

# **EXECUTIVE SUMMARY**

## **ES-1 Introduction**

The Vermont Agency of Transportation (VTrans), in cooperation with the Federal Highway Administration (FHWA), is proposing improvements to the transportation system to, from and within an area known as the Circ-Williston project area from Interstate Route I-89 to the Towns of Williston and Essex and the Village of Essex Junction in Chittenden County, Vermont. The project area is shown in Figure ES-1-1.

This Executive Summary contains the following sections:

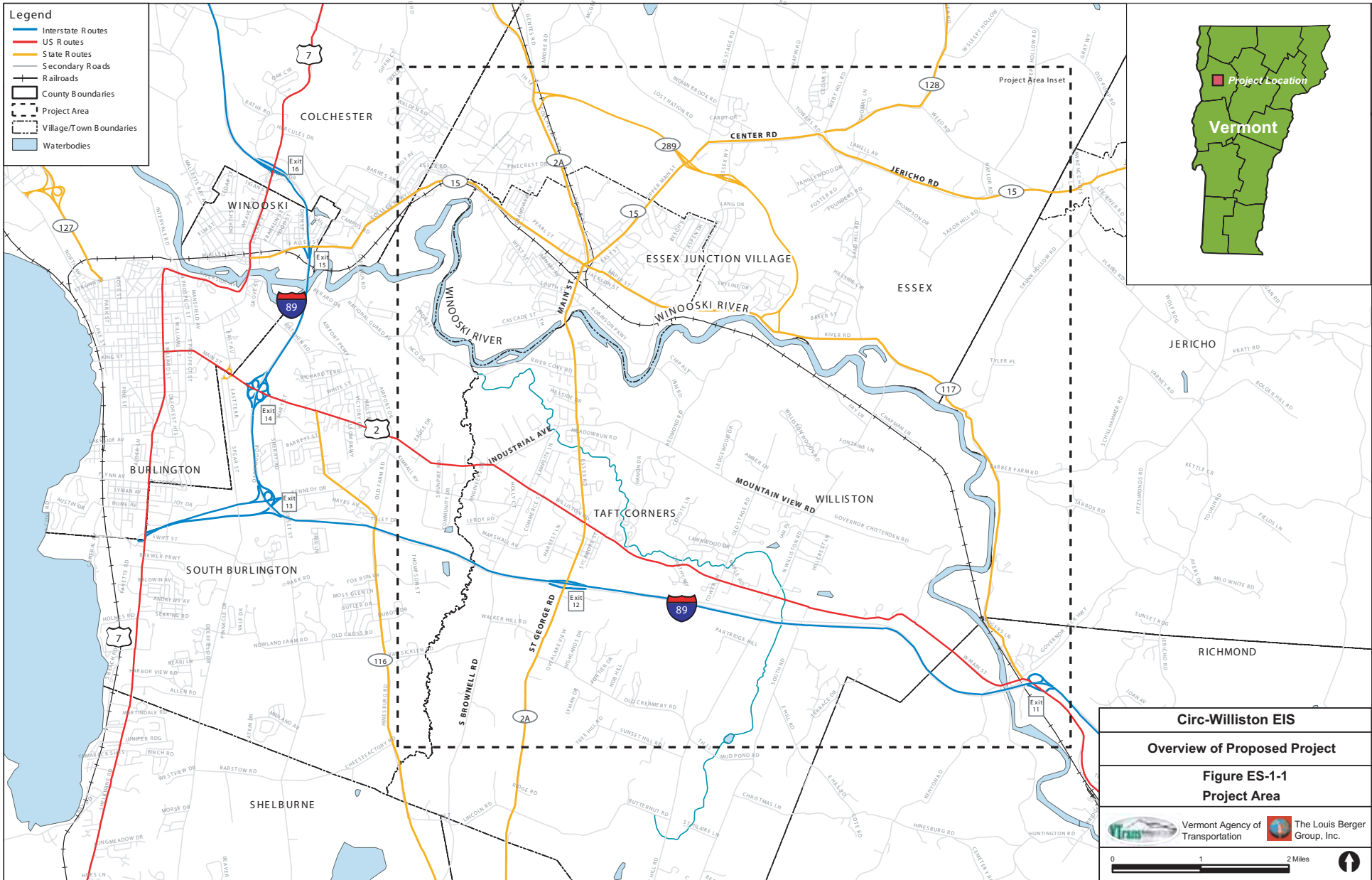
- § An overview of the history of the project (ES-2);
- § The purpose and need for the project (ES-3);
- § Description of the alternatives screening process and the alternatives evaluated in the EIS (ES-4);
- § Description of the Preferred Alternative (ES-5);
- § The transportation performance of the alternatives (ES-6)
- § The environmental impacts and mitigation associated with the alternatives (ES-7); and
- § The federal and state permits required to advance the Preferred Alternative (ES-8).

## **ES-2 Project History**

### **ES-2.1 Previous Studies**

Numerous studies and plans for improving transportation in the project area have been undertaken at various levels of government since the late 1950s. These studies resulted in plans for a limited access circumferential highway from VT 127 in Colchester through Essex, and around Essex Junction and the Five Corners intersection (VT 2A-VT 15-VT 117) to I-89 in Williston. Local municipalities began making provisions for a circumferential highway in their comprehensive plans beginning in 1967. In 1975, the Chittenden County Regional Planning Commission (CCRPC) adopted a Regional Plan with the circumferential highway as a major objective of the Plan's transportation component. The project was called the Chittenden County Circumferential Highway Project (CCCH), and consisted of a 16-mile limited access facility located in the towns of Williston, Essex and Colchester.

Funding for the CCCH was secured through a Demonstration Grant from the 1982 Surface Transportation Act. A Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) were completed in 1986. Subsequently, federal funds were used to construct four of the 16 miles in Essex, between VT 117 east of Essex Junction and VT 2A and Susie Wilson Road north of Essex Junction. This section of two-way roadway opened to traffic as VT 289 in 1993.



Source: Draft 2025 Chittenden County Metropolitan Transportation Plan, CCMP.

In 1999, VTrans completed a reevaluation of CCCH Segments A-B (I-89 in Williston to VT 117 in Essex) and determined that a supplemental environmental impact statement was not needed. In 2002, Executive Order 13274: Environmental Stewardship and Transportation Infrastructure Project Reviews named the Chittenden County Circumferential Highway as a high-priority project, requiring federal agencies to “expedite their reviews for relevant permits or other approvals” for the project to the maximum extent practicable and allowed by law. Since the Demonstration Grant project funds were insufficient to complete the CCCH, FHWA proposed using additional federal-aid highway funds to complete the project. FHWA adopted the 1986 FEIS in 2002 and decided to undertake a more comprehensive reevaluation of Segments A-F that incorporated a public involvement component. After extensive additional study, VTrans and FHWA issued an Environmental Assessment (EA)/Reevaluation on August 9, 2002. Working closely with the EPA, VTrans and FHWA undertook additional environmental studies, resulting in a second EA/Reevaluation in 2003. The final revised reevaluation (FREA) and Record of Decision were issued in 2003 indicating that the construction of Segments A-F would not result in any significant impacts not previously evaluated in the 1986 FEIS. The CCCH segments are illustrated in Figure 1.4-1.

### **ES-2.2 Court Decision and Current EIS Process**

In 2004, the Vermont Public Interest Research Group, Friends of the Earth, Sierra Club, the Conservation Law Foundation and two individuals sued FHWA and VTrans for not fully complying with NEPA. On May 10, 2004, the U.S. District Court of Vermont granted an injunction barring the construction of Segments A-B.

On October 8, 2004 the Vermont Secretary of Transportation announced that VTrans was beginning a new environmental study and Environmental Impact Statement that would consider CCCH Segments A-B as well as other transportation alternatives in the Williston, Essex and Essex Junction area. The Notice of Intent for this EIS was published in the Federal Register by FHWA on November 26, 2004. During the development of the Draft Environmental Impact Statement (DEIS), six public meetings/workshops were held as part of scoping, alternatives screening, and to present preliminary results from the DEIS studies. Each of the public meetings was held in two to three separate locations to facilitate public participation throughout Chittenden County. In addition, four public technical workshops were held as part of the development of the methodology for assessing indirect effects and cumulative impacts.

A Cooperative Agreement between FHWA, VTrans and 11 state and federal resource agencies was entered into in May, 2005. The purpose of this agreement was to ensure a commitment from these cooperating resource agencies to work in a cooperative manner; to affirm the roles of the resource agencies to provide meaningful input into the EIS process; to collaboratively develop information and evaluate transportation alternatives, mitigation, and enhancement; and to establish a framework for resolving disagreements among agencies. Approximately 20 interagency meetings were held to allow representatives of state and federal resource agencies to provide feedback on the scope of work and results of the environmental technical studies conducted for the DEIS.

The Notice of Availability for the Circ-Williston Transportation Project DEIS was published in the Federal Register on August 10, 2007. The DEIS was distributed to the project mailing list by CD-ROM, posted on the project website and made available at local libraries. CD-ROMs containing the DEIS were mailed on request at no charge.

Public hearings on the DEIS/Section 404 Permit Application were held on October 16, 2007 in Essex Junction and Williston. In total, at least 110 individuals attended the public hearings. Over 40 individuals commented for the record during public hearings and some individuals commented multiple times. The public comment period was extended to November 21, 2007, bringing the total duration of the comment period to 110 days. Over 300 comments on the DEIS were received through postal mail, faxes, email and through the project website. The public and agency comments and corresponding responses from VTrans and FHWA are provided in FEIS Appendix Q: *Comment Response Document*.

Several additional studies have been undertaken since the publication of the DEIS. Some of these studies were conducted in response to specific comments on the DEIS (e.g. suggestions of additional alternatives), while others were conducted for permitting purposes (e.g. wetland mitigation site search). Throughout the development of these additional studies, VTrans and FHWA have continued a robust program of outreach and consultation with resource agencies. Between the publication of the DEIS and this FEIS, 18 interagency meetings have been held (including field visits to the Circ A/B corridor and reviews of potential wetland mitigation sites). A complete summary of the additional studies conducted since the DEIS is provided in Section 1.4.2.

On July 6, 2010, the U.S. Army Corps of Engineers (ACOE) identified the Preferred Alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA) under the Clean Water Act Section 404 (b)(1) Guidelines (40 CFR 230). A copy of the letter containing the LEDPA decision is provided in FEIS Appendix S: *Public Involvement and Agency Coordination Addendum*.

Note that no significant new information or circumstances have been identified that would require the preparation of a Supplemental Environmental Impact Statement (SEIS), see Section 1.4.2 and Table 1-1.

## **ES-3 Project Purpose and Need**

### **ES-3.1 Project Purpose**

The purpose of the Circ-Williston Transportation Project is to improve access to, from, and within the project area and remedy existing and projected deficiencies including congestion, safety, and mobility issues (including movement of both people and goods). The transportation deficiencies the proposed project is intended to address are described in Section ES-3.2, below.

### **ES-3.2 Project Area Transportation Deficiencies**

Population and employment in the project area have grown rapidly in the past three decades. This growth has led to corresponding increases in automobile and truck travel and traffic congestion. Chittenden County has been the fastest growing county in Vermont, adding 48,000 persons and 70,000 jobs between 1970 and 2000. Population and employment growth has dispersed beyond the traditional urban core of Burlington, South Burlington, and Winooski. Williston was the fastest growing municipality in Chittenden County between 1990 and 2000, growing from 4,900 to 7,700 residents and 4,600 to 9,700 jobs.

The project area is expected to continue to be one of the fastest growing areas in Chittenden County over the next 20 years. Williston is expected to add over 2,900 residents and 10,500 jobs between 2000 and 2030. A large portion of the growth expected in Williston is planned for a high density zoning district at Taft Corners (VT 2A and US 2). Future population and employment growth will exacerbate existing transportation systems deficiencies, creating unacceptable levels of congestion, safety problems, and reduced mobility of people and goods.

The summaries of congestion and safety issues below are focused on the VT 2A corridor as one of the most congested areas in the project area. However, congestion and safety issues throughout the project area were considered as part of the EIS process and documented in the transportation analyses.

### **Congestion**

Four of the major signalized intersections along VT 2A will have an unacceptable level of service (LOS) F in the 2030 No Build condition.

- § Industrial Avenue/Mountain View Road in the AM and PM peak hours.
- § South Street/River Street in the AM peak hour.
- § Marshall Avenue/Maple Tree Place in the PM peak hour.
- § Five Corners in the AM and PM peak hours.

In addition, several roadway segments of VT 2A will experience severe congestion. Because of these congested conditions on VT 2A, many drivers will seek other, parallel routes. The nearest alternate route to VT 2A that provides a crossing of the Winooski River in the project area is North Williston Road, a collector route through a rural/residential area of Williston. Traffic volumes and congestion are expected to increase substantially on North Williston Road, inconsistent with its functional classification and roadway design.

### **Safety**

The majority of VT 2A roadway segments and intersections, including Marshall Avenue/Maple Tree Place, Industrial Avenue/Mountain View Road, and Five Corners are designated by VTrans as high crash locations because they exceed the statewide average crash rates. As traffic volumes increase on VT 2A, the number of accidents occurring in these locations is expected to continue to increase. VT 2A serves both as an arterial for north-south travel between Williston, Essex and Essex Junction, and as a collector for numerous business and residential access. The existing layout of VT 2A has many side streets and commercial and private driveways with little opportunity for access management. For example, there are approximately 60 businesses and households with direct access to VT 2A, and an additional 15 minor streets leading to residential subdivisions between I-89 and the Winooski River in Williston. Local residents have noted that it is becoming increasingly difficult to find a safe gap in the VT 2A traffic flow for vehicles coming from the side streets and driveways along the corridor.

## **Movement of People and Goods**

Future growth and traffic congestion will reduce the mobility of people and goods to, from, and within in the project area. For example, the duration of the average trip from Williston to Essex will increase by 6 minutes between 2005 and 2030, from 21 minutes to 27 minutes during the PM peak hour. Increased travel times will result in increased costs for individuals and businesses, as a result of lost time and fuel consumption.

## **ES-4 Alternatives Considered**

### **ES-4.1 Alternatives Screening**

Beginning with the scoping phase of the EIS process, numerous transportation alternatives were suggested by the public and other agencies for consideration. Alternatives screening was conducted to narrow the range of possible alternatives to those that potentially meet the project purpose and need, therefore warranting a more detailed analysis of transportation benefits and environmental impacts. Figure ES-4-1 illustrates the major steps in the alternatives screening process.

