one percent, or 12 thousand tons, of all the freight moving in Vermont by weight, yet over two percent, or $1 billion, by value. This highlights the high-value, low-weight nature of air freight shipments, which consist primarily of electronics, food, chemicals, mail and other time-sensitive goods. As the service sector of Vermont's economy continues to grow, the share of air shipments relative to other types of movements in the state will likely expand.

Currently six airlines provide scheduled air passenger service to the Burlington International Airport, and Cape Air offers passenger service between Boston, MA and Rutland. In addition to Rutland, the Western Corridor is served by three other state-owned airports: in Franklin County (Highgate), Middlebury and Bennington (William H. Morse). Privately owned public use airports are located in Shelburne and Vergennes (Basin Harbor).

Water Transportation

Ferry services accommodating bicyclists, pedestrians, passenger vehicles and trucks are operated on Lake Champlain at four locations to the west of the study area. These crossings provide connections between the study area and neighboring New York. Grand Isle to Plattsburgh, NY operates year round on a 24 hour basis. This is essentially a shuttle–type operation with approximately 76 round trips daily (12-minute one-way crossing time). Burlington-Port Kent, NY operates from late spring through early fall with a one hour crossing time. Charlotte – Essex, NY operates year round with increased frequency being provided from late spring through early fall. The crossing time is 20 minutes. All routes can accommodate vehicles up to 40 tons, though some Burlington runs have 20 ton weight limits. In addition, the Ticonderoga Ferry operates May through October and serves the same users including trucks up to 15 tons with three trips per hour from 8:00 am to 6:00 pm (7:00 pm in summer).

With the closure of the Lake Champlain Bridge in the fall of 2009, demand for ferry services connecting New York and Vermont increased significantly. Long term impacts to these services are difficult to ascertain at this point.

Bicycle and Pedestrian Facilities

The *Vermont Bicycle and Pedestrian Plan* is VTrans' policy document for addressing the development and accommodations of bicycle and pedestrian facilities on a regional and statewide basis. Individual regions also plan for bicycle and pedestrian accommodations through their local plans. Most state highways throughout the corridor are included in the regional on-road bicycle network, but they are not necessarily reflected in local plans, which tend to emphasize shared use paths and trail networks. Factors that affect the comfort level of cyclists - traffic volumes, % trucks, vehicle speeds, lane and shoulder widths - vary considerably by route and segment. A number of "rail-trails" and shared use paths (Deleware & Hudson, Missisquoi Valley Rail Trail and Burlington Bikeway) have been developed within the corridor as well, that serve both commuter and recreational needs.

Most towns and villages have sidewalks within the town centers and central neighborhoods. Designated bike lanes are more common in urban and developed areas. Along rural highways, sidewalks and designated bike lanes are uncommon. The Western Corridor planning process did not invest a significant amount of resources examining corridor-wide bicycle and pedestrian facilities, infrastructure opportunities and issues due to the more localized nature of these facilities. Ongoing planning efforts that follow this study should expand the focus and understanding of corridor-wide bicycle and pedestrian options.

2.2 Future Conditions

Population and demographic data and projections from *Woods and Pool (2007)* was used to provide information on conditions in the Western Corridor by 2030. For detailed information see *Appendix B*, *Future Conditions*.

Demographics

By 2030, the population of the Western Corridor is projected to reach 439,200 - an increase of 96,600 people (28 percent) compared to 2005. Nearly half of the projected population growth, - 44,100 people - is expected to occur in the greater Burlington area (Chittenden County). All counties are expected to experience population growth.

Grand Isle and Addison Counties are expected to see the largest relative increase in population, with increases of 63.6 percent and 51.5 percent respectively. Between 2005 and 2030, Rutland County will see the slowest rate of increase, though the population is still expected to increase by 9,400 new residents (or 14.8 percent).

Economic Characteristics

The fastest growing industry is expected to be the service sector, growing by 53 percent and adding over 53,000 jobs. This represented more than two-thirds of all new jobs in the corridor. Construction, government, retail, wholesale trade and transport also are expected to show double-digit increases on a percentage basis. The manufacturing sector is expected to decline slightly, losing 1,000 jobs (3 percent). These projections largely reflect current regional and national trends showing a shift away from manufacturing and into services and other sectors of the economy. The employment base is expected to trend towards smaller companies and self-employment.

Economic growth will continue to be stronger in the Burlington region, which benefits from Interstate highway access, an international airport as well as growth industries in Burlington. It is possible, however, that the past few decades' trend of growth on the periphery of the Burlington region may slow or be reversed by broader economic and demographic forces including higher energy prices, a "back to the city" movement, and greater interest in efficient land use as a strategy for reducing energy consumption and greenhouse gas emissions.

Highways

Traffic projections for future analysis year of 2030 were derived from the VTrans' Travel Demand Forecasting Model. To establish a 2030 base line, the future conditions model run presumes no additional transportation improvements in the corridor other than the following planned major projects;

- Bennington Bypass
- Chittenden County Circumferential Highway
- Middlebury Rail Spur
- St. Albans Federal Street Extension

Level of Service (LOS) analyses were conducted for all highway segments and selected intersections in the study area. *Appendix B* provides detailed LOS results for study highways and intersections.

Traffic growth is expected on all major study highways. On US 7, the greatest increases – 8,000 vehicles per day over current volumes - are forecasted north and south of Burlington. Other major routes in the Burlington area are also expected to experience substantial growth in traffic.

Compared to today's levels, traffic volumes on US 7 are forecast to grow by an average of 36 percent. Substantial increases in daily traffic (greater than 40 percent) are expected on US 7, north of Burlington to the Canadian border, south of Burlington to Brandon, in the Manchester area (on US 7 and VT 7A), as well as on VT 22A. Traffic growth on US 7 is generally expected to be lower to the south, except as noted around Manchester.

Truck volumes in 2030 are projected to average between 1,000 and 2,000 trucks per day along most of the US 7 corridor. Truck traffic is forecast to grow at a somewhat higher rate than automobile traffic – 40 to 60 percent across most of the corridor. This is consistent with national trends in freight traffic and a result of increasing economic output as well as changes in shipping patterns. The highest volume increases (500 to 750 trucks per day) along US 7 are forecasted south and north of Rutland, on some segments between Vergennes and Burlington, and in Colchester.

By 2030, ten of the 27 roadway segments that were analyzed in this study are expected to operate at LOS E. Of the 14 signalized intersections studied, two are expected to operate at an overall LOS E. As discussed in previous sections, intersections with approach LOS less than C for rural areas or capacity and queue issues in urban areas should be evaluated further. Some improvement in traffic conditions is expected in Bennington due to the completion of the Bennington Bypass.

Freight Movements

In 2006 over 47 million tons of freight, worth over $43 billion, was transported into, out of, within, and through Vermont via all available modes. By 2030 those figures are expected to increase to 82 million tons of freight worth over $113 billion. That is an increase of 73 percent in terms of tonnage, and 160 percent in terms of value. The disparity in growth rate for tons and dollars is the result of a continuing increase in goods that have high value relative to their weight, such as small packages and high technology equipment vs. raw materials.

Freight traffic to and from other states is expected to increase about twice the rate of internal traffic (84 vs. 44 percent), while international traffic is expected to increase about three times as fast (118 percent).

Even though trucking will remain the dominant mode of moving freight in Vermont, railroad transportation is anticipated to increase by 63%. This suggests that there is an opportunity for rail to capture some freight cargoes which presently are transported by truck, based on commodity types and shipment patterns. There will be a continuing need to invest in infrastructure upgrades throughout the western corridor (from Bennington to the Canadian border) to ensure that the rail network is operationally compatible with the larger national rail system.

Passenger Rail

Improvements to the *Vermonter* route on NECR's line and others to the south to accommodate higher passenger train speeds and a planned extension of the *Ethan Allen* from Rutland to Burlington will provide higher levels of service to the corridor but are highly dependent on the state receiving Federal Rail Grant funding. Expansion of passenger rail south of Rutland to Bennington and Hoosick Junction, NY would also increase rail service in the western corridor.

2.3 Summary of Key Issues

In summary, the key issues identified in the Western Corridor for the future analysis year of 2030 include:

- Localized highway congestion and safety concerns will require further evaluation and monitoring that might lead to capacity improvements and/or combination of land use and transportation solutions;
- Projected growth in trucking activity will be much higher than increases in general traffic;
- Interest in improving and expanding public transportation services (both bus and rail);
- Interregional connections to external networks (highways, air and rail);
- Need to improve rail infrastructure; and,
- Need to reinforce the links between transportation, land use, economic vitality, and quality of life.

3 Vision, Goals and Objectives

The vision statement developed for this plan represents the broader aspirations for the corridor and its communities over time. Five goals have been identified to direct future actions in support of this corridor vision. Objectives associated with each goal identify specific means by which the goals may be achieved.

3.1 Corridor Vision

"Western Vermont is served by a safe, balanced, fully-integrated multimodal transportation system that provides regional mobility, travel choices, fosters economic vitality, and supports sustainable growth. The transportation system supports compact land use patterns and preserves the vibrant communities along the Western Corridor."

3.2 Goals and Objectives

The Vermont Western Corridor Transportation Management Plan has five primary goals:

- Highways - Improve highway system efficiencies and safety in Vermont's Western Corridor.
- Freight - Improve freight movements in the Western Corridor.
- Public transportation - Increase public transportation use and enhance regional connectivity for passenger travel.
- Economic vitality - Support corridor investments that promote economic vitality in the region.
- Quality of life - Implement efficient, sustainable and context-sensitive transportation strategies that support a high quality of life in Western Corridor communities.

3.2.1 Highways

Goal: Improve highway system efficiencies and safety in Vermont's Western Corridor.

Context plays an important role in determining suitable design and performance characteristics associated with highways and major roadways. The objectives under this goal recognize that a different balance of priorities are needed in towns and villages compared to less developed rural areas.

Objective 1: Improve traffic operations, safety and travel reliability for highway segments between urbanized areas/village centers.

Objective 2: Balance regional mobility needs with local transportation priorities and plans within towns and village centers. Improve safety within these areas.

3.2.2 Freight

Goal: Improve freight movements in the Western Corridor.

Three specific objectives define the elements associated with improving freight movements in the corridor:

Objective 1: Improve travel times and reliability on Western Corridor highways to provide improved service to freight customers.

Objective 2: Improve infrastructure, services and intermodal connections to improve the efficiency of all freight modes, with particular emphasis on increasing the share of freight hauled by rail and air freight traffic.

Objective 3: Identify and encourage preservation of high-priority rail line frontage for businesses that use rail services. Create additional rail frontage as part of commercial property development.

3.2.3 Public Transportation

Goal: Increase public transportation use and enhance regional connectivity for passenger travel.

A number of specific objectives further define ways to achieve the goal of increased use of public transportation and improve regional passenger travel:

Objective 1: Provide well-coordinated local, regional and interstate public transportation serving the communities along the corridor.

Objective 2: Improve access to public transportation services (bus and rail) and linkages/connections between travel modes.

Objective 3: Establish passenger rail service and supporting facilities throughout the length of the Western Corridor.

Objective 4: Improve travel options in the Western Corridor by providing a range of modal choices.

3.2.4 Economic Vitality

Goal: Support corridor investments that promote economic vitality in the region.

Three objectives to gauge transportation's role in supporting economic vitality in the region were identified:

Objective 1: Maintain and strategically improve transportation infrastructure to support businesses in Western Vermont.

Objective 2: Increase employment and tourism activity in the Western Corridor.

Objective 3: Facilitate growth in passenger and freight traffic at airports within the Western Corridor consistent with airport Master Plans and the state's Airport System and Policy Plan.

3.2.5 Quality of Life

Goal: Implement efficient, sustainable and context-sensitive transportation strategies that support a high quality of life in Western Corridor communities.

The quality of life goal generally seeks to reduce or mitigate potential adverse effects associated with transportation infrastructure and services. Specific objectives are:

Objective 1: Maintain air quality "attainment" status under the federal Clean Air Act for all Western Vermont counties.

Objective 2: Reduce or mitigate the adverse effects of truck traffic within town and village centers where feasible.

Objective 3: Support commercial and residential settlement patterns concentrated in compact villages and urban centers separated by rural countryside, consistent with state, regional and local plans.

Objective 4: Provide safe, inviting and convenient pedestrian and bicycle accommodations that connect travel modes and provide access and circulation within communities. Plan and build streets and other transportation infrastructure with all users in mind.

Objective 5: Limit adverse environmental and community impacts of transportation infrastructure and services.

4 Implementation and Action Plan

The Implementation and Action Plan (Plan) outlines steps to advance transportation, land use and related strategies recommended by the Vermont Western Corridor Transportation Management Plan. Recommended strategies have been selected based on their potential to achieve the study's vision, goals and underlying objectives for the nearly 200-mile long Western Corridor. The strategies described in the plan are in most cases broadly defined actions that provide a framework for subsequent planning efforts by state, regional and local agencies to develop and implement specific improvements and programs.

4.1 Moving Forward

This study involved a collaborative effort by the Chittenden County Metropolitan Planning Organization (CCMPO); Regional Planning Commissions (RPCs) for Bennington County, Rutland County, Addison County, Chittenden County, and the Northwest Region (Franklin and Grand Isle Counties); and the Vermont Agency of Transportation (VTrans). Furthermore, the study group worked with the Federal Highway Administration (FHWA), Vermont Rail Systems, New England Central Railroad and other regional stakeholders during the course of the study. Through this process, a precedent for regional coordination of transportation planning along the Western Corridor has been established.

Continuing cooperative planning efforts will be essential in supporting the development and implementation of specific projects based on the strategies that are recommended in this plan. Ongoing coordination will help ensure that improvements that advanced are compatible with one another and consistent with overall corridor goals. By working together, communities, groups and agencies along the corridor should also have a stronger voice in advocating for priorities.

A *Western Corridor Working Group* will be formed at the completion of this study to continue coordinated planning efforts and further advance actions recommended in the Implementation and Action Plan. The working group will include representatives from all organizations that participated during the development of this study (RPCs, CCMPO, VTrans and other interested stakeholders). An important function of the Working Group will be to bring diverse stakeholders together (local, regional, and state agencies, property owners, businesses and others) into agreement on mutually beneficial land use and transportation strategies and actions to address issues identified in this Plan and develop mechanisms and interagency agreements for cooperatively pursuing the strategies. This Plan will serve as a "blueprint for action" for the planning agencies, municipalities, and other stakeholders in the corridor.

An important "next step" for the planning agencies in the corridor is to prioritize key short corridor segments in their region for more detail evaluation of issues and refinement of multimodal strategies recommended in the Plan that are appropriate for that particular segment. The responsibility of the planning agencies will also extend to ensuring that plans for individual segments are compatible with those of adjacent segments and with the Western Corridor Transportation Management Plan, to the extent possible.

A major challenge in developing strategies for this corridor, is that the type, condition, availability and use of transportation infrastructure and services varies considerably over the corridor – as do the land use objectives and plans of the many communities in the corridor. The transportation needs of the businesses – current and future - are highly diverse. Residents have strong but varied perspectives with respect to community character, services and ambiance. Of equal importance – there are varying degrees of "affordability" with respect to improving transportation up and down the corridor. For these reasons, great care will need to be taken in identifying the "boundaries" of a sub-corridor segments and its priority relative to other segments. The guiding principals for identifying boundaries are included in the Vermont Corridor Management Handbook (VTrans, July 2005).

Also consistent with the Handbook, segment studies should be *Collaborative*, meaning that transportation agencies, local governments, businesses and the public all participate in plotting a balanced set of realistic transportation and land use strategies for that segment. Ideally, a successful corridor management plan is one that state and regional agencies, municipalities, and other stakeholders in the corridor agree with, and use as a blueprint for both transportation and land use planning, regulation and decision-making.

4.2 Recommended Strategies and Actions

Table 4-1 lists recommended strategies and identifies which goal(s) are the basis for their selection. While recommended strategies were selected primarily on the basis of their support for one or two study goals, many strategies would support other study goals as well. *Appendix C, Evaluating Strategies*, details the evaluation of candidate strategies and actions relative to each of the study goals. The study goals and underlying objectives are described in *Chapter 3, Vision, Goals and Objectives*.

Table 4-1: Recommended strategies and basis for selection

Strategy		Highways	Freight	Public transportation	Economic vitality	Quality of life
H1	Improve signalized intersections	X	X			
H2	Improve local circulation	X		X	X	X
H3	Implement access management	X				
H4	Highway realignment and widening	X	X		X	
H5	Minor roadway reconfiguration	X	X			
H6	Safety improvements	X	X			
F1	Increase rail load ratings		X	X	X	
F2	Improve truck access to rail and airports		X		X	
F3	Establish additional transload facilities		X		X	
F4	Market rail-served properties		X		X	
F5	Preserve rail frontage for best uses		X			
T1	Expand and improve public transportation services			X		X
T2	Expand passenger rail service and intercity/interstate bus services			X	X	X
T3	Develop additional intermodal centers (Passenger Hubs)			X		
T4	Establish additional park-and-ride lots and intercept facilities			X		
T5	Expand travel demand management programs			X		X
T6	Improve traveler information	X	X	X	X	
T7	Improve bicycle and pedestrian accommodations			X	X	X
T8	Reduce border crossing delays for future passenger rail services			X		
E1	Improve airport infrastructure		X		X	
Q1	Region-wide operating agreement					X
Q2	Comprehensive truck noise mitigation/management program					X
Q3	Streetscape improvements				X	X
Q4	Implement traffic calming measures					X
Q5	Encourage use of alternative fuel vehicles					X
Q6	Encourage compact, mixed-use development within towns			X		X

Strategies are presented in the order discussed in the sections that follow.
X = Primary basis for selection (strategy may support additional goals as well – see Appendix C)

4.2.1 Plan Organization

The Implementation and Action Plan (Plan) is organized according to the study goals. Strategies are assigned an identification number that begins with a letter indicating the section under which the strategy is discussed:

H – Strategy is described under Highway actions (section 4.3);

F – Strategy is described under Freight actions (section 4.4);

T – Strategy is described under Public transportation actions (section 4.5);

E – Strategy is described under Economic vitality actions (section 4.6); and,

Q – Strategy is described under Quality of life actions (section 4.7).

Strategies that were selected on a basis of supporting multiple goals are discussed in detail in one section only, but identified under each of the other relevant sections as well.

Given the breadth of this study, recommended plan elements have been developed to varying levels of specificity depending on the nature of the strategy and amount of available supporting data and information. For example, strategy *H1: Improve signalized intersections* includes examples of potential improvements to facilities with capacity problems that were identified through detailed Level of Service (LOS) analyses. The potential improvements presented in Table 4-2 should not be construed as a list of future projects but rather should be treated as a starting point to address capacity or safety problems at specific locations. Conversely, strategy *F3: Improve truck access to rail facilities and airport* is a concept that has not yet been studied to the same degree of detail. In this case, the necessary near-term action is to further evaluate and identify specific needs.

The Plan recommends numerous strategies—several by mode (highway, rail, freight, public transportation) and others by category (economic vitality, quality of life)—all were developed to address corridor Goal(s) and Objective(s). However, the US 7 corridor varies greatly with respect to function and utility over its approximately 200 mile length in Vermont. As state and regional stakeholders move towards implementation of the Plan, it is crucial to look at multimodal solutions for issues facing the Western Corridor. Strategies addressing specific issues should be evaluated together at a more detailed sub-corridor level to select and prioritize appropriate actions.

More information on each strategy's benefits (or in some cases impacts) in relation to the study goals is presented in *Appendix C, Evaluating Strategies*.

4.3 Highway actions

These strategies were selected primarily on the basis of their ability to support the goal of improving traffic operations and safety on corridor roadways. Highway strategies were developed for both the developed areas/town centers (H1, H2, H3, H6) and the rural segments (H1, H4, H5, H6) of the western corridor. Some highway strategies are applicable throughout the western corridor. Recommended actions are:

Improve signalized intersections (Strategy H1)

Improve local circulation (Strategy H2)

Implement access management strategies (Strategy H3)

Highway realignment and widening (Strategy H4)

Minor roadway reconfiguration (lane and shoulder widths) (Strategy H5)

Safety improvements (Strategy H6)

Strategy T6: *Improve traveler information*, is also recommended as a means to improve highway safety and reliability. Strategy T6 is described later under *Public transportation actions*.

4.3.1 Traffic Improvements in Towns and Developed areas

One objective under this goal is to balance regional mobility needs with local transportation priorities and plans within towns and village centers and improve safety within these areas.

H1: Improve signalized intersections

Traffic signals are generally located within urbanized areas or at the intersection of major highways in the Western Corridor. Due to changes in traffic volumes and travel patterns, signals should be evaluated and timings adjusted on a regular basis to ensure that they are operating efficiently. In some cases, upgrading signal control and detection equipment could improve traffic flow and reduce travel delays, particularly in locations where signals are closely spaced. Where congestion is especially severe, additional lanes or turn pockets may be warranted.

This Plan recommends that roundabouts should be considered as potential treatments at locations where traffic control upgrades are warranted. Roundabouts are preferred at certain locations because they allow vehicles to proceed through intersections without stopping and generally decrease the risk of higher-severity collisions. In 2002, the Vermont State Legislature directed VTrans "to carefully examine and pursue the opportunities for construction of roundabouts at intersections determined to pose safety hazards for motorists" (Act 141, Section 37). However, roundabouts also require more land area compared to other traffic control devices, especially two lane roundabouts that are required to accommodate high traffic volumes. Two lane roundabouts can also present unique challenges for pedestrians with visual impairments as they rely upon their hearing to detect gaps in the traffic and determine when to cross. In two lane roundabouts the ability to detect gaps is often masked by the sounds generated by the second lane of traffic. A quantitative analysis based on costs and benefits of a proposed traffic control facility (traffic signals or roundabouts) should be conducted and results considered in selecting the appropriate treatment for a specific location.

This study evaluated existing (2005) and projected year (2030) conditions at major intersections on federal aid highways. Detailed Level of Service (LOS) analyses were conducted for 26 intersections in the western corridor using 2005 existing traffic data and 2030 estimated traffic data from the no-action scenario and the results are presented in the *Existing Conditions* report (Appendix A) and *Future Conditions* report (Appendix B) respectively. A number of corridor intersections are projected to experience congestion by the year 2030. Examples of improvement options for those intersections with either future LOS ≤ D or with deteriorating LOS compared to the 2005 conditions are described in Table 4-2.

Near-term and longer-term actions

- Develop a schedule to monitor traffic volumes and operations at signalized intersections and update signal timings as necessary.
- Prioritize congested intersections and/or sub-corridors around these congested facilities for more detailed evaluation and selection of preferred improvements. Table 4-2 lists major highway intersections in the western corridor that are projected to experience congestion in the future analysis year 2030. This table also presents examples of possible solutions for consideration at these facilities—more detailed evaluation is needed to develop preferred alternatives, typically through a scoping process. Similar strategies could be applied to other signalized intersections along the corridor.
- Conduct detailed intersection and/or sub-corridor evaluations of the prioritized congested locations.
- Consider roundabouts as a possible alternative during planning and analyses of improvements at intersections that experience congestion and safety issues in the corridor.
- Recommend improvements for programming under the Transportation Improvement Program (STIP/TIP) or Statewide Safety Program.
- Upgrade signal controller equipment and where appropriate provide vehicle detection and interconnect traffic signals to improve traffic flow along the corridor and reduce travel delay. Improvements to adjacent traffic signals along corridor segments should be considered at the same time to standardize equipment and maximize the efficiency of the signal control system.

Actions to be led by VTrans, RPCs or CCMPO and local Municipalities, depending on responsibility for maintenance and operation of specific intersections.

Table 4-2: Examples of Improvement Options at Congested Signalized Intersections

US 7 / US 2 — Colchester

2005 Traffic Conditions

Intersection: LOS C

Projected 2030 Traffic Conditions

Intersection: LOS E

Congested Movements:

US 2 EB Left LOS F (98 sec)
US 7 NB Left LOS F (111 sec)
US 7 SB Thru LOS F (125 sec)

Discussion

This intersection of the Roosevelt Highway (US 2) and the Ethan Allan Hwy (US 7) at Chimney Corner is projected to operate at LOS E conditions by the year 2030. Adjacent access to I-89 just to the west of the intersection attracts traffic to this location, resulting in heavy turning movements.

Example Options for Addressing Congested Movements

- Addition of a second eastbound left-turn pocket improves LOS to D or better for all movements (after adjusting traffic signal timing). This action would also require widening US 7 to the east to create a second receiving lane for turning traffic.
- The potential for additional turn pockets to better serve the northbound left turn or southbound right turn movements from US 7 appears limited since many of these vehicles are destined for I-89 and would need to remain in a single, outside turn lane to access these northbound on-ramp.
- Replacement of existing signalized intersection with a roundabout.
- Addition of a second entrance to the I-89 northbound onramp, with access directly from US 7 north of the intersection. This would involve reconfiguring the on-ramp to include a merge area or intersection to accept two entrances.

Burlington US 7/US 2 — Burlington

2005 Traffic Conditions

Intersection: LOS C

Projected 2030 Traffic Conditions

Intersection: LOS E

Congested Movements:

US 2 EB Thru LOS E (59 sec)
Main St WB Left LOS E (86 sec)
Main St WB Thru LOS E (70 sec)
US 7 SB Thru LOS E (74 sec)

Discussion

S Willard St carries US 7 and US 2 through Burlington, north of Main St. US 2 turns east on Main St, while US 7 continues toward the south. S Willard St has one travel lane in each direction and no turn lanes at the Main St intersection. Left turn pockets are provided on Main St, which also carries one travel lane in each direction. The intersection is located in an established residential neighborhood.

Example Options for Addressing Congested Movements

- Add left turn pockets on S. Willard - The curb to curb width on S Willard St is approximately 35 feet, which is sufficient but parking may need to be prohibited near the intersection. This change could improve intersection operations to LOS D, with all movements in the LOS C and D range.
- Add an additional east-west lane on Main St within the existing right-of-way (approx. 75-feet between existing sidewalks).
- Revised signal phasing. Consider elimination of exclusive pedestrian phase.

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans. Examples of Improvement options are based on 2030 capacity analyses for intersections with LOS ≤ D or deteriorating LOS compared to current conditions.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.

Table 4-2, Continued

US 7 / I-189 off-ramps

South Burlington

2005 Traffic Conditions

Intersection: LOS B

Projected 2030 Traffic Conditions

Intersection: LOS D

Congested Movements:

SB Thru LOS E (73 sec)

Discussion

Heavy traffic volumes associated with the I-189 ramps mix with local trips and longer-distance regional trips on US 7. The roadway cross-section is essentially built-out to a maximum configuration given the cross-section of the overpass over I-189 and adjacent properties.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary.
- Widen the I-189 off-ramp to provide an additional turn lane (2 left turns, 1 through, 1 right turn).
- Add a lane on US 7 in each direction between Farrell Road and Hannaford Drive. This would result in an excessively wide road profile that might not be conducive to pedestrians crossing the roadway.

US 7 / Swift St

South Burlington

2005 Traffic Conditions

Intersection: LOS B

Projected 2030 Traffic Conditions

Intersection: LOS D

Congested Movements:

WB Left LOS F (100 sec)
WB Rt LOS F (187 sec)
SB Left LOS F (119 sec)

Discussion

This intersection is impacted by its proximity to the I-189 on-ramp and the traffic accessing that route. Swift St itself experiences high traffic volumes due to a lack of alternate routes.

Poorly operating movements are those turning movements associated with traffic traveling to or from Swift St. Through movements on US 7 operate adequately.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary.
- Consider construction of parallel road segments to improve network connectivity and provide alternate routes for local trips.
- Capacity improvements to Swift St. approach and I-189 on-ramp.
- Add a lane on US 7 in each direction between Farrell Road and Hannaford Drive. This would result in an excessively wide road profile that might not be conducive to pedestrians crossing the roadway.

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans. Examples of Improvement options are based on 2030 capacity analyses for intersections with LOS ≤ D or deteriorating LOS compared to current conditions.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.

Table 4-2, Continued

US 7 / Allen Rd — South Burlington

2005 Traffic Conditions

Intersection: LOS B

Projected 2030 Traffic Conditions

Intersection: LOS C

Congested Movements:

WB Thru LOS E (67 sec)
SB Left LOS F (120 sec)

Discussion

US 7 has recently been improved in this area to provide a 5-lane cross section plus bus pullouts as well as designated bike lanes. Under higher travel demands in the future, traffic turning to/from US 7 at Allen Rd is projected to experience longer delays typical of LOS E and F conditions. Through movements and the intersection as a whole are expected to operate adequately.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary.
- Consider construction of parallel road segments to improve network connectivity and provide alternate routes for local trips.
- Widen Allen Road to provide an additional left turn pocket.

US 7 / VT22A — Ferrisburgh

2005 Traffic Conditions

Intersection: LOS B

Projected 2030 Traffic Conditions

Intersection: LOS C

Congested Movement:

EB Left LOS E (72 seconds)

Discussion

VT 22A intersects with US 7 at a T-intersection. Low volume Locust Ln also intersects US 7 nearby. The left turn from VT 22A to northbound US 7 is forecast to operate at LOS E by 2030.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary. Longer cycle length may be appropriate here.
- Replacement of the existing signal with a high-speed rural roundabout—which is a roundabout that is designed to facilitate higher speed approaches. A roundabout at his location may also improve safety. This would require additional right-of-way, though adjacent land is undeveloped.
- Widen US 7 and VT 22A to provide additional lanes in the vicinity of the intersection.

US 7 / US 4 (to Woodstock) — Rutland City

2005 Traffic Conditions

Intersection: LOS D

Projected 2030 Traffic Conditions

Intersection: LOS D

Congested Movement:

NB Thru LOS E (149 sec)
SB Left LOS F (70 sec)

Discussion

The opposing northbound through and southbound left turn movements are projected to operate at LOS E and F conditions respectively by 2030. The intersection is constrained by adjacent developed properties.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary.
- Widen roadway to provide a dual left turn lane from southbound US 7 to US 4 (would require a 2nd eastbound lane segment on US 4 also).
- Widen US 7 to provide additional through lanes.
- Close west leg of intersection (driveway) to reallocate signal time to other movements.

Table 4-2, Continued

US 7 / US 4 (to NY)

Rutland City

2005 Traffic Conditions

Intersection: LOS D

Projected 2030 Traffic Conditions

Intersection: LOS D

Congested Movements:

EB Left LOS E (71 sec)
NB Left LOS E (69 sec)
WB Left LOS E (55 sec)

Discussion

High left turning volumes that cross the predominate north-south movements contribute to congestion at this location. This intersection has ample room for expansion.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary.
- Consider operating the eastbound and westbound left turning movements as permitted+protected operations and reallocate signal time to other movements.
- Widen to provide dual left turn lanes
- Replace intersection with a high-speed rural roundabout—which is a roundabout that is designed to facilitate higher speed approaches.

US 7 / VT 9

Bennington

2005 Traffic Conditions

Intersection: LOS D

Projected 2030 Traffic Conditions

Intersection: LOS D

Congested Movements:

EB Left LOS E (62 sec)
NB Left LOS F (83 sec)
SB Left LOS F (105 sec)

Discussion

Traffic volumes at the intersection of US 7 and VT 9 in downtown Bennington are relatively low, but turning vehicles are projected to experience significant delay. The adjacent developed properties preclude widening to provide additional lanes.

Example Options for Addressing Congested Movements

- Periodically investigate traffic signal timing and refine as necessary.
- Consider operating left turns as permitted and protected operations, which could significantly reduce delay for turning vehicles.

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans. Examples of Improvement options are based on 2030 capacity analyses for intersections with LOS ≤ D or deteriorating LOS compared to current conditions.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.

H2: Improve local circulation

In some locations, major routes such as US 7 carry a substantial share of local trips due to lack of connectivity within the local street grid. Improvements to the local street network to improve local circulation would decrease traffic and turning movements on major arterials, and in turn reduce congestion and improve safety. However, such improvements should be designed to discourage longer-distance trips on the corridor from using local streets to bypass congested areas. This can be achieved through application of appropriate traffic calming measures and adherence to local and residential streets standards to discourage pass-though traffic.

Near-term actions

- Working with towns and villages, identify locations in towns and villages where lack of network connections forces local traffic to rely on major highways for local circulation. Update long-range plans to include identified improvements.
- Implement low-cost improvements aimed at improving local circulation, such as changes in traffic control or wayfinding guidance (signage) geared toward local traffic.

On-going actions

- As (re)development occurs within the Town/Village/Growth Centers in the corridor, plan for and construct local road connections, parallel routes, and other road improvements to provide additional routes for local traffic. Consider implementing traffic calming improvements to discourage through traffic.
- Develop plans for developer (traffic impact) fees, special assessment districts, etc. to build necessary local street connections.

Actions to be led by RPCs/CCMPO and local Municipalities in consultation with VTrans and Developers.

H3: Implement access management strategies

Access management strategies are intended to reduce and improve access points to roadways, which can improve both traffic flow and safety. They can be implemented through the development of standards that guide how new (or redeveloped) properties may access the roadway, or as specific capital projects designed to improve roadway design elements (e.g. – turn lanes), consolidate driveway and other access points, or otherwise improve access points. VTrans has developed a comprehensive access management program that describes the benefits of access management techniques, presents a toolkit of "best practices", and defines regulatory and design standards for six categories of access management that are based on highway classification and context. These resources provide a foundation for expanding and applying access management techniques throughout the corridor.

Near-term and longer-term actions

- Assist municipalities in drafting land use plans and regulations that require good access design in the development or redevelopment process
- Continue support for VTrans' access management and access improvement programs for state highways.

- Develop and implement access management standards for key roadways managed by local agencies that are consistent with VTrans' statewide program.
- Identify locations in developed areas (towns and villages) where roadway improvements or redesigned access could confer significant benefits. These typically will include developed areas in and around towns, though typically outside of downtown. Develop and implement capital projects at these locations to consolidate, standardize and improve access.

Actions to be led by RPCs or CCMPO in consultation with local Municipalities and VTrans.

4.3.2 Traffic Improvements in Outlying Areas

A second objective under the goal of improving highway efficiency and safety is to: improve traffic operations, safety and travel reliability for highway segments between urbanized areas/village centers. Travel reliability refers to the consistency of travel conditions on a corridor, including the ability to recover or limit impacts associated with incidents.

H1: Improve signalized intersections

Outside town and village centers, traffic signals are generally located at intersections of major (usually state) highways. Due to changes in traffic volumes and travel patterns, signals should be evaluated and timings adjusted on a regular basis to ensure that they are operating efficiently. In some cases, upgrading signal control and detection equipment could improve traffic flow and reduce travel delays.

This Plan strongly recommends that roundabouts should be considered as potential treatments at locations in outlying areas where traffic control upgrades are warranted. Roundabouts are preferred at certain locations because they allow vehicles to proceed through intersections without stopping and generally decrease the risk of higher-severity collisions. In 2002, the Vermont State Legislature directed VTrans "to carefully examine and pursue the opportunities for construction of roundabouts at intersections determined to pose safety hazards for motorists" (Act 141, Section 37). However, roundabouts also require more land area compared to other traffic control devices, especially two lane roundabouts that are required to accommodate high traffic volumes. A quantitative analysis based on costs and benefits of a proposed traffic control facility (traffic signals or roundabouts) should be conducted and results considered in selecting the appropriate treatment for a specific location.

H4: Highway realignment and widening

US 7 and other major highway corridors are constructed to varying standards, based largely on when each specific segment was designed and built. Older segments generally have narrower lanes and shoulders and alignments that correspond to lower design speeds. These segments have posted speed limits of 40 mph or 45 mph. Segments that have been reconstructed or repaved in more recent years are following more closely the Vermont Design Standards with improved alignments and in general with 12-foot lanes and 8-foot shoulders for segments posted at 50 mph.

Outside of developed areas, corridor highways are exclusively two-lane roads (one lane each direction), except for short climbing lane or passing lane segments. In terms of basic lane

capacity, two-lanes are sufficient to accommodate existing and projected year-2030 traffic volumes in most locations. There are a few select locations though, that widening to provide additional lanes merits further consideration.

Highway recommendations to construct additional lanes, which would typically involve conversion to a divided highway, are costly and would involve considerable impacts to the built and/or natural environment. For these reasons, the likely applicability of large-scale highway reconstruction or expansion is limited. Instead, more limited improvements such as targeted widening to provide passing lanes or climbing lanes at key locations may have higher feasibility from both a funding and implementation standpoint. Similarly, smaller-scale improvements that address lane and shoulder widths (see strategy H5 discussion that follows), but do not involve substantial highway re-alignment could confer some of the travel reliability and safety benefits associated with a full reconstruction. Where it's feasible, this Plan recommends that rural section improvements should raise the posted speed limit to 50 mph which should be the standard for travel outside developed areas in the western corridor.

Table 4-3 provides example of improvement options for specific 2-lane corridor segment that exhibit LOS < D in 2030 under the no-action scenario. Note that traffic analysis of current and future conditions indicates that increased capacity is not warranted on most rural segments of US 7.

In summary, types of projects that may evolve from this general strategy include:

- Selectively improve segments to provide additional climbing lanes or passing lanes. These projects would provide additional passing opportunities, primarily benefiting safety and travel reliability, with modest improvements in capacity. They could be implemented selectively and therefore at lower cost and with fewer impacts than broader scale realignment and expansion of highway segments.
- Increase posted speed limit to 50 mph by upgrading highway segments with LOS ≤ D to Vermont Design Standards, including lane widths, shoulder widths, and improved alignment. The primary aim of these projects would be to improve travel speeds and reliability for passengers and freight. Safety benefits could be expected as well, but should be evaluated on a case-by-case basis, as actions that increase travel speeds may also tend to increase the severity of crashes.
- Reconstruct and expand highway segments to add additional travel lanes to increase the capacity of the roadway.

<u>Near-term and longer-term actions</u>

- Prioritize 2 lane rural segments, from the list presented in Table 4-3, to address poor LOS (less than D) and lower-speed conditions. Develop preferred alternatives to upgrade specific segments though the scoping process.
- In coordination with the recommended safety improvements (see strategy H6 below), develop and prioritize projects to address locations where highway crash history indicates improved alignment and roadway geometry are needed. Update regional priorities to include these projects into the Transportation Improvement Program (STIP/TIP).

Actions to be led by RPCs/ CCMPO and VTrans.

H5: Minor roadway reconfiguration (lane and shoulder widths)

Minor roadway reconfiguration would maintain current alignments, but improve roadway geometry through either (1) restriping to delineate lane and shoulder locations on existing paved areas, or (2) modestly widening the roadway to increase the paved area available for shoulders. Such actions would be much less costly than full reconstruction of roadway segments and would have fewer impacts to the built or natural environment. Improved travel reliability and safety are the primary justifications for such actions, as speed and capacity benefits are negligible. Application of this strategy is most appropriate either as an interim measure, or in locations where the roadway alignment and capacity are generally sufficient.

Near-term and longer-term actions

- Prioritize locations and develop specific proposals, covering multiple locations, to address corridor segments with lane and shoulders widths that are lower than appropriate standards and the current and/or future LOS is less than D, as identified in Table 4-3. Recommend improvements for programming in the statewide capital program, as appropriate.
- Based on the results of more detailed safety analysis on corridor segments (see strategy H6 below), implement minor reconfiguration improvement to address locations where highway collision history indicates such changes could be beneficial.
- Consider applicability of this scale of improvement as an interim measure at locations with identified congestion or safety issues. Consider implementing improvements in conjunction with necessary maintenance activities, such as pavement overlays, to minimize disruption and costs.

Actions to be led by VTrans, RPCs and CCMPO.

Table 4-3: Examples of Improvement Options on Rural and Suburban Highway Segments

US 7 Swanton

Segment #2: (VT 78 – St Albans town line north)

Existing Traffic Conditions

LOS E

Traffic volume: 552 vehicles

(Design hour total both directions)

Discussion

Segment volumes are modest, but alignment and limits travel speeds. Passing opportunities are very limited.

- The posted speed limit is 40 mph.
- Lane widths are generally 12 feet with shoulders typically 5 to 6 feet.
- Additional travel lanes are not necessary

Projected 2030 Traffic Conditions

LOS E

Calculated Avg Travel Speed: 35 mph

Traffic volume: 705 vehicles

(Design hour total both directions)

Example Options for Improving Highway Segments (2030 conditions)

- Restripe to 11-foot lanes and add one foot to the shoulder to improve consistency with current standards for a 40 mph posted speed.
- Realign to allow a posted speed of 50 mph to improve operations to LOS D and a higher avg travel speed.
- Selective widening to provide periodic passing lanes and improve passing opportunities, which is a key contributor to the poor LOS.

US 7 Milton

Segment #5 (Bartlett Rd –Andrea Ln south)

Existing Traffic Conditions

LOS D

Traffic volume: 1244 vehicles

(Design hour total both directions)

Discussion

This segment experiences high peak traffic volumes. Passing opportunities are very limited.

- The posted speed limit is 50 mph.
- Lane widths are generally 12 feet with shoulders typically 3 to 4 feet.
- Highway alignment already allows 50 mph posted speed

Projected 2030 Traffic Conditions

LOS E

Calculated Avg Travel Speed: 39 mph

Traffic volume: 1756 vehicles

(Design hour total both directions)

Example Options for Improving Highway Segments (2030 conditions)

- Widening to provide 8-foot shoulders could benefit travel reliability and improve safety, and improve average travel speeds by +2 mph to +3 mph. Lanes are already 12-feet wide.
- Selective widening to provide periodic passing lanes may improve travel reliability by increasing passing opportunities, potentially improve LOS to D, and increase average speeds by up to +5mph.
- Widening to provide additional travel lanes would achieve LOS A and free-flow speeds (50+ mph).

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.
3. See Figure 4-1 for segment locations and LOS information.

Table 4-3, Continued

US 7 Milton-Colchester **2005 Traffic Conditions** LOS D Traffic volume: 1244 vehicles (Design hour total both directions) **Projected 2030 Traffic Conditions** LOS E Calculated Avg Travel Speed: 41 mph Traffic volume: 1756 vehicles (Design hour total both directions)	Segment #6 (Andrea Ln south – US 2) **Discussion** This segment experiences high peak traffic volumes. Passing opportunities are very limited. • The posted speed limit is 50 mph. • Lane widths are generally 12 feet with shoulders typically 8 feet. • Lane and shoulder widths meet current standards. • Highway alignment already allows 50 mph posted speed. **Example Options for Improving Highway Segments (2030 conditions)** • Selective widening to provide periodic passing lanes may improve travel reliability by increasing passing opportunities. • Widening to provide additional travel lanes would achieve LOS A and free-flow speeds (50+ mph).
US 7 Colchester South **2005 Traffic Conditions** LOS E Traffic volume: 1741 vehicles (Design hour total both directions) **Projected 2030 Traffic Conditions** LOS E Calculated Avg Travel Speed: 35 mph Traffic volume: 2422 vehicles (Design hour total both directions)	Segment #8 (Blakely Rd – Rathe Rd) **Discussion** This segment experiences very high peak volumes. Passing is generally not allowed on this segment. • The posted speed limit is 50 mph. • Lane widths are generally 12 feet with shoulders typically 8 feet. • Lane and shoulder widths meet current standards. • Highway alignment already allows 50 mph posted speed. **Example Options for Improving Highway Segments (2030 conditions)** • Widening to provide additional travel lanes would achieve LOS B and free-flow speeds (50+ mph).

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.
3. See Figure 4-1 for segment locations and LOS information.

Table 4-3, Continued

US 7 Charlotte **2005 Traffic Conditions** LOS D Traffic volume: 1302 vehicles (Design hour total both directions) **Projected 2030 Traffic Conditions** LOS E Calculated Avg Travel Speed: 41 mph Traffic volume: 1830 vehicles (Design hour total both directions)	Segment #9 (Shelburne Town Line south – Ferry Rd / VT F5) **Discussion** This segment experiences high peak traffic volumes. Passing opportunities are limited. • The posted speed limit is 50 mph. • Lane widths are generally 12 feet with shoulders typically 8 feet. • Lane and shoulder widths meet current standards. • Highway alignment already allows 50 mph posted speed. **Example Options for Improving Highway Segments (2030 conditions)** • Selective widening to provide periodic passing lanes may improve travel reliability by increasing passing opportunities, potentially improve LOS to D, and increase average speeds by up to +5mph. • Widening to provide additional travel lanes would achieve LOS A and free-flow speeds (50+ mph).
US 7 Charlotte-Ferrisburgh **2005 Traffic Conditions** LOS D Traffic volume: 1,176 vehicles (Design hour total both directions) **Projected 2030 Traffic Conditions** LOS E Calculated Avg Travel Speed: 38 mph Traffic volume: 1,619 vehicles (Design hour total both directions))	Segment #10 (Ferry Rd / VT F5 – Ferrisburgh town line north) **Discussion** This segment experience high peak traffic volumes. Passing opportunities are limited. • The posted speed limit is 50 mph. • Lane widths are generally 12 feet, though shoulders are typically less than 2 feet. • Highway alignment already allows 50 mph posted speed. **Example Options for Improving Highway Segments (2030 conditions)** • Widening to provide 8-foot shoulders could benefit travel reliability and improve safety, and improve average travel speeds by +2 mph to +3 mph. Lanes are already 12-feet wide. • Selective widening to provide periodic passing lanes would improve passing opportunities. • Widening to provide additional travel lanes would achieve LOS A and free-flow speeds (50+ mph).

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.
3. See Figure 4-1 for segment locations and LOS information.

Table 4-3, Continued

US 7 Ferrisburgh	Segment #11 (Ferrisburgh town line north – VT 22A)
2005 Traffic Conditions LOS D Traffic volume: 1,313 vehicles (Design hour total both directions)	**Discussion** This segment experiences high peak traffic volumes. Passing is allowed on much of this segment, but opposing traffic volumes limit passing opportunities. • The posted speed limit is 50 mph. • Lane widths are generally 12 feet with shoulders typically 8 feet. • Lane and shoulder widths meet current standards. • Highway alignment already allows 50 mph posted speed.
Projected 2030 Traffic Conditions LOS E Calculated Avg Travel Speed: 38 mph Traffic volume: 1842 vehicles (Design hour total both directions)	**Example Options for Improving Highway Segments (2030 conditions)** • Selective widening to provide periodic passing lanes would improve passing opportunities. • Widening to provide additional travel lanes would achieve LOS A and free-flow speeds (50+ mph).
US 7 Middlebury North	Segment #14 (Middlebury town line north – Main St / VT 30)
2005 Traffic Conditions LOS E Traffic volume: 1,113 vehicles (Design hour total both directions)	**Discussion** Segment volumes moderately high, but alignment limits travel speeds. Passing is generally not allowed on this segment. • The posted speed limit is 40 mph. • Lane widths are generally 12 feet, though shoulders are typically less than 3 feet.
Projected 2030 Traffic Conditions LOS E Calculated Avg Travel Speed: 31 mph Traffic volume: 1499 vehicles (Design hour total both directions)	**Example Options for Improving Highway Segments (2030 conditions)** • Widening to provide 8-foot shoulders may benefit travel reliability and improve safety. Lanes are already 12-feet wide. • Selective widening to provide periodic passing lanes would improve passing opportunities. • Realigning to allow a posted speed of 50 mph is projected to improve avg travel speed to 41 mph • Widening to provide additional travel lanes would achieve LOS A and free-flow speeds (50+ mph).

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.
3. See Figure 4-1 for segment locations and LOS information.

Table 4-3, Continued

VT 7A Manchester South	Segment #23 (south of Manchester – Arlington town line north)
2005 Traffic Conditions LOS E Traffic volume: 880 vehicles (Design hour total both directions) **Projected 2030 Traffic Conditions** LOS E Calculated Avg Travel Speed: 36 mph Traffic volume: 1162 vehicles (Design hour total both directions)	**Discussion** Segment volumes are moderate, but alignment limits travel speeds. Passing opportunities are limited. • The posted speed limit is 45 mph. • Lane widths are generally 12 feet, though shoulders are typically less than 3 feet. • Realignment and higher posted speeds not recommended due to highway's context and status as alternate to US 7. • Traffic volumes do not justify additional travel lanes. **Example Options for Improving Highway Segments (2030 conditions)** • Widening to provide 8-foot shoulders may benefit travel reliability and improve safety, improve LOS to D, and improve average travel speeds by +3 mph to +4 mph. • Selective widening to provide periodic passing lanes would improve passing opportunities, which is a key contributor to the poor LOS.
VT 7A Arlington	Segment #24 (Arlington town line north – VT 313)
2005 Traffic Conditions LOS E Traffic volume: 616 vehicles (Design hour total both directions) **Projected 2030 Traffic Conditions** LOS E Calculated Avg Travel Speed: 32 mph Traffic volume: 814 vehicles (Design hour total both directions)	**Discussion** Segment volumes are relatively modest, but alignment limits travel speeds. Passing is generally not allowed on this segment. • The posted speed limit is 40 mph. • Lane widths are generally 12 feet, though shoulders are typically less than 2 feet. • Realignment and higher posted speeds not recommended due to highway's context and status as alternate to US 7. • Traffic volumes do not justify additional travel lanes. **Example Options for Improving Highway Segments (2030 conditions)** • Widening to provide 8-foot shoulders may benefit travel reliability and improve safety, and improve average travel speeds by +3 mph to +4 mph. • Selective widening to provide periodic passing lanes would improve passing opportunities.

Notes:

1. Capacity analyses were conducted for current conditions and 2030 "no action" scenario, where no new improvements are presumed other than four major projects: the Bennington Bypass; the Circumferential Highway in Chittenden County; the Middlebury Rail Spur; and the Federal Street Extension in St. Albans.
2. The examples presented in this table should not be construed as a list of future projects but rather as discrete options that could be evaluated together with other land use and transportation options in addressing capacity and safety issues at specific locations.
3. See Figure 4-1 for segment locations and LOS information.

Figure 4-1: LOS Information and Two-Lane Rural Segments Locations

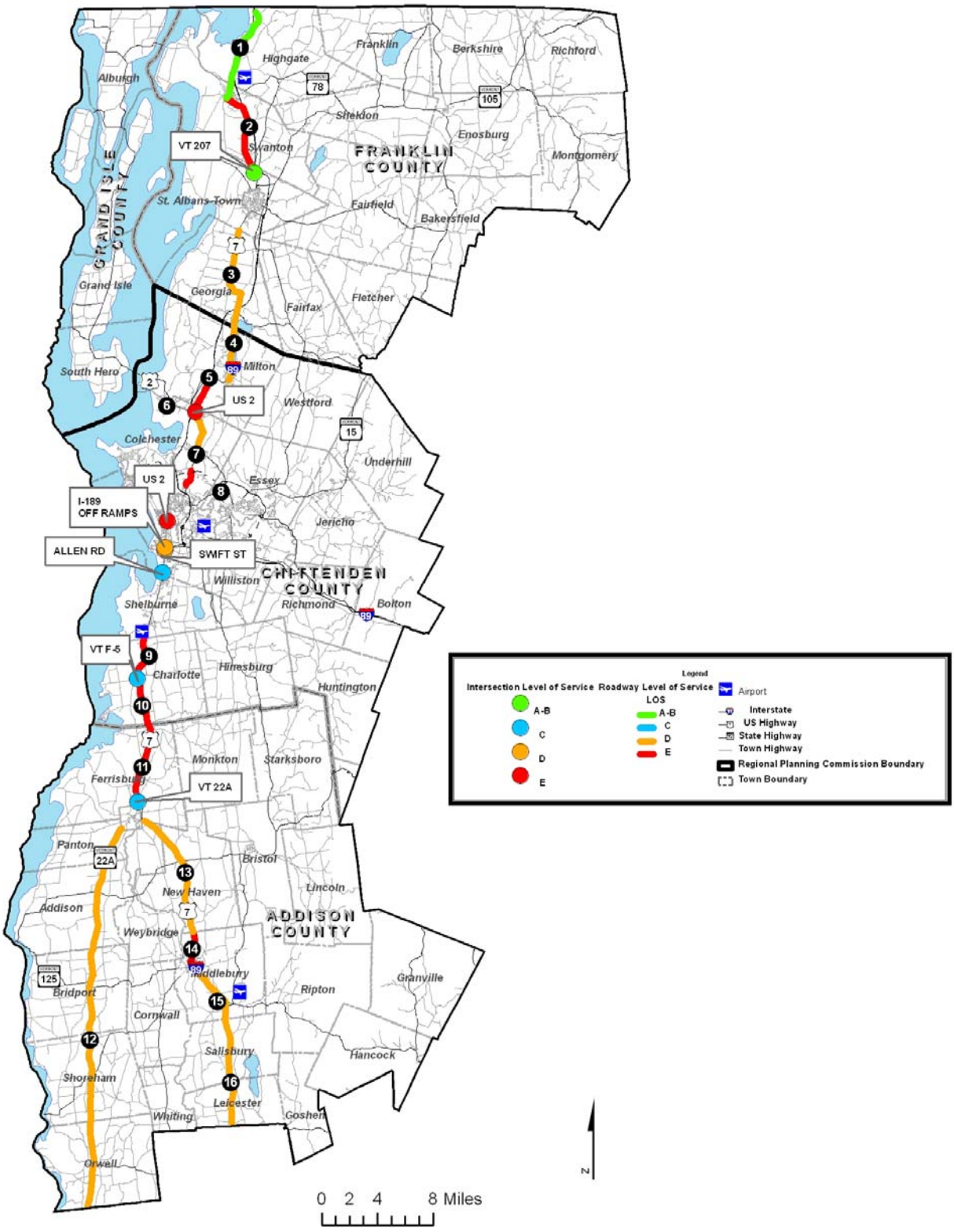
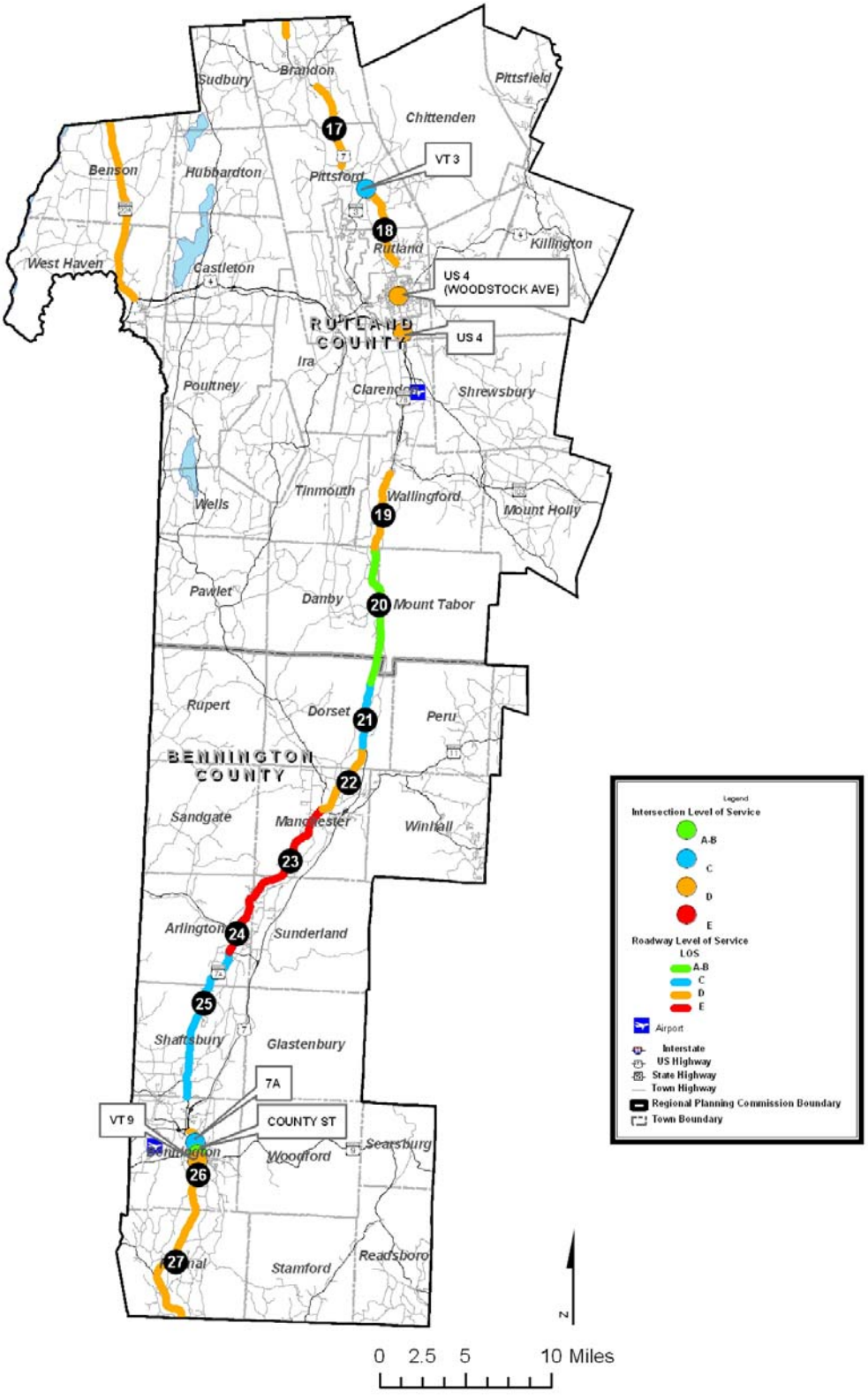


Figure 4-1 *(Continued)*: LOS Information and Two-Lane Rural Segments Locations



4.3.3 Safety

H6: Safety improvements

The intent of this strategy is to improve highway safety by addressing High Crash Locations (HCL)—sections and intersections—in the Western Corridor. According to VTrans' Highway Crash Location Report (2003 – 2007), 15 of the top 100 HCL intersections and 13 out of the top 100 HCL sections in the State are located along US 7. VTrans is addressing safety on Vermont's highways though various programs including the Highway Safety Improvement Program (HSIP) and the High Risk Rural Roads Program (HRRR).

Highway safety does not depend solely on road geometrics and traffic flows but also on human behavior, enforcement and other factors. Vermont's Strategic Highway Safety Plan (SHSP) has taken a broad look at the safety issue—the plan was developed in 2006 and is currently being implemented by stakeholders from Vermont's diverse safety community. The SHSP's core mission is to "Minimize the occurrence and severity of crashes, related human suffering and economic losses on the Vermont transportation network…" the SHSP is comprehensive and focuses on **E**ngineering, **E**ducation, **E**nforcement and **E**mergency Medical Services.

Near-term actions

- Work regionally/locally in coordinating with the statewide HSIP program to continue to monitor and prioritize HCL (sections and intersections) in the Western Corridor, both on US 7 and other major routes.
- Identify HCL in the corridor that could benefit from short-term, low cost improvement strategies.
- Implement low cost safety improvement strategies.
- Continue participation and support of the SHSP process. Work to implement SHSP elements throughout the corridor.
- Continue participation in multi-disciplinary Road Safety Audit Reviews (RSARs).
- Identify and prioritize safety issues at railroad crossing.

On-going actions

- Consider safety implications in the implementation of all transportation improvements.

Longer-term actions

- Develop and implement safety improvement strategies for all HCL in the Western Corridor on an on-going basis.

Actions to be led by VTrans, RPCs/CCMPO in collaboration with affected municipalities.

4.4 Freight Actions

Actions to improve freight service in the Western Corridor include strategies designed to improve freight and rail efficiency, improve access to freight terminals and services, and increase rail market share. Recommended actions are:

- Invest in rail infrastructure in order to achieve load rating standards of 286,000 lb. for rail/bed and 315,000 lb for new bridges (Strategy F1)
- Improve truck access to rail facilities and airports (Strategy F2)
- Further explore with shippers, receivers, rail and truck operators the potential for additional transload facilities within the corridor to provide efficient intermodal (truck and rail) connectivity (Strategy F3)
- Market rail-served properties to appropriate businesses (Strategy F4)
- Strategically select appropriate rail frontage to preserve for commercial or industrial development uses that will/could utilize rail services (Strategy F5)

Also recommended as means of improving truck travel times and reliability and thus improving freight movements in the corridor are several highway strategies described previously;

- Improve signalized intersections (Strategy H1)
- Highway realignment and widening (Strategy H4)
- Minor roadway reconfiguration (lane and shoulder widths) (Strategy H5)
- Safety improvements (Strategy H6)

Two additional strategies described later under *Public transportation* and *Economic vitality actions* would also address travel reliability for freight and goods movement;

- Expand traveler information (Strategy T6)
- Improve infrastructure at key airports in the Western Corridor (Strategy E1)

4.4.1 Travel Reliability and Safety of Highways for Freight Movements

Highway strategies described in previous sections also support improved travel reliability for truck movements. Strategies H1, H4, H5 and H6 are specifically recommended for their benefits to truck, as well as automobile travel.

4.4.2 Improve Rail Efficiency

F1: Invest in rail infrastructure in order to achieve load rating standards of 286,000 lb. for rail/bed and 315,000 lb for new bridges.

Rail infrastructure in the Western Corridor must be maintained and improved to standards that allow for cost effective operations and connections to the national rail network. The primary goal is to accommodate the railroad industry standard loaded car weight of 286,000 pounds. Currently, much of the rail infrastructure in Vermont cannot accommodate heavy carloads that

are commonplace elsewhere (particularly for bulk shipments such as grains, aggregates, etc). As a result, some shippers in Vermont must have their products shipped in partially loaded railcars, an inefficient and costly prospect, or instead by truck.

The critical infrastructure components that dictate the rail loading standards are bridges and track/bed. VTrans manages an ongoing program to upgrade the State owned Western Corridor rail lines, to the so-called "286 capability." In addition, the Vermont legislature mandated that all new rail structures (bridges) achieve the standard of 315,000 lbs where feasible.

Near-term and longer-term actions

- Continue upgrading the freight rail infrastructure to the 286,000 lb standard for track and 315,000 lb standard for new bridges in the Western Corridor—from Bennington to the Canadian border and all connecting links, including Burlington to Essex Junction. This includes improvements to the first priority route, as identified in the VT State Rail & Policy Plan, 2006, of the segment of the Western Corridor between Florence and Rutland.
- Reconsider designation of other first priority routes during the next rail plan update. The viability and service potential of specific out-of-state "gateway" connections have recently changed, resulting in corresponding changes in some rail freight traffic patterns in the state during the past year. If these are sustained, the route between Rutland and Hoosick Junction, NY will have greater importance and may warrant consideration as a higher priority as well.
- Maintain coordination with neighboring states and Canada to cooperatively identify needs and opportunities for railroad infrastructure and service improvements which can be mutually beneficial.

On-going actions

- Ensure that rail infrastructure is maintained to retain load ratings.

Actions to be led by VTrans, Railroads, the Vermont Rail Council, and the RPCs/CCMPO.

4.4.3 Improve Access to Freight Terminals and Services

F2: Improve truck access to rail facilities and airports

Actions

In order to maintain an efficient intermodal freight network in the corridor it is necessary to provide trucks with safe and efficient access to railroad freight and airport cargo facilities. These roadways need to be designed, constructed, and maintained to safely accommodate appropriate truck weight and length requirements consistent with Vermont law.

Near-term actions

- Identify and prioritize roadway upgrades to safely accommodate truck traffic to existing rail freight yards and airport cargo terminals. The routes should not compromise the safety and quality of life in residential neighborhoods and should be designed to accommodate trucks of all legal dimensions and weights.

Longer-term actions

- Improve gates and terminal facilities at rail and airport facilities to accommodate existing and anticipated security requirements which may result in screening or queuing of trucks at entrance points.

Actions to be led by private facility owners/operators support from the host Municipalities, Railroads and Airport Operators in coordination with VTrans, RPCs/CCMPO.

F3: Establish additional transload facilities to provide efficient intermodal (truck and rail) connectivity

Rail/Truck transload facilities are locations on railroad lines where shipments can be transferred between trucks and railroad cars, thereby enhancing the opportunity for rail shipments as supported by local trucking activity. The transload facilities are assumed to handle general merchandise and bulk shipments, but do not encompass containers or trailers which are typically handled at large mechanized intermodal terminals.

Transfer of commodities can be directly between train and truck, or interim storage facilities can be employed, such as warehouses and storage tanks. Such facilities already exist along the Western Corridor rail lines, but developing additional facilities could improve the geographical distribution and improve access for shippers. Conversely, establishing additional transload facilities would increase switching requirements for the railroads and could slow train schedules as loads are picked up and dropped off at the additional sites. In deciding whether and where to establish new transload facilities, this balance of increased access to markets more intensive operating requirements and additional capital and maintenance costs for the railroads must be examined. VTrans currently offers a rail enhancement program that shares the cost of rail facilities, including rail sidings, three ways between VTrans, the Railroad and the shipper.

Near-term actions

- Continue to offer the three-way Railroad Enhancement Program.
- Conduct a market feasibility study to determine those locations best suited for locating new transload facilities based on potential to generate additional rail freight traffic and/or reduce shippers' costs. The location, number and types of sites to be developed should to be coordinated with the operating railroad throughout the Corridor in a systematic manner.
- Either in conjunction with or following the market feasibility study, select potential new or existing transload sites for further development. A long-range visioning exercise conducted with RPC/MPO members helped identify general locations where these facilities may be located (see Appendix D). Specific sites should be:
  - Located along railroad lines, preferably within the railroad right-of-way that provide sufficient space for placing of railcars, land area for any ancillary buildings and support facilities and efficient truck access.
  - Zoned accordingly and compatible with existing activities in the immediate area including residential and commercial operations.

Longer-term actions

- Where practical, initiate construction of new, or expansion of existing, transload facilities, and adjust railroad service schedules as needed to accommodate use of the facilities. The construction activity would be coordinated by the railroads, probably in partnership with transload facility owners/operators. The facility owners/operators could be shippers/receivers or third-party transportation logistics-type firms.

Actions to be led by RPCs, CCMPO and Regional Development Corporations (RDCs) working with VTrans, freight shippers and railroad operators, with support from municipalities for land use compatibility and zoning compliance.

4.4.4 Increase Rail Market Share

F4: Market rail-served properties to appropriate businesses

Properties that can be best served by rail are often leased to a company that does not use rail service, while some businesses that could benefit from the efficiencies of freight rail service are located off of existing rail corridors and unable to find (or are unaware of) suitable locations with rail access. Establishing a program to increase the awareness of available rail-served properties and match potential clients with these properties could contribute to increased use of rail in the corridor. Such a program would be aimed at decision makers, corporate real estate professionals, entrepreneurs and private businesses.

One example of such a program is administered by the Pennsylvania Department of Transportation, which established an online directory that identifies over 200 properties across the state with rail access. The database includes other important site location information that would be useful to site locator decision makers as well. A similar database of rail-served properties could be compiled by the Municipalities/RPCs/CCMPO/Regional Development Corporations (RDCs) for use by commercial real estate brokers and the Vermont Department of Economic Development.

Near-term actions

- Develop a Rail Freight Properties Directory. Once compiled, this directory could be made available on-line.
- Work with the State of Vermont and RDCs to incorporate the directory on their web site—possibly under a Commercial Property Locator section.

Longer-term actions

- Maintain and update the directory.

Action to be led by the Western Corridor Working Group and RDCs/ACCD with support from, Railroad Operators and Municipalities.

F5: Encourage preservation of appropriate rail frontage for commercial or industrial development uses that will/could utilize rail services

The number of developable properties in the Western Corridor that are located with access to rail and have other attributes suitable for rail-dependent uses, such as adequate parcel size,

good roadway access, appropriate zoning, lack of environmental constraints and compatible neighboring land uses is limited. Preserving or providing incentives to reserve such sites for business and industrial uses that can benefit from rail access could increase the share of freight movements that travel by rail.

The preservation of these properties is a land use issue that needs to be managed by each municipality in collaboration with the RPCs/CCMPO and the railroad.

Near-term actions

- RPCs/CCMPO lead efforts to work with local municipalities and the railroads to identify and strategically select properties that currently have access to rail and could be developed as rail-served businesses.
- Identify new properties that may be appropriate for development (or redevelopment) as rail served businesses. Considerations that should be taken into account (at a minimum) should include: roadway access, adjacent uses, natural resources and municipal plans.
- Draft sample zoning language that would limit use and development of properties to industrial/light industrial uses, with a stated preference for rail-served businesses.

Longer-term actions

- Once the specific properties are identified, the RPCs could then work with railroad and municipalities to incorporate the selected rail-served businesses into regional and town plans as appropriate.

Actions to be led by RPCs/CCMPO in collaboration with Municipalities and the Rail Freight Operators.

4.5 Public Transportation Actions

These actions are aimed at increasing use of public transportation, enhancing regional connectivity and improving travel options. Recommended actions are:

- Expand and improve public transportation services throughout the corridor (Strategy T1)
- Expand passenger rail service and intercity/interstate bus services (Strategy T2)
- Develop additional intermodal centers (passenger hubs) (Strategy T3)
- Establish additional park-and-ride lots and intercept facilities (Strategy T4)
- Expand travel demand management programs (Strategy T5)
- Improve traveler information (Strategy T6) and education/marketing to use services already in place.
- Improve bicycle and pedestrian accommodations (Strategy T7)
- Work with Canadian and US entities to reduce international border crossing delays for passenger rail (Strategy T8)

Also recommended as a means of supporting transit usage and improving the viability of other travel options is strategy Q6: Encourage compact, mixed-use development within towns, which is described later under *Quality of life actions*.

4.5.1 Expand and Improve Transit Services

T1: Expand and improve public transportation services

Public transit services in the corridor are currently provided by individual transit agencies in each region of the corridor; Addison County Transit Resources (ACTR), Chittenden County Transportation Authority (CCTA), The Green Mountain Community Network, Inc., Marble Valley Regional Transit District (MVRTD "The Bus"), and Green Mountain Transit Agency (GMTA) in Franklin and Grand Isle counties. In addition to transit routes within their respective regions, connecting services to adjacent regions are provided, though such connections are limited and hours of operation and schedule coordination limit the usefulness of these connections in many cases.

Near-term actions

- Each transit provider in the corridor should conduct system planning to increase the efficiency and effectiveness of their services, operation and coordination with human service transportation as well as to improve connections with other passenger transportation services within and beyond their service area.

Longer-term actions

- Expand service coverage area and increase service frequencies. Explore public-private partnership opportunities to support services.
- Implement transit improvements in conjunction with related actions (see below).

Actions to be led by Regional Transit Agencies and VTrans in collaboration with RPCs/CCMPO and Municipalities.

Related strategies

Transit service refinements and expansion would benefit from coordinated implementation with the other actions recommended in this section, including establishing park-and-ride lots and intercept facilities (T4), creating intermodal centers (T3), and improving bicycle and pedestrian accommodations (T7) to provide better access to transit. Enabling and encouraging compact, mixed-use development (Q6) will help create the concentration of activity needed to support transit and public transportation services, while travel demand management (T5) and traveler information (T6) programs would increase awareness and encourage use of transit services.

T2: Expand passenger rail and intercity/interstate bus service

Passenger Rail Service

The State of Vermont contracts with Amtrak to provide Intercity Passenger services on two routes into Vermont:

Amtrak's Ethan Allen Express originates in Penn Station, New York City and terminates in Rutland Vermont. The State supported portion of the route begins at the Albany/Rensselaer station and includes stops at Schenectady, Saratoga Springs, and Fort Edward in New York State, Castleton and finally Rutland, Vermont. Amtrak operates two trains per day (one in each direction) each day at a maximum speed of 60 mph on the Clarendon & Pittsford Railway. Latest ridership data indicates that this service has about 3,900 riders per month and has seen a 6% annual growth in ridership over the past couple of years.

Amtrak's Vermonter originates in Washington, DC and operates on the Northeast Corridor up to New Haven, Connecticut where it heads north on the Springfield line to Springfield, Massachusetts. North of that point begins the Vermont state supported service that stops at Amherst, Massachusetts, Brattleboro, Bellows Falls Vermont, Claremont New Hampshire, Windsor, White River Junction, Randolph, Montpelier, Waterbury, Essex Junction and terminating in St. Albans, Vermont. The latest ridership figures indicate that the Vermonter had 74,016 passengers over the 12 month period that ended September 30th, 2009. The latest ridership data for this service indicate that there was a moderate growth between 2008 and 2009 (around 2%) and a more substantial growth over a two year period (around 17%).

There has been a long history of interest in implementing additional passenger rail service in the Western Corridor. In the latest VT State Rail & Policy Plan (2006) developed by VTrans the existing Vermonter and Ethan Allen Amtrak services were designated as the first priority. The second priority identified in the Policy Plan is upgrading the route between Rutland and Burlington, which is also consistent with establishing passenger rail along the western corridor. Also, an on-going effort known as ABRBE (Albany/Bennington/Rutland/Burlington/Essex Junction) has been focusing on establishing passenger rail service throughout the western corridor (including southwest Vermont).

Near-term actions

- Continue ongoing initiatives to upgrade rail throughout the length of Vermont's Western Corridor to accommodate and improve passenger rail service (NY-Bennington-Rutland-Burlington-St. Albans).
- Use American Recovery and Reinvestment Act (ARRA) of 2009 funding and/or other funding streams to upgrade rail infrastructure (rail/bed/bridges) at identified high-priority segments in the corridor. This is a necessary step in meeting the long-held goal of expanding and improving intercity rail passenger service in the Western Corridor. Through the ARRA High Speed and Intercity Passenger Rail discretionary grant application Vermont is seeking to:
  - Improve infrastructure (CLP and VTR lines) to increase speeds and expand Amtrak's Ethan Allen service north of Rutland, to Burlington with a stop in Middlebury; and
  - Improve infrastructure (NECR line) to increase speeds and on time performance of the Vermonter service from Swanton to the Massachusetts border, through Essex Junction and White River;
  - Initiate a joint planning study with New York State to develop a new service to serve the Vermont communities between Rutland and Hoosick Junction, NY and the New York communities between Hoosick and Rensselaer, as well as the communities between Rensselaer, NY and the stations served in New York up to Rutland. The vision is to have multiple frequencies in a "loop" system that would provide service to those communities. One of the products of the work will be a service development plan.

Longer-term actions

- Initiate discussions among all relevant stakeholders regarding extension of passenger rail service to Montreal (see Recommendation T8).
- Complete additional infrastructure upgrades necessary to extend/initiate passenger rail service in the corridor. These improvements include:
  - Assessment/Improvements to at-grade crossings, as necessary
  - Improvements to the corridor signal system to comply with the *Rail Safety Improvement Act of 2008*, as required.
  - Development of business plan for the long-term funding of operating and maintenance costs.

Actions to be led by VTrans and Railroads in collaboration with Amtrak and RPCs/CCMPO.

Intercity Bus Service

The level of intercity bus service in the corridor has declined markedly over the last 20 years, partially as a result of deregulation of the intercity bus industry. Nationally and in Vermont, intercity bus operators have reduced or eliminated service to smaller communities, focusing instead on carrying passengers over longer distances between major terminals or hubs. For example, Greyhound has eliminated service in much of the corridor, now serving only Burlington.

The Vermont Public Transportation Policy Plan addressed this issue in the following policy statement:

> *VTrans will support a vital intercity bus network in Vermont, serving both intra-state travel and travel to other metropolitan areas in New York, New England, and Quebec by providing attractive and accessible facilities (park-and-rides with bus shelters) at convenient locations along major travel corridors.*

Near-term and longer-term actions

- A VT Western Corridor Intercity Bus Service Restoration Plan is recommended, including the following elements;
  - Determine key markets and ridership potential;
  - Identify specific routes and service levels that are needed in the corridor;
  - Recommend a process for implementing the restoration of service. Successful approaches to implementing intercity bus service in other areas has included contracting with a private transit service provider to operate intercity-type service with support by purchasing vehicles (by utilizing federal funds – Section 5311 (f) or CMAQ) and providing terminal space/maintenance facilities; or purchasing buses for existing public transit providers and working out a funding program for operation of the service.
  - Secure long-term funding to support services

Action to be led by Western Corridor Working Group in coordination with regional Transit Providers, Greyhound and other intercity bus operators.

4.5.2 Improve Access to Transit

T3: Develop a network of intermodal centers (Passenger Hubs) to improve connectivity among the various modal choices

Intermodal centers or passenger hubs are facilities designed to provide comfortable, convenient access to transit services and transfer opportunities between different routes or modes of travel. Potential sites should be centrally located to population centers, have good access to roads and possibly be located adjacent to railroad corridors to allow for potential passenger rail service in the future. Passenger intermodal centers may be located in established downtowns and village centers as well as new growth areas or could be developed in conjunction with park-and-ride and intercept facilities.

A visioning process was conducted to identify potential locations for intermodal centers. These were selected based on compatible land uses and zoning, proximity to residential and commercial uses, location along rail corridors and/or bus lines and similar factors. The exercise was not intended to determine market feasibility for development of intermodal centers at any given locations, but rather as a starting point for identifying siting opportunities. Identified locations are shown in *Appendix D*.

Near-term actions

A coordinated effort will be necessary to maintain or expand existing intermodal facilities and to develop new facilities as they become necessary or as opportunities for development occur. This coordinated effort will entail the following primary steps:

- Identification by Public Transit Providers and RPCs/CCMPO of locations and specific sites where intermodal centers would facilitate connectivity and projection of when intermodal centers may be beneficial. Potential intermodal hub locations identified in this study (Appendix D) can form a starting point for this effort. This could be part of the system's planning effort conducted by regional Public Transit Providers and RPCs/CCMPO in coordination with municipalities and VTrans.
- Identification by RPCs/CCMPO/Municipalities of opportunities to integrate intermodal centers with other public or private developments in the planning/design phase.
- Modification of municipal master plans and zoning, as necessary, to accommodate intermodal centers. Modifications to enable and promote supportive land uses (see strategy Q6) should also be considered at this time.
- Coordination among RPCs/CCMPO, Transit Providers, VTrans and municipality to identify potential funding opportunities, including public private partnerships, for development of intermodal passenger hubs.

Longer-term actions

- Plan and implement transportation/transit services to intermodal centers.
- Promote and expand services to intermodal centers.
- Plan for and facilitate supportive land use development (higher-density residential, mixed use) in proximity to intermodal centers.

Action to be led by RPCs/CCMPO, regional Transit Agencies and Municipalities in coordination with VTrans.

Related strategies

The development of intermodal centers should be undertaken in coordination with several other recommended strategies. Park-and-ride lots and intercept facilities (T4) can be co-located with intermodal centers to provide auto access to transit and public transportation services. Expansion of transit services (T1) and implementation of passenger rail and interstate bus service (T2) should be focused around new intermodal centers. Enabling and encouraging compact, mixed-use development (Q6) will help create the concentration of activity needed to support transit and public transportation services.

T4: Park-and-ride lots and intercept facilities

Park-and-ride lots and intercept facilities expand access to public transportation services and provide opportunities for ridesharing and parking management strategies. In locations where high demand is anticipated, specific development of a park-and-ride lot may be warranted (e.g., at an intermodal passenger hub). A more economical and cost-effective approach in many cases however could be to enter into a formal or informal leasing arrangements with existing land owners who have excess parking during peak commuting hours. These "leased lot" park-and-

rides are typically established at churches or other organizations with large parking lots that are underutilized during the weekday.

Near-term actions

- Identify potential park-and-ride and intercept locations along existing and planned transit routes, or at proposed intermodal centers. These evaluations should take into account the frequency and schedule of transit services, ridership potential (market), and opportunities for leased lots or new construction.
- Investigate the feasibility of a leased-lot pilot program along the western corridor. Identify the potential for this type of program and to develop approaches to resolve some of the typical concerns such as traffic impacts, snow clearing requirements, and lease and liability terms.
- Coordinate with RPCs/CCMPO, transit agencies and VTrans to identify potential funding opportunities and timeframes for developing new park-and-ride lots and intercept facilities.
- Continue the Municipal Park and Ride Program.

Long-term actions

- Design/permit/construct park-and-rides and intercept facilities in coordination with the development of intermodal centers or at other high-demand locations.
- Proactively explore opportunities to co-develop park-and-ride and intercept facilities with other public or private land uses to increase the level of activity, reduce development costs, and promote security at lot locations.

Action to be led by RPCs/CCMPO, regional Transit Agencies, Municipalities in consultation with VTrans

Related strategies

Park-and-ride lots and intercept facilities can be co-located with intermodal centers (T3) to provide auto access to transit and public transportation services. Expansion of transit services (T1) and implementation of passenger rail and interstate bus service (T2) should serve park-and-ride lot and intercept facility locations to the extent possible. Travel Demand Management programs (T5) and Traveler information systems (T6) can be used to promote and encourage the use of park-and-ride lots and intercept facilities. Secure bicycle parking and safe travel by bicyclists and pedestrians (T7) should also be offered at these facilities.

4.5.3 Increase Travel Options and Information

T5: Expand Travel Demand Management program

VTrans has initiated the GO Vermont Program to increase cost effective travel options across the State. The GO Vermont Program provides information and services for carpools, vanpools, public transit and other modes of passenger transportation. GO Vermont also maintains a web site which provides links to carsharing services, bicycle information, transit services, telecommuting information, employer support programs, transit/bicycle tax incentives and

other transportation alternatives. The program plans to offer automated ridematching services in the near future.

The GO Vermont program is an effective and efficient means of implementing travel demand management in the corridor and can improve the effectiveness of transportation services. Recommended actions focus on expanding the programs offered by GO Vermont to provide even greater travel resources and reach additional markets.

Near-term and longer-term actions

- Support the expansion of the GO Vermont program, both in existing and new markets.
- Use Go Vermont as a means of coordinating travel information for services and programs provided by the various transportation agencies (including transit providers) across regional boundaries in the Western Corridor.
- Develop *Parking Management Plans* for many of the downtowns within the corridor. Strategies to limit the supply of parking and to manage it through pricing can encourage alternative mode use or trip chaining on foot. One of the definitions of trip chaining is when visitors park downtown once and then visit multiple locations on foot. Downtown visitors will do this if walking is easier and safer (with adequate pedestrian accommodations) than driving either because of parking scarcity or pricing. This is effective in compact city/town/village centers that have a strong demand by visitors, such as Burlington, Rutland or Middlebury.

Action to be led by VTrans, RPCs/CCMPO and municipalities in coordination with local transit agencies.

T6: Expand traveler information systems

VTrans manages an initiative called ConnectVermont aimed at developing and deploying a comprehensive information system for travelers. The program's vision is to deliver this information through all available types of media, such as websites, road signs, radio stations and traditional media, via all types of devices, including laptops, PDA's, cellular phones and car radios. The program currently includes multiple ways to identify road conditions and construction related delays.

In addition to the roadway related traveler information, enhanced public transit system traveler information would provide cost effective enhancements to the transportation system of the corridor. This could include a number of different initiatives.

Near-term actions

- Bus and train location information – Automated location systems that identify the current location of buses or AMTRAK trains in service. This information can be transmitted to signs at bus stops, cell phones, or computers. This could be implemented for each public transit provider as funds are available. CCTA is currently in the process of implementing this type of service.
- Publication of travel information directed to both residents and tourists. Consider coordinating these efforts with the GO Vermont Program.

- Continued support of the ConnectVermont initiative for the implementation of a roadway condition information network.
- Plan for longer-term implementation of consistent Intelligent Transportation Systems elements in the corridor that will form the basis for future traveler information systems.

Longer-term actions

- Corridor-wide traveler information systems – The bus location information networks for each service provider can be compiled in a corridor-wide system which will help travelers make connections between service providers.
- Implement roadway condition information network throughout the corridor.

Action to be led by VTrans in coordination with AMTRAK and local transit agencies, RPCs/CCMPO.

T7: Strengthen and expand pedestrian and bicycle improvement programs in local communities

VTrans developed the Vermont Pedestrian and Bicycle Policy Plan in January 2008. This Plan not only outlines bicycle and pedestrian policy, goals and objectives, and actions but highlights the status of bicycling and walking in the State. This policy plan identifies current actions, new actions, and long-term actions for VTrans, the MPO/RPCs and other stakeholders. Most of the actions in this plan are applicable to the State as a whole and for the Western Corridor to strengthen and expand pedestrian and bicycle improvement programs in local communities.

Recommendations for strengthening bicycle and pedestrian programs, facilities and accommodations in the corridor focus on highlighting ways in which the "strategic actions" in the statewide policy plan can most effectively be applied within the study corridor.

Near-term and Longer-term actions

- Encourage adoption by municipalities and assist in drafting of language relating to bicycle and pedestrian needs (such as bicycle parking) in development ordinances.
- Develop "Complete Streets" policies that fully integrate access for all users in street design standards. Integrate multi-modal transportation guidelines into local land use regulations and local and regional land use and transportation plans.
- Use municipal and regional citizen committees to provide input on bicycle and pedestrian activities on the local and regional level.
- Encourage commuting by bicycle and walking by providing information regarding facilities and amenities at businesses, retail areas and other destinations. These efforts would ideally be implemented as part of the broader travel demand management program (T5) described previously.
- Plan, build and maintain accessible pedestrian facilities that are fully integrated into commercial and urban areas, village centers, and appropriate rural locations. Use the *Vermont Pedestrian and Bicycle Facility Planning and Design Manual* as a framework for project development.
- Develop walkway programs to build key missing segments, especially near schools, parks, senior housing and other generators of pedestrian activity.

- Develop regional bicycle plans that identify the compatibility of routes for bicycling and recommended specific improvements to upgrade roadways to accommodate bicycles.

Action to be led by, RPCs/CCMPO and municipalities in coordination with VTrans

T8: Work with Canadian and US entities to reduce international border crossing delays for passenger rail

This strategy addresses the need to provide expedited inspection of passenger trains at the United States – Canada border, while maintaining necessary vigilance in securing the international border. Delays to rail transportation services can negatively impact operating costs and service reliability. Unlike highway border crossings whereby additional inspection lanes can be added, trains are inspected individually and inspection difficulties with one passenger will delay the entire train. It should be noted that the Western Corridor does not, at present, have rail passenger service which extends across the border into Canada. However, the predecessor to the present-day *Vermonter* formerly operated to Montreal and delays incurred by border crossing inspections of passengers were cited as one of the reasons for discontinuing the service.

Near-term and longer-term actions

- Support efforts to engage U.S. Customs and Border Protection, Department of Homeland Security and the Canada Border Services Agency to study potential means of reducing delays incurred during border crossings for passenger rail services.
- Passenger clearance through US Customs is a system-wide issue for Amtrak, which affects its New York – Montreal *Adirondack* service, New York – Toronto *Maple Leaf* service as well as west coast trains operating between Seattle and Vancouver. One potential approach may be to have passengers "pre-cleared" at terminal stations such as Montreal. This and other potential approaches would require study by all stakeholders.

Actions to be led by the State of Vermont/VTrans, Amtrak and Railroad Operators with the participation of the US Customs and Border Protection, Department of Homeland Security, and Canada Border Services Agency. Support from Vermont's congressional delegation should be pursued.

4.6 Economic Vitality Actions

Many of the actions recommended previously under other goals also would support economic development objectives to improve air and rail access to Vermont and support Vermont businesses. These include:

- Improve local circulation (Strategy H2)
- Highway realignment and widening (Strategy H4)
- Invest in rail infrastructure (track and bridges) in order to achieve the national standard of 286,000 lb. load rating and eliminate current clearance restrictions where practical (Strategy F1)
- Improve truck access to rail facilities and airports (Strategy F2)
- Establish transload facilities where practicable to provide efficient intermodal (truck and rail) connectivity (Strategy F3)
- Market rail-served properties to appropriate businesses (Strategy F4)
- Expand passenger rail service and intercity/interstate bus services (Strategy T2)
- Improve traveler information (Strategy OPT-4)
- Improve bicycle and pedestrian accommodations (Strategy T7)

One additional action is specifically recommended to improve air access to Vermont:

- Improve infrastructure at key airports in the Western Corridor (Strategy E1)

4.6.1 Improve Air Access in Vermont

E1: Improve infrastructure at key airports in the Western Corridor

The Western Corridor is served by the only two commercial service airports in the state, Burlington International Airport and Rutland Southern Vermont Regional Airport. According to *The Economic Impact of Vermont's Public-Use Airports – Final Technical Report (April 2003)*, the total statewide on-airport economic impact for all public-use airports in Vermont is over $276 million. Burlington International Airport is a primary aviation economic generator for air transportation in the Western Corridor and for the state as a whole. At approximately $242.5 million, Burlington International Airport comprises 88 percent of the on-airport statewide economic impact total. The total economic impact for Rutland Southern Vermont Regional Airport is significantly smaller at $7.5 million, or 3 percent of the statewide total.

The airports are an important component of the transportation network in the corridor. In February 2007, VTrans completed the *Vermont Airport System and Policy Plan* which took a strategic approach in identifying 20 year needs of the system. In addition to identifying the specific prioritized needs at each of the airports, it also included policy-related recommendations that can improve the performance of the system.

Near-term and longer term actions

- Implement improvements identified for each airport as identified in the *Vermont Airport System and Policy Plan*.
- Develop intermodal and multimodal ground access plans for each of the airports in the corridor. The development of these plans would require the coordinated effort of the airport operator, the local regional transit authority/provider, VTrans District Transportation Administrator, the local municipalities and the RPCs/CCMPO. The intermodal ground access plans should identify the most effective ways to enhance access to the airport though utilization of various modes including rental cars, taxi, bus and bike. Truck access needs to be safely accommodated to meet the airport's needs.
- Continue efforts by VTrans staff, airport operators, and regional planners to work with municipalities to modify municipal master plans and zoning codes as needed in the areas surrounding airports to ensure future land uses that are compatible with the airport's Master Plans and their intended uses.

Action to be led by VTrans and/or Airport Operators with coordination from RPCs/CCMPO

4.6.2 Support Vermont Businesses

The other strategies noted at the beginning of the *Economic vitality actions* section support economic vitality in the region through reducing business and shipping costs, supporting tourist activities, and improving access from outside of the region. In addition, the *Quality of life actions* described in the following section that preserve or enhance the appearance and character of towns and villages along the corridor are also likely to positively benefit businesses supported by tourism.

4.7 Quality of Life Actions

Quality of Life actions are those aimed at improving the environment – either natural or built – through reducing or mitigating impacts associated with transportation services and infrastructure. Recommended Quality of Life Actions are:

- Explore the feasibility of a region-wide operating agreement to assist in the seamless operation of truck travel throughout the corridor while minimizing impacts to the communities. (Strategy Q1)
- Explore the feasibility of a comprehensive truck noise mitigation/management program (Strategy Q2)
- Develop and implement streetscape improvements (Strategy Q3)
- Implement traffic calming measures (Strategy Q4)
- Encourage use of alternative fuel vehicles and supporting infrastructure (Strategy Q5)
- Encourage compact, mixed use development within identified growth areas in urban village areas to improve mobility (Strategy Q6)

Also recommended for their support of quality of life objectives are several strategies described previously;

- Improve local circulation (Strategy H2)
- Expand and improve public transportation services throughout the corridor (Strategy T1)
- Expand passenger rail service and intercity/interstate bus services (Strategy T2)
- Improve bicycle and pedestrian accommodations (Strategy T7)

4.7.1 Reducing Traffic Impacts in Communities

Q1: Explore the feasibility of a region-wide operating agreement to assist in the efficient operation of truck travel throughout the corridor while minimizing impacts to corridor communities.

A region-wide operating agreement is envisioned as a means to assist in the efficient operation of truck travel through the corridor and ensure consistent application of regulations along the corridor, pertaining to truck travel. This strategy would be implemented as a Memorandum of Understanding between local municipalities that defines consistent and compatible transportation operating policies and mitigation strategies. The content of the agreement is subject to negotiation between the involved agencies and may change over time.

It would be advantageous to hold a "summit" to discuss the truck impacts and potential solutions that can be instituted corridor wide and at the same time consider the potential operating and economic impacts of potential solutions on area businesses and truck operators. The goal is to develop an approach to address local impacts in a manner that is consistent corridor-wide, rather than shifting impacts from one community to another but also to facilitate a seamless operation of trucks in the corridor.

Near-term actions

- Identify and define parameters for those elements to be covered in the agreement, including any relevant local regulations currently in force. This could involve a number of efforts;
  - Identify existing truck and/or traffic regulations in the corridor that could be incorporated into the agreement.
  - Work with local communities to identify other issues that should be addressed in the operating agreement.
  - Work with trucking industry, shippers/receivers and other affected parties to identify potential concerns and impacts.
- Coordinate with VTrans and local municipalities to define agreement structures and build support.

Longer-term actions

- Administer agreement and modify as needed through an ongoing coordinated effort

Actions to be coordinated by the Western Corridor Working Group in collaboration with Municipalities, Trucking Industry and Economic Development Corporations.

Q2: Explore the feasibility of a comprehensive truck noise mitigation/management program

A noise mitigation program could include elements to address noise through actions directed at reducing noise generation, masking or buffering noise, and/or through land use and planning actions to locate more sensitive receptors (residences, hospitals, schools) away from noisy transportation facilities (airports, railroads, highways).

Near-term actions

- Explore the feasibility of a corridor-wide noise management program that broadly addresses noise issues occurring throughout the corridor. The intent of the program is to study and identify potential solutions to identified noise issues.
- Encourage communities to consider transportation impacts – including noise – in their long-range planning and regulatory efforts.
- Consider regulatory changes to reduce noise impacts in towns and villages.

Longer-term actions

- Consider the use of "quiet pavements" when repaving highways.
- Consider streetscape and traffic calming techniques as means to reduce roadway noise.
- Explore the feasibility of using the corridor-wide noise management program as a means to either directly implement or administer funding to local/regional agencies to locally implement noise management strategies.

Actions to be coordinated by the RPCs and CCMPO in collaboration with Municipalities, Trucking Industry and Economic Development Corporations and in consultation with VTrans.

Q3: Streetscape improvements

The towns and villages of the Western Corridor are important components of the high quality of life experienced by many of the residents along the corridor. The Vermont state legislature identified the importance of downtowns across Vermont by establishing the Vermont Downtown Program (VDP) in 1994 as a way to stem the slow abandonment of downtowns by businesses. The importance of maintaining a vibrant town or village center, whether an officially designated downtown or not, is that they help reduce vehicle travel and minimize environmental impacts from sprawl type development. Additionally, improved streetscapes typically result in a safer and more attractive environment for walking and bicycling which reduces town/village congestion. All towns and villages along the corridor would benefit from improvements to streetscapes, aesthetics and "complete street" roadway designs (meaning the examination of all aspects of the roadway including sidewalks, crosswalks, bike lanes, freight loading areas etc.).

Near-term actions

- The Vermont Downtown Program has initiated a reinvestment in the infrastructure in downtowns across the corridor. Communities along the Western Corridor should continue to support and utilize this program to the extent possible as a means of enhancing the streetscapes of downtowns along the corridor.
- Develop streetscape plans and regulations tailored to individual towns and villages along the corridor. These plans should develop proposed guidelines that address:
  - Sidewalk inventory, conditions and suitability, crosswalks and pedestrian facilities;
  - Shade trees and landscaping;
  - Bicycle accommodations;
  - Street lighting;
  - Parking;
  - Driveways and access management;
  - Building and signage design standards; and,
  - Other street furniture (e.g. – benches, public amenities) and architectural elements.

Longer-term actions

- Incorporate streetscape elements into municipal plans and implement as new development or redevelopment occurs.
- Incorporate streetscape improvements into transportation projects. Include even if they are not funded by VTrans. Combine these improvements with pedestrian, bicycle, and traffic calming improvements as appropriate.
- Pursue grant funding from a variety of sources to implement streetscape improvements in key commercial and residential areas of towns and villages. In addition to transportation funding programs, investigate community and economic development funding options.

Actions to be led Municipalities and the RPCs/CCMPO.

Q4: Implement traffic calming measures

Traffic calming measures can help to improve safety and reduce impacts associated with vehicle traffic by lowering vehicle speeds in towns and villages. The *Vermont Agency of Transportation Traffic Calming Study and Approval Process for State Highways (2003)* provides a well-developed framework for considering and implementing appropriate traffic calming measures on major routes within the Western Corridor. Traffic calming measures may also be appropriate on local streets at key locations to limit pass-through/bypass vehicle traffic.

Near-term actions

- Work with local communities to identify locations that could benefit from traffic calming improvements. Ideally, a specific traffic calming plan should be developed for each community that is consistent with VTrans' traffic calming approval process.
- Implement small-scale traffic calming elements (signing, lane striping, etc) consistent with the identified plan in the near-term.

Longer-term actions

- Incorporate traffic calming features in future roadway, transit, and development projects, consistent with the community's traffic calming plan. Combine with and incorporate bicycle and pedestrian improvements, as appropriate.

Actions to be led RPCs/CCMPO and local municipalities.

4.7.2 Sustainability

Q5: Encourage use of alternative fuel vehicles and supporting infrastructure

Using alternative fuels to power vehicles can reduce the nation's dependence on imported petroleum and reduce harmful pollutants and exhaust emissions. Many alternative fuels can be domestically produced and derived from renewable sources. One of the leading proponents for increasing the use of alternative fuels is the Clean Cities program, sponsored by the U.S. Department of Energy. The Vermont Clean Cities Coalition (VCCC) was initiated in 2001 as the local affiliate of the Clean Cities program.

Clean Cities supports local efforts to adopt practices that contribute to the reduction of petroleum consumption, including programs to promote alternative fuels and advanced vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction. The Clean Cities strategies for encouraging the use of alternative fuel vehicles include:

- Providing information on the benefits and availability of alternative fuels and vehicles.
- Targeting niche markets that are well suited for alternative fuels, such as airports, delivery vehicles, shuttle services, municipalities, transit agencies, and school districts.
- Building more alternative fueling infrastructure.
- Developing local and state incentives for the use of alternative fuels.

Vermont has made significant strides in encouraging the use of alternative fuels. These include:

- Passage of the Alternative Fuel and Advanced Vehicle Research and Development Tax Credit. Vermont businesses that qualify as a high-tech business, involved exclusively in the design, development, and manufacture of alternative fuel vehicles, hybrid electric vehicles, and electric vehicles (EVs) or energy technology involving fuel sources other than fossil fuels, are eligible for up to three of the following tax credits: 1) payroll income tax credit; 2) qualified research and development income tax credit; 3) export tax incentive; 4) small business investment tax credit; and 5) high-tech growth tax credit. Certain limits and restrictions apply.
- Support of the Vermont Biodiesel Project, which is a public/private partnership between the Vermont Biofuels Association, the Vermont Fuel Dealers Association, the Vermont Sustainable Jobs Fund and the Vermont Department of Public Service. The primary goals of this project are to build demand for and increase supply of biofuels in the state. Initial project efforts involved creating a commercial-focused program targeting large buyers that would be willing to use biodiesel blends for heating, transportation and other equipment.

Near-term and longer-term actions

- Continue support to the Vermont Clean Cities Coalition, the Vermont Biodiesel Program and other similar programs.
- Encourage development of needed alternative fuel supporting infrastructure, such as biodiesel service stations or charging stations for hybrids/electric vehicles.
- Consider implementing a program to encourage the acquisition of alternative fuel vehicles (AFVs) by local government agencies. Such a program could be modeled on the New Jersey Alternative Fuel Vehicle Rebate Program, which was supported by $500,000 in Congestion Mitigation and Air Quality Improvement (CMAQ) funding and modeled on a rebate program funded by the U.S. Department of Energy (DOE).

Actions to be led by the Clean Cities program with support from the RPCs/CCMPO

Q6: Encourage compact, mixed use development within identified growth areas in urban/village areas to improve mobility

Many potential benefits can be realized by continuing the historic settlement pattern of compact, mixed use urban/village areas separated by rural countryside throughout the Western Corridor. From a transportation perspective, this type of development pattern reduces costs associated with the operation and maintenance of roadways (as well as other public infrastructure), is more conducive to travel by transit, walking and bicycling, and is likely to reduce the overall number and length of vehicle trips in the corridor. Other (non-transportation) benefits of concentrating development in towns and villages include reduced impacts to natural resources, and increased potential for economic vitality of towns and villages.

Near-term actions

- Encourage local communities to adopt planning and zoning techniques that result in compact, mixed-use development patterns. Some general strategies could include:
  - Allowing more compact and intensive, but appropriately scaled, development in and around the village areas;

  - Limiting the type and intensity of development that can occur in outlying areas or offering incentives to preserve these areas;
  - Providing incentives for mixed use development;
  - Establishing provisions that allow for creative site development (e.g. shared parking, alternative access configurations, shared/enhanced public spaces);
  - Encouraging development of schools, preschools and day care centers in ways which reduce travel demand; and
  - Reducing/eliminating parking requirements where it can be demonstrated as appropriate.
- Continue to coordinate land use and transportation planning efforts, through the collaborative statewide Transportation Planning Initiative (TPI) between VTrans and the RPCs as well as the coordinating efforts between the CCMPO and the CCRPC.

Longer-term actions

- On-going implementation of near-term actions.
- Monitor development patterns and transportation investments and adjust as necessary.

Actions to be led the RPCs/CCMPO, local municipalities and State of Vermont