

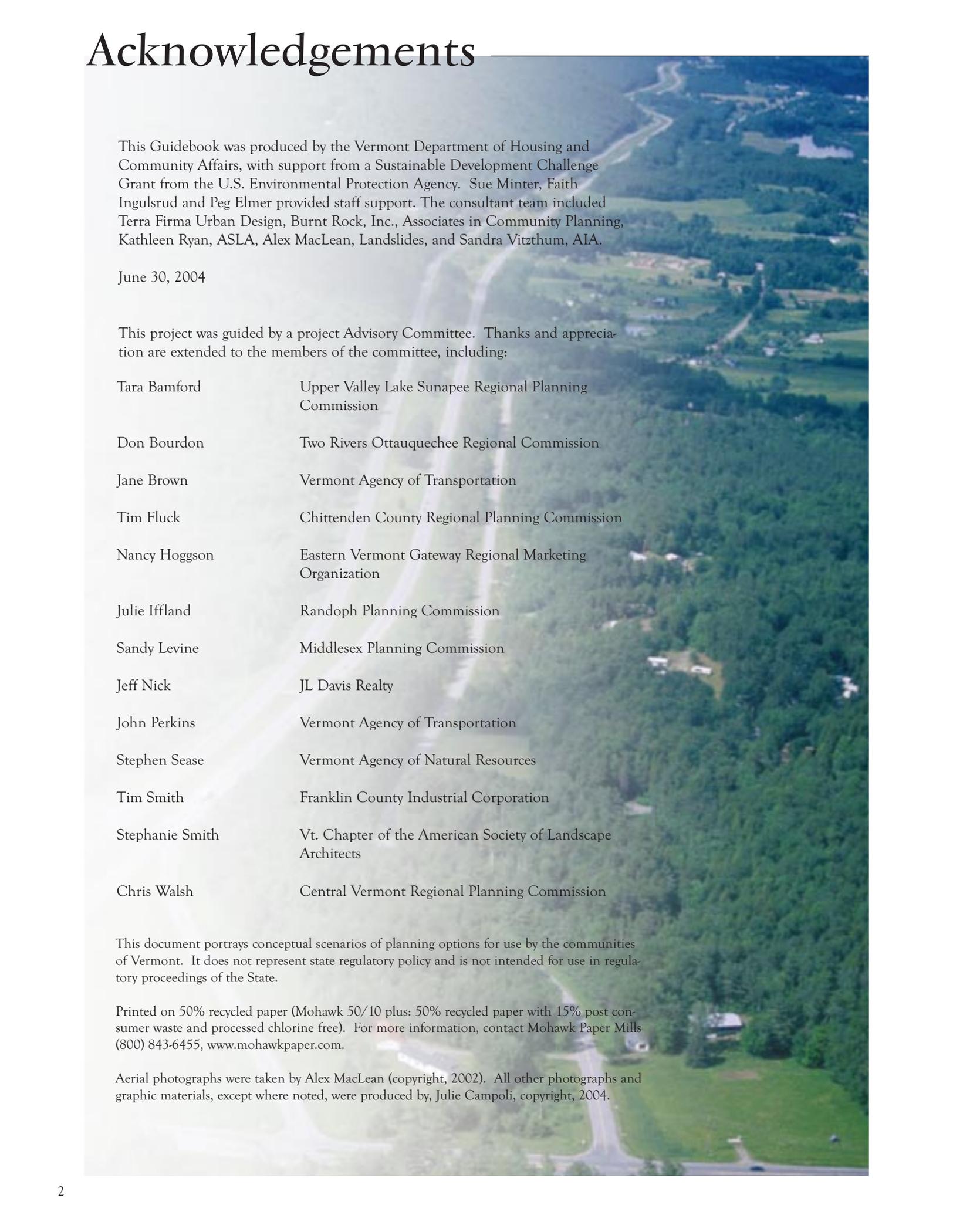
# VERMONT INTERSTATE INTERCHANGE



## *Planning and Development* DESIGN GUIDELINES

Vermont Department of Housing and Community Affairs

# Acknowledgements



This Guidebook was produced by the Vermont Department of Housing and Community Affairs, with support from a Sustainable Development Challenge Grant from the U.S. Environmental Protection Agency. Sue Minter, Faith Ingulstrup and Peg Elmer provided staff support. The consultant team included Terra Firma Urban Design, Burnt Rock, Inc., Associates in Community Planning, Kathleen Ryan, ASLA, Alex MacLean, Landslides, and Sandra Vitzthum, AIA.

June 30, 2004

This project was guided by a project Advisory Committee. Thanks and appreciation are extended to the members of the committee, including:

Tara Bamford	Upper Valley Lake Sunapee Regional Planning Commission
Don Bourdon	Two Rivers Ottauquechee Regional Commission
Jane Brown	Vermont Agency of Transportation
Tim Fluck	Chittenden County Regional Planning Commission
Nancy Hoggson	Eastern Vermont Gateway Regional Marketing Organization
Julie Iffland	Randolph Planning Commission
Sandy Levine	Middlesex Planning Commission
Jeff Nick	JL Davis Realty
John Perkins	Vermont Agency of Transportation
Stephen Sease	Vermont Agency of Natural Resources
Tim Smith	Franklin County Industrial Corporation
Stephanie Smith	Vt. Chapter of the American Society of Landscape Architects
Chris Walsh	Central Vermont Regional Planning Commission

This document portrays conceptual scenarios of planning options for use by the communities of Vermont. It does not represent state regulatory policy and is not intended for use in regulatory proceedings of the State.

Printed on 50% recycled paper (Mohawk 50/10 plus: 50% recycled paper with 15% post-consumer waste and processed chlorine free). For more information, contact Mohawk Paper Mills (800) 843-6455, [www.mohawkpaper.com](http://www.mohawkpaper.com).

Aerial photographs were taken by Alex MacLean (copyright, 2002). All other photographs and graphic materials, except where noted, were produced by, Julie Campoli, copyright, 2004.

# Table of Contents

## INTRODUCTION

Background	4
Public Policy	4
Purpose of the Guidebook	5
Creating This Guidebook	5
How To Use This Guidebook	6

## PLANNING GUIDELINES

Existing Conditions	7
Planning Considerations	8
Local & Regional Context	8
Land Uses	9
Existing & Planned Infrastructure	10
Planning Strategies	11
Public Outreach	11
Municipal Planning	11
Regional Planning	18
State Resources & Programs	19

## DESIGN GUIDELINES

The Vermont Context	20
Access Management	27
Site Development	29
Site Layout	30
Building Design	32
Lighting	34
Signs	35
Landscaping	36

APPENDIX	40
----------	----

RESOURCES	41
-----------	----

# Introduction

*We're on the verge of the greatest development Vermont has ever seen.*

George D. Aiken, 1961.

Comments commemorating the completion of the first segment of Vermont's interstate highway system.

*These highways are not only freeing motor vehicles to serve their full economic and social potential, but are also, in inevitable consequence, expected to influence the development of the state no less significantly than the coming of the railroad.*

Vermont Life, 1966

## Background

Vermont's interstate system has been a valuable public asset since work began on it in 1957. Constructed as part of the nation's post-war infrastructure investment program, the project took 25 years to complete at a total cost of \$670 million. The state's 320 miles of interstate highways are now the backbone of Vermont's transportation network. They offer world-class views to visitors and tourists, and provide an engine for economic development through the efficient delivery of travelers, goods, and services around the state. They serve as gateways to the state from Massachusetts (via I-91), New Hampshire (via I-89 and I-93) and Quebec (via I-91 and I-89). With nearly 60% of Vermont's land area lying within 20 miles of one of 52 highway interchanges, the interstate system also functions as the front door to many cities and villages, and much of the state's rural countryside.<sup>1</sup>

Many communities along Vermont's interstate system have benefited from the opportunities for improved transportation and tourism provided by the highways. But while proximity to the interstate offers development opportunities, those opportunities can lead to unanticipated community challenges. In some locations, large-scale commercial development close to interchanges has led to increased congestion and accidents, reduced levels of service along roads and at nearby intersections, and increasing public costs of mitigating these impacts. There is also growing concern that some types of interchange development undermine the economic vitality of nearby downtowns. And the dispersed, auto-dependent growth patterns emerging at many interchanges can have detrimental impacts on Vermont's scenery, environment, and traditional downtowns, endangering the quality of life that defines Vermont.

## Public Policy

Throughout the history of development along the interstate, Vermonters have supported the preservation of the scenic qualities of the corridor. This support resulted in the landmark 1967 law prohibiting billboards, in addition to several state initiatives and regulatory decisions that highlighted the importance of protecting scenic highway corridors, including the interstate system.<sup>2</sup>

Planning for development along the interstate system also takes place within a larger policy context. Vermont's planning and development law establishes statewide goals for land use (24 VSA/4302). An overarching goal within the law is to maintain the historic settlement pattern of compact villages and urban centers surrounded by rural countryside.



Although they mar the beauty of many other interstate corridors, not one of the 500,000 billboards lining America's major highways can be found in Vermont. When the state banned billboards it removed a major contributor of visual clutter from the landscape. With outdoor advertising so long gone from our roadways, it's easy to forget the negative impact billboards can have on scenery. As other states and communities across the country struggle to limit the placement and size of billboards, Vermont is literally sitting pretty.

Strip development along highways is discouraged and important historic, natural and scenic features of the Vermont landscape are to be identified, protected and preserved. In addition, the statute seeks to foster a strong economy that provides rewarding job opportunities and maintains high environmental standards.



The landscape at I-93 Exit 1 in Waterford embodies the pattern that Vermont's land use law refers to—compact settlement surrounded by rural countryside.

Executive Order 07-01 was signed in 2001 to encourage development and/or conservation of land at the interchanges that will be consistent with state land use goals. Intended to guide state agency decisions on planning for and responding to development proposed at Vermont's interchanges, the Executive Order refocused attention on development issues specific to interchange areas.

Stimulated by state policy, several Vermont municipalities have worked to plan for growth around local interchanges. Between 1998 and 2003 eleven municipalities developed plans to help guide anticipated growth around interchanges.<sup>3</sup> Moreover, several municipalities and the State initiated land conservation of key scenic parcels near interchanges.<sup>4</sup> In 2000, the Vermont Department of Housing and Community Affairs (DHCA) received a three-year grant from the US Environmental Protection Agency to further interchange area planning along the interstate. The grant includes: planning projects in four municipalities, natural resource inventories in those communities, and the development of this design guidebook.

## Purpose of the Guidebook

Interchanges will continue to attract development, just as the junction of rivers did in earlier times. Given that fact, what will the development at interchanges consist of? How will it affect existing infrastructure? How will it fit into Vermont's landscape? This guidebook is intended to facilitate the type of development at interstate interchanges that will maintain and even enhance the economic and environmental character of Vermont's communities.

Intended for use by municipalities, land developers and public officials, this guidebook promotes ways to support growth at interchanges that is consistent with state land use goals and other state policy initiatives. It was created as a resource for understanding growth patterns by visualizing the pattern of land use that will likely result in the absence of meaning-

ful planning, and by illustrating more compact and land-efficient design and development. It explains the consequences of incremental, uncoordinated decision making, and offers strategies for implementing a compact growth pattern, while addressing the land uses that are generally recognized to be necessary or desirable at interchanges.

The guidebook was developed and distributed for use as an educational and planning tool for those seeking to manage land use and growth pressures in their communities. The contents of the Guidebook are intended to illustrate how the application of various planning principles might affect a site's development and the resulting impacts on the community. The scenarios depicted in the Guidebook are conceptual and demonstrate the possible use of alternative development approaches. **The contents of the Guidebook are not intended as and should not be construed or applied as a statement of the regulatory policy of the State of Vermont, and do not supersede the policies and requirements of adopted municipal and regional plans and bylaws.**

## Creating This Guidebook

This Guidebook is the culmination of a multi-phased study of Vermont's interchanges. Early in the process of preparing the guidebook, each interchange was photographed, both from the ground and the air, to establish an inventory of land use patterns and views. The photographs were evaluated, with each view given a scenic quality rating, to determine where the most vulnerable areas may be. A land use analysis provided a picture of how interchanges are currently used, as well as an idea of existing development conditions.

This analysis led to the creation of six interchange types representing different growth contexts. Several focus groups were conducted to solicit the advice of state officials and policy-makers, local and regional planners, landowners and developers, and conservation organizations (46 participants). Advice, oversight and document review was also provided by the project Advisory Committee, which included representation from regional planning, economic development and marketing organizations, local and state officials, and interchange developers.

## ***Development at Interstate Interchanges: Why the Special Attention?***

Developable land around Vermont's 52 interstate interchanges is a finite resource that provides a unique set of opportunities and challenges for development, especially when viewed from a statewide perspective. Development patterns at interstate interchanges are important to all citizens of Vermont for the following reasons.

- We expect to have a safe and efficient road system, and pay taxes to support the state transportation system including the interstates and interconnecting highways. Uncoordinated development that generates high levels of congestion at interchange areas can hamper our ability to travel safely and efficiently around the state.
- Vermont's planning and development statute encourages all municipal and regional plans to further the state's primary land use goal: To plan development so as to maintain the historic settlement pattern of compact village and urban centers separated by rural countryside. [24VSA§ 4302(c)(1)]
- Public funds support a wide range of economic development programs directed towards our historic downtowns and villages. Public investments in these historic centers (public buildings, sewer/water facilities, sidewalks and parks) seek to maintain their vitality. Development at interchanges that competes with villages and downtowns, can undermine Vermont's efforts to maintain and improve these historic centers of social and economic activity.
- Vermont's interstate highways provide travelers a window onto the state's natural and cultural treasures as they traverse scenic farmland, rolling wooded hillsides, mountains, and valleys flanked by villages and small cities. These scenic landscapes help to reinforce the unique Vermont "brand," a high-quality environment combined with a rich community life. This kind of positive, recognizable image is important to the economic success of a small, remote state like Vermont. By protecting our waterways, valued farmland, and other significant natural and cultural resources at interstate interchanges through conservation and careful development, we can provide gateways to our communities that successfully convey the unique qualities that define Vermont.
- Services for travelers and facilities requiring trucking are necessary to a healthy economy in Vermont. These often need to be located at interstate interchanges. Optimal locations for interchange-related facilities need to be identified and efforts made to ensure that necessary and viable interchange uses are given priority over uses that could be located elsewhere.

This guidebook suggests ways that planning for development at interstate interchanges can address these statewide concerns. Owners and developers of land at interstate interchanges, and the municipalities that contain those lands, make decisions about how the interstate interchange areas will be developed. The planning and design guidelines that follow are intended to help those decision-makers meet not only their individual, business or municipal goals but to do so in a way that will address the overall interests of the people of

## **How To Use This Guidebook**

The guidebook is organized into two sections. The first—**Planning Guidelines**—examines existing conditions at interchange areas and addresses the special planning issues to be considered to fully address growth there. This section also describes strategies for planning at the municipal and regional levels and some of the state resources that are available. The second half of the guidebook presents **Design Guidelines** for development at interstate interchange areas. These include design concepts to help new development fit into the various Vermont contexts found at interstate interchanges. Included are recommendations on siting, building, and landscaping development at interchange locations.

The Planning section is intended primarily for use by local and regional planners in preparing and adopting plans and regulations for land around interchanges. The Design Guidelines are directed to a broader audience. They may be used by developers and landowners beginning work on designing development projects, local planning commissions crafting standards for the review of projects, and citizens interested in learning about desirable development patterns at the state's interchanges. Rather than using the guidelines to evaluate specific projects, the guidelines are designed to help communities and regions prepare policies that are specific to the unique setting and context of each of the state's 52 interchanges.



# Planning Guidelines

Who decides what the pattern of growth will be? Individual landowners' decisions are guided by site constraints, market demand, municipal and regional planning, and local and state regulations. This Guidebook emphasizes the benefits of proactive planning for interchange area development. A productive and inclusive planning process can bring together the interests of landowners with the goals and concerns of municipal officials and citizens as well as regional and state entities. An effective planning process can ultimately lead to a more efficient and predictable regulatory process for interchange development.

This section outlines a community planning approach that addresses the needs of landowners, anticipates the trends of the market, and meets local and regional goals. As municipalities contemplate options for their interchange, they should take a close look at the **existing conditions** and forces affecting the physical form of growth. They should also consider several issues associated with interchange development. **Planning Considerations** reviews topics such as local and regional contexts, land use, and infrastructure. **Planning Strategies** offers recommendations for reaching out to the public, developing plans, delineating zoning districts, and protecting natural resources, as well as outlining regional and state planning resources.

## Existing Conditions

Research conducted for this guidebook examined the physical qualities and development conditions of Vermont's interchanges. A summary of the findings follows:

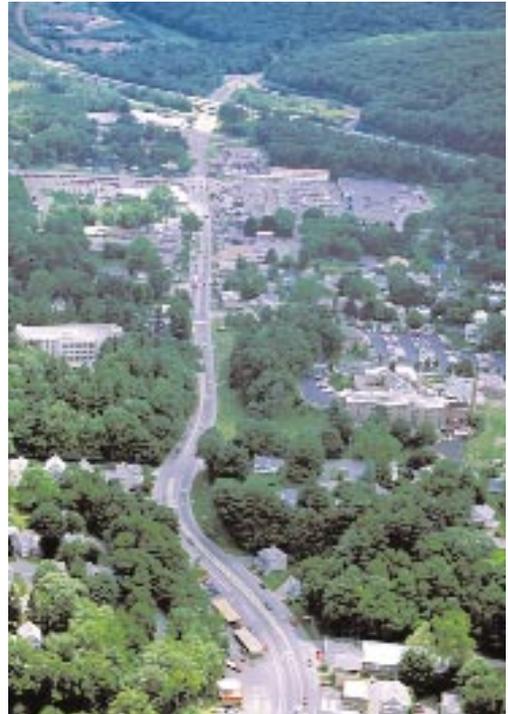
**Views are picturesque.** A scenic analysis of interchange areas revealed some thirty high-quality views. But in many cases, the vista from the interstate contrasts sharply with the one beyond the exit ramp, where commercial strip development has spread along intersecting highways.



The view from the southbound lane of the interstate, just before I-89, Exit 21, Swanton.



The view just beyond the exit ramp at I-89, Exit 21, Swanton.



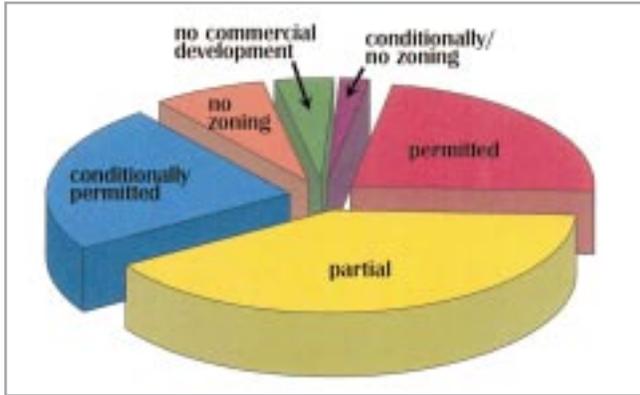
Development that occurred before or soon after the interstate's construction had a relatively compact pattern. This strip development emerged along Rte. 5 in Brattleboro more than twenty years ago.



Recent development near I-89 Exit 7 in Berlin exhibits a more dispersed pattern, with larger lots and more space between buildings.

**Growth is increasingly dispersed.** The pattern of development around interchanges has changed from relatively compact (c.1960s) to more scattered (after 1980). Lots and setbacks have increased, spreading development over a wider area.

**Commercial uses dominate.** Growth at most (91%) of Vermont's interchanges is governed by land use regulations that allow a wide array of uses. Nearly all interstate municipalities have targeted areas surrounding their interchanges as appropriate locations for commercial and industrial development. Gas stations, industrial parks, or warehousing are found at 60% of interchanges.



Status of commercial zoning at interstate interchanges. Most communities have designated at least part of the land around their interchange as a commercial district. Source: VT Department of Housing and Community Affairs

**Traffic is increasing rapidly.** Average annual traffic has jumped by 10% in the last 5 years and is expected to grow by 44% in the next 20 years. Interchanges have attracted retail uses, which, in turn, have generated more traffic and considerable congestion in some locations.

**Sewer and water are often available.** A majority of interchanges are located within a half mile of municipal water and wastewater collection systems.

Interchange municipalities should examine similar topics at a site-specific level. Take a close look at the physical qualities of the interchange, how it grew in the past, and the conditions that may shape its future growth. In this early phase of planning, ask some questions, such as:

- ¥ What is the scenic quality of the interchange?
- ¥ Are there areas that are visually sensitive and need special consideration?
- ¥ What land use and development patterns have evolved over time?
- ¥ How has this affected traffic?
- ¥ How will current regulations affect the look and feel of future development?
- ¥ What are the local and regional market trends for this interchange?
- ¥ What are the community goals and vision for the interchange area?

## Planning Considerations

In addition to a physical analysis, municipalities should consider several issues associated with interchange development. The following section briefly describes some of the challenges and choices communities face to achieve local planning goals in concert with regional and state goals.

### LOCAL & REGIONAL CONTEXT

*Consider how new development will affect the community overall, as well as a particular interchange area.*

**Regional Context.** Interchange area planning should take into consideration regional market demands for goods and services. Neighboring municipalities should coordinate responses to interstate-related needs such as rest areas and traveler services.

**Relationship to Community Centers.** An important issue facing interchange communities, and the state in general, is the relationship between interchange development and development within existing downtown and village centers. A municipality should consider which types of development would be beneficial, and whether certain types of interchange area growth will draw public investment and economic vitality away from its traditional center. Competition



Rte. 100 in Waterbury intersecting I-89 Exit 10 is an arterial road that is sometimes overwhelmed by increased traffic. In a short exit ramp, without additional capacity to accommodate waiting vehicles, cars can back up to the travel lane of the interstate, posing a safety hazard.

between interchange locations and traditional centers takes place at both the local and regional level.

**Growth Centers.** A number of state policies and programs encourage development and targeted public investment within locally designated growth centers — commonly defined as areas of compact, higher density, mixed use development that are served by existing or planned infrastructure, which may include roads, sidewalks, water, wastewater and storm water management systems. Growth centers are not appropriate at all interchanges. The development objectives of the town and region should be considered before designating a growth center at an interchange area. The competitive advantages and disadvantages for other existing historic and planned growth centers in the community and region should be examined, as well as whether or not infrastructure is available to support an interchange growth center.

**Gateways.** Interchanges often serve as an entrance or gateway to a community. Consider the type of image — the first impression — the community wants to present to the traveling public.

## LAND USES

*Consider what uses are appropriate for interchange area development. Uses that benefit from or require convenient access to the interstate system, including those that cater to interstate travelers or generate heavy truck traffic, will continue to locate in these areas.*

**Traveler Services.** Interstate travelers around the nation have come to expect convenient access to fuel, a fast meal, and a good night's sleep. These goods and services are all available in Vermont, though not at all interchanges. Planning for traveler services should be based on an assessment of the regional service network. Communities should identify and consider available services and facilities in nearby villages and downtowns, and at other interchanges, to evaluate whether additional or complementary services are needed at a particular interchange.

**Transportation & Commuter Facilities.** Consider the availability of multi-modal facilities and connections in the vicin-

ity of the interchange area that will serve area commuters. The state transportation agency (VTrans) has sited a number of facilities at interchanges to promote regional ridesharing, and to ensure adequate highway maintenance. According to VTrans officials, additional maintenance facilities will not be needed in the foreseeable future. VTrans is, however, planning for the establishment, upgrade and expansion of park-

### Vermont's "Growth Centers"

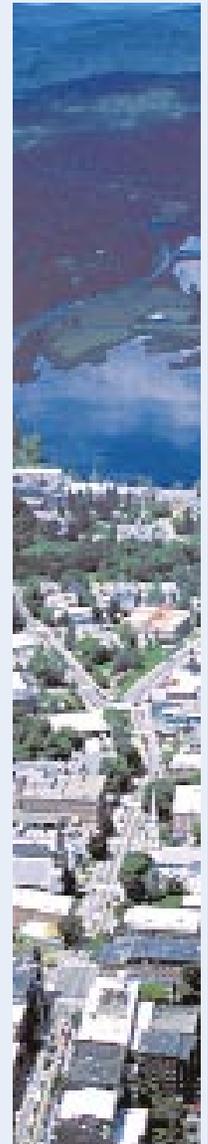
Under current state policies governing access to federal CDBG funds, the State Revolving Fund and Downtown Program incentives, four types of growth centers have been identified in Vermont:

**Downtown** — the traditional central business district of a community, served by public infrastructure, which is characterized by a cohesive core of commercial and mixed-use buildings, often interspersed with civic, religious and residential buildings and public spaces, typically arranged along a main street and intersecting side streets. Downtowns may also be defined to include adjoining, higher density residential neighborhoods.

**Village Center** — the traditional center of a community, such as an historic village, which is similar to a downtown, but, occurs at a smaller scale.

**New Town Center** — an emerging community center that is planned for, or developing as, the community's central business district, comprised of compact, pedestrian-friendly, multistory and mixed-use development that is characteristic of a traditional downtown, and is supported by planned or existing urban infrastructure, including curbed streets with sidewalks and on-street parking, and storm water, sewer and public water supply systems.

**Industrial Park** — an existing or planned industrial park, which may serve as an exception to the three types of growth centers listed above, to accommodate manufacturing, trucking and warehousing businesses that are more appropriately located outside of an existing or emerging center because they 1) would be incompatible with nearby residential areas, 2) require immediate access to a major railroad or highway, or 3) need substantial amounts of land.



and-ride facilities at most interchanges. These facilities can generate significant amounts of traffic at peak hours; but these also can be designed to incorporate transit facilities such as bus stops and bicycle storage units to promote alternative travel modes.

**Trucking & Freight Facilities.** The primary purpose of the interstate highway system is to provide an efficient transportation network. As Vermont's population and economy grow, truck traffic is expected to increase. Facilities that rely on access to large trucks or large numbers of trucks for supplies and distribution, or provide services such as fuel and

repair, will of necessity locate close to interchanges. This also is true of other uses that generate high truck traffic, as communities attempt to divert such uses, and their truck traffic, away from historic village centers.

The scale of trucking and freight facilities – including shipping, warehouse and transfer facilities, truck service areas, and many industrial uses that generate heavy truck traffic – poses special design challenges to communities. Warehousing and shipping facilities tend to be utilitarian, large, and often involve expansive driveway, parking, loading and storage areas. However, uses requiring heavy truck traffic generally do not rely on high visibility to attract customers. Careful siting, clustering in more compact industrial parks, screening and landscaping can mitigate visual impacts.

## EXISTING & PLANNED INFRASTRUCTURE

*Consider needed infrastructure improvements, associated costs, and the impacts of induced growth. The type, pattern and density of development within an interchange area will depend in part on the capacity of existing and planned infrastructure, including connecting roads and – in more densely settled areas and designated growth centers – water, wastewater, storm water, parking and pedestrian infrastructure.*

**Traffic Safety & Highway Capacity.** Municipalities should consider the long-term impacts of interchange area development on traffic and pedestrian circulation and safety. They should also contemplate existing and planned transportation infrastructure – including interchange access areas (entrance and exit ramps) and the extended road network. Pursuing development without adequately addressing road and traffic impacts can result in strip development, which can cause traffic congestion, deterioration of roadway function, unsafe driving and walking conditions, and the need for costly infrastructure improvements.

**Integrate transportation and land use planning.** Channel appropriate growth into already settled areas. Concentrating development in higher density, mixed-use growth centers



## Trucking and Freight Facilities in Vermont

The interstate system and key state routes are included in the National Highway System (NHS) for the interstate transport of goods. Planning for trucking, including freight “mobility, access and connectivity,” has been a requirement under federally funded state and regional transportation planning since 1998. In 2000 US DOT called for improvements in NHS connections to freight facilities.

A 2001 Vermont Statewide Freight Study found that trucking is by far the dominant mode of freight transportation in Vermont, accounting for 91% of freight moving to, from and through the state. It also was noted that the state, “characterized by beautiful landscapes, quaint old towns and villages, and a quality of life that attracts many...is not conducive for the development of large industrial operations or large trucks moving on substandard highways through small villages.”

The Vermont Truck Network has been designated by the state to enhance the state’s economic environment while limiting the impacts of truck traffic on Vermont’s small towns and villages. This limits large trucks to specified routes. Interstate highways have no overall restrictions on truck length, while specified state highways are limited to trucks up to 72 feet in length. All other state highways – the majority of the total mileage – are limited to trucks no greater than 68 feet in length.

Interstate corridor communities, particularly those that provide connections to other routes on the NHS and the Vermont Truck Network, or to other modes of freight transport such as rail, should evaluate the need for freight facilities, including freight terminals, in the vicinity of their interchange areas.

can reduce trip distances and traffic volumes. Encourage or require master planning of large properties to unify incremental access to public roads. Limit development along arterials in rural areas.

### Plan for a future street network.

Anticipate the need for future access. Map out an interconnected network of streets with parallel routes that can fill in over time as parcels are developed. Place proposed streets on an official map. Identify the road improvements that will be needed to support planned development and determine the associated costs and financing options. This can be accomplished through a coordinated land use and transportation planning and capital budgeting program. As development occurs at interchange

areas, the increase in traffic should be carefully monitored and managed – through recommended access management and traffic calming guidelines – to maintain roadways and promote pedestrian and traffic safety.

**Water & Sewer Service.** Communities can expect greater interest in development at interchange areas that are served by public water and sewer systems. Consider the secondary impacts of extending service along heavily traveled highway corridors. Where extensions are necessary to serve growth centers, manage access to water and sewer through defined service areas, and support high densities within those areas. This can help reduce the need to extend lines in order to sell excess capacity and can reinforce Vermont’s traditional settlement pattern.

**Park & Ride facilities.** Vermont Agency of Transportation is working to establish, upgrade and/or expand the park-and-ride facilities at most interstate interchanges. Communities



### **Infrastructure Costs as Part of the Equation**

A 2001 corridor study of US Route 7 from Winooski to Georgia documented existing and proposed land use and development patterns within the vicinity of I-89 interchange areas (Exits 15-18). Based on a build-out analysis of local plans and zoning – and proposed growth center development in corridor towns– it was determined that, in addition to other roadway improvements:

- Interchange improvements will be needed at Exits 16, 17 and 18,
- Exit 15 will need to be expanded to a full (4-way) interchange, and
- A new “Exit 17” will be needed.

Preliminary estimated cost: \$11.2 to \$20.4 million (not including right-of-way acquisition) *Source: Route 7 Winooski to Georgia Corridor Study, 2001. Prepared for the Chittenden County MPO by Oman Analytics, Peter Hart, Community Planning & Design, and Kathleen Ryan, Landscape Architect.*

should work with VTrans to help plan for and site these important commuter facilities.

## **Planning Strategies**

Communities have several tools available to steer growth toward a desirable pattern. A comprehensive planning process involves several components. Below is a list of strategies for planning at the municipal and regional levels as well as some of the state resources that are available.

### **PUBLIC OUTREACH**

*Define desirable growth patterns and ways to achieve them through a public process.*

**Landowners.** Landowners generally make the development decisions for particular parcels. Their interests and plans should be considered in the context of larger community goals and objectives. Planners should work with landowners and developers to integrate their projects into the municipality’s interchange planning process. Landowners should work to coordinate project development with that of neighboring properties and the surrounding area, and with infrastructure and road improvements.

**Public Involvement.** It may seem easier to develop a plan or proposal with minimal public scrutiny, but it’s then generally harder to win public support. To be most effective a comprehensive planning process should identify and encourage participation by anyone who might be affected by interchange area development – including local residents, busi-

nesses, and interest groups, as well as individual property owners.

**Coordination with the State.** The Vermont Agency of Transportation (VTrans) owns property bordering every interchange and is also the state permitting entity for access rights (curb cuts) along state corridors. Therefore, VTrans and municipalities should work together in a community planning process. Consultation and coordination with VTrans is important in order to ensure that state and local decisions are made in concert with one another. VTrans also encourages interchange area planning and town and regional coordination through access management and corridor planning efforts.

**Common Themes.** It’s important to identify common issues and themes to be addressed in interchange planning, and to articulate goals and objectives as well as to reconcile major differences (particularly before a regulatory process begins).

**Visualizing Options.** There are a variety of ways to involve the community – through local surveys, informational meetings and materials, and public forums. One of the hardest, but most important tasks is helping people visualize future development options. This can be accomplished through graphic representations, computer modeling, visual preference surveys, and more interactive design workshops (charettes).

### **MUNICIPAL PLANNING**

*Develop a municipal plan that guides anticipated growth at the interchange and spells out policies and recommendations for the area. Define appropriate districts to accommodate interstate-related uses within the municipality’s planning goals. Consider natural, cultural and scenic features, including critical open space areas and view sheds.*

**Municipal Plan.** Municipalities (including towns, cities and incorporated villages) are granted broad authority under Vermont’s Planning and Development Act (24 VSA Chapter 117) to plan for and regulate development within their borders. An adopted municipal plan provides the basis for both regulatory and non-regulatory means to achieve desired patterns of development. The municipal plan should include specific recommendations to guide the growth and to mitigate any negative impacts of interstate-related development on road capacity, natural, cultural and scenic resources, open space, and existing villages and downtowns. For a more detailed list of municipal plan options see Appendix. The Vermont Department of Housing and Community Affairs *Planning Manual for Vermont Municipalities* provides helpful information and guidance for preparing municipal plans.

## ***Successful Community Planning for Interchange Area Development***

The scenic Randolph exit has been an area of community concern and a site of development pressure over the past five years. In 1998 Randolph used Community Development Block Grant (CDBG) funds to undertake an economic development plan for the area. This resulted in a master plan for the interchange area that identified potential sites for development, articulated the desired land uses, and mapped sensitive scenic areas. This work was furthered from 2000-2003 through a subsequent planning study (funded through the EPA Sustainable Development Challenge Grant) which used a community visioning process to bring together property owner(s), interested residents, and the planning commission.

The Two Rivers-Ottawaquechee Regional Planning Commission provided technical assistance to the town of Randolph on this project. With support from the Orton Family Foundation, the "Community Viz" technology was used to help the community actually visualize, in three dimensions, what different development scenarios might look like. After many meetings and consultations, the Exit 4 Committee created a future development scenario that was agreeable to participants and presented it to the larger community at a well-attended forum. In addition to articulating where industrial and commercial development might be sensitively located, the future development scenario included location for a park-and-ride facility. As a follow-up to the planning process, the Randolph Planning Commission and Exit 4 Committee have developed new (draft) zoning regulations and design standards for the area to enable the type, density and location of development envisioned by the Exit 4 Committee. In addition, an Access Management Plan for the interchange area has been developed, in cooperation with VTrans.

**Interchange Area Plan.** Since interchange areas are the focus of more intense growth pressure, it makes sense to develop a more detailed plan for each of these areas. Inventory and mapping information should be detailed enough to deal with the complexities of ownership, resource protection and development. Interchange area planning can involve the following steps:

1. Delineate the interchange plan area in relation to existing and planned interchange functions, transportation networks, land uses, and settlement patterns.
2. Inventory and map natural, cultural and scenic resources, including view sheds and critical open space areas.
3. Determine which areas are suitable for development by identifying those that are not (e.g., surface waters, floodplains, wetlands, steep slopes).
4. Evaluate the functional capacity of the transportation network within and around the interchange.
5. Determine the capacity of existing water and sewer infrastructure to support development.
6. Identify ownership patterns (e.g., parcel maps) and engage landowner(s) in the planning process.

## ***Chapter 117 Planning Requirements***

Four of the required "elements" specified in Chapter 117 for consideration in municipal and regional plans are especially relevant to interchange areas:

- Resource Protection – to include the identification of significant natural, cultural, and scenic resources, and associated protection policies;
- Transportation – to include an analysis of the existing and planned capacity of the transportation network, the identification of needed transportation improvements, and associated access management policies;
- Facilities – to include an analysis of water and sewer infrastructure capacity, the mapping of existing and proposed service areas, and related policies; and
- Land Use – to include an analysis of existing and proposed land use, the designation of areas to accommodate different types and densities of development (land use/zoning districts), and related development and open space protection policies.

In order to have a confirmed planning process and be eligible for multiple state benefits, municipal plans must be approved by regional planning commissions. Municipal and regional plans are required to be consistent with relevant state planning goals.

7. Define alternative interchange development scenarios through public involvement using graphic visualization techniques such as build-out analyses, design charrettes, visual preference surveys, graphic renderings and computer modeling.

8. Establish a preferred type and pattern of development, to include:

- ¥ The type, location and density of development (designated land use districts, growth centers),
- ¥ A proposed road network,
- ¥ Associated infrastructure service areas (if any), and
- ¥ Open space or scenic view sheds designated for conservation.

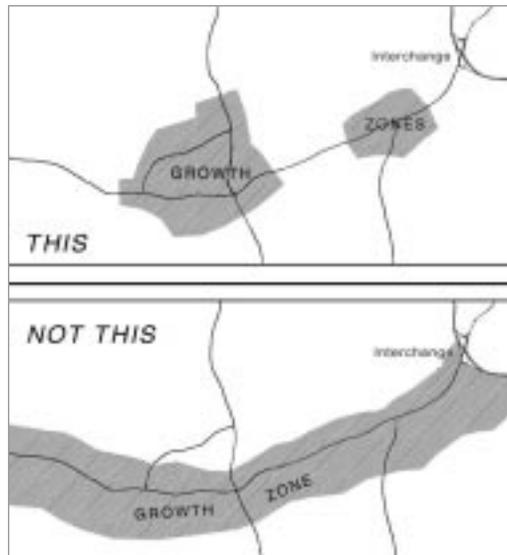
9. Establish policies and guidelines for land subdivision and site development within the interchange area.

10. Identify needed road and infrastructure improvements to support proposed types and densities of development, as well as associated costs and methods of financing.

11. Schedule and assign specific implementation measures or tasks. To have the full legal effect of a plan for implementation purposes, an interchange area plan should be incorporated in, or adopted as an amendment to, the municipal plan.

This level of planning often requires some outside expertise to conduct inventories and analyses, offer development strategies, and identify infrastructure needs and associated costs.<sup>5</sup> Planning grants are currently available to qualified communities through the state's Municipal Planning Grant and Community Development Planning Grant programs administered through the Department of Housing and Community Affairs.

**Interchange Districts.** The type and density of development at an interchange area may be managed locally through the delineation of zoning districts. Carefully consider both the type, and the size, of designated dis-



Establish growth zones around road intersections, not along highway corridors.

tricts to ensure that they are consistent with local planning and development objectives.

**District Delineation.** Since most interchange areas include three or more sectors, defined by the interstate and the local road network, it is generally not appropriate to include an entire interchange area within one zoning district. Most interchange districts are too large for development and over zoning can result in scattered, lower density development, strip development along intersecting roads, and the loss of critical open space. The size of a proposed district will vary based on proposed uses, development constraints, the availability of infrastructure, and open space protection. In delin-

### ***Municipal Plan Example: 2002 Colchester Master Plan***

Colchester has actively planned for and is encouraging development in three local growth centers, which are Exit 16, 17 and Severance Corners. ...

*Exit 16 is a densely developed commercial and industrial area. ... This growth center geographically includes all four sides of the interchange exit, extends north to Sunny Hollow, and extends south to the Winooski River. ... The entire area is served by municipal water and sewer... The area is largely built out although future development is anticipated at Water Tower Hill, in the area surrounding the former Rathe Landfill, as well as infill development throughout the growth center. Currently this area includes very limited mixed-use and few pedestrian amenities. Encouraging mixed-use development and pedestrian facilities is important for this area.*

*The Exit 17 growth center is largely undeveloped with some storage warehouse uses, other light industrial uses, and limited residential development. The Planning Commission and Select Board adopted a Growth Center Plan for the Exit 17 area in 2000 which calls for mixed use development that will allow for industrial, commercial and residential development with limited retail opportunities. The area is characterized by poor soils unsuitable for conventional wastewater disposal. The Town has actively been pursuing sewer capacity and decentralized wastewater systems for this area and the Exit 17 Growth Center Plan encourages the Town and property owners to pursue wastewater options to allow this area to develop.*

-2002 Colchester Master Plan, Local Growth Centers, pp.37-38.





## ***Municipal Interchange Development Tools (Non-regulatory)***

A municipality may use the following non-regulatory tools, alone or in conjunction with local bylaws, with the purpose of implementing a municipal plan and the state land use goals.

<p>Capital Budget and Program</p>	<p>A municipality may adopt a five-year capital program, updated annually and divided into annual capital budgets, to provide for maintaining current and acquiring future capital improvements.</p>
<p>Tax Increment Financing</p>	<p>Pursuant to 24 VSA 53, subchapter 5 (§1891 - 1900), a municipality may issue bonds to pay for new infrastructure, such as roads, water and sewer lines, in a defined growth center, and apply the incremental tax revenues to pay off those bonds for up to 10 years.</p>
<p>Development Agreements</p>	<p>When it furthers the objectives of the municipal plan and is not possible under current regulations, a municipality may adopt a process, with standards and criteria for its application, to negotiate an agreement for review of a particular parcel that establishes the rights and obligations of all parties.</p>
<p>Transfer, Purchase or Acceptance of Development Rights</p>	<p>A municipality may specify sending and receiving areas in order to transfer, purchase or accept the donation of development rights, to further the conservation or development objectives of a plan.</p>
<p>Supplemental Plans to the town plan, which may ultimately become incorporated into the town plan may include:</p>	<p><b>Official Map.</b> A municipality may adopt an official map which identifies future municipal utility and facility improvements, such as road or path rights-of-ways, parkland, utility rights-of-way and other public improvements to provide the opportunity for the community to purchase land identified for public improvements prior to development for other use.</p> <p><b>Access Management Plan.</b> A municipality may adopt an access management plan to manage traffic and access onto public roads from adjacent property.</p> <p><b>Downtown, Village Center or New Town Center Plan.</b> A municipality may adopt a plan for the development and revitalization of downtown and village centers, or to plan for a new town center.</p> <p><b>Open Space Plan.</b> A municipality may adopt a plan to assess critical natural resources and to guide public and private conservation strategies.</p>
<p>Conservation Commission</p>	<p>A municipality may form a conservation commission to work on conservation and natural resource planning issues.</p>



eating district boundaries, consider where the development pattern should be dense and where it should remain sparse. Districts can be delineated to concentrate development in nodes around key road intersections or in other suitable locations, and restricted elsewhere along road corridors and in open space areas.

**Commercial and Industrial Districts.** Some uses— particularly those needing to accommodate significant trucking activity are not compatible with downtowns and villages and may be more appropriately located near the interchange. However, communities should carefully assess the development capacity of their downtowns and existing industrial parks to determine whether new commercial and industrial areas are actually needed for economic development. If there are existing vacancies and adequate space for growth in already settled areas, commercial and industrial districts at the interchange could be limited or downsized. However, some uses— particularly those needing to accommodate significant trucking activity are not compatible with downtowns and villages and may be more appropriately located near the interchange.

**Traveler Service Districts.** Vermont communities can avoid the random distribution of gas stations and fast food restaurants that are typical of interchanges in other states. One approach is to define a traveler services district in one portion of the interchange to allow for the siting of gas station/convenience stores, lodging facilities and restaurants. The area could be selected so as to limit the visual impact of



Swanton has designated a limited area around I-89, Exit 21 a "Travelers' Service" District (foreground).

such development. Taking this further, communities can establish design standards within the district to create a particular look and visitor experience in the interchange area, and to facilitate development of an integrated circulation system that minimizes traffic impacts. The result can be an attractive, compact, pedestrian-oriented plaza with a variety of businesses offering traveler services. A different approach is to channel travelers downtown by limiting uses at the interchange. This can have an economic benefit as well, since those travelers may also patronize other downtown businesses.



This development in Grantham, NH adjacent to I-89, offers gas and food as well as other services within a small area. The close set buildings, unified architecture and restraint in the use of signage, helps this commercial center fit its rural context.

**Mixed-Use Districts.** Where a new or expanded growth center is envisioned and supported by existing or planned infrastructure, a municipality should consider delineating a mixed-use or village district. Compact, higher density development, with a variety of uses would be allowed within an attractive, pedestrian-friendly environment. One relevant form is the Transit Oriented Development (TOD), which consists of a dense mix of uses designed in a compact pattern around a transit facility.<sup>6</sup>

**Overlay Districts.** Overlay districts— such as gateway, design review, or access management districts— should be considered where appropriate, to apply design and/or access management standards to development allowed within one or more underlying interchange districts. For design review districts, as enabled under state planning statutes, this involves the preparation of a report that includes an analysis of specific design issues, and related design guidelines. The guidelines included in this handbook offer a good place to start.

**Natural & Scenic Resource Protection.** Consider the identification and protection of significant natural, cultural and scenic features, including critical open space areas, view sheds, and natural resources such as wetlands and streams within the vicinity of the interchange.

**Open Space Plan.** An important aspect of the interchange planning process is the identification and mapping of significant natural, cultural and scenic features and open space areas. This should include the identification of interchange areas or parcels that may contain a view shed, or form an essential part of an interconnected open space system. Such areas should be incorporated in a plan for preserving open space near the interchange.

**Conservation Strategy.** Generally, a variety of strategies will be needed to protect or minimize impacts to natural and scenic features, and open space within interchange areas. These may include:

- ¥ non-regulatory options, such as the purchase of land or interests in land (development rights and conservation easements);

## **Regional Interchange Area Policies**

### *Example: Two Rivers Ottawaquechee Regional Plan*

The 2003 Two Rivers-Ottawaquechee Regional Plan identifies interchange areas as one of six types of land use settlement patterns in the region. The plan highlights related issues and opportunities, noting that “the lack of planning for development at interchange areas has prompted various forms and types of undesirable development along roads immediate to the interchange.” The plan goes on to define the following general interchange policies, as well as specific policies for each of the region’s seven interchange areas. These incorporate many of the best development practices proposed for use in interchange areas.

#### *General Interchange Planning Policies*

1. *It is the policy of the Region that any area planned for interchange development be constructed to:*
  - a. *complement the design principles and standards reflected in this Plan;*
  - b. *promote the most appropriate land uses as determined through a locally sponsored planning process involving affected landowners, municipalities and the Regional Commission;*
  - c. *maintain a high standard of scenic amenities for visually sensitive areas with due regard to impacts on neighboring properties and highway uses;*
  - d. *discourage creation or establishment of uses deemed more appropriate to town centers and village settlements; and*
  - e. *encourage planned unit developments (such as trucking terminals, industrial and office parks, service centers, professional offices, and public buildings).*
  
2. *It is the policy of the Region to support the development of Area Plans for each of the interchange areas. Such plans should be conducted locally as part of each local Planning Commission’s ongoing planning program in cooperation with landowners, the Regional Commission, and other affected parties. Work should focus on creating an integrated site and design plan that serves as a means of addressing potential conflicts or problems noted above. Elements that the plan should include are:*
  - a. *access management controls;*
  - b. *pedestrian amenities;*
  - c. *parking;*
  - d. *energy efficiency;*
  - e. *utilities/public services;*
  - f. *outdoor lighting;*
  - g. *landscaping and screening;*
  - h. *signage; and*
  - i. *open space conservation*
  
3. *The Area Plan could serve as the foundation for the identification of the highest and best use of these areas and could provide a framework for future development to follow. Incremental and uncoordinated development inconsistent with Area Plans for each of the interchange areas should be discouraged.*
  
4. *Development concepts that should be used for interchange areas include:*
  - a. *a circulation system that is conducive to pedestrian, bicycle and other non-vehicular traffic;*
  - b. *a density or lot coverage area that is higher than surrounding rural settlement areas;*
  - c. *use of planned unit development concepts such as high density areas offset by open space;*
  - d. *a design that incorporates public spaces and promotes social interactions;*
  - e. *a mixture of uses including non-residential and community facilities, and possibly residential;*
  - f. *central focal points or public spaces serving the entire area;*
  - g. *a pattern and scale of development that complements traditional patterns and uses in existing town centers and village settlements; and*
  - h. *provision for ride share parking and travel information services.*
  
5. *Any new development at or near interchange areas should promote a nodal development pattern where buildings are clustered, off-street parking is screened in the rear of the parcel and, where practical, inter-connected to adjoining parcels.*
  
6. *Municipalities with interchange areas are encouraged to promote creation and adoption of an official map per 24 VSA §4422 to provide a legal means of creating an interconnected network of streets, walkways, and other public facilities or amenities on land designated as interchange development areas.*
  
7. *Land use plans for interchange areas should be of a type, scale and design that complement s uses within existing town centers or village settlement, or areas proximate to them. Appropriate uses may include highway oriented lodging and service facilities, trucking terminals, research establishments, office and business parks, and light manufacturing facilities or similar type uses.*
  
8. *Town centers and village settlements are the preferred locations for small businesses, civic and governmental uses catering to the general public, and other uses that together constitute the diverse fabric of downtowns. It is in the Region’s interest to encourage and enable land uses that have been traditionally developed or planned for downtown areas to remain economically viable. High priority should be given to public investments benefiting infrastructure, housing and transportation facilities within town centers and village settlements. Accordingly, land use activities that have the effect of eroding the socio-economic vitality of downtowns should be discouraged.*

- ¥ regulatory incentives such as density bonuses to concentrate development in portions of the interchange;
- ¥ the use of designated building envelopes for each property to localize development on a portion of the site;
- ¥ recommended design standards to minimize the visual impacts of development; and/or strict prohibitions to protect specific resources, such as wetlands, stream and wildlife corridors.

A municipality should consider those strategies that will be most effective, and most accepted, locally.<sup>7</sup>



Concentrate development in areas of the interchange where it will have the least impact on natural resources and views.

## REGIONAL PLANNING

*Coordinate with the Regional Planning Commissions to frame planning goals within a broader context and to access information and expertise.*

Interchange planning and development takes place within a regional context. Development patterns at one interchange may affect the market for development at another interchange, and may affect the transportation function of connecting arterials between towns. Regional planning for interchange areas allows for a more comprehensive consideration of an area/region's economic development and land use needs, rather than a sole focus on the site-specific issues. Vermont's twelve regional planning commissions (RPCs) can help towns work together and can provide valuable resources for local and regional interchange planning efforts. RPCs help coordinate land use and transportation planning functions, and provide a regional perspective for planning. RPC staff can offer technical assistance to towns by conducting transportation corridor and interchange area studies, and assisting with community involvement and visioning efforts. In addition, regional plans can be especially useful for identifying and addressing interchange area issues within their broader regional context. As a part of the state's

Transportation Planning Initiative, (in effect since 1992), RPCs and Chittenden County's Metropolitan Planning Organization (MPO) have been given important roles in determining regional and state transportation funding priorities. RPCs and the MPO are charged with preparing regional transportation plans and related studies, which form the basis for determining regional transportation improvement priorities. Interchange areas – including associated land use and development patterns, and potential impacts to the state road network – are now being given much more consideration in transportation studies funded by VTrans under regional work programs.

Local communities can and should continue to participate in regional planning efforts through their representation on regional boards and transportation advisory committees. Some commissions also provide for appointed representation from other interested parties on regional boards, or through citizen advisory committees. All regional planning initiatives must include some form of public outreach, including opportunities for public participation and comment.

RPCs are also the primary source of technical planning and GIS mapping assistance for many of Vermont's interstate corridor communities. RPC staff collect data, provide information and guidance, assist in local planning and public outreach efforts, and help draft local land use regulations. For communities without municipal planning staff, RPCs are the best source of needed planning and development review assistance. Local technical assistance initiatives are included in annual commission work programs, funded

through the Vermont Municipal and Regional Planning Fund and the Agency of Transportation's Transportation Planning Initiative.

## STATE RESOURCES & PROGRAMS

State agencies administer several technical and financial assistance programs that could be augmented to include a focus on the State's interchange areas. Technical, planning, financing and program assistance is available through the planning divisions of the Department of Housing and Community Affairs (DHCA), the Agency of Natural Resources (ANR), and the Agency of Transportation (VTrans).

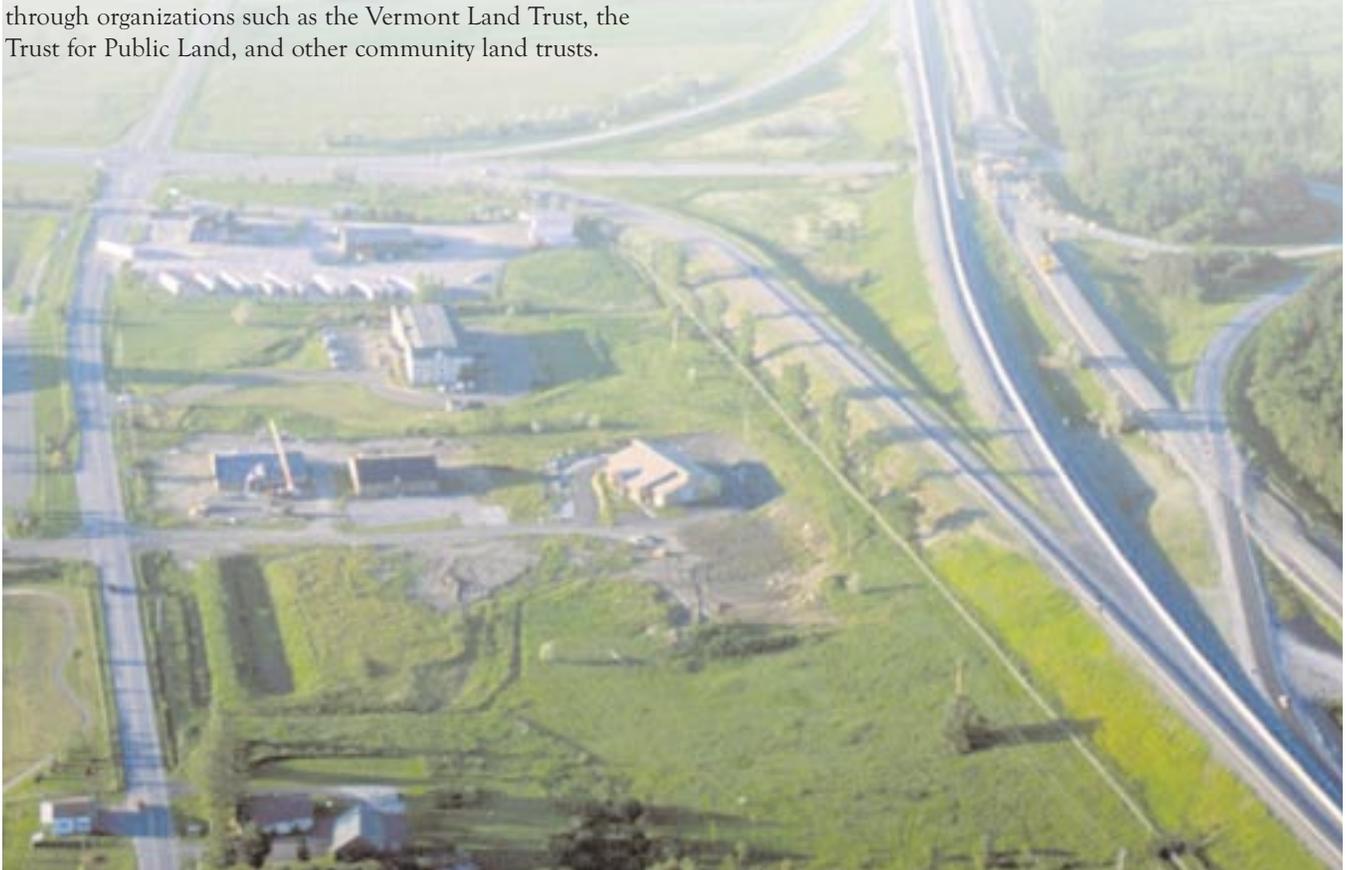
DHCA has highlighted interchange areas for potential funding under the state's Municipal Planning Grant Program. Interchange area planning is also eligible for funding under the state's Community Development Block Grant Program and through the Agency of Transportation's Enhancement Grant and Scenic Byways Programs.

Funding for the acquisition of land, or interests in land – including the purchase of development and conservation easements – is available on a competitive basis through the Vermont Housing & Conservation Trust Fund, administered by the Vermont Housing & Conservation Board; and to a more limited extent through VTrans' Transportation Enhancements Grant Program. Often these funds must be leveraged with municipal and private sources, accessed through organizations such as the Vermont Land Trust, the Trust for Public Land, and other community land trusts.

Local and regional plans, policies, and regulations for interchange area development may also be considered and may play an important role under several other state regulatory and financing programs including, but not limited to:

- ¥ Act 250 (District Commission, Environmental Board)
- ¥ state highway access permits (VTrans)
- ¥ the State Transportation Improvement Program (STIP), for funding transportation projects (VTrans)
- ¥ transportation project development (VTrans)
- ¥ transportation facility siting (VTrans)
- ¥ park and rides (VTrans)
- ¥ state Revolving Loan Fund (RLF) for funding water and sewer infrastructure (ANR)
- ¥ air quality permits (ANR)
- ¥ wetlands permits (ANR)
- ¥ storm water permits (ANR)
- ¥ Vermont Downtown Program, for development incentives and infrastructure financing in designated downtowns, villages and emerging town centers (DHCA)

Such programs benefit from the guidance provided by clearly stated plan policies and regulations at the local level, and from ongoing communication and cooperation to ensure that public policies, regulations and financing programs are coordinated and consistently applied at all levels of government.<sup>8</sup> Addressing interchange development issues in a coordinated, public manner – before an individual project is proposed that requires state and local permits, or public financing – can help prevent conflicts later in the process, and further local and state goals and objectives.



# Design Guidelines

## Tailoring Guidelines to the Vermont Context

Vermont's interchanges (or areas within them) can be grouped into the following six categories that represent different growth contexts and development conditions. They are described below. Types A, B, and C are found in areas near existing settlement, where a higher level of growth is appropriate. Types D and E are in outlying areas where growth should be more limited in scope. Type F is a special category interchanges with little or no access to the surrounding land.

This section describes each type and provides corresponding examples of Vermont interchanges. It offers a glimpse of how new growth might look if it adhered to current trends, and how it would appear if it followed an alternative approach. Each type is illustrated with simulated images, except for Type F, which has no real development capability. These sets of images illustrate various design approaches to interchange development. A more detailed description of specific techniques and strategies follows.

The development scenarios presented are based on generalized Geographic Information Systems (GIS) data that describe natural resource constraints to development including: parcel lines, soils, slope, floodplain, wetland and habitat. The build-out scenarios are based on an analysis of the general pattern and trends in land use currently emerging around Vermont's interstate interchanges as well as actual zoning regulations and property boundaries present in the particular locations. The build-out scenarios indicate long-term rather than immediate development possible under current zoning. The alternative development scenarios offer a conceptual view of a more compact and land efficient pattern. These are not based on detailed land surveys, engineering studies, or analyses of the market conditions for development. They are intended to illustrate a design approach rather than provide a detailed site plan. Municipalities wishing to replicate these concepts in an interchange master plan should obtain more accurate data and conduct a thorough design process.

### A NEARBY VILLAGE OR DOWNTOWN

A village or downtown is located within 1.5 miles of the interchange. There is undeveloped land between the Type A interchange and the village/downtown. Development in this context presents the opportunity to expand the village fabric in an interconnected, compact pattern at an urban or village density. Some examples of this type are St. Albans (I-89, Exit 19), Montpelier, Sharon, Putney, Weathersfield, Norwich, Fairlee, Barton, Orleans, St. Johnsbury (I-91, Exit 20), Derby Line, and Barnet. See page 22.

### B NEW OR EMERGING GROWTH CENTER

A village or downtown is located near the Type B interchange but cannot be expanded in a contiguous pattern because of development constraints. A satellite growth center, with a mix of uses that complement rather than compete with the traditional center can be developed on land near the interstate. This category is a subset of the village/downtown type. It is difficult to identify which interchanges fit this type without a more detailed analysis of building constraints and opportunities at each site. Middlesex, however, is one example. Some interchanges that appear to fit the type A profile might actually fall into this category after closer review at the local level. See page 23.



*A Note about Parking: Given the conceptual nature of the scenarios that follow, uses were not assigned to depicted buildings and, as a result, paved areas shown do not reflect specific parking standards. In the alternative examples, however, the scenarios do represent a planning and design approach that provides adequate parking with minimum use of paving. This is achieved through careful siting, shared facilities, and complementary uses. Design techniques are illustrated in further detail in the Site Layout section of the Guidelines.*

## **C** REGIONAL ARTERIAL HIGHWAY/ POTENTIAL STRIP DEVELOPMENT

The intersecting highway functions both as a regional corridor and connector to a town center in the Type C interchange. There is a significant volume of traffic and increasing amount of commercial strip development along the highway. This category includes the more highly developed interchanges such as Williston, South Burlington, Colchester (I-89, Exit 16), Berlin (I-89, Exit 7), White River Junction, and Brattleboro (I-91, Exits 1 and 3), where new infill development can inject a wider variety of uses and more a walkable pattern. Also included in this type are less developed interchanges that are now emerging as strip highways: St. Albans (I-89, Exits 19 and 20), Royalton, Bradford, Derby (I-91, Exit 28), and Waterbury. In these cases new development could be designed to modify the linear pattern, by being limited to specific areas or nodes and surrounded by open land. In both cases access to the highway needs to be carefully managed in order to protect the transportation function. See page 25.

## **D** CONNECTOR ROAD

For the Type D interchange, the intersecting highway or access road carries primarily local traffic or traffic headed to a downtown more than 1.5 miles away. Growth pressure is less intense and the existing settlement, which takes a linear form, is sparse. To encourage the historic settlement pattern and channel most new commercial uses to the town center, limits would be needed on new commercial uses at the interchange. Uses demanding proximity to the interchange can be sited to protect visual and natural resources. Hartford, Randolph, Rockingham, Weathersfield, and Richmond are some other examples of Type D interchanges. See page 26.

## **E** RURAL, INTERSTATE-RELATED

Existing development in the rural Type E locations is primarily limited to interstate-related uses such as traveler services, and transportation and trucking facilities. Since they do not need to be visible from the road, buildings are distributed in a dispersed rather than a linear pattern. In order to continue this pattern of use, new growth would need to be limited in scope and carefully sited. Examples of Type E interchanges include Williamstown, Springfield, Berlin (I-89, Exit 6), Westminster, Hartland, Lyndon (I-91, Exit 24), and Newbury. See page 27.

## **F** LIMITED ACCESS HIGHWAYS

Lack of access to land on intersecting highways prevents development at these interchanges, which are most often located at the intersection of two controlled access roads. Examples include Hartford (I-91, Exit 10), Derby (I-91, Exit 27), and St. Johnsbury (I-91, Exits 19 and 21).





## A NEARBY VILLAGE OR DOWNTOWN

Like many interchanges in this category, I-91, Exit 18 in Barnet sits close to the historic village center. The existing built pattern is compact. Development is confined to a small area around the center. Open fields provide a sharp contrast between built and unbuilt areas. Views from the interstate of village buildings across an open meadow are striking.



New space:  
57,000 sq. ft.  
Indus./Comm.

Under current zoning regulations, large-lot subdivision of the meadow as well as the land along the state highway could easily be expected. The resulting pattern would be dispersed. Single use, single story buildings, each with a dedicated parking lot, would create an inefficient layout and redundant paving. Multiple curb cuts would increase vehicular turning movements, affecting the flow of traffic along the state road.



New space:  
61,000 sq. ft.  
Indus./Comm.  
13-17 units residential

An alternative approach could provide new business opportunities AND protect the scenic qualities of the interchange. By clustering new buildings at the edge of the meadow and sharing parking and circulation space, views of the village would be preserved. Using the same land-efficient approach in other areas of the site would create a pattern that resembled the historic compact land use pattern. If just one quarter of the new buildings were

two story, as shown, this alternative could provide some 4,000 more square feet of commercial/industrial space than the current trend scenario. An important feature of this approach is to extend the village street network to accommodate new development. A range of building types serves a diversity of uses, including residential.



## B NEW OR EMERGING GROWTH CENTER

Nearby Middlesex Village has very little space to grow, but the area northwest of I-89, Exit 9 (shown in the upper left) offers gently sloping terrain, an ample supply of groundwater and good soils for on-site septic disposal. Travelers on I-89 catch glimpses of the open fields to the left as they approach the interchange from the north.



New space:  
390,000 sq.ft.  
Indus.

Until recently Middlesex's land use regulations defined this entire area as a 600 acre industrial zone. The large size of the district would provide no incentive to site buildings and driveways efficiently. Development could extend across the site, leaving no open fields. The large, one-story, single-use buildings (warehouses and truck facilities) shown here are typical of structures built recently at interchanges around the state. The pattern is auto-dependent with a road layout that is costly to build and maintain.



New space:  
122,500 sq. ft.  
Indus./Comm.  
50 units residential

Middlesex is considering revisions to the town's zoning to establish a smaller commercial district and a wider mix of uses. Although less land is developed, the more compact pattern provides a substantial amount of space for a combination of light industrial, office and residential uses. While large industrial buildings are appropriate in some new growth center settings, this particular community is considering limits to

the size of new structures. The image reflects Middlesex's interim rules limiting building size to 15,000 sq.ft. The smaller building size, tighter layout, and interconnected street network create a more village scale development.



## C REGIONAL ARTERIAL HIGHWAY/ POTENTIAL STRIP DEVELOPMENT

Like other Type C interchanges, Exit 10 in Waterbury is intersected by a regional transportation corridor. Rte. 100 is the only thoroughfare between the interstate and the fast-growing Stowe/Morrisville area. Traffic volumes along Rte. 100 are high and growing steadily. The segment of Rte. 100 just north of the interchange (shown here) lies within two commercial zoning districts, one of which extends north to the

Stowe town line. Despite the physical constraints presented by a sloping site, incremental strip development has occurred here in past years, altering the traditional pattern of open land punctuated by dense development at the crossroads.



New space:  
64,870 sq.ft.  
Comm./Indust.

Under a current trend scenario, retail development continues to appear along the highway, hugging the road for direct access and visibility. Several curb cuts are added, slowing

traffic with additional turning movements. The high traffic numbers, and potential customers, justify

the higher costs associated with building on these difficult sites. Extensive cutting is necessary to carve space out of the wooded hillside on the western side of the road and filling is required to create level space close to the road on the east side. A traffic-generating large-scale market increases the congestion. The auto-oriented pattern prevents pedestrian trips between businesses.



New space:  
89,200 sq.ft.  
Comm./Indust.

In an alternative scenario, development is located in fewer areas of the site but at a higher density. A broader range of uses and an interconnected street network could mitigate some

of the traffic problems associated with development. With the construction of a slower parallel road business

traffic could be separated from through traffic. Curb cuts would be consolidated into two locations on Rte. 100. Industrial and/or office buildings could sit comfortably in this setting. Aligned in a tighter pattern along the new street, they would be able to share circulation and loading space. The large parking lot could accommodate the turning requirements of trucks. Given the short distances and traditional street profile, pedestrians would be able to walk comfortably from building to building. Moving development away from the highway would also relocate it to a more level spot, suitable for building.

## D CONNECTOR ROAD



Rte. 2 in Richmond connects I-89, Exit 11 (not shown) with Richmond Village and a few other small communities. This segment of highway carries a considerably lighter load of traffic than I-89, which it parallels. Like other Type D interchanges, this area sits well outside the boundaries of the village but is experiencing some incremental commercial growth. At this small scale, the mix of residential and low-key commercial uses blends into the landscape.



New space:  
48,000 sq. ft. Comm.  
16 units residential

If the incremental development continued in the same form, this is how it might appear. Richmond's zoning regulations prevent building in a floodplain, which makes up the entire field in the left of this image.

As a result, development is confined to one side of the road, protecting distant views of Camel's Hump from the Exit 11 off-ramp and Rte. 2. The regulations do not, however, significantly

restrict curb cuts or define areas within a site that are suitable for development. Filling in the open field at right with regularly spaced buildings, each with a separate drive, would change the character of this section of road.



New space:  
40,000 sq. ft. Comm.  
16 units residential

Under an alternative scenario, this area could develop as an integrated residential

and office district rather than a string of unrelated businesses. Key to this approach is keeping the scale small and the uses limited. Retail, with its higher traffic impact, need for visibility and potential to detract from

the historic village, would not be allowed. Smaller lots, smaller structures, shared parking and drives, and the clustering of development into a portion of the site helps the development fit without having much of a presence on the road. A small, interconnected street network provides a walkable framework and limits turning movements onto Rte. 2.



## E RURAL, INTERSTATE-RELATED

Like other Type E examples, Exit 17 in Newbury features a scattering of mostly industrial and transportation-related uses. Rte. 302 – which intersects with I-91 at Exit 17 – is a designated state truck route, which likely accounts for several of the current uses located at the site. Open fields provide a few scenic views along the interstate while the existing vegetative pattern blocks views of the more recent development.



New space:  
88, 500 sq. ft. Comm./Indus.

If development continued in this scattered pattern, Exit 17 might look like this. Growth would be spread beyond the currently settled area to the open fields and wooded hillside, present-

ing a view from the interstate as a haphazard assortment of industrial buildings.



New space:  
123, 000 sq. ft.  
Comm./Indus.

Alternatively, development could take a form that maintains the rural views from the interstate. Filling in around the existing

buildings at a higher density would add the same amount of square footage but limit the visual impact of growth. The existing industrial park, which is already

screened from the interstate, could be built out in a more intensive pattern. This more efficient use of space would require less circulation and parking infrastructure.

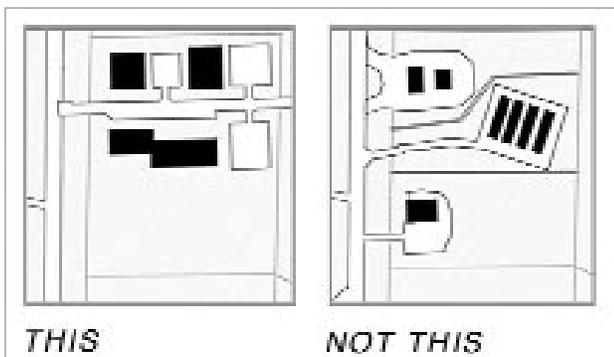
The following section is a broad but not exhaustive list of design guidelines. Within each category, guidelines and techniques are grouped according to the context to which they are relevant. Most guidelines are appropriate for all interchange types, but some are suitable for one or two types. The guidelines described below are drawn from several sources. Please refer to the list of references in the appendix for more detailed information.

## ACCESS MANAGEMENT

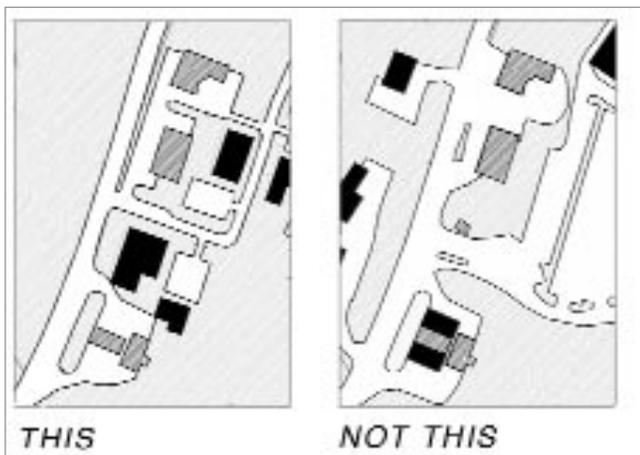
Managing access to highways near interchanges has many benefits: improving safety conditions, improving access to property, reducing congestion, postponing or preventing expensive highway improvements and promoting desirable land use patterns. The basic principle behind access management is to limit the number of conflict points along a road. This can be accomplished by regulating land uses, separating through traffic from turning traffic, and carefully locating signals and access points. Access management strategies vary according to the road classification and setting. Regional arterial corridors such as U.S. 4 will demand a different approach from local collector roads such as VT 122 in Lyndon or VT 78 in Swanton. VTrans has recently developed a classification system and set of standards for managing access to the state highway system. Its Access Management Program Guidelines (Nov., 2001) provides guidance on appropriate strategies for road types.

### FOR ALL INTERCHANGE TYPES

**Limit curb cuts.** Subdivide land into parcels that do not require direct access to the road.

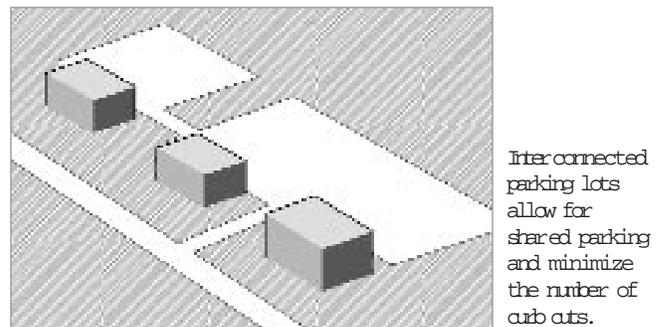


**Consolidate existing curb cuts.** As properties are redeveloped, seek to eliminate redundant or excessive access by installing curbing or providing access from a neighboring driveway.



**Share parking and access.** Create interconnected shared parking lots to limit the amount of paving, driveways, and access points.

**Develop secondary or service roads.** Turning movements onto individual properties can take place from a secondary road rather than an arterial. If a secondary road does not exist, consider the creation of a shared driveway, service road or new public street in site plan development.



**Design for pedestrian connections.** Accommodate pedestrians in the layout of driveways and parking lots, providing crosswalks and minimizing conflict points.



**Design for pedestrian connections.** Accommodate pedestrians in the layout of driveways and parking lots, providing crosswalks and minimizing conflict points.

**Install medians where appropriate.** On busy roads, medians can keep traffic flowing by limiting left turns to a few locations. They also ease pedestrian crossing by providing a mid-point refuge, and can improve the appearance of the road.<sup>9</sup>



A median provides greater control over left turn movements, channeling them to intersections. This technique keeps traffic flowing and provides an aesthetic benefit.

**Provide adequate distance between signalized intersections.** Space intersecting public streets at the following distances to protect the capacity of intersecting arterials:

<i>Highway Type</i>	
Category 2 - Controlled access, high speed, high volume roads where access to abutting land is subordinate to through traffic movements (e.g. VT 62, Berlin, VT 63, Rte 191, Newport)	1 mile
Category 3 - Med. to high speed over med. to long distances. (Regional corridors such as US 4 Hartford, VT and 103 Rockingham)	1/2 mile
Category 4 - Moderate speeds over med. distance routes (e.g. Class 1 town highways and minor collectors on state highways)	1/4 - 1/2 mile
Category 5 - Frontage or service roads	500 ft.
Category 6 - Urban roads	500 ft.

Source: Vermont Agency of Transportation Access Management Program Guidelines

## FOR VILLAGE/DOWNTOWNS, NEW GROWTH CENTERS, AND REGIONAL STRIPS (INTERCHANGE TYPES A, B, AND C)

**Provide adequate distance between the interstate and nearby curb cuts.** Allow at least 250 feet between interstate exit/entrance ramps and adjacent curb cuts.

**Accommodate bicycles.** Where uses are concentrated and residential areas are nearby, accommodate bicycles by providing bicycle parking and links to any nearby bike paths.

**Provide for public transit,** including adequate stops and shelters.

**Plan for public parking.** A successful public parking program with shared lots and on-street parking, reduces the need for on-site parking. Minimum parking standards should be reduced, if possible, with these interchange types, to allow businesses to minimize paving.

## FOR CONNECTOR ROADS AND RURAL SETTINGS (INTERCHANGE TYPES D AND E)

**Provide adequate distance between the interstate and nearby curb cuts.** Allow at least 500 feet between interstate exit/entrance ramps and adjacent curb cuts.

**Discourage direct parking access.** Do not allow cars to back directly out onto the highway.

**Provide adequate distance between curb cuts.** Although there are no clear standards for the spacing of unsignalized intersections and driveways, one method to calculate distances is based on the design speed of the road in question.<sup>10</sup>

<i>Design Speed (mph)</i>	<i>Curb Cut Spacing</i>
20	125
25	150
30	200
35	225
40	275
45	325
50	400
55	450

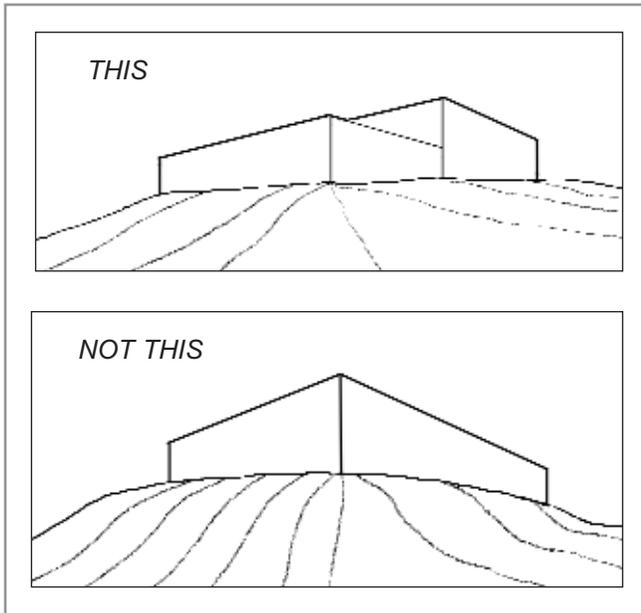
Source: Vermont Agency of Transportation Access Management Program Guidelines

# SITE DEVELOPMENT

Minimal disturbance of the natural landform of a site can provide significant environmental and aesthetic benefits. Through careful site design, the negative effects of grading and removal of vegetation can be reduced.

## FOR ALL INTERCHANGE TYPES

**Preserve the natural topography of the landscape by limiting clearing and grade disturbance.** Vermont's rolling terrain is an important part of its unique character. Development that flattens or creates artificial plateaus degrades that character. Design and grade the site to minimize cut and fill. Terrace parking and buildings to hug the existing topography. Design grading to avoid steep embankments and sharp grade changes that are incompatible with surrounding topography.



Use site and building design to follow the natural contours of the site. On sloping terrain a stepped building (above) can eliminate the need for an artificial plateau (below).

**Preserve existing vegetation wherever possible.** Incorporate and reinforce the existing pattern of woods and fields. New structures will more likely fit into the landscape if the existing trees and natural vegetation that surrounds them are preserved.

**Provide for wildlife crossing points.**

**Buffer development from water resources.** Allow for adequate buffers between development construction and streams and wetlands. Setbacks should be in accordance with *The Vermont Wetland Rules* and the Agency of Natural Resources procedures for stream bank buffers.<sup>11</sup>

**Make storm water management an attractive feature of the site.** Design storm water management and erosion control to adhere to natural drainage patterns using open channel systems and retention ponds with natural aquatic vegetation where possible. Best storm water management practices are reflected in ANR's *Vermont Storm Water Manual – Volume II – Technical Guidance*, which requires that runoff be retained and treated on-site to avoid down-stream erosion and to filter out impurities.<sup>12</sup> Vermont regulations generally allow creativity in the design of retention and treatment facilities. Storm water facilities can be a way to create inviting outdoor spaces. Careful consideration given to their placement and detailing will improve the value of the overall site.

## FOR VILLAGE/DOWNTOWNS, NEW GROWTH CENTERS, AND REGIONAL STRIPS

**Combine storm water facilities to serve several properties.** Retention ponds and drainage channels take up space and are difficult to fit on the small lots of a compact village settlement. However, like parking, streets, and sewage treatment, storm water systems are infrastructure investments that can be shared. Master planned developments can include a system designed to anticipate and accommodate future uses.



Stormwater facilities are a critical piece of infrastructure but they can also be an attractive public amenity. Source: Kathleen Ryan.

## FOR RURAL SETTINGS

**Preserve existing vegetation wherever possible.** Large trees and tree groupings with the best screening value should be saved. An early assessment by a trained professional, as well

as a Tree Preservation Plan, can help identify the most valuable vegetation and determine the measures needed to preserve it.

## SITE LAYOUT

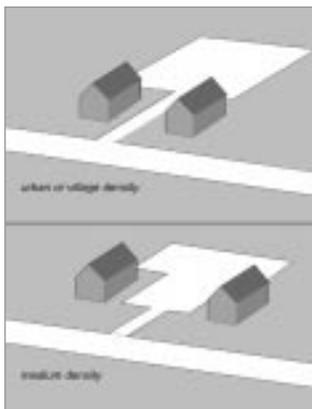
Buildings, parking areas, drives, walkways, and sometimes, lots and streets, are the parts that make up a site. The difference between a poor site plan and an exceptional one is the extent to which these components work together efficiently and in keeping with Vermont's compact settlement patterns. Buildings will enhance community character if they relate to each other and have a direct relationship with the street and the people who use it.

Industrial land uses present special challenges to compact and land efficient development. Market forces and potential future expansion needs may constrain opportunities. Compact industrial development may not be possible in every case. Yet, certain types of industrial uses, and a mix of uses within an industrial zone may offer opportunities for compact and multi-story development. Moreover, tools for improving site plan and design (such as reducing set backs and increasing lot coverage requirements) can improve opportunities for compact development within industrial areas. In addition, allowances for expansions within a zone, rather than for each particular lot may help to address concerns about future expansion needs. Zoning and use requirements in industrial zones should be reviewed to evaluate potential existing regulatory constraints to compact industrial development.

## FOR ALL INTERCHANGE TYPES

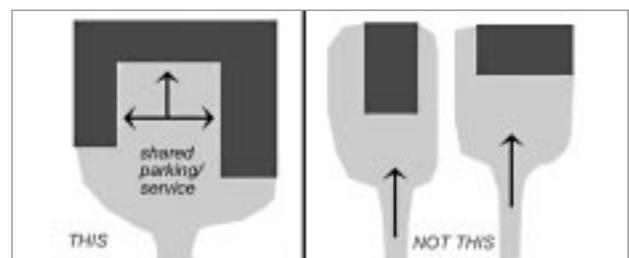
**Use space efficiently.** Maximize available land and open space by siting buildings close together. Set buildings close to the street. Use multi-story buildings wherever use and function permit. Although warehouse and other industrial uses may not lend themselves to multi-story structures, in some cases, the office functions of these uses can be located in a second story portion of the building.

**Locate parking lots to the side or rear of buildings.** Except in cases where full vehicular access is demanded (e.g. public safety, highway maintenance and other vehicular facilities) parking and service areas should not be located in front of buildings. Front yard parking creates a barrier between buildings and the street and allows the view of cars to dominate. Rear parking lots can provide loading and circulation space. Side parking lots are visible from the street but do not visually take over the streetscape if they don't extend beyond the front line of the building



In village settings, make lots narrow with parking in the rear. In less dense locations, parking can be to the side. Do not allow parking lots to extend beyond the front wall of the building.

**Minimize paved surfaces.** Provide adequate but not excessive parking. Locate driveways and lots between buildings to create shared parking facilities. Where adjoining parcels are not held in single ownership and development is incremental, rights-of-way and/or reciprocal easements can be required and reserved through local site plan or conditional use review in zoning regulations.



To make more out of less paving, buildings can be grouped around a shared parking and loading area as in this example where one lot serves 4 or 5 businesses (above, left).

**Preserve scenic views,** especially views seen from the interstate by placing buildings away from sight lines.

## FOR VILLAGE/DOWNTOWNS, NEW GROWTH CENTERS, AND REGIONAL STRIPS

**Replicate the traditional patterns of the surrounding settlements.** Make development fit the existing fabric, especially in places where new structures will be seen from the interstate.



THIS

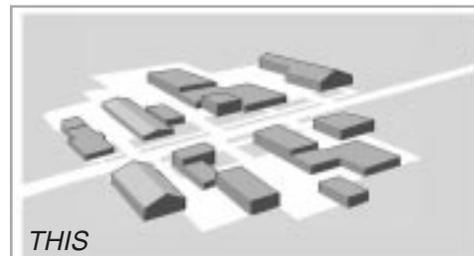


NOT THIS

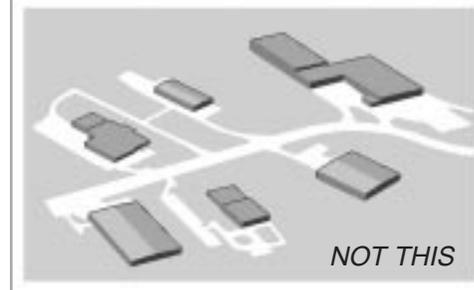
A traditional pattern consists of tight groupings of buildings set close to existing structures (left). This arrangement fits the context of the existing village as well as protects views from the interstate.

**Relate buildings to the street.** Place buildings close together along a street, preferably with the narrow end facing the street. This may be possible for large industrial buildings as well as smaller multi-story retail and office uses. This layout will make it possible to share parking and driveways. It will also create an environment that is the appropriate scale for pedestrian circulation

**Line streets with sidewalks.** Build safe, comfortable connections between buildings and between parking lots and building entrances.

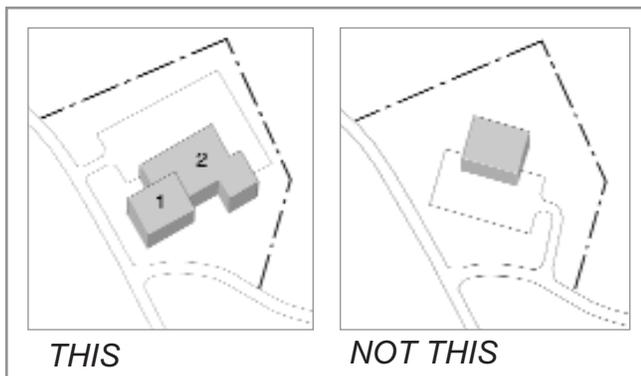


THIS



NOT THIS

Build to the street, close together, so that walking is possible.



THIS

NOT THIS

If a building is sited on the edge of the lot (left, 1) it leaves room for a future addition (2) as well as an expanded parking area. Buildings placed in the middle of a parcel (right) leave fewer options for future expansion.

**Anticipate future growth needs.** Plan the site in a way that enables future expansion without the acquisition of additional land. Consider how to make the most of parcels and growth areas, not just today but in the future. Build in a way that allows for density and for the continuation of a compact pattern. Some communities may choose to build-out a growth center to its fullest potential. Consideration should be given to the future growth needs of the entire area, rather than for each individual parcel, in order to accommodate future growth or expansion while maintaining a compact pattern.

## FOR CONNECTOR ROADS AND RURAL SETTINGS

**Replicate agricultural patterns.** As with traditional farm buildings, arrange structures in formal groupings, close together and at right angles



These maintenance sheds, seen from I-91, are close together and aligned at right angles. They fit the context of their surroundings by replicating the pattern of agricultural out buildings.

**Group traveler services together.** Share parking facilities and connect buildings with sidewalks. Place drive-through facilities at the rear of the property to minimize pedestrian conflicts and visual impact

**Protect the working landscape.** Develop strategies to facilitate/ensure maintenance of the working landscape, agricultural lands, community gardens, farming, etc.

## BUILDING DESIGN

The exterior appearance of buildings is important because intentionally or not, buildings communicate a community's values and help define its uniqueness. Well-designed building exteriors also help orient people, providing focal points and visual cues about the location of public and private spaces. Well-articulated public entrances are one such example. The way each building relates to other buildings is also important because the groupings of buildings, such as those around a green, define the outdoor spaces we inhabit.

### FOR ALL INTERCHANGE TYPES

**Design unique buildings that fit the context.** With the exception of the most utilitarian functions that are well screened from view, buildings should be designed to fit the character of the site. Avoid generic and franchise prototype designs, particularly designs that do not fit the local context. In general, a new building should be remarkable more for its quality of design than for its commercial associations.

**Use local materials whenever possible that are of high quality, durable, and provide visual interest.**

**Wood** is the most predominant material for both structure and finishes in Vermont. An economical alternative with a similar appearance is cement fiberboard. Corners, window casings, and other edges should be carefully constructed. Consider using wood trim in combination with fiberboard siding.

**Brick veneer** is a worthwhile investment both for low maintenance and for resale value. Cornices are perhaps the most important detail for visual impact, although the connection between the foundation and first floor is also critical.

**Metals** such as corrugated sheet metal, standing seam metal roofs, and even flat sheets, are well established in Vermont. Many buildings, whether residential, industrial, or even civic, have metal roofs. The initial investment of metal roofs pays off in low maintenance, low snow loads, and even discounts in fire/hazard insurance.

**Make buildings energy efficient.** All structures are subject to Vermont's energy codes and must meet certain standards for windows, insulation, and ventilation.<sup>13</sup>

### FOR VILLAGE/DOWNTOWNS, NEW GROWTH CENTERS, AND REGIONAL STRIPS

Look to Vermont's downtowns and villages as models for architectural design. At the heart of this form is the capacity to increase density over time. Forms that allow future infill development will not only fit the Vermont context but will provide future options for economic development.

**Building Orientation.** A traditional village building pattern is to orient buildings gable-end to street, making a somewhat narrow building that runs deep into the lot.

**Address the street.** Sometimes the front of the building faces the street, but quite often the front faces parking on the side facade. In either case, the street facade is a formal

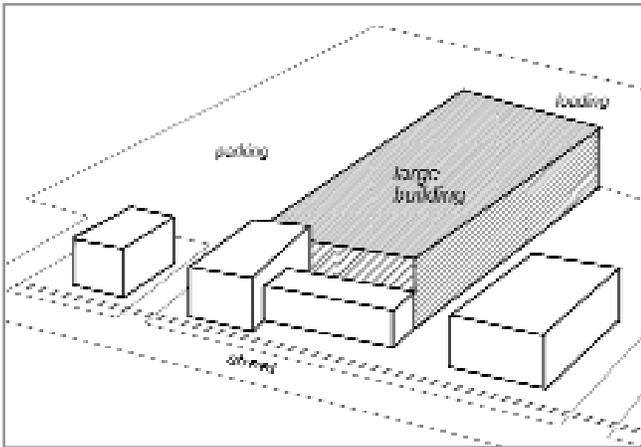


Building facades that face the street should be more formal, or highly articulated, than side and rear facades. Formality can be achieved through architectural details such as exterior ornament that casts shadows (left), generous and sometimes symmetrical windows (middle), and protected entranceways (left, right).

gesture. Formality is implied through details such as:

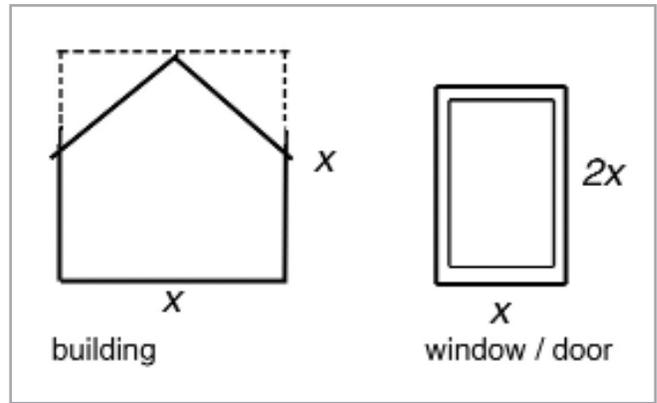
- ¥ a higher level of exterior ornament;
- ¥ more shadows created by this ornament;
- ¥ generous windows; and
- ¥ covered entrances.

**Massing.** Large buildings ought to be designed to reduce their bulky appearance. Add box-like volumes on to the rear of village scale buildings.



Large buildings can fit a compact setting by extending the large volume to the rear of a smaller scale structure. Truck access and loading can occur in a large rear service lot. Source: S. Vitzthum.

**Use traditional proportions to create buildings that have a village scale.** In a compact growth setting where a village or downtown is the model, houses, inns, churches, town halls, and other such models should be examined. Modern buildings can be built to this model, by breaking them down into smaller-sized elements and linking them together.



Many old buildings have a height equal to their width (proportion of 1:1) with roof pitches anywhere from 9:12 to 12:12. Windows have a proportion of 1:2. Source: S. Vitzthum

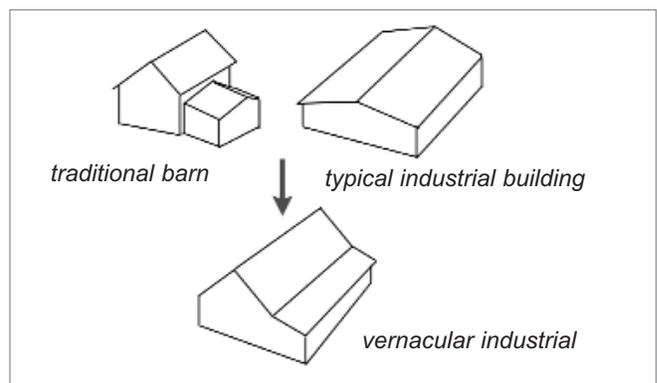


Modern buildings can be large but maintain a human scale by breaking their mass into smaller components designed to traditional proportions (gables, windows and doors).

## FOR CONNECTOR ROADS AND RURAL SETTINGS

Agricultural or transportation-related buildings can provide a model for new buildings in a rural setting.

**Massing.** In a farm/rural setting, the barn or mill is a possible model. Modern equivalents might be warehouses or transfer stations, rural rest stops/filling stations, or sheds. When building to this model, the many barns, sheds, mills and other industrial structures of Vermont should be studied. Modern development requires spans wider than those of traditional models, but large footprints can be achieved by attaching sheds. This technique also gives the building an organic quality. Use gabled roofs where possible. If one is building a modern structure, consider breaking down a large, square plan to a main portion under a gabled roof with attached sheds.



Rural industrial buildings can better their setting by adjusting the roof pitches to replicate the massing of Vermont barns. Source: S. Vitzthum.



**Color.** In rural settings, dark and muted colors can help large buildings blend into their surroundings. Avoid white and light colors on structures that have not been designed to a high standard, especially when trees or topography cannot provide adequate screening.

White and other light colors make masses appear larger. The white siding on these storage lockers makes them visually jump forward, while the dark building behind them appears less dominant despite its larger size.

## LIGHTING

Well-designed exterior lighting provides necessary illumination at night while reducing light pollution. Light pollution involves both glare and sky glow. Glare is caused when a light source is unshielded or when a bright light is introduced into an otherwise dark setting. Glare can temporarily impair vision — a safety hazard at worst and a nuisance at best. Sky glow, the reflection of light in the night sky, reduces the ability to see stars and other features of the night sky. This is of concern not only for astronomers but also for those seeking to protect the rural qualities of their community. Many Vermont interchanges are located in rural settings where the surrounding countryside is dark at night. In this environment, even low-level lighting will be a conspicuous addition to the night landscape. In urban areas, light pollution is a common problem that can be minimized with careful design of new development. Limit illumination to the lowest level needed to create an inviting nighttime environment. The nighttime visibility of a given site from the interstate will depend on its light levels, the size of the area illuminated, and the total amount of light power used. Screening and orientation on the landscape may mitigate the direct visibility of light fixtures but will not reduce the glow from the developed area. Sky glow can be reduced somewhat by the use of cut-off fixtures and by using minimum light levels.

### FOR ALL INTERCHANGE TYPES

**Avoid over lighting.** Site lighting levels should not exceed the minimums for each use recommended by the Illumination Engineering Society of North America (IESNA) in their current guidelines OR as recommended by the Outdoor Lighting Manual for Vermont Municipalities, whichever is lower. The IES document, RP 33-99 is available as a guide for convenience store and gas station canopy lighting.<sup>14</sup> These references are often used in state regulatory review (Act 250).

**Minimize glare through the use of properly installed and appropriate lighting fixtures.** Fixtures using high wattage lamps (over 70 wt Metal Halide or the equivalent) have the greatest potential to produce glare. These fixtures will enclose or shield the lamp from being directly visible by passersby if they meet the specifications for Full Cut-Off or Cut-Off fixtures as defined by the Illumination Engineering Society of North America (IESNA). Decorative fixtures using low wattage lamps that are not cut-off types could be considered for use if total site illumination remains low.

Disability glare can impair visibility and cause accidents.

Discomfort glare is an annoyance that detracts from the night landscape.



Gas stations should be visible but not overlit. Appropriate lighting such as this, focuses light in the pumping area and doorways where it is needed. Source: Outdoor Lighting Manual for Vermont Municipalities.

### Address security concerns.

Illumination used for surveillance should comply with all the recommendations for normal site lighting such as light level, glare and color rendering. If after hours security is an issue, property owners should consider alarms, motion sensor lights, or both. Lights by themselves do not prevent break-ins but do provide visibility for surveillance by patrols.



Cut-off lamps such as these will eliminate glare in parking areas. Source: Outdoor Lighting Manual for Vermont Municipalities.

### Use appropriate lamp types.

Use lamp (bulb) types that illuminate the color of surrounding objects correctly. Metal halide or compact fluorescents are appropriate. Incandescent lamps can be considered if low wattages are used (50-70wts). High or low-pressure sodium lamps that cast an orange glow should be discouraged. These lamps render green vegetation with a brown/olive cast and connote a harsh setting.

**Discourage illumination of building facades**, especially if the building is a light color. The reflectance of the walls may make the building more prominent and visible from the interstate. Illuminated awnings lit from beneath or above should be used sparingly. Illuminate signs, site and building entries as necessary for safety, rather than as advertising. Consider turning lights out after business hours. Discourage competitive lighting between businesses. Set a common standard through local regulations to prevent business from using lighting to compete for attention.

## SIGNS

Though signs are meant to convey information, too many signs competing for attention create visual clutter that overwhelms the viewer, defeating the purpose of the signs. On a road, visual clutter can become dangerous, as motorists concentrate on deciphering information from the signs instead of on traffic. Signs need not be large or high to convey information. To avoid visual clutter carefully consider the number, placement, height and size of business signs. They should be smaller in villages and growth centers, and scaled to the speed of the road in rural areas.

### FOR ALL INTERCHANGE TYPES

**Place signs in a location that is not visible from interstate travel lanes.** In Vermont, the lack of billboards and the resulting lack of visual clutter from signs along the interstate is a unique feature that both residents and visitors appreciate. On-premises signs that are oriented to travelers on the interstate can also lead to visual clutter, since they need to be large, like billboards, in order to communicate with people at high speeds. For this reason, on-premises signs oriented to the interstate are discouraged in favor of smaller signs oriented to local roads. Information about traveler services needs to be addressed in a variety of other ways.

**Avoid sign clutter** by limiting freestanding signs to one per lot. Exceptions should be made for businesses sharing properties.

**Avoid signs that overwhelm the setting.** Limit the height to 12 feet in villages and growth centers and 16 feet in rural areas where travel speeds are higher. Signs rarely need to be more than 20 square feet in size to be effective.

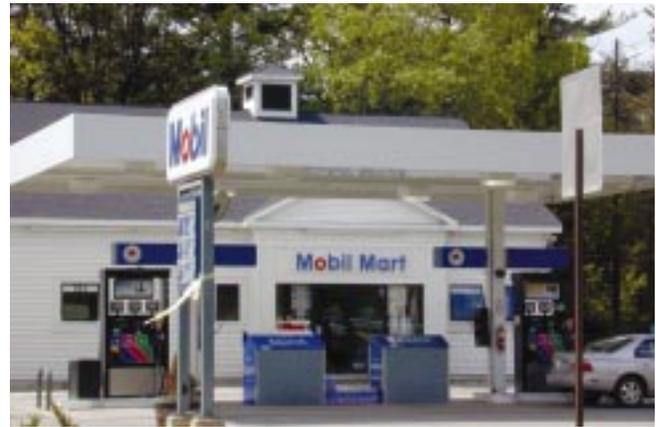


Over-sized signs dwarf the buildings and landscape that surround them.



The sign marking this gas station is large enough to see from the exit ramp yet doesn't overwhelm its immediate setting.

**Avoid using gas station canopies as signage.** Canopies that span pump islands are large, a minimum of 13.5 feet high and as long as 100 feet in some cases, and often dwarf nearby structures. Adding colorful corporate logos makes them even more dominant. Where canopies are appropriate limit the face to solid neutral colors to prevent the structure from visually overwhelming the site.



This gas station canopy serves its purpose, shielding patrons, without dominating the scene. The plain surface of the canopy doesn't hold the eye but allows it to travel down to the doorway of the building.

**Light signs from above.** Shield and direct light downward to prevent it from spilling beyond sign area. Use minimum amount of light to make the sign visible. To reduce glare, avoid internally lit signs, especially those with light-colored backgrounds.

## LANDSCAPING

Landscaping can perform two different design functions defining space and screening. It also provides environmental benefits such as shade and filtering of runoff. Trees, walls, fences, and earth forms can be used to shape outdoor space by providing edges and canopies as well as emphasizing entrances and other important areas. Large trees provide structure to a landscape.

Shrubs and smaller plants furnish it with texture. In addition to blocking undesirable views, trees can be used to filter storm water runoff and create shade.

### *Landscaping and Screening*

There are many commercial and industrial buildings around Vermont's interchanges that travelers never see. This is because state and local land use regulations often require developers to "screen" or plant trees between their buildings and the highway. In locations with existing vegetation this technique works quite well in maintaining a green edge along the road, sustaining the illusion of an intact traditional landscape. Landscaping can play a role in helping a development fit in, softening its visual impact, or even making it disappear. But it has its limitations. When the essence of a scenic view is its very openness no amount of landscaping can mitigate the effects of a building that intrudes on the void. Using landscaping and screening to hide poorly designed and located buildings is generally an unsatisfactory approach. The best practice is to site and design buildings that fit the character of their surroundings, and, more specifically, not site them in visually sensitive locations.

### FOR ALL INTERCHANGE TYPES

**Except in urban or village settings, screen development from view of the Interstate.** Install planting along the line of sight to block or filter views. Screening Techniques:

**Deciduous vegetation** located in the line of sight does not completely block, but filters views, reducing the impact of an incompatible element. Even in winter layers of branches and twigs create a veil across the background element reducing its visual impact. Deciduous trees can be used as focal points, providing visual interest through seasonal variations.

**Dense evergreen plantings** can block the line of site completely, year-round. Evergreens do not always thrive along highways, however. They are generally more vulnerable to road salt (in the form of storm water runoff and salt spray) and highway air pollution. Species near the highway (50 yards for spray) should be selected with this in mind.



In settings where evergreen species do not fit the natural or aesthetic context, deciduous trees can provide an adequate screen. Rather than block a view, deciduous trees filter it enough to veil the effects of intrusive forms.

**Berms.** Although they achieve an immediate screen effect and can buffer noise, if they are not designed well, berms can be an intrusive element. Design the slope and contour of a berm to echo those of the surrounding landscape. The exceptions are earthworks type installations that are intended to be unique forms or berms that are formed against a wall, enclosing a space. If a berm's shape is incompatible with surrounding landform, planting will exaggerate the effect. The sloping sides of berms shed water quickly leaving less for root systems and limit the spread of roots, jeopardizing the long-term viability of large trees and shrubs planted there.

**Walls and fences** can be effective and immediate screens and useful for shaping defining and enclosing a site. Inexpensive, functional fences can be planted with fast growing vines to quickly create a green wall.

**Select plant materials that fit the context of the site.** Unify new and existing landscapes by using species native to the area or similar to neighboring sites, especially in rural settings.

**Avoid invasive exotic plant species.** A growing concern over invasive plants crowding out native species has resulted in an effort by state regulators to develop an advisory list of plant species that should be avoided, especially in rural areas. It is important to note, however, that not all non-native plants are invasive.<sup>15</sup>

**Landscape parking lots.** In large parking lots, transform a sea of asphalt into a sea of foliage by planting trees on landscaped islands. This will create a cooler, more humane space for users of the lot as well as improve the appearance of parking lots from the interstate. Plant large-species shade trees 30-50 feet on center. Design islands to be a minimum of 10 feet wide to provide adequate space for root growth.



Landscaped islands break up the massiveness of large parking lots, provide a permeable surface that absorbs run-off, and offers space for the large trees to thrive and form a shady canopy.



Drivers prefer shaded parking spaces even if they are farther from the building entrance.



A large parking lot can blend unobtrusively into its surroundings when planted with closely-spaced shade trees.



Tree-lined gateway to Brattleboro, I-91, Exit 2.

**Create a gateway with trees.** Trees planted in rows along a thoroughfare provide a ceiling or canopy over the road and create animated patterns of light and shadow. The effect is one of a green tunnel, which forms a strong transition between two areas. Tree-lined roads, once common in Vermont, can provide a common gateway element at the transition between the interstate and local communities. On state highways regulations for planting in the right-of-way along roadways approaching interchanges will vary depending on the VTrans classification of the roadway, the speed limit, and the topography along the shoulder. If speed limits are low and curbs are in place, plantings such as street trees can be installed as close as 3 feet behind the curb. Uncurbed shoulder and planting setbacks may be 12 feet or more.<sup>16</sup>

## FOR CONNECTOR ROADS AND RURAL SETTINGS

**Screen development from view of the interstate.** See p.36.

**Use native plant types that relate to the surrounding vegetation.** A mixed deciduous hedgerow will create a more inter-

esting year-round planting than a monoculture evergreen buffer. Species that are indigenous to the area will have a higher chance of survival and help unify new and existing landscapes.



# ENDNOTES

1. Kevin O Conner, *A Vermont Century: Photographs and Essays from the Green Mountain State*, Dick Van Susteren, ed., Rutland Herald, Barre-Montpelier Times Argus, 1999, p.135.
2. For example, the *Vermont State Comprehensive Outdoor Recreation Plan* (SCORP) identifies scenic highways as a valuable public resource. And, in Edwin and Avis Smith #6F0391-EB, the Vermont Environmental Board considered the visual impact of a subdivision along I-89 in Franklin County and concluded that, The Board has consistently emphasized the importance of protecting the scenic views along the Interstate corridor. See, e.g., Re: Heritage Group Inc., Findings of Fact and Conclusions of law #4C0730-EB (March 27, 1989; Ammex Warehouse Company, Inc. and Use Permit #6F0248-EB (August 3, 1981). P. 6.
3. These plans have chiefly been funded through the Vermont Community Development Program and the Municipal Planning Grant program.
4. Conservation of land near interchanges has occurred in Colchester, Hartland and Springfield. Richmond is also pursuing a scenic conservation easement near the interchange.
5. Regional planning commissions and private consultants may work with municipalities to development interchange area plans. For example, in 2000 the Upper Valley Lake Sunapee Regional Planning Commission conducted an initial analysis of land use issues within each of the region s interstate exits. The intent of this study was to assist communities to assess and document issues associated with interchange development (constraints, plans, regulations) and to establish a regional database of development trends at interchange sites as a resource for local planning. Regional Planning Commissions and private planning consultants may work with municipalities to develop interchange area plans.
6. More information about transit-oriented design is included in the Chittenden County Regional Planning Commission s *Transit-Oriented Design (TOD) for Chittenden County*, First Edition , March 2002, available on-line at [www.ccrpcvt.org](http://www.ccrpcvt.org).
7. State funding sources for the purchase of land or conservation easements include Enhancement and Scenic Byways Program Funds, administered through the Agency of Transportation, and the Vermont Housing & Conservation Trust Fund, administered by the Vermont Housing & Conservation Board (VHCB). Many conservation projects in interchange areas, however, do not rank highly under existing VHCB program and funding criteria. It is recommended that a separate funding category and allocation specific to conservation projects within interchange areas be established.
8. A state agency referral provision under Chapter 117 [4409(c)(6)] requires that, for any proposed development within 500 feet of an entrance or exit ramp to a limited access highway, a municipality must submit a copy of the application to the Vermont Agency of Transportation for review and comment prior to the issuance of a zoning permit.
9. Access management recommendations were taken from the *Northwest Regional Planning Commission Access Management Guidebook* by Elizabeth Humstone and Julie Campoli, 1997.
10. Vermont Agency of Transportation, *Access Management Program Guidelines* (Nov., 2001), p.29. These are distances that would allow a driver traveling at the design or posted speed to see traffic emerging from intersecting driveways and stop if necessary.
11. *Streambank and Lakeshore Vegetation Management Procedure*, Agency of Natural Resources (6/96); *Vermont Wetland Rules*, Water Resources Board, (1/02).
12. Volume I specifies the technical standards and Volume II presents the supporting information. Contact the Agency of Natural Resources Water Quality Division for the status of the current law on which development must receive a permit and/or other current best practices manuals or regulations that prevail in your watershed area.
13. Efficiency Vermont can provide additional information on energy efficient measures, (800)860-4095.
14. This document, titled *Lighting for Exterior Environments*, is periodically updated, the current available is Number RP-33-99. Available at [http://www.techstreet.com/cgi-bin/detail?product\\_id=224967](http://www.techstreet.com/cgi-bin/detail?product_id=224967).
15. A list of invasive plants and weeds can be obtained from the Vermont Department of Environmental Conservation, (802)241-3770. Also available from the same office is *Planting Sustainable Landscapes – A Guide for Plan Reviewers* available from the Vermont Urban& Community Forestry Program (802)241-3678. This publication includes a brief list of potentially invasive species of street trees.
16. Further detail is available in *Landscape Guide for Vermont Roadways and Transportation Facilities* available from the Vermont Urban& Community Forestry Program, (802)241-3678.



# Appendix

---

Although not all sources listed below are specific to highway interchange areas, several contain detailed information on how to achieve good planning and design.

Babize, Mollie and Cudnohufsky. *Designing Your Corner of Vermont: Protecting Your Property Investment Through Good Site Design*, Vermont Council on the Arts, 1991.

*Community Rules: A New England Guide to Smart Growth Strategies*. Conservation Law Foundation and Vermont Forum on Sprawl, 2002.

Context Sensitive Design: Thinking Beyond the Pavement. Federal Highway Administration, 2002. [www.fhwa.dot.gov/csd/](http://www.fhwa.dot.gov/csd/).

Creighton, James. *Involving Citizens in Community Decision Making: A Guidebook*. Program for Community Problem Solving, Washington DC. (202)783-2961.

*Dealing with Change in the Connecticut River Valley: A Design Manual for Conservation and Development*. Lincoln Institute of Land Policy, 1988.

Fleming, Ronald Lee. *Saving Face: How Corporate Franchise Design Can Respect Community Identity*, Planning Advisory Service Report Number 452, American Planning Association, 1994.

*Fort Collins Design Manual: Examples and Explanations of Fort Collins Land Use Code Standards*, May 2000. [www.ci.fortcollins.co.us/advanceplanning/documents.php](http://www.ci.fortcollins.co.us/advanceplanning/documents.php)

*Growing Smarter: Best Site Planning for Residential, Commercial & Industrial Development*, Vermont Forum on Sprawl, March, 2001.

*Growth Centers In Vermont*. A Report by the Vermont Planners Association, 1999.

Humstone, Elizabeth, and Campoli, Julie. *Northwest Regional Planning Commission Access Management Guidebook*, 1997.

*The Interchange Planning and Management Handbook*. Interstate 81 Corridor Council. 1991. Published by the Interstate-81 Corridor Council, in cooperation with the Virginia Polytechnic Institute. Roanoke, Virginia, July, 1991.

Kindsehi, Thomas K., ASLA and Charles W. Causier, AICP. *Preserving Endangered Rural Character*, 1999 American Planning Association Conference Proceedings, 1999. [www.asu.edu/caed/proceedings99/](http://www.asu.edu/caed/proceedings99/).

*Landscape Guide for Vermont Roadways and Transportation Facilities*, Vermont Urban & Community Forestry Program. (802)241-3678.

*Lighting for Exterior Environments*, Illuminating Engineering Society of North America. This document is periodically updated, the current edition available is Number RP 33-99. [http://www.techstreet.com/cgi-bin/detail?product\\_id=224967](http://www.techstreet.com/cgi-bin/detail?product_id=224967).

Matheny, Nelda and Clark, James. *Trees and Development: A Technical Guide to Preservation of Trees During Land Development*, 1998. Available from the International Society of Arboriculture.

*Planning Manual for Vermont Municipalities*. Vermont Department of Housing and Community Affairs, 2000.

*Planting Sustainable Landscapes – A Guide for Plan Reviewers*, Vermont Urban & Community Forestry Program. (802)241-3678.

Rhees, Suzanne Sutro, AICP. 1993. *Zoning the Interchange*. *Zoning News*, American Planning Association, December, 1993.

Ryan, Kathleen and Munson, Michael. *Outdoor Lighting Manual for Vermont Municipalities*, Chittenden County Regional Planning Commission, 1996.

*Vermont Agency of Transportation Access Management Program Guidelines*, Nov., 2001.

*Vermont's Scenic Landscapes: A Guide for Growth and Protection*. Vermont Agency of Natural Resources, 1991.

*Vision 2020—Living with I-99: Final Land Use & Sustainability Plan and Strategies Handbook*. ClearWater Conservancy. 2001. [www.clearwaterconservancy.org](http://www.clearwaterconservancy.org).



## State-wide Organizations

Preservation Trust of Vermont  
104 Church St.  
Burlington, VT 05401  
(802)658-6647

Vermont Department of Housing and Community Affairs  
National Life Building  
Montpelier, Vermont 05620  
(802)828-3211  
<http://www.dhca.state.vt.us/>

Vermont Forum on Sprawl  
110 Main St.  
Burlington, VT 056401  
(802)864-6310  
[www.vtsprawl.org](http://www.vtsprawl.org)

Vermont Housing and Conservation Board  
136 Main St.  
Montpelier, VT 05602  
(802)828-3250

Vermont Land Trust  
8 Bailey Ave.  
Montpelier, VT 05602  
(802)223-5234  
[www.vlt.org](http://www.vlt.org)

Vermont Planners Association  
Growth Center Committee  
c/o VT League of Cities and Towns  
89 Main St., Suite 4  
Montpelier, VT 05602-2948  
(802)229-9111 or (800)649-7915  
[www.vermontplanners.org](http://www.vermontplanners.org)

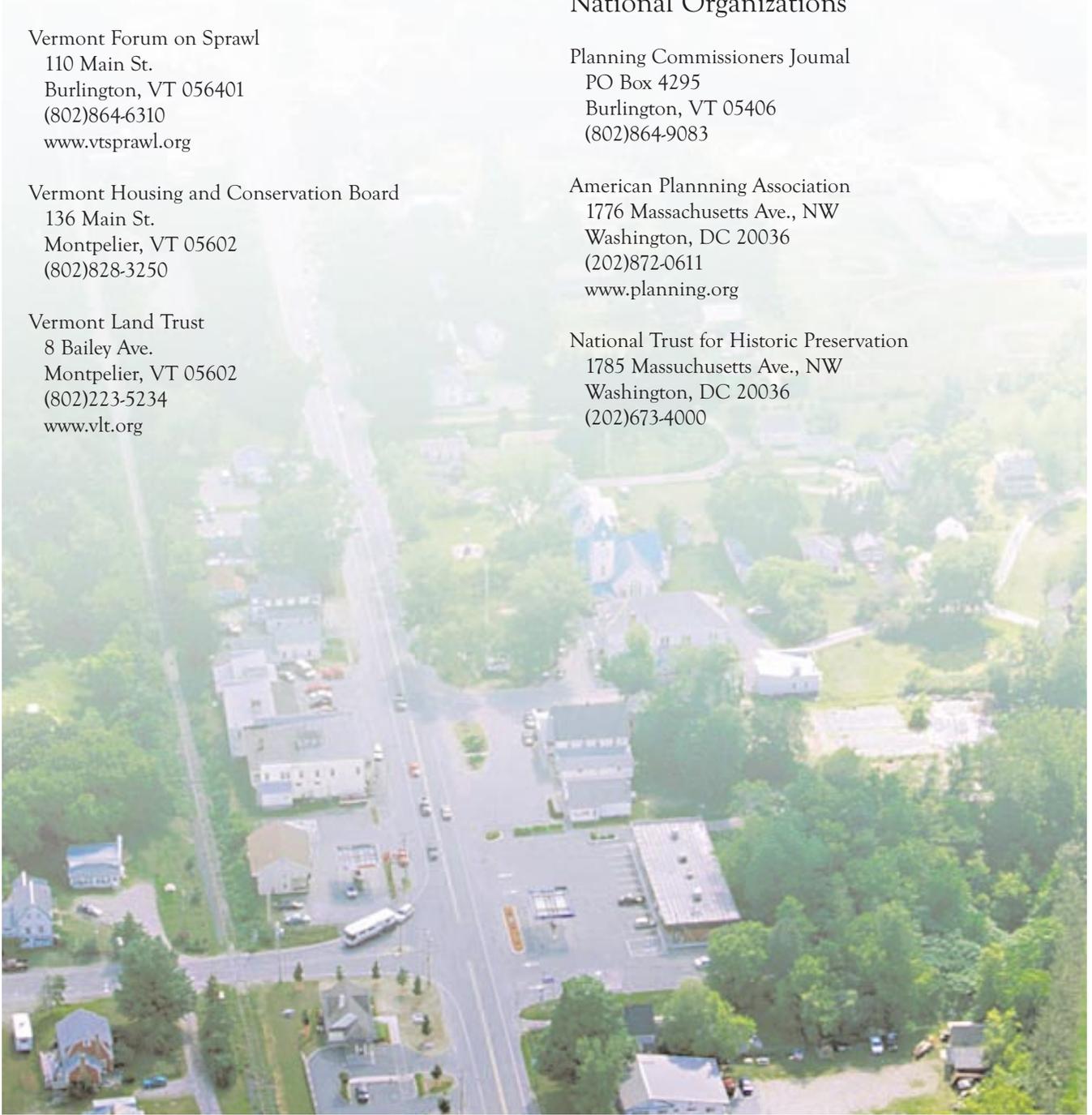
Vermont Planning Information Center  
[www.vpic.info](http://www.vpic.info)

## National Organizations

Planning Commissioners Journal  
PO Box 4295  
Burlington, VT 05406  
(802)864-9083

American Planning Association  
1776 Massachusetts Ave., NW  
Washington, DC 20036  
(202)872-0611  
[www.planning.org](http://www.planning.org)

National Trust for Historic Preservation  
1785 Massachusetts Ave., NW  
Washington, DC 20036  
(202)673-4000



Vermont  
Department of  
Housing and  
Community Affairs

National Life  
Building  
6th Floor  
Drawer 20

Montpelier, VT  
05620

(802) 828-3211  
(800) 622-4553

[http://www.dhca.  
state.vt.us/](http://www.dhca.state.vt.us/)