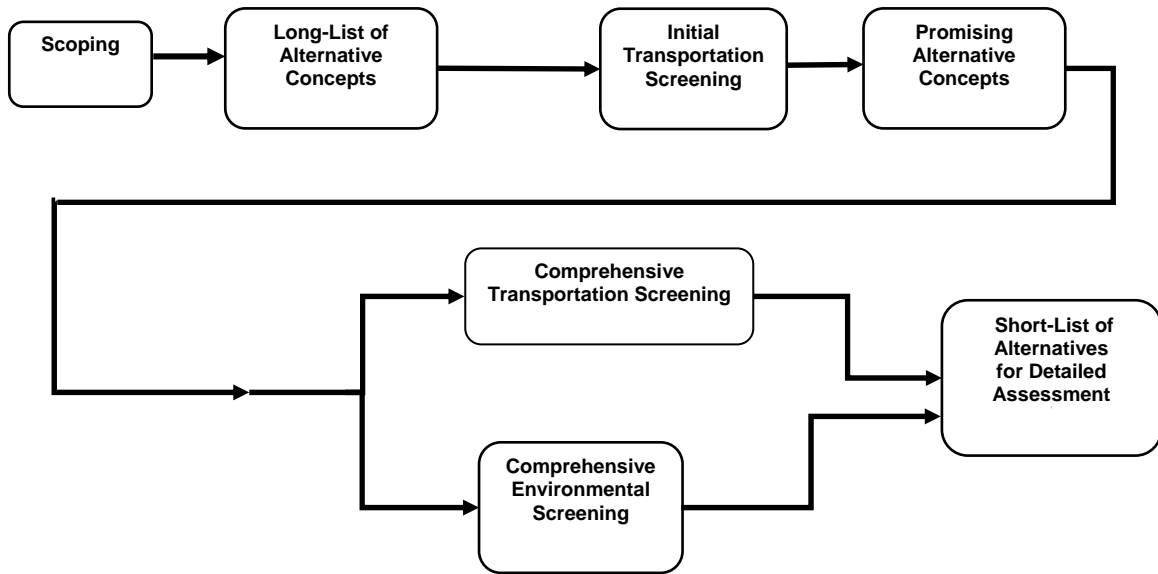
An initial “long list” of 68 alternative transportation concepts was created based on public and agency suggestions received during interviews and open houses during scoping. These 68 concepts were organized into six general categories:

- § Transportation Demand Management
- § Public Transportation
- § Pedestrian/Bicycle
- § Freight Movement
- § Improvement of Existing Roadways, and
- § Construction of New Roadways.

Initial transportation screening used an intuitive process to evaluate the likelihood of each concept to relieve congestion on VT 2A, improve mobility between Williston and Essex and improve safety on VT 2A. Concepts that could potentially meet the project objectives and purpose and need were refined and combined, with public input, to create 23 alternatives for quantitative comprehensive screening, taking into account transportation and environmental considerations. The 23 alternatives subject to comprehensive screening included public transportation/transportation demand management improvements, improvements to existing roadways, and new roadways. Finally, the results of the comprehensive transportation and environmental screening were used to select the “short-list” of Build Alternatives subject to detailed analysis in the EIS. The federal and state resource agencies concurred with the short-list of alternatives for analysis in the EIS at the U.S. Army Corps of Engineers (ACOE) Phase I Workshop held on October 18, 2005.

Refer to Chapter 3 for detailed information regarding the alternatives screening process, including descriptions of each alternative considered, transportation and environmental screening metrics and the rationale for the elimination of specific alternatives.

**Figure ES-4-1  
Circ-Williston Alternatives Screening Process**



**ES-4.2 Description of Alternatives Evaluated in the EIS**

This section describes the No Build Alternative and the ten Build Alternatives that were developed from the alternatives screening process for detailed evaluation in the EIS. The Build Alternatives are organized into three categories: the VT 2A Alternatives (2, 3, 22); the Circ A/B Alternatives (16a, 16b, 16c and 17); and the Hybrid Alternatives (18, 19, 23). The alternative designation numbers are not sequential because they retain the number they were assigned during the initial screening of potential alternatives for the proposed project. Table ES-1 summarizes the type, location and key elements of the VT 2A, Circ A/B and Hybrid Alternatives.

**No Build Alternative**

The future condition without the proposed project is called the No Build Alternative. Analysis of the No Build Alternative is required by the National Environmental Policy Act (NEPA) and is used as a baseline for the evaluation of the environmental effects of the Build Alternatives. The No Build Alternative includes expected improvements in the VT 2A and Circ A/B corridors, as well as other transportation and non-transportation projects in Chittenden County that would be completed by the analysis year of 2030.

In general, the No Build Alternative includes all the improvements committed to in the Chittenden County Metropolitan Planning Organization’s (CCMPO) *Transportation Improvement Program* (TIP) and the improvements with anticipated funding that are included in the *2025 Metropolitan Transportation Plan* (MTP).

Future residential and commercial development for the No Build Alternative was projected using the Land Use Allocation Module (LUAM) of the Chittenden County Transportation Model. These estimates of future development included information on

known projects gathered from local government officials, development review board minutes, town and county reports on planned and permitted development and press reports. In addition to known development proposals, development associated with projected future population and employment growth by 2030 was allocated based on accessibility and development constraints. This information was used to identify future growth patterns under the No Build Alternative in order to provide a baseline for comparing the Build Alternatives.

### **VT 2A Alternatives (2, 3, 22)**

#### ***Existing Roadway Layout of VT 2A***

In order to understand the VT 2A Alternatives, it is helpful to understand the current roadway layout of VT 2A. From I-89 to US 2 in Williston, VT 2A is generally four-lanes, with additional turning lanes at intersections. The remainder of VT 2A from US 2 to Five Corners in Essex Junction is generally two-lanes, with additional turning lanes at intersections. Figure ES-4-2 shows the typical cross sections for VT 2A existing conditions. All major intersections on VT 2A are signalized intersections. VT 2A crosses the Winooski River on a two-lane bridge structure north of James Brown Drive in Williston.

#### ***Common Elements with the VT 2A Alternatives***

The defining characteristic of the VT 2A Alternatives is that they involve improvements to VT 2A between I-89 Exit 12 in Williston and Five Corners in Essex Junction. They all involve varying degrees of roadway widening, as well as intersection improvements.

The VT 2A alternatives would all require full reconstruction of VT 2A, including the removal of existing pavement, the placement of gravel base materials, and new pavement for the full length of the roadway. The VT 2A Alternatives include completion of a continuous Williston Alternative Transportation Path (WATP) along VT 2A. The existing portions of the WATP that have already been constructed would be maintained or relocated. The VT 2A Alternatives would also include a commitment to improvements to bus waiting areas, such as better signing and the installation of benches or shelters (see Figure ES-4-3 through Figure ES-4-5 for the alignments, proposed improvements and cross-sections for the VT 2A Alternatives).

All of the VT 2A Alternatives would require the replacement of the VT 2A bridge over Allen Brook.

**Table ES-1  
Build Alternatives**

Name	Type of Alternatives	Location of Alternatives	Key Elements of Alternatives
VT 2A Alternatives (2, 3, 22)	Improvements to existing roadway	VT 2A, from I-89 Exit 12 to the Five Corners intersection in Essex Junction.	<ul style="list-style-type: none"> <li>§ Widening to increase the number of travel lanes</li> <li>§ Roundabout intersections (Alternatives 3 and 22)</li> <li>§ Signalized intersection improvements (Alternative 2)</li> </ul>
Circ A/B Alternatives (16a, 16b, 16c, 17*)	Construction of new roadway	The existing Circ A/B right-of-way, between I-89 in Williston and the existing terminus of VT 289 at VT 117 in Essex.	<ul style="list-style-type: none"> <li>§ Construction of a four-lane limited access highway with various interchange options and a grass median (Alternatives 16a, 16b, 16c)</li> <li>§ Construction of a four-lane boulevard style roadway with at-grade intersections and a landscaped median (Alternative 17)</li> </ul>
Hybrid Alternatives (18, 19, 23)	Combinations of improvements to the existing roadway with construction of new roadway	VT 2A, from I-89 Exit 12 to the Five Corners intersection in Essex Junction and the existing Circ Segment A right-of-way between I-89 and Mountain View Road.	<ul style="list-style-type: none"> <li>§ Same improvements being considered in the VT 2A alternatives with the addition of “Circ Street” between I-89 and Mountain View Road (four lanes between I-89 and US 2 and two lanes between US 2 and Mountain View Road).</li> </ul>

\* Preferred Alternative

***Differences Between the VT 2A Alternatives***

Alternative 2 would widen VT 2A to four travel lanes, with additional turning lanes and the installation of new traffic signal systems at intersections. Alternative 3 would also widen VT 2A to four travel lanes, but instead of turning lanes and new traffic signals, roundabouts would be installed at key intersections. Alternative 22 would involve tapered widening of VT 2A, with four travel lanes at the southern part of the corridor, three lanes (two travel lanes with a continuous two-way left turn lane) in the middle segment and two travel lanes (unchanged from the existing layout) in the northernmost part of the corridor from James Brown Drive to Five Corners in Essex Junction. Alternative 22 would also involve the installation of roundabouts at six intersections, while Alternative 3 would have roundabouts at nine intersections.

The bridges carrying I-89 over VT 2A would need to be replaced to accommodate intersection turning lanes under Alternative 2. The I-89 bridges would not need to be replaced as part of Alternatives 3 and 22, which involve roundabouts at this location. The existing VT 2A bridge over the Winooski River would be widened to four lanes under Alternatives 2 and 3. The bridge would not be modified under Alternative 22.

More detail on the design of the VT 2A Alternatives, including preliminary engineering design plans, is provided in DEIS Appendix P: *Preliminary Engineering Technical Report*.

## **Circ A/B Alternatives (16a, 16b, 16c, 17)**

### ***Common Elements with the Circ A/B Alternatives***

The defining characteristic of the Circ A/B Alternatives is the construction of a new roadway connecting I-89 in Williston to VT 289 in Essex, in the existing Circ A/B right-of-way. The Circ A/B Alternatives would require the construction of a new bridge over the Winooski River/VT 117 and interchange ramps to connect the new roadway to the existing interchange of VT 289 and VT 117 (see Figure ES-4-6 through Figure ES-4-9 for the alignments, proposed improvements and cross-sections for the Circ A/B alternatives).

The Circ A/B alternatives would also involve intersection improvements on VT 2A, but less extensive than the improvements proposed for the VT 2A alternatives. These improvements are called “spot improvements”. These minor improvements are described in detail in Section 3.5.4.

The WATP near the Allen Brook School would be reconstructed to cross over the proposed Circ A/B roadway. Additional multi-use paths are proposed on the west side of Redmond Road and on the south side of Mountain View Road. The Circ A/B alternatives would also include a commitment to improvements to bus waiting areas, such as better signing and the installation of benches or shelters.

All of the Circ A/B Alternatives include the construction of bridges over I-89, Allen Brook, Redmond Creek and the Winooski River.

### ***Differences Between the Circ A/B Alternatives***

Alternative 16 is a four-lane limited access highway with grade separated interchanges, while Alternative 17 is a four-lane boulevard-type street with at-grade intersections.

There are three different combinations of interchange options being evaluated for Alternative 16, referred to as Alternatives 16a, 16b and 16c, respectively. These options were evaluated to investigate the effects of including an interchange at US 2, and a different interchange design in the area of Mountain View Road and Redmond Road designed to reduce wetland impacts.

Alternative 16a would have a trumpet interchange with I-89 and with Redmond Road, but would have no connection to US 2. Alternative 16b would have the same trumpet interchanges as 16a at I-89 and Redmond Road, but it would also have a partial cloverleaf interchange at US 2. Alternative 16c would have a trumpet interchange with I-89, no connection to US 2, and a diamond interchange with Mountain View Road.

As proposed in the DEIS, Alternative 17 (Circ A/B Boulevard) would have a diamond interchange at I-89, and at-grade signalized intersections with US 2 and Mountain View Road. For more information on Alternative 17 and the design refinements made to this alternative for the FEIS, please refer to Section ES-5.

In addition to the bridge structures common to all Circ A/B Alternatives, a bridge carrying US 2 over the Circ A/B roadway would be constructed under Alternatives 16a, 16b, and

16c. These alternatives would also include a bridge to carry the Circ A/B roadway over Mountain View Road.

More detail on the design of the Circ A/B Alternatives, including preliminary engineering design plans, can be found in DEIS Appendix P: *Preliminary Engineering Technical Report*.

### **Hybrid Alternatives (18, 19, 23)**

#### ***Common Elements with the Hybrid Alternatives***

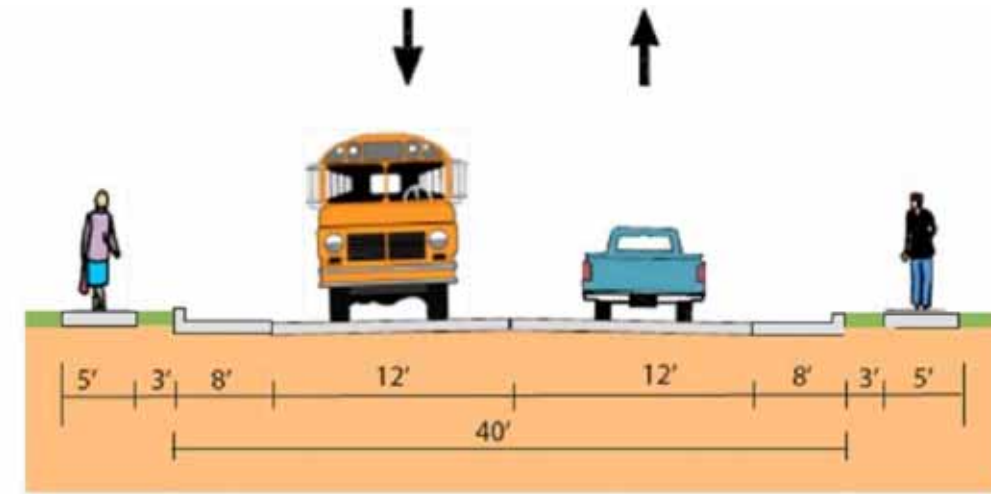
The defining characteristic of the Hybrid Alternatives is that they combine widening and intersection improvements on VT 2A with a boulevard-type roadway in the existing Circ A right-of-way, from I-89 to Mountain View Road. This roadway in the Circ A roadway is called the “Circ Street” in this EIS. Figure ES-4-10 through Figure ES-4-12 depict the alignments, proposed improvements and cross sections for the Hybrid Alternatives.

The Circ Street would have a diamond interchange with roundabouts at I-89, and at-grade intersections with US 2 and Mountain View Road. These at-grade intersections could be either signalized or roundabout intersections. The Circ Street would have four lanes with a landscaped median from I-89 to US 2, and two travel lanes from US 2 to Mountain View Road. The Circ Street would have a multi-use path on the east side of the roadway, separated by a landscaped buffer, from US 2 to Mountain View Road. The existing WATP near the Allen Brook School would cross the Circ Street at-grade. The Circ Street terminates at Mountain View Road and has the same design in Alternatives 18, 19 and 23. More detail on the design of the Circ Street, including preliminary engineering design plans, can be found in DEIS Appendix P: *Preliminary Engineering Technical Report*.

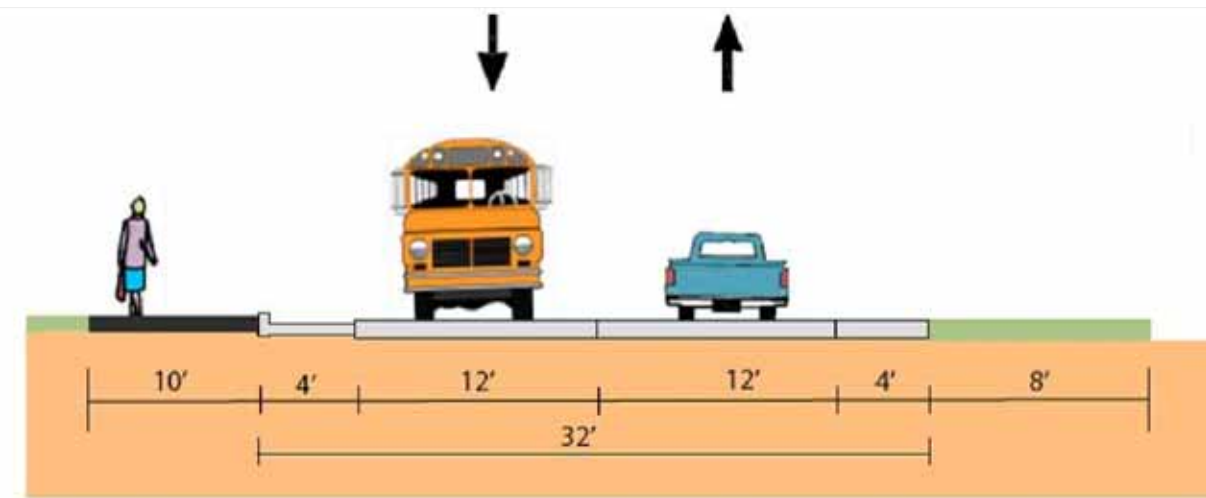
#### ***Differences Between the Hybrid Alternatives***

Alternatives 18, 19 and 23 would involve different types of widening and intersection improvements on VT 2A. The improvements on VT 2A would be identical to those described above for Alternatives 2, 3 and 22.

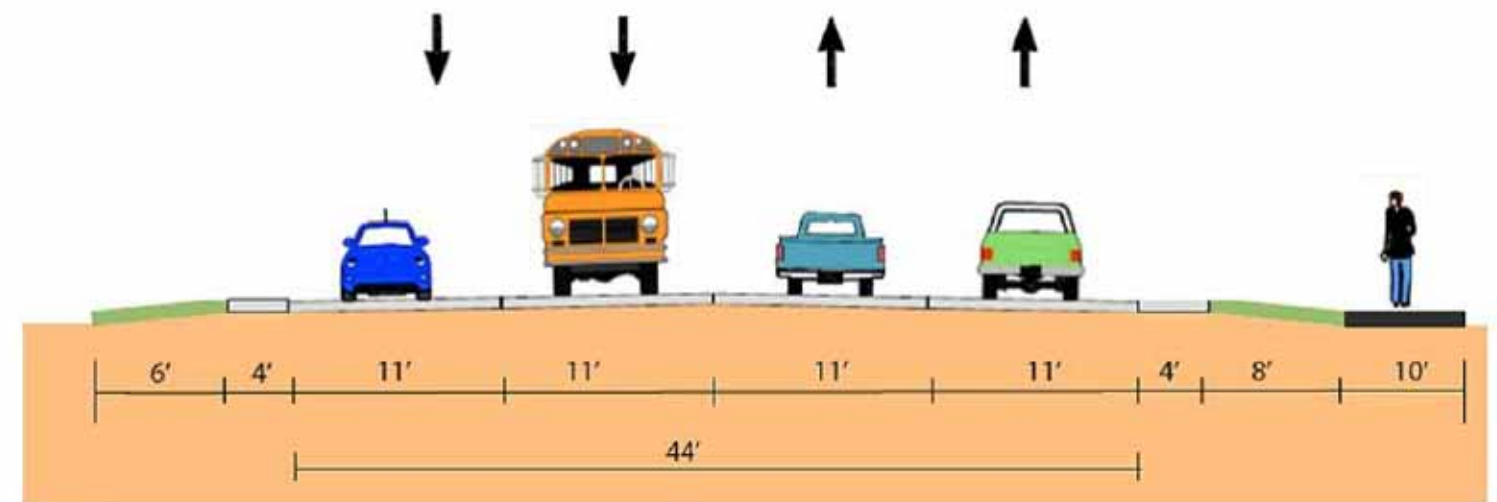
- § Alternative 18 (Alternative 2 VT 2A Improvements plus Circ Street)
- § Alternative 19 (Alternative 3 VT 2A Improvements plus Circ Street)
- § Alternative 23 (Alternative 22 VT 2A Improvements plus Circ Street)



Cross Section 3







Cross Section 2






Cross Section 1



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  1 Trumpet Interchange
-  2 Partial Coverleaf Interchange
-  3 Diamond Interchange

Circ-Williston EIS

VT2A Alternatives

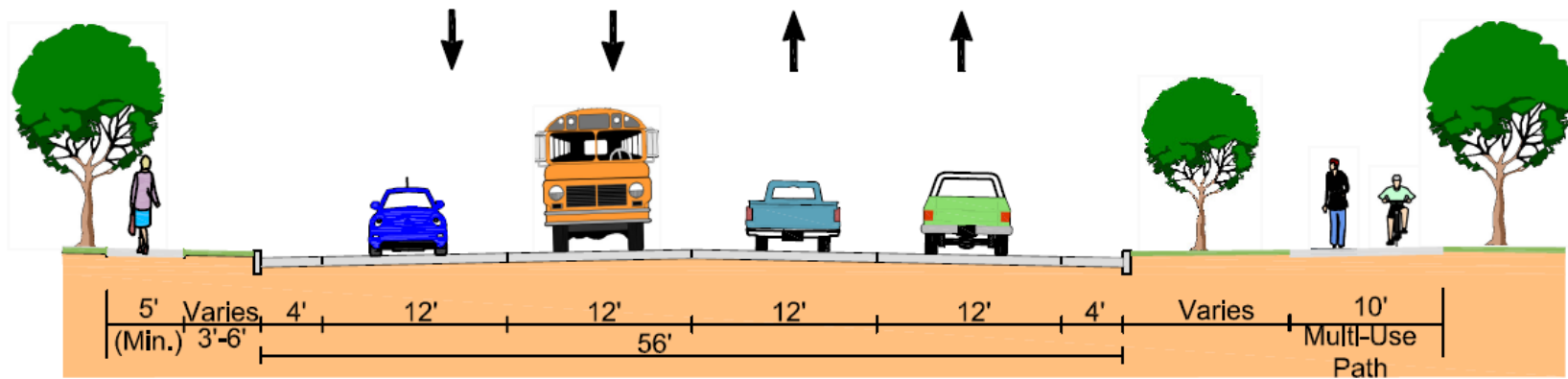
Figure ES-4-3a

**Alternative 2:  
Four-lane VT2A with signalized  
intersection improvements**




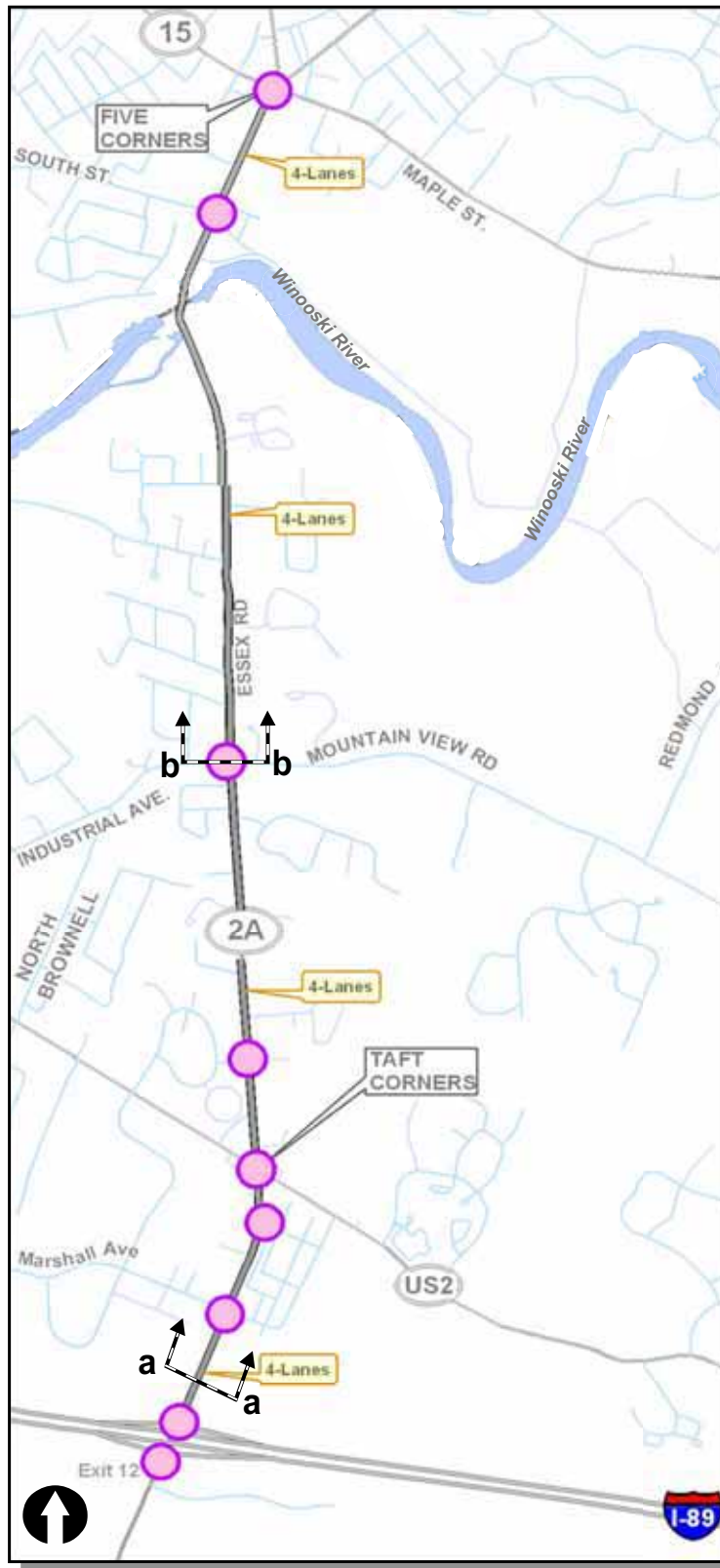
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Transportation

a-a







Four-lane VT 2A including a sidewalk on the west side and a multi-use path on the east side.




Circ-Williston EIS
VT2A Alternatives
FigureES-4-3b
Alternative 2: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  1 Trumpet Interchange
-  2 Partial Coverleaf Interchange
-  3 Diamond Interchange

Circ-Williston EIS

VT2A Alternatives

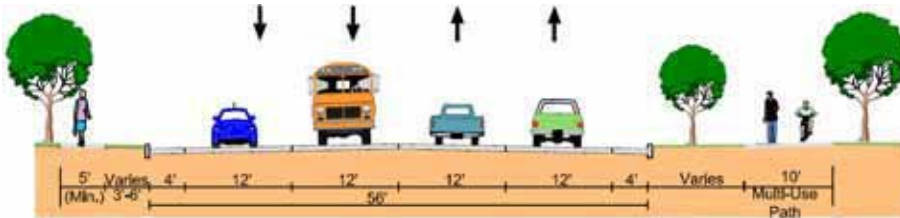
Figure ES-4-4a

**Alternative 3:  
Four-lane VT2A with roundabouts**



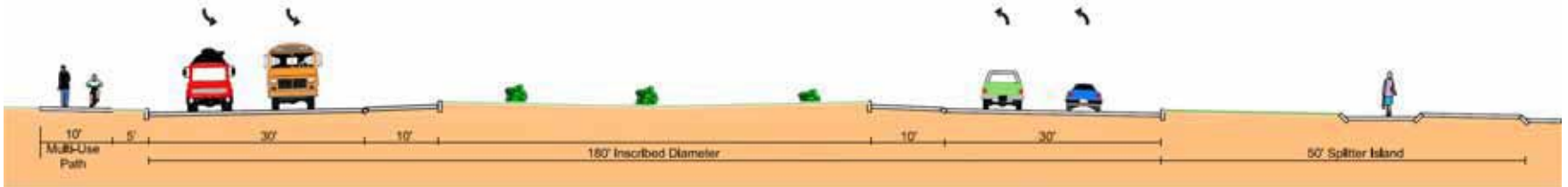
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**a-a**




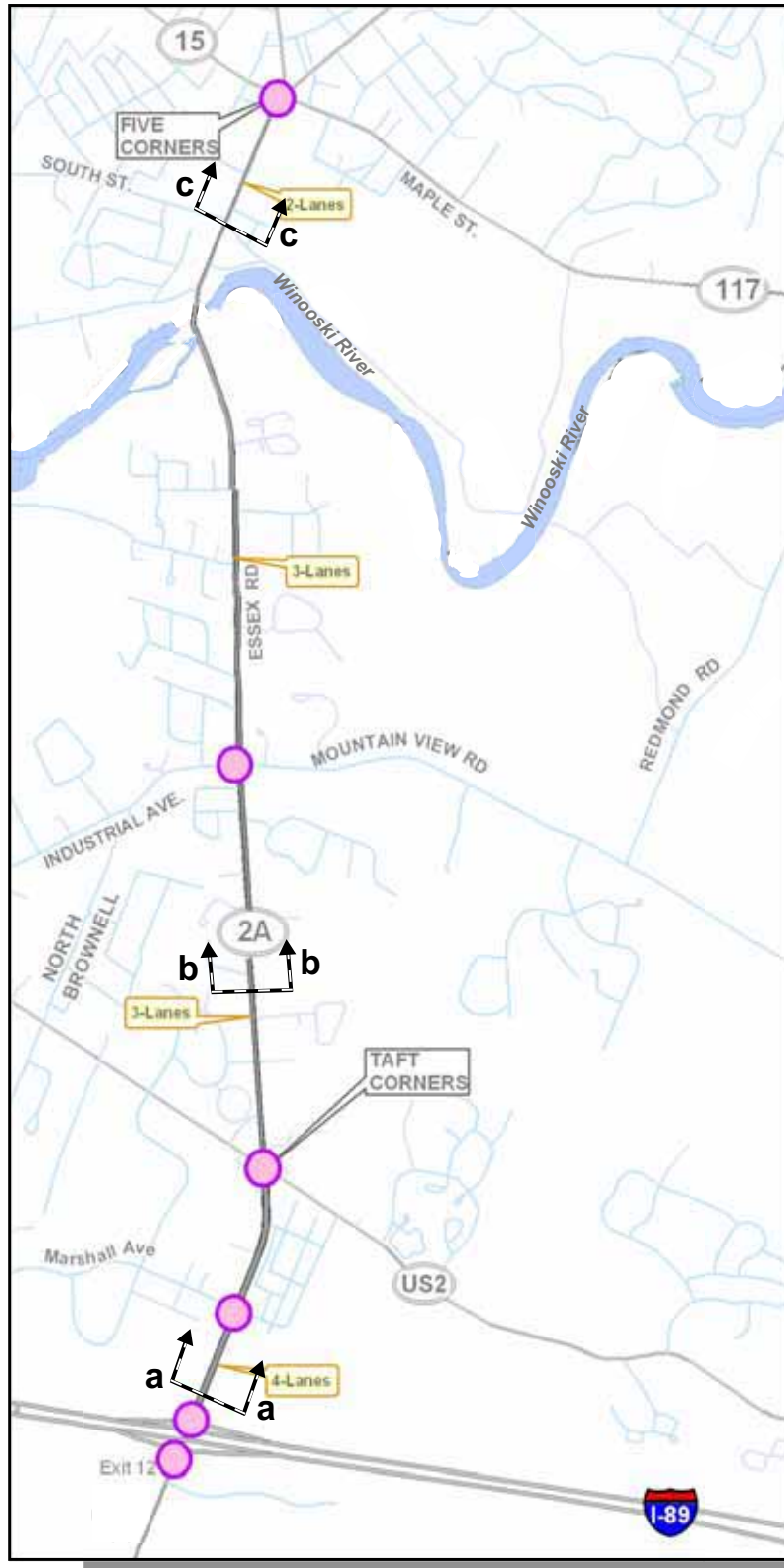
Four-lane VT 2A including a sidewalk on the west side and a multi-use path on the east side.

**b-b**






Typical two-lane roundabout including a landscaped island with apron. A multi-use path would be located on the west side of the intersection of VT 2A and Mountain View Road. A splitter would be located on the east side to accommodate pedestrian travel.




Circ-Williston EIS
VT2A Alternatives
Figure ES-4-4b
Alternative 3: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  Trumpet Interchange
-  Partial Coverleaf Interchange
-  Diamond Interchange

Circ-Williston EIS

VT2A Alternatives

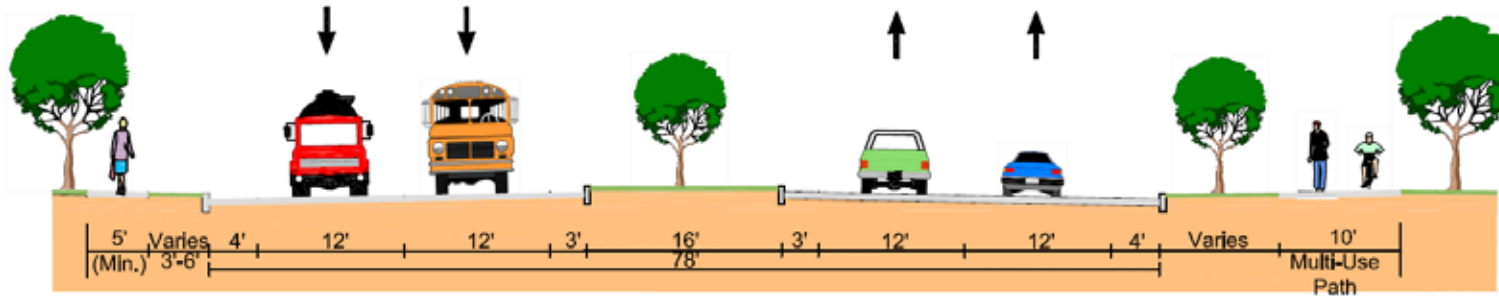
Figure ES-4-5a

**Alternative 22:**  
Tapered widening on VT2A with  
signalized and roundabout intersections



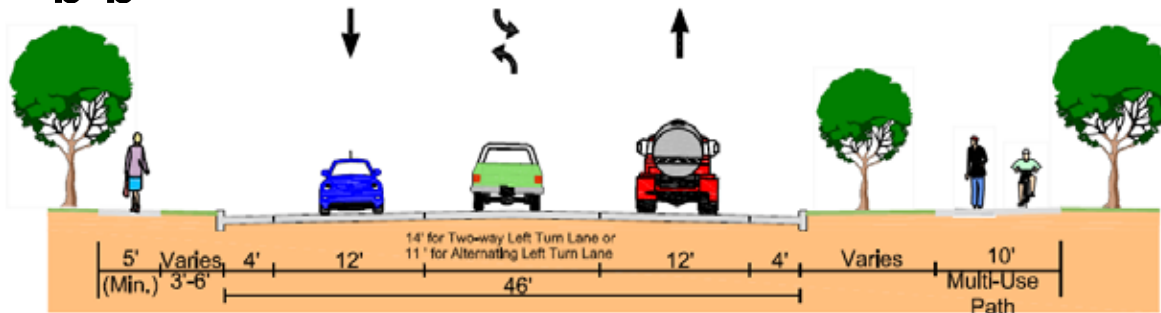
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Transportation

### a-a



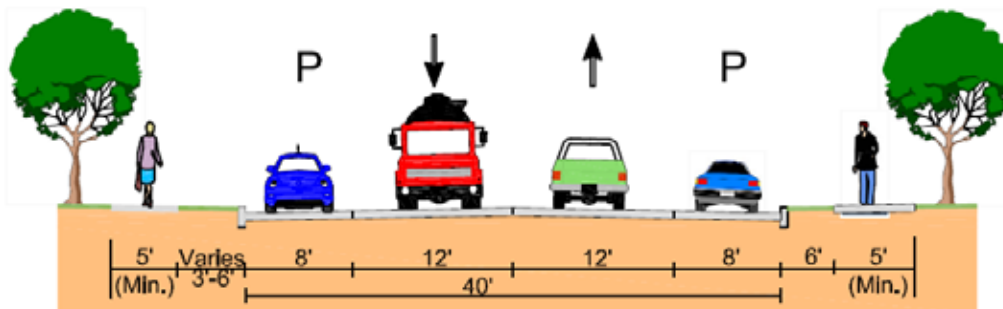
Four-lane VT 2A with a raised median, a sidewalk on the west side and a multi-use path on the east side.

### b-b




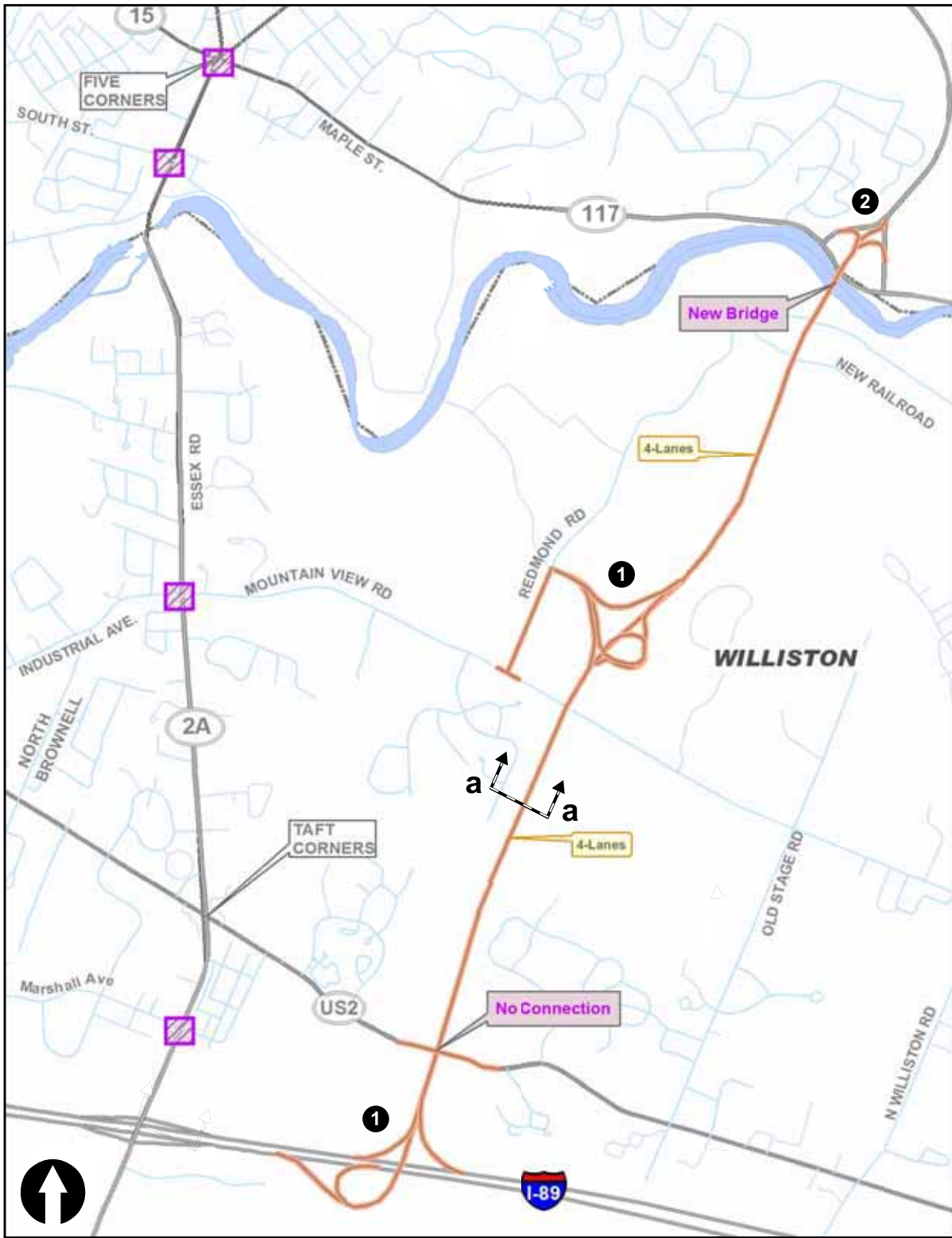
Three-lane VT 2A including two-way left turn lane or alternating left turn lane, sidewalk on the west side and a multi-use path on the east side.

### c-c







Two-Lane VT 2A, including parking and sidewalks on both sides.




Circ-Williston EIS
VT2A Alternatives
Figure ES-4-5b
Alternative 22: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  Trumpet Interchange
-  Partial Coverleaf Interchange
-  Diamond Interchange

**Circ-Williston EIS**

**CIRC A/B Alternatives**

**Figure ES-4-6a**

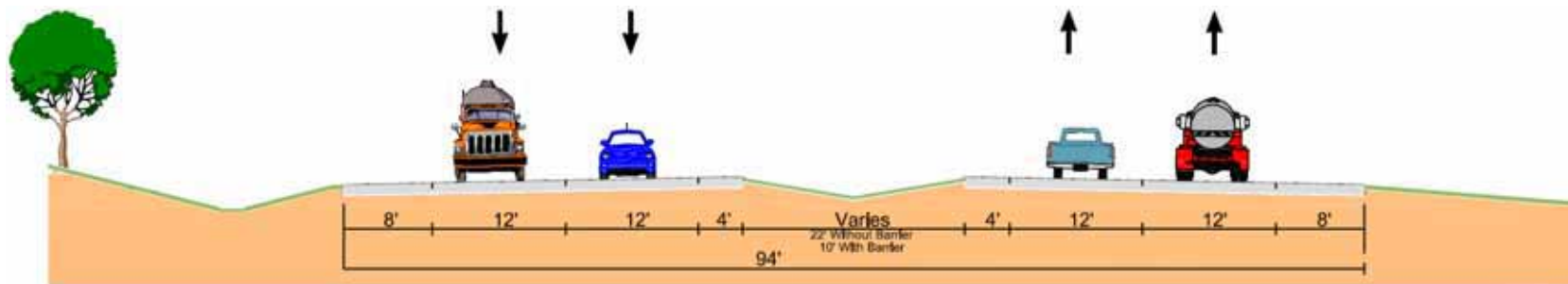
**Alternative 16a:**

Circ A/B limited access highway with VT 2A spot improvements. No connection to US 2, and a trumpet interchange with Redmond Road.




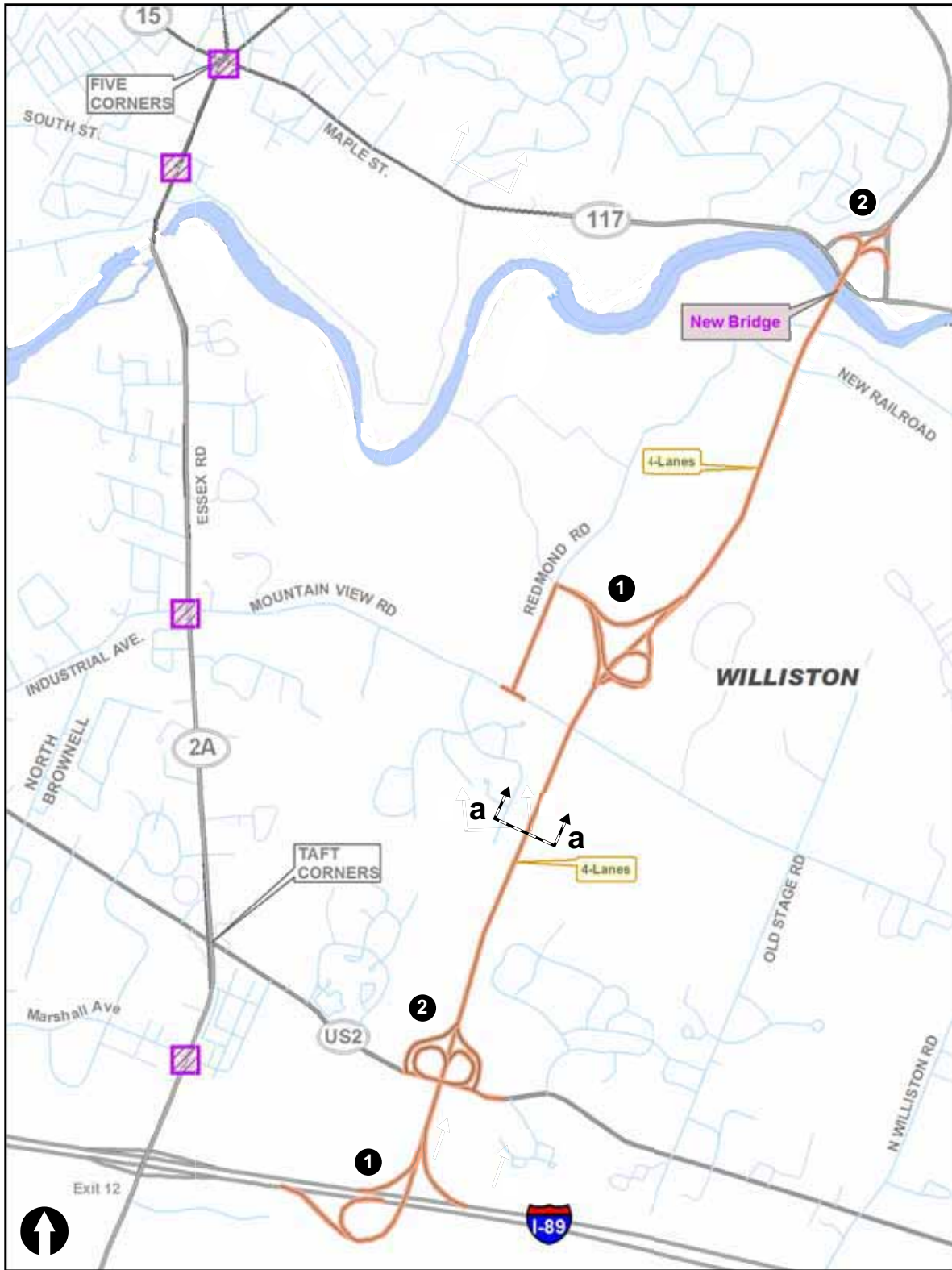
Vermont Agency of Transportation

a-a







Four-lane Circ A/B limited access highway, including shoulders and grass median.




Circ-Williston EIS
CIRC A/B Alternatives
Figure ES-4-6b
Alternative 16a: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  1 Trumpet Interchange
-  2 Partial Cloverleaf Interchange
-  3 Diamond Interchange

**Circ-Williston EIS**

**CIRC A/B Alternatives**

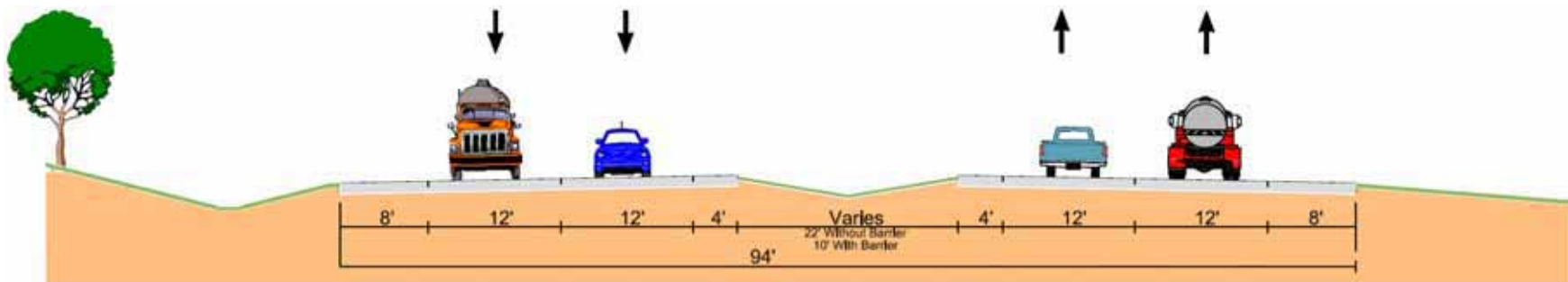
**Figure ES-4-7a**

**Alternative 16b:**  
 Circ A/B limited access highway with  
 VT 2A spot improvements.  
 Partial cloverleaf interchange  
 at US 2 and a trumpet interchange  
 with Redmond Road.




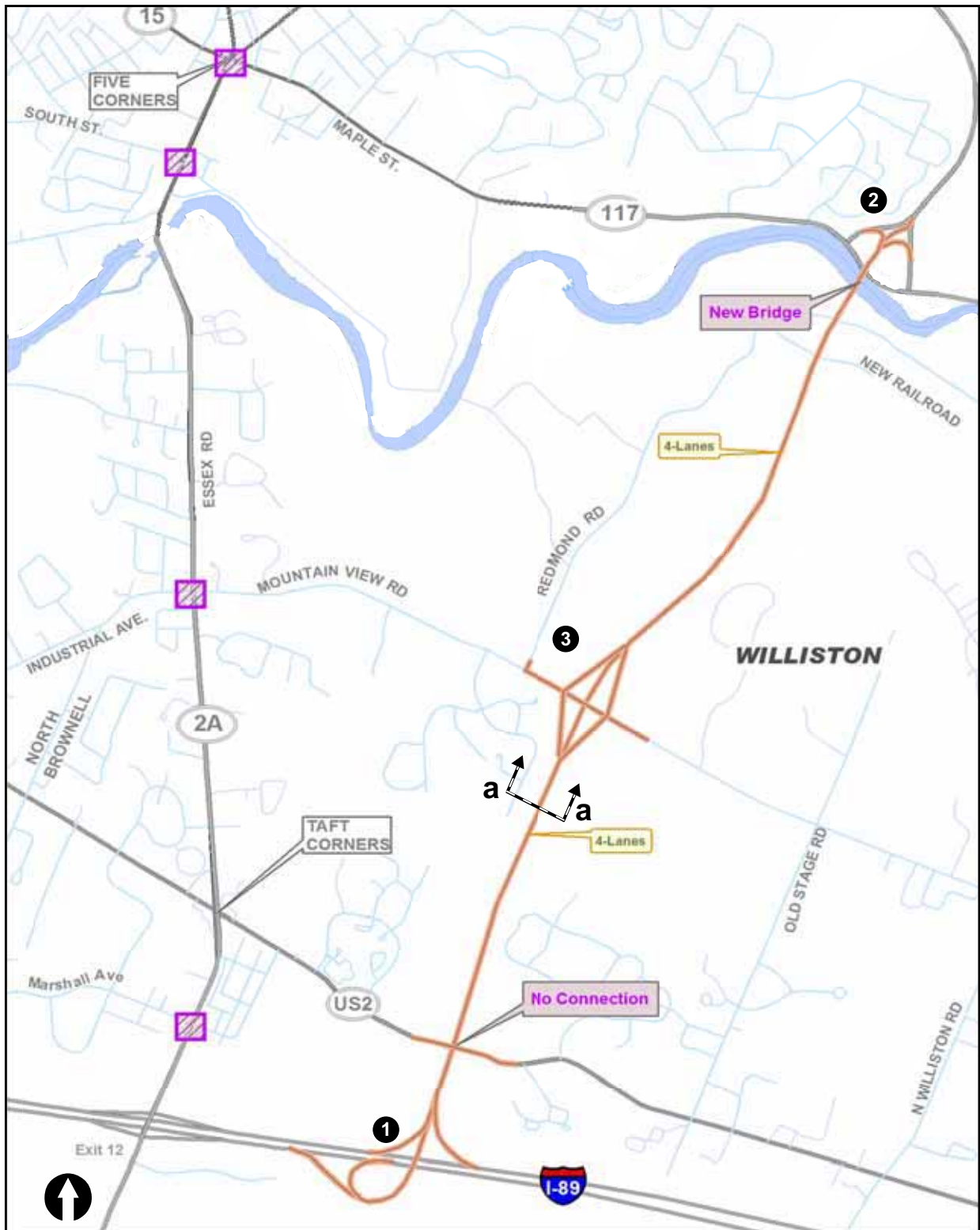
Vermont Agency of  
 Transportation

a-a







Four-lane Circ A/B limited access highway, including shoulders and grass median.




Circ-Williston EIS
CIRC A/B Alternatives
Figure ES-4-7b
Alternative 16b: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  Trumpet Interchange
-  Partial Coverleaf Interchange
-  Diamond Interchange

**Circ-Williston EIS**

**CIRC A/B Alternatives**

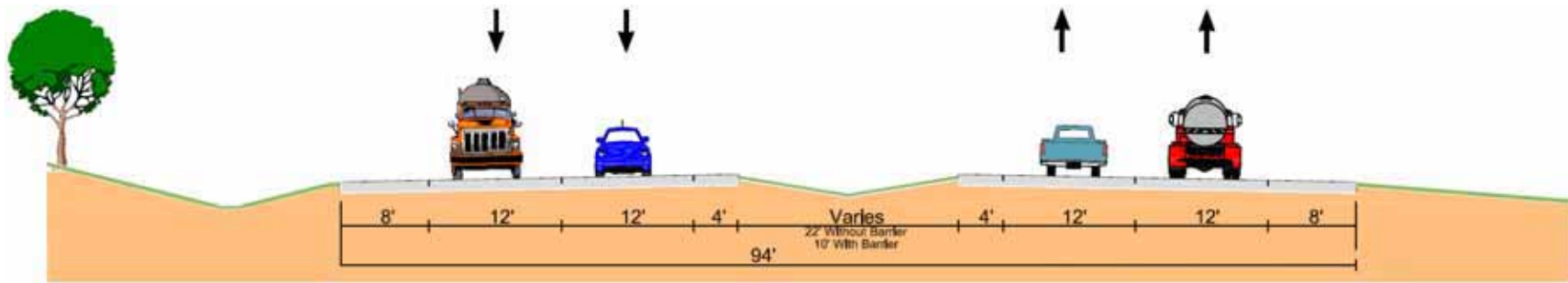
**Figure ES-4-8a**

**Alternative 16c:**  
 Circ A/B limited access highway with  
 VT 2A spot improvements.  
 No connection to US 2, and a diamond  
 interchange at Mountain View Road.




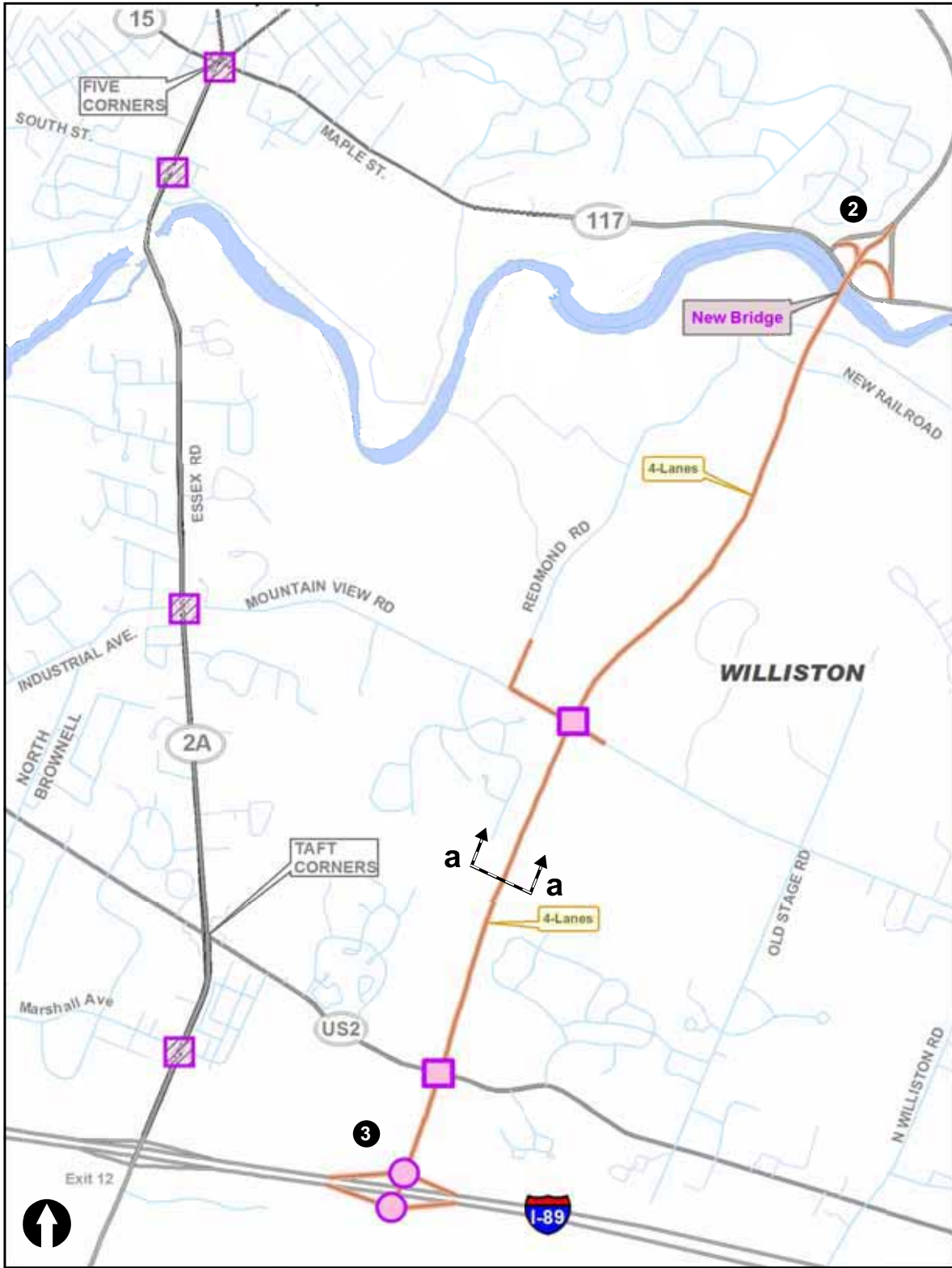
Vermont Agency of  
 Transportation

a-a







Four-lane Circ A/B limited access highway, including shoulders and grass median.




Circ-Williston EIS
CIRC A/B Alternatives
Figure ES-4-8b
Alternative 16c: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  1 Trumpet Interchange
-  2 Partial Coverleaf Interchange
-  3 Diamond Interchange

**Circ-Williston EIS**

**CIRC A/B Alternatives**

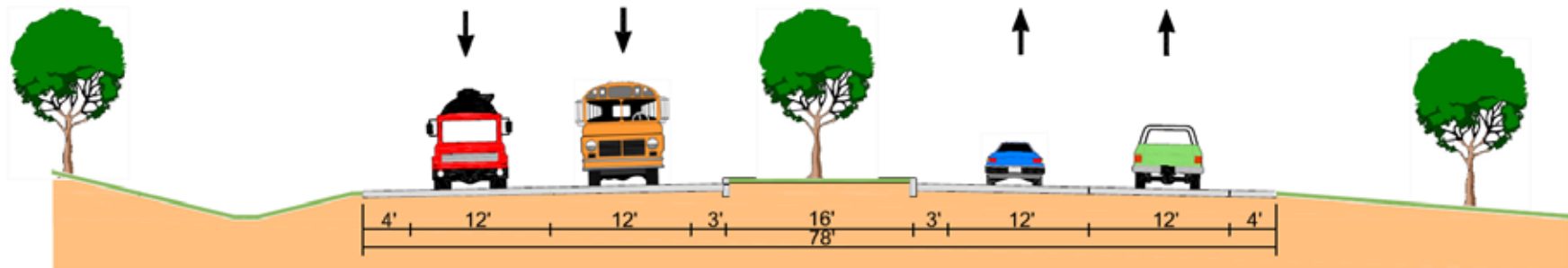
**Figure ES-4-9a**

**Alternative 17:  
Circ A/B Boulevard with VT2A  
spot improvements**




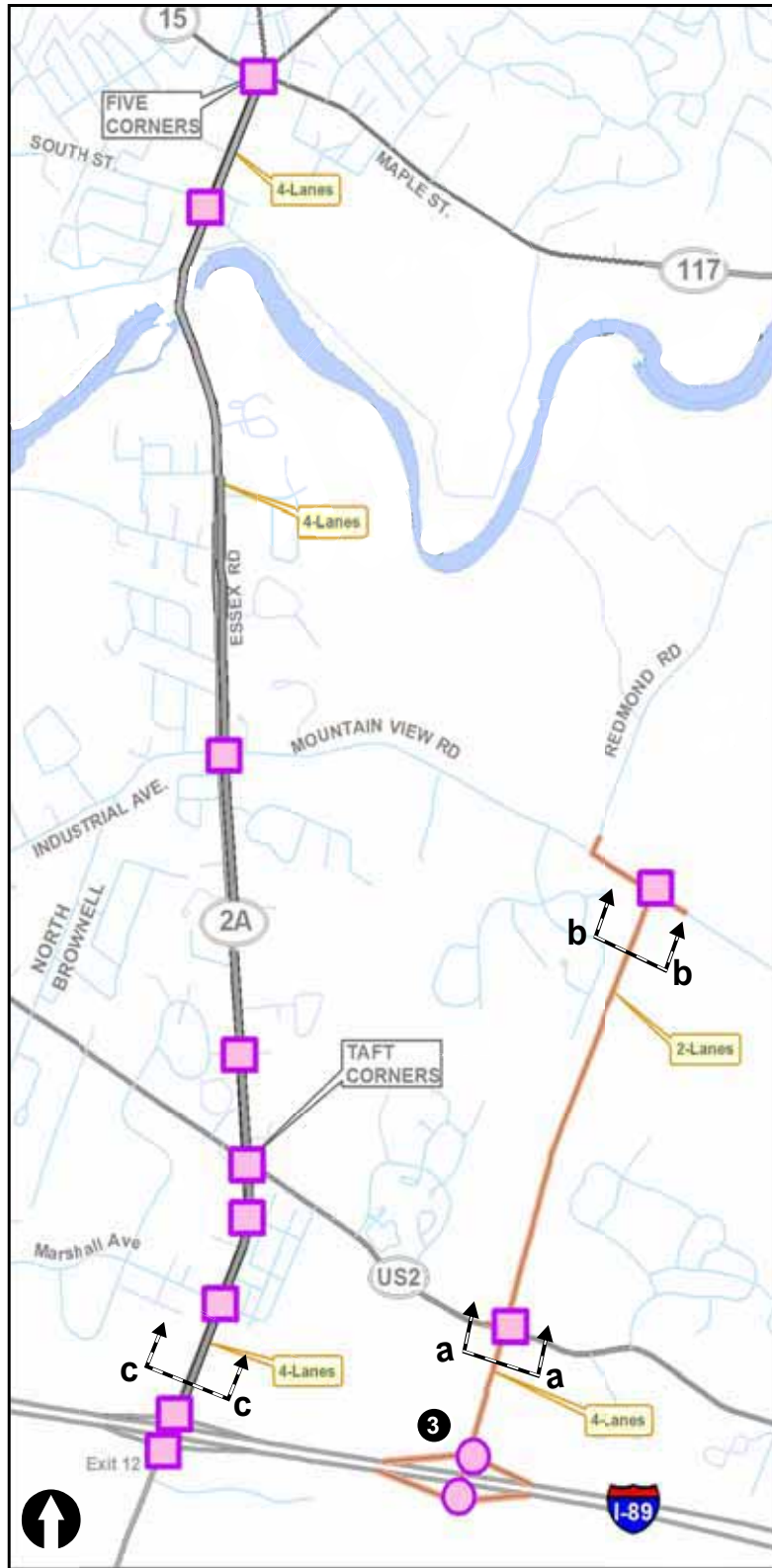
Vermont Agency of  
Transportation

a-a







Four-lane Circ A/B boulevard, including shoulders and a landscaped median.




Circ-Williston EIS
CIRC A/B Alternatives
Figure ES-4-9b
Alternative 17: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  1 Trumpet Interchange
-  2 Partial Coverleaf Interchange
-  3 Diamond Interchange

Circ-Williston EIS

Hybrid Alternatives

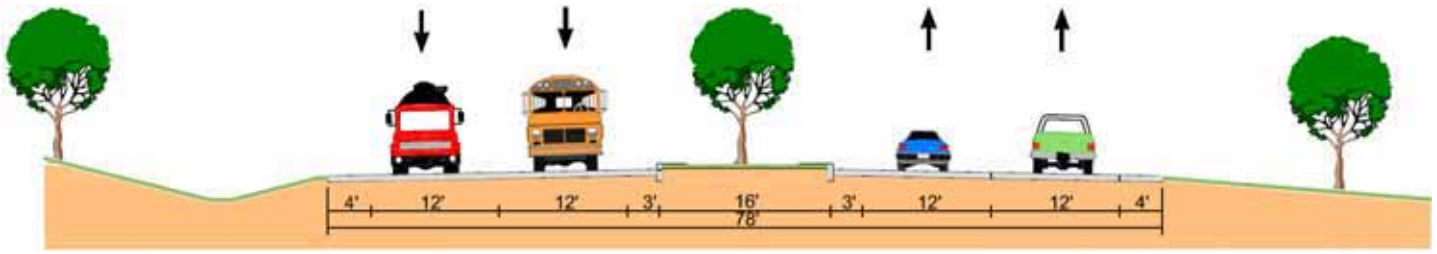
Figure ES-4-10a

**Alternative 18:**  
Four-lane VT2A with signalized intersection improvements plus Circ Street.



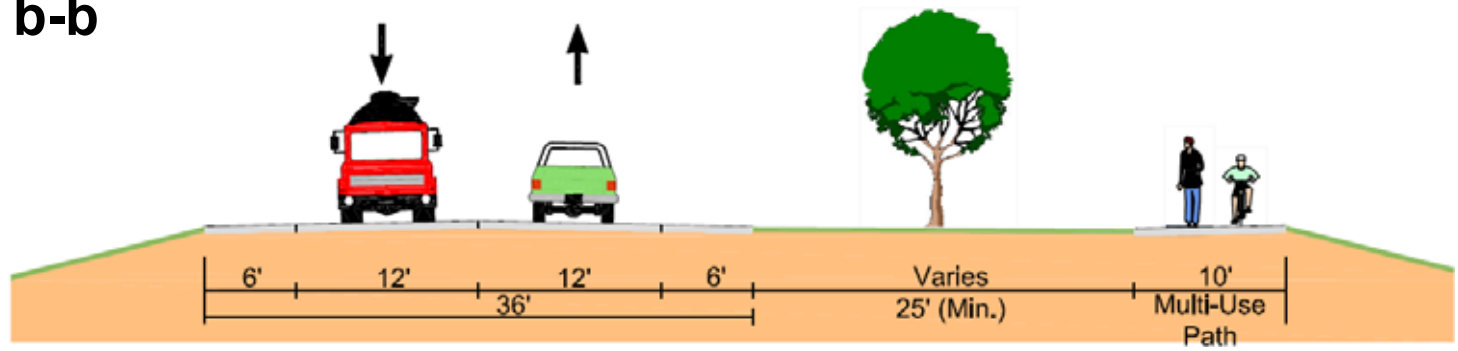
Vermont Agency of Transportation

**a-a**



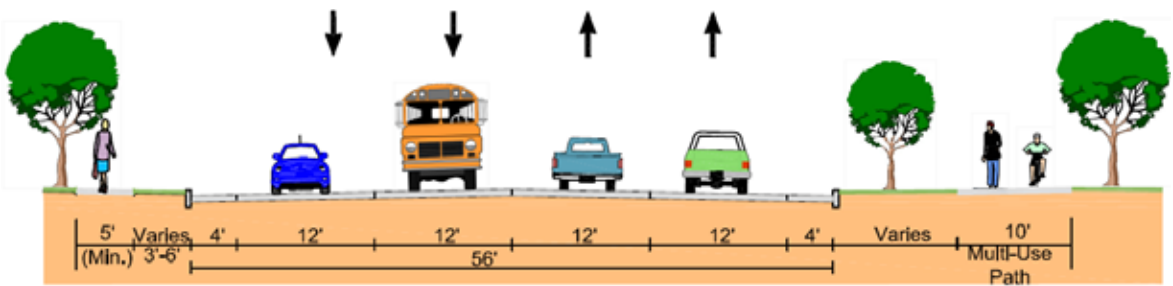
Four-lane Circ street boulevard, with a landscaped median.

**b-b**




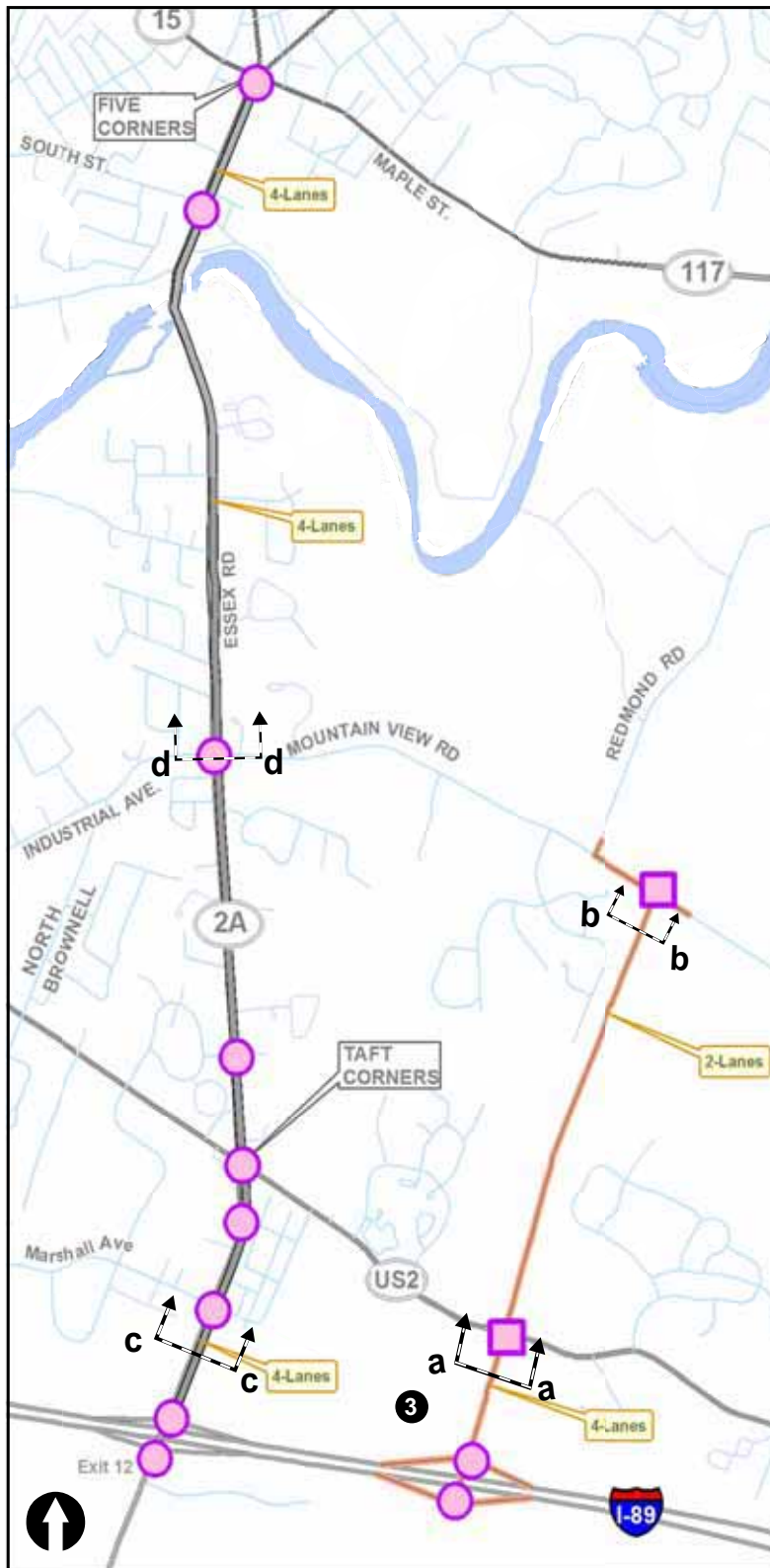
Two-lane Circ street with a multi-use path on the east side, separated from the roadway by a landscaped buffer.

**C-C**







Four-lane VT 2A including a sidewalk on the west side and a multi-use path on the east side.




Circ-Williston EIS
Hybrid Alternatives
Figure ES-4-10b
Alternative 18: Typical Cross Sections
 Vermont Agency of Transportation



**Legend**

-  Signalized Improvements
-  Spot Improvements
-  Roundabout
-  Typical Cross Section Location

**Interchange Types:**

-  Trumpet Interchange
-  Partial Coverleaf Interchange
-  Diamond Interchange

Circ-Williston EIS

Hybrid Alternatives

Figure ES-4-11a

**Alternative 19:**  
Four-lane VT2A with  
roundabouts plus Circ street



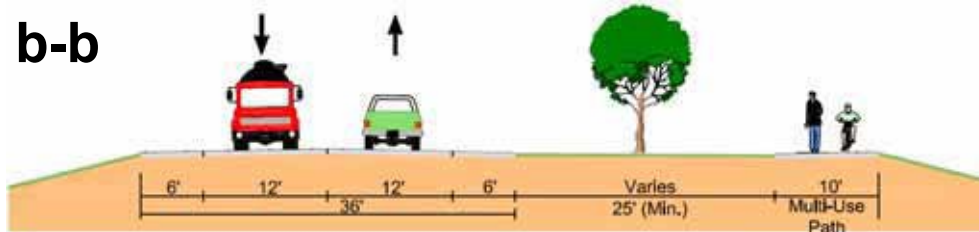
Vermont Agency of  
Transportation

**a-a**



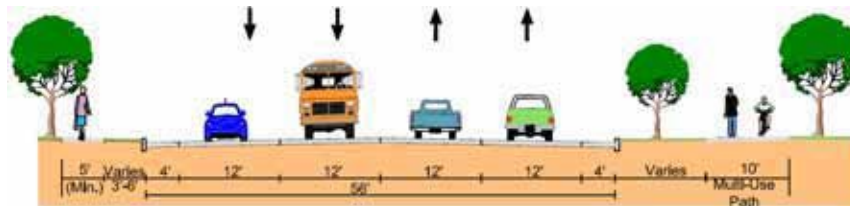
Four-lane Circ street boulevard, with a landscaped median.

**b-b**



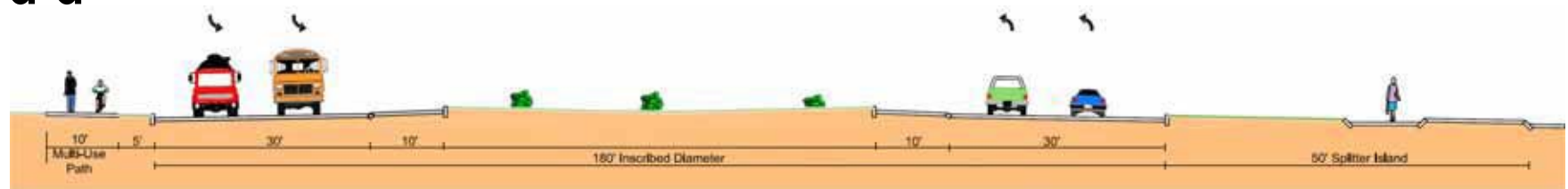
Two-lane Circ Street with a multi-use path on the east side, separated from the roadway by a landscaped buffer.

**C-C**



Four-lane VT 2A including a sidewalk on the west side and a multi-use path on the east side.

**d-d**



Typical two-lane roundabout including a landscaped island with apron. A multi-use path would be located on the west side of the intersection of VT 2A and Mountain View Road. A splitter would be located on the east side to accommodate pedestrian travel.





## ES-5 Preferred Alternative

The Build Alternatives studied in detail each vary in transportation performance, and each would impact different aspects of the environment. VTrans and FHWA weighed these benefits and impacts and also considered the No Build Alternative. While the measures used to compare the congestion, safety and mobility benefits and environmental impacts were important considerations, no single measure alone was determinative. Instead, an accumulation of factors led VTrans and FHWA to choose a Circ A/B corridor alternative over a VT 2A corridor alternative, or a Hybrid Alternative. Key factors in the Preferred Alternative decision included:

- § the ability of the alternatives to meet the transportation need identified for the project;
- § consistency with local and regional plans;
- § environmental and community impacts; and
- § views of government agencies, and the public.

Based on extensive consideration of these factors, VTrans and FHWA have identified a Preferred Alternative.<sup>1</sup> The Preferred Alternative is a modified version of the Circ A/B Alternative 17 (Circ A/B Boulevard) analyzed in the DEIS. The Preferred Alternative would be located primarily within the existing Circ A/B corridor right-of-way acquired in the early 1990's (See Figure ES-5-1). On July 6, 2010, ACOE identified the Preferred Alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA) under the Clean Water Act Section 404 (b)(1) Guidelines (40 CFR 230). A copy of the letter containing the LEDPA decision is provided in FEIS Appendix S: *Public Involvement and Agency Coordination Addendum*.

The Preferred Alternative design involves a trumpet interchange with I-89 in Williston, signalized intersections with U.S. 2 and Mountain View Road, and a connection to VT 289 and VT 117 in Essex. The Preferred Alternative would feature two travel lanes in each direction, separated by an 8 to 16 foot wide raised median (See Figure ES-5-2). The speed limit on the new roadway would be 40 mph, minimizing noise and other community character impacts for adjacent residential areas in Williston. The following describes the general design characteristics of the Preferred Alternative, moving from south to north.

A new trumpet interchange would be constructed between I-89 and the Circ A/B roadway. The interchange would require rock cuts and fill on the hillside south of I-89. Auxiliary lanes would be constructed on I-89 between the existing I-89 Exit 12 in Williston and the proposed new interchange. A bridge structure would be constructed to carry the Circ A/B roadway over I-89. Between I-89 and US 2, the Preferred Alternative would be constructed on fill over old fields. To minimize wetland impacts for the Preferred Alternative, the design speed and radius of the I-89 northbound off-ramp was reduced and a retaining wall was incorporated along the ramp. In addition, a median barrier was extended up to the intersection with US 2 instead of a grass median to minimize the area disturbed by the roadway.

The Preferred Alternative would have a signalized intersection at US 2 (See Figure ES-5-1). This configuration allows for access to US 2, but with substantially fewer wetland

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<sup>1</sup> Detailed information on the rationale for the Preferred Alternative is provided in Chapter 4.

impacts than an interchange or grade separation in this location. Instead of a box culvert as originally planned, a 345-foot bridge span would be used to carry the roadway over Allen Brook to minimize aquatic habitat impacts. Beyond US 2, the Circ A/B roadway would pass over open land near the Allen Brook School and the South Ridge, Coyote Run and Brennan Woods subdivisions. The Preferred Alternative median width was reduced from the 16 feet typically used with a boulevard design to 8 feet to minimize wetland impacts between US 2 and Mountain View Road. The narrower median width combined with the Allen Brook bridge reduces the direct permanent wetland impacts of the Preferred Alternative by 1.8 acres between US 2 and Mountain View Road in comparison to the DEIS base design for Alternative 17.

The Preferred Alternative would have a signalized intersection at Mountain View Road. The Preferred Alternative incorporates an easterly alignment shift in the vicinity of the Circ A/B crossing of Mountain View Road (See Figure ES-5-3). The alignment shift was introduced as a means to minimize impacts to the forested wetland north of Mountain View Road, which includes a vernal pool used by wood frogs. The alignment shift would require a full acquisition of a 1.6 acre vacant parcel adjacent to Mountain View Road. The alignment shift would also require a less than one acre partial property acquisition from the Catamount Golf Course. The property acquisition is not expected to impact the layout and use of the golf course.

North of Mountain View Road, the Preferred Alternative would be constructed through a forested area on Martel Hill and adjacent to the planned location for the Chittenden County Solid Waste District Regional Landfill. The Circ A/B Alternatives would pass over the forested riparian corridor along Redmond Creek, and between the Chittenden Solid Waste District Transfer Station and the retired Williston landfill. Instead of a box culvert, a 177-foot bridge is proposed over the Redmond Creek corridor to minimize aquatic habitat impacts and to maintain wildlife passage through the riparian corridor. The Winooski River bridge would begin just before the railroad tracks, spanning over the railroad, wetlands/floodplain, river and VT 117. On the opposite side of the Winooski River, the Circ A/B roadway would be connected to the existing VT 289 and VT 117.

The transportation improvements under the Preferred Alternative include minor “spot improvements” at the following locations along VT 2A: I-89 Exit 12 northbound ramps, Marshall Avenue/Maple Tree Place, Mountain View Road/Industrial Avenue and South Street/River Street.







## ES-6 Summary of Transportation Performance

Table ES-2 summarizes the results of the transportation analysis of the Build Alternatives in comparison to the No Build Alternative.

The Preferred Alternative meets the transportation purpose of the project by reducing travel times and congestion throughout the project area, without creating new transportation problems. The Preferred Alternative would improve traffic flow on VT 2A, eliminating Level of Service F conditions and reducing congestion on all severely congested roadway segments. In addition to effects on VT 2A, the Preferred Alternative would reduce traffic volumes and congestion on North Williston Road, VT 15 and VT 117. The Preferred Alternative would also reduce crashes in the project area and substantially improve mobility to, from and within the project area. For example, on a countywide basis, the Preferred Alternative would reduce vehicle hours traveled by a total of 435 hours per day from the travel time savings during the AM and PM peak hours. Assuming approximately 260 weekdays in a year, the total travel time savings over one year would be 113,100 vehicle operating hours.<sup>2</sup>

Other Circ A/B Alternatives (16a, 16b and 16c) would generally have transportation performance similar to the Preferred Alternative. The exception is Alternative 16b, which would not adequately meet the purpose and need because the Five Corners intersection would remain at LOS F in the PM peak hour.

Widening VT 2A to four-lanes would address some aspects of the purpose and need, but would create new problems at the same time. For example, the four-lane VT 2A with signals alternative (Alternative 2), as well as the four-lane VT 2A with roundabouts alternative (Alternative 3), attract between 22 percent and 53 percent more traffic to VT 2A,<sup>3</sup> which would greatly impede entry or crossing vehicles from side streets and driveways. Alternative 2 would not eliminate LOS F conditions at Five Corners in the AM and PM peak hours. Traffic flow would also breakdown at the roundabouts at Marshall Avenue/Maple Tree Place, US 2, Industrial Avenue/Mountain View Road, South Street/River Street and Five Corners in the PM peak hour under Alternative 3. These alternatives also increase traffic volumes and congestion on the area's other major roadways, specifically, 15 percent to 20 percent increases in traffic volumes on Route 15 and Route 117 in Essex Junction. As a result, Alternatives 2 and 3 do not adequately meet the purpose and need for the project.

Alternative 22 involves roundabouts and tapered widening of VT 2A. Alternative 22 would reduce crashes on VT 2A and in the project area, but would not remedy severe congestion on the Industrial Avenue/Mountain View Road to South Street/River Street segment of VT 2A or improve mobility in the project area. Under Alternative 22, the Marshall Avenue/Maple Tree Place intersection would remain at LOS F in the PM peak hour. As a result, Alternative 22 does not adequately meet the purpose and need for the project.

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<sup>2</sup> This estimate does not include any off-peak travel time savings or travel time savings on weekends and holidays.

<sup>3</sup> Based on two-way traffic volumes for the PM peak hour under Alternative 2 (four-lane VT 2A with signalized intersections). A similar pattern holds for the AM peak hour (31 to 44 percent two-way traffic volume increases relative to the No Build condition.) The largest percent increases in traffic volumes would occur in the portion of the VT 2A corridor between Industrial Avenue/Mountain View Road and Five Corners.

Combining the various VT 2A improvement alternatives considered with a Circ Street between I-89 and Mountain View Road in the Circ A corridor would not substantially improve the transportation performance of these alternatives. The Hybrid Alternatives (18, 19 and 23) generally have the same problems as the corresponding VT 2A Alternatives and therefore do not adequately meet the purpose and need for the project.

**Table ES-2  
Traffic Performance of the Build Alternatives**

	VT 2A Intersections at LOS F (AM peak/ PM peak)	VT 2A Roundabouts with Critical Approach Capacity Exceeded (AM peak/PM peak)	Severely Congested VT 2A Segments Not Improved (AM peak/PM peak)	VT 2A Side Streets with Increases of Delay Over 50% (AM peak/PM peak)	Reduction in Crashes in the Project Area	Reduction in Travel Time Williston to Essex (PM peak)
Alternative 2	1/1	N/A	0/1	3/2	-3.0%	-10%
Alternative 3	0/0	3/5	0/0	3/2	-4.4%	-9%
Alternative 22	0/1	2/3	1/1	0/0	-7.2%	0%
Alternative 16a	0/0	N/A	0/0	0/0	-4.7%	-15%
Alternative 16b	0/1	N/A	0/0	0/0	-4.7%	-17%
Alternative 16c	0/0	N/A	0/0	0/0	-4.9%	-14%
<b>Alternative 17*</b>	<b>0/0</b>	<b>N/A</b>	<b>0/0</b>	<b>0/0</b>	<b>-3.7%</b>	<b>-14%</b>
Alternative 18	1/0	N/A	0/0	3/3	-0.7%	-11%
Alternative 19	0/0	3/4	0/0	3/1	-2.6%	-10%
Alternative 23	0/0	2/2	1/1	0/0	-5.8%	-1%



Does not remedy a No Build condition transportation deficiency or creates a new deficiency.

Notes:

Reductions/increases/improvements are the net change in comparison to the 2030 No Build condition.

\*Preferred Alternative

## ES-7 Summary of Environmental Impacts and Mitigation

This section provides a summary of the environmental impacts of the alternatives and the associated mitigation measures. The chapter of the FEIS providing more detailed information on the methodology, affected environment (existing conditions), impacts and mitigation is provided in parentheses in the section heading for each topic.

### ES-7.1 Land Use (Chapter 6)

#### Consistency with Local Plans

##### **No Build Alternative**

The No Build Alternative would be inconsistent with the transportation portions of the plans of Williston, Essex and Essex Junction which call for the completion of the CCCH

(including Segments A and B). Under the No Build Alternative, traffic volumes through residential areas along VT 2A in Williston and Essex Junction would continue to increase, inconsistent with local planning objectives.

### ***VT 2A Alternatives***

The VT 2A Alternatives would be inconsistent with the transportation portions of the plans of Williston, Essex and Essex Junction which call for the completion of the CCCH (including Segments A and B). These alternatives would be inconsistent with local planning that has anticipated construction of the CCCH, including the Chittenden Solid Waste District Regional Landfill which was accepted by Williston "with the understanding that the truck traffic serving this facility would be able to use the highway once constructed."<sup>4</sup> Williston, Essex and Essex Junction have submitted comments on the DEIS opposing the VT 2A and Hybrid Alternatives, in addition to comments during scoping. Widening of VT 2A and the associated increase in traffic volumes is explicitly opposed in the Essex Junction's 2008 Comprehensive Plan Update, which states:

"Due to the growth in non-destination traffic, the village supports alternative routes between adjacent communities along with an additional crossing over the Winooski River. Non-destination traffic is a threat to the vitality of the Village Center where the emphasis needs to be on local access, pedestrian mobility and safety, and aesthetics. Increased vehicular capacity is in direct conflict with these Village Goals and therefore is not supported to the extent it would involve additional vehicle lanes and road widening."

The VT 2A Alternatives would also be inconsistent with the completed Essex Junction Redevelopment Project, which involved streetscape improvements and additional parking along VT 2A.

### ***Circ A/B Alternatives***

Completion of the CCCH (including Segments A/B) is generally supported by the comprehensive plans of Williston, Essex, and Essex Junction and has been anticipated in local planning.

Alternative 16b and the Preferred Alternative would be inconsistent with the portion of the 2006 Williston Comprehensive Plan which states that there should be no interchange between the CCCH and US 2. However, in comments on the DEIS, the Williston Selectboard stated the intention to revise the town plan to be consistent with their comments.<sup>5</sup> The Williston Selectboard comments indicate a preference for grade separated interchanges at US 2 and Redmond Road, along with a boulevard cross section and a reduced speed limit. Minimizing impacts to Allen Brook is also a preference of Williston for the Circ A/B roadway.

The Preferred Alternative would be consistent with the preference of the Williston Selectboard for a roadway with a boulevard profile, a reduced speed limit and minimal impacts to Allen Brook due to extensive bridge span. However, the Preferred Alternative

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<sup>4</sup> See the letter dated October 18, 2005 in the correspondence section of DEIS Appendix D: *Public Involvement and Agency Coordination*.

<sup>5</sup> The next update of the Williston Comprehensive Plan is expected by February 2011 when the current plan expires.

would not be consistent with Williston's preferred interchange configuration (the Preferred Alternative involves at-grade intersections at US 2 and Mountain View Road, not grade-separated interchanges). The Preferred Alternative uses at-grade intersections at these locations to minimize natural resource impacts.

The Preferred Alternative would be entirely consistent with the Williston Planning Commission comments on the DEIS indicating support for Alternative 17 as the best balance of meeting transportation needs while minimizing environmental impacts.

### ***Hybrid Alternatives***

The VT 2A portion of the Hybrid Alternatives would be inconsistent with the comprehensive plans of Williston, Essex and Essex Junction, and the Essex Junction Redevelopment Project (see the discussion for the VT 2A Alternatives above). The Circ Street would also be inconsistent with local plans that support completion of the CCCH (including Segments A/B) to reduce traffic volumes in residential areas in Williston and Essex Junction.

### **Parks and Recreational Facilities**

#### ***No Build Alternative***

Under the No Build Alternative, parks and recreational facility improvements are expected in the future, in accordance with local plans. These plans call for expansions of the WATP along VT 2A, an Alternative Transportation Path between Allen Brook Lane and Circ A/B right-of-way, and a primitive path on the east side of the Circ A/B corridor between Mountain View Road and Redmond Creek. The land north of the Allen Brook School would be developed as ball fields.

#### ***VT 2A Alternatives***

The VT 2A Alternatives would widen VT 2A, resulting in the lateral relocation of existing and planned segments of the alternative transportation path on VT 2A between US 2 and the Winooski River.

Alternatives 3 and 22 would replace the signalized intersection at Five Corners with a new roundabout design and require the reconfiguration of the external areas of Veteran's Memorial park, a small triangular park featuring war monuments, a row of flags, a fountain, a path and landscaping. Specifically, the alternatives would encroach into the southerly portion of the park area (taking 917 square feet), requiring the relocation of the main entry point to the park. Based on discussions with Essex Junction officials, the activities, features and attributes of the park would be adversely affected by the relocation of the main entry point as the orientation of the entry point to the war monuments is important for veterans' ceremonies. The impact to Veterans Memorial Park is considered a "use" under Section 4(f) of the Department of Transportation Act, a law requiring FHWA to avoid of historic and parkland resources (See Chapter 21: Section 4(f) Resources for more information).

### ***Circ A/B Alternatives***

In the VT 2A corridor, the Circ A/B Alternatives would include a spot improvement at the Industrial Avenue/Mountain View Road intersection that would result in the relocation of a portion of the WATP located immediately north of Industrial Avenue.

In the Circ A/B corridor, the Circ A/B Alternatives would include an overpass that would carry the WATP over the new roadway. The design would conform closely to the design which has been discussed with the Town since the late 1990s. The replacement of the at-grade temporary WATP segment with a WATP segment on an overpass structure would not adversely affect the existing and planned activities, attributes or features of this segment of the WATP (See Chapter 21: Section 4(f) Resources).

### ***Hybrid Alternatives***

In the VT 2A corridor, the Hybrid Alternatives would require the same lateral relocation of the WATP as the VT 2A Alternatives. Alternatives 19 and 23 would impact Veteran's Memorial park in the same way as described above for Alternatives 3 and 22.

In the Circ A/B corridor, the WATP would cross the new roadway at-grade with a pedestrian-operated traffic signal. The alignment of the WATP would remain similar to the existing alignment. Construction could be planned to allow continuous use of the WATP during construction. Because of concerns expressed by Town officials over pedestrian safety with an at-grade crossing, the impact of the Circ Street on the WATP within the Circ right-of-way would adversely affect the activities, features, and attributes of the facility. This impact could be avoided by placing the WATP on structure over the roadway, similar to the overpass described in the Circ A/B Alternatives.

### ***Farmland***

#### ***No Build Alternative***

In the VT 2A corridor, vacant parcels with farmland soils are currently zoned for commercial, mixed use and residential development and are expected to be developed consistent with zoning regulations under the No Build Alternative. Outside the Circ A/B corridor right-of-way, there are a few undeveloped parcels with farmland soils that may be developed in the future consistent with local zoning regulations.

#### ***VT 2A Alternatives***

The VT 2A Alternatives would have no effect on active farming and would require the conversion of less than one-half acre of farmland soils.

#### ***Circ A/B Alternatives***

Depending on the alternative, the Circ A/B Alternatives would require the acquisition of 4.5 to 21.54 acres of farmland soils outside the existing right-of-way.<sup>6</sup> The Preferred Alternative would require the acquisition of 7.3 acres of farmland soils outside the

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<sup>6</sup> The farmland soil impacts from the acquisition of the existing Circ A/B right-of-way in the early 1990's have previously been mitigated, see Chapter 6.

existing right-of-way. The Preferred Alternative would also require the acquisition of up to four acres of a parcel intermittently farmed by lease (parcel north of I-89 and west of the Circ A/B right-of-way). The affected parcel is owned by the Town of Williston. No other active farmland would be impacted under the Circ A/B Alternatives. The acquisitions of farmland soils beyond the existing right-of-way would occur on parcels that do not meet the definition of farmland under Federal Farmland Protection Policy Act, therefore no mitigation is required.

### ***Hybrid Alternatives***

In the VT 2A corridor, less than one-half acre of farmland soils would be converted, as described above for the VT 2A Alternatives. The Circ Street portion of the Hybrid Alternatives would require the acquisition of seven acres of farmland soils outside the existing Circ A/B right-of-way. The Circ Street would also require the acquisition of up to four acres of a parcel intermittently farmed by lease (parcel north of I-89 and west of the Circ A/B right-of-way).

## **ES-7.2 Social and Economic Conditions (Chapter 7)**

### **Property Acquisitions**

#### ***No Build Alternative***

No property acquisition impacts are anticipated under the No Build Alternative.

#### ***VT 2A Alternatives***

The largest number of residential and business displacements would occur under the four-lane VT 2A with roundabouts alternative (Alternative 3)—four residences and six businesses. Alternatives 2 and 22 would result in one to three residential displacements and four business displacements (See Table ES-3). These residential and business displacements involve uses that are well represented in the community and can be relocated, would not occur in a concentrated area, and would not result in a substantial diminishment of the household or employment base of the community.

The VT 2A Alternatives would require a substantial number of partial property acquisitions (77 to 157, depending on the alternative) that are not expected to encroach upon structures or substantially alter the use of the property, but would alter community character along the corridor, as discussed in the community character section, below.

#### ***Circ A/B Alternatives***

The Preferred Alternative would not require any residential or business displacements, as it would be located primarily within the existing Circ A/B right-of-way. Other Circ A/B Alternatives would similarly not displace residents or businesses, with the exception of Alternative 16b which would displace one residence in order to construct an interchange with US 2.

The Preferred Alternative would require four full acquisitions of vacant parcels and eleven partial property acquisitions. The property acquisitions associated with the Preferred Alternative are the result of an alignment shift at Mountain View Road to avoid

a vernal pool and reduce wetland impacts, the relocation of some stormwater basins outside of the existing right-of-way to reduce wetland impacts, and spot improvements on VT 2A. One of the partial property acquisitions is 0.7 acres from the Catamount Country Club property. The property acquisition under the Preferred Alternative is not expected to substantially affect the layout of the golf course located on the Catamount Country Club property.

***Hybrid Alternatives***

The Hybrid Alternatives would require the same property acquisition impacts in the VT 2A corridor as the corresponding VT 2A Alternatives. Additional property acquisitions would be required for the Circ Street to accommodate stormwater treatment areas and a diamond interchange with roundabouts at I-89. No residential or business displacements would be required with the Circ Street portion of the Hybrid Alternatives.

***Mitigation***

Relocation and/or compensation for the land owners affected by property acquisitions under the Build Alternatives would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and Vermont law for property acquisition for highway projects

**Table ES-3  
Summary of Property Acquisition Impacts**

	<b>Residential Displacements</b>	<b>Business Displacements</b>	<b>Full Acquisitions</b>	<b>Partial Acquisitions</b>
No Build	0	0	0	0
Alternative 2	3	4	8	155
Alternative 3	6	4	12	157
Alternative 22	1	5	8	77
Alternative 16a	0	0	3	9
Alternative 16b	1	0	4	9
Alternative 16c	0	0	4	12
<b>Alternative 17*</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>11</b>
Alternative 18	3	4	9	159
Alternative 19	6	4	13	161
Alternative 23	1	5	9	81

\*Preferred Alternative

**Community Character**

***No Build Alternative***

While future development under the No Build Alternative is expected to occur consistent with local planning documents, community impacts would occur from the increasing traffic volumes on VT 2A through residential areas in Williston and Essex Junction.

## ***VT 2A Alternatives***

The extent of partial property acquisitions under Alternatives 2 and 3, although individually small, would result in the alteration of the character of the landscape in the areas to the north of Blair Park in Williston and along the Park Street corridor in Essex Junction. Acquisitions that result in the shortening of front yards and setbacks may result in alteration of the appearance of properties, the utility of the space, and the loss of shade trees. Alternative 22 would also require property acquisitions in residential areas north of Blair Park in Williston, but would require fewer acquisitions along the Park Street corridor in Essex Junction. Alternatives 3 and 22 would require more property acquisitions at the Five Corners intersection in Essex Junction than would Alternative 2 in order to accommodate a roundabout.

By providing four-lanes for the length of the corridor, Alternatives 2 and 3 would substantially increase 2030 traffic volumes in residential areas in Williston and Essex Junction. For example, residential areas along the Park Street corridor between Cascade Street and Iroquois Avenue/Franklin Street in Essex Junction would experience a 46 to 61 percent increase in northbound traffic volumes during the PM peak hour (compared to the No Build Alternative). These traffic volume increases would increase traffic noise levels (see Chapter 9: Noise) and reduce the quality of life for residents of these areas.

Alternative 22 provides less capacity and would not substantially change traffic volumes in residential areas in comparison to the No Build Alternative, although the number of impacted noise receptors would increase (from 46 under the No Build condition to 60 under Alternative 22).

## ***Circ A/B Alternatives***

The community character impacts of the Circ A/B Alternatives would be substantially less than the VT 2A Alternatives, and are primarily related to visual and noise effects. Local residents of the subdivisions adjacent to the Circ A/B corridor between U.S. 2 and Mountain View Road would be sensitive to visual changes in foreground views that would occur under the Circ A/B Alternatives. The Preferred Alternative would have less visual impact in this segment than the other Circ A/B Alternatives (16a, 16b, 16c) due to a narrower roadway cross section and the opportunity for median landscaping with a boulevard design. Additional mitigation could be achieved through strategic plantings to screen residential areas from the roadway.

Traffic volumes and speeds under Alternatives 16a, 16b, and 16c would result in increased traffic noise levels that would exceed FHWA and VTrans noise impact criteria. As a result of a lower speed limit (40 mph) and a greater distance between the roadway and residences, the Preferred Alternative would not result in any noise impacts in the Circ A/B corridor (see Chapter 9: Noise).

By diverting traffic from other roadways, the Circ A/B Alternatives would reduce traffic volumes in residential areas along VT 2A in Williston and Essex Junction, and VT 15 and VT 117 in Essex Junction. This would result in improvements in community character and quality of life for the residents of these areas.

### ***Hybrid Alternatives***

In the VT 2A corridor, Alternatives 18, 19 and 23 would have the same impacts as Alternatives 2, 3 and 22, respectively. In the Circ A/B corridor, the Circ Street would have no noise impacts and minor visual impacts.

### **Environmental Justice**

The potential for environmental justice issues was examined using U.S. Census 2000 data to identify the percentage of minority and low income residents in the census blocks in the VT 2A and Circ A/B corridors in relation to the proportion of such residents in Chittenden County as a whole. The residential displacements, noise and visual impacts under any of the Build Alternatives would not cause a disproportionately high or adverse effect on any environmental justice population area.

### **Emergency Response Services**

#### ***No Build Alternative***

Under the No Build Alternative, increased traffic congestion in the project area would adversely impact emergency response times. Although drivers are required to pull over and allow emergency vehicles to pass, the results of interviews conducted with emergency response service providers in the project area indicated that congestion still affects emergency response times under certain circumstances, such as at intersections, on narrow roadways, and during the winter when snow and ice conditions may make it difficult for drivers to pull over on to the roadway shoulder.

#### ***VT 2A Alternatives***

The VT 2A Alternatives would generally reduce congestion on some portions of VT 2A, improving emergency response times along this key emergency response route. However, as discussed in Section ES-6, certain congested VT 2A roadway segments and intersections would not be improved under certain VT 2A Alternatives. Alternatives 2 and 3 would provide four-lanes from I-89 to Five Corners, providing additional room for emergency vehicles to pass regular traffic. Alternative 22 would not widen VT 2A in Essex Junction, and therefore would not improve emergency vehicle access in Essex Junction. The VT 2A Alternatives would not provide an alternative to VT 2A and North Williston Road for mutual aid responses between Essex and Williston.

#### ***Circ A/B Alternatives***

The Circ A/B Alternatives (including the Preferred Alternative) would provide an alternative to route to VT 2A and North Williston Road for trips between Essex and Williston, improving emergency vehicle response times for mutual aid responses. The Circ A/B roadway would improve transportation systems connectivity, providing emergency response providers with additional routing options in the event of unexpected closure of other roadways, such as the occasional flooding of the approach to the North Williston Road bridge. The Circ A/B Alternatives would reduce traffic volumes and congestion on VT 2A, North Williston Road, VT 15, and VT 117, improving emergency response times throughout the project area to a much greater degree than the VT 2A Alternatives during peak hours.

### **Hybrid Alternatives**

The VT 2A portion of the Hybrid Alternatives would have the same emergency services benefits and drawbacks as described above for the VT 2A Alternatives. The Circ Street portion of the Hybrid Alternatives would provide some additional options for emergency vehicle routing within Williston, but would not improve emergency vehicle response between Essex and Williston because the Circ Street would terminate at Mountain View Road.

### **ES-7.3 Air Quality (Chapter 8)**

The Clean Air Act and its amendments led to the creation of National Ambient Air Quality Standards (NAAQS) by the U.S. Environmental Protection Agency (EPA) for six criteria air pollutants: carbon monoxide, sulfur dioxide, ozone, particulate matter, nitrogen dioxide, and lead. The NAAQS are set at levels designed to protect public health. In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics.

The air quality analyses conducted for this EIS include the following components:

- § A microscale analysis of carbon monoxide and nitrogen dioxide concentrations near congested intersections. The results of this analysis show that the concentrations of these pollutants would be well below the NAAQS under the No Build and Build Alternatives.
- § A qualitative evaluation of the potential for particulate matter impacts in accordance with EPA and FHWA guidance. Based on this analysis, the ambient particulate matter levels in the project area are expected to continue to meet the NAAQS for these pollutants under the No Build and Build Alternatives.
- § A regional emissions analysis for two pollutants that lead to the formation of ozone (nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC)). The results of this analysis show that all of the Build Alternatives would reduce NO<sub>x</sub> and VOC emissions in comparison to the No Build condition.
- § A regional emissions analysis for Mobile Source Air Toxics (MSATs). The results of this analysis show that all of the Build Alternatives would reduce MSAT emissions in comparison to the No Build condition. The effects of the Build Alternatives on MSAT emissions are expected to be very small in comparison to the overall reductions in MSAT emissions expected under the No Build condition as a result of phased increases in fuel content and engine operation standards.

Chittenden County is currently an attainment area for all criteria pollutants, therefore demonstrating compliance with transportation conformity rules is not required for this project.

## **ES-7.4 Noise (Chapter 9)**

Noise impacts were analyzed in accordance with FHWA and VTrans noise policy. A summary of the total number of impacted receptors under the No Build and Build Alternatives is provided in Table ES-4.

### ***No Build Alternative***

Under the No Build Alternative, noise levels along VT 2A would range from 55 to 71 dBA and be similar to existing noise levels, which are primarily influenced by traffic noise. Noise levels along the Circ A/B corridor are predicted to remain close to existing noise levels, which are in the mid-40 and mid-50 dBA range (typical for rural and/or suburban environments).

### ***VT 2A Alternatives***

Under the VT 2A Alternatives, future noise levels are predicted to exceed the 67 dBA noise abatement criterion at 60 to 84 sensitive receptors, depending on the alternative. The largest number of noise impacts would occur under Alternative 3 (four-lane VT 2A with roundabouts).

### ***Circ A/B Alternatives***

As a result of the Circ A/B Alternatives, future noise levels are predicted to exceed the 67 dBA criterion at 39 to 52 receptors along VT 2A, depending on the alternative.

In the Circ A/B corridor, the Preferred Alternative and the Hybrid Alternatives would not result in any exceedences of the noise abatement criteria, while Alternatives 16a, 16b and 16c would result in exceedences of the noise abatement criteria at 33 to 34 sensitive receptors along the Circ A/B corridor.

### ***Hybrid Alternatives***

Under the Hybrid Alternatives, future noise levels are expected to exceed the 67 dBA criterion at 59 to 72 receptors along VT 2A, depending on the alternative.

In the Circ A/B corridor, the Hybrid Alternatives would not result in any exceedences of the noise abatement criteria.

### ***Mitigation***

For the VT 2A corridor, noise mitigation barrier modeling was not performed because the locations where impacts would occur would require abatement measures that would not be feasible. Noise barriers would not be effective on VT 2A due to the number of side streets and driveways along the corridor.

Noise barriers in the Circ A/B corridor were not evaluated for the Preferred Alternative because the Preferred Alternative would not result in any noise impacts in the Circ A/B corridor. For information on the noise barriers considered for other Circ A/B Alternatives, refer to DEIS Appendix L: *Noise Technical Report*.

**Table ES-4  
Summary of Noise Impacts**

	<b>VT 2A Corridor Impacted Receptors</b>	<b>Circ A/B Corridor Impacted Receptors</b>	<b>Total Noise Impacts</b>
No Build	46	0	46
Alternative 2	75	0	75
Alternative 3	84	0	84
Alternative 22	60	0	60
Alternative 16a	52	34	86
Alternative 16b	39	34	73
Alternative 16c	39	33	72
<b>Alternative 17*</b>	<b>52</b>	<b>0</b>	<b>52</b>
Alternative 18	72	0	72
Alternative 19	72	0	72
Alternative 23	59	0	59

\*Preferred Alternative

## **ES-7.5 Archaeological and Historic Architectural Resources (Chapter 10)**

### ***No Build Alternative***

Impacts to the character and setting of historic and archaeological resources in the project area could occur as a result of development activity under the No Build Alternative. However, no specific development proposals are known that would have an adverse effect on the historic and archaeological resources identified in the VT 2A and Circ A/B corridors.

### ***VT 2A Alternatives***

The historic architectural resource impact analysis summarized in the DEIS primarily focused on the size of the proposed property acquisitions and the distance between the structure and roadway under the various alternatives to make preliminary effects findings under Section 106 of the National Historic Preservation Act. The level of analysis was commensurate with the information needed to compare the ten Build Alternatives under consideration in the DEIS. For the FEIS, a reassessment of the VT 2A corridor historic resource impacts was conducted by the VTrans and FHWA. The reassessment consisted of plan review and field review. The reassessment identified several locations where the VT 2A Alternatives would result in a loss of mature street trees contributing to the historic setting of the affected properties, primarily along the Park Street corridor in Essex Junction. In addition, the reassessment also explicitly considered the potential impacts of utility relocations on the historic resources, as the VT 2A Alternatives would require existing overhead utilities to be relocated closer to the houses along VT 2A to accommodate roadway widening in many areas. These issues were not evaluated in detail in the 2006 Cultural Resources Technical Report impact assessment. Based on the reassessment, VTrans and FHWA agreed that the preliminary effect determinations presented in the DEIS should be modified from “No Adverse Effect” to “Adverse Effect” for ten historic resources for Alternative 2 and for eight historic resources for Alternative 3. For Alternative 22, one preliminary finding of “No Adverse Effect” was changed to

“Adverse Effect”. For the remaining historic resources, the 2006 Cultural Resources Technical Report effects findings were reaffirmed. For detailed information, refer to FEIS Appendix Y: *VT 2A Corridor Historic Architectural Resources Effects Update Memo*.

Including the changes from the reassessment described above, Alternative 3 would have an adverse effect on 15 historic properties eligible or listed on the National Register of Historic Places, while Alternative 2 would result in adverse effects to 13 historic properties (See Table ES-5). Alternative 22 does not involve roadway widening in Essex Junction where numerous historic resources are located, and consequently has fewer adverse effects (four). The adverse effects range from the loss of setbacks and mature street trees that impact the historic setting of each property to the complete removal of historic structures. For detailed information on the avoidance measures considered for the VT 2A Alternatives historic resource impacts, refer to Chapter 21: Section 4(f) Resources. Mitigation was also considered in accordance with VTrans’s *Manual of Standards and Guidelines*, as described in DEIS Appendix G: *Cultural Resources Technical Report*.

A Phase IB archaeological survey identified two archaeologically sensitive sites along VT 2A. If a VT 2A Alternative was selected, Phase II site evaluations would be required to determine if these sites are eligible for the National/State Register of Historic Places. However, since the Preferred Alternative would not require the disturbance of these sites, no further study of these sites is required for this project.

### ***Circ A/B Alternatives***

The Circ A/B Alternatives would not have an adverse impact on any historic resources. The Circ A/B corridor was previously studied through the Phase III data recovery stage, which included the excavation of all known important archaeological sites. Therefore, no additional archaeological studies are required for the Preferred Alternative.

### ***Hybrid Alternatives***

Along the VT 2A corridor, the Hybrid alternatives would have the same impacts as the VT 2A Alternatives. As with the Circ A/B Alternatives, the Circ Street would not have an adverse effect on historic properties or require additional archaeological studies.

**Table ES-5  
Summary of Historic and Archaeological Resource Impacts**

	<b>Adversely Affected National Register of Historic Places Eligible or Listed Properties</b>	<b>Archaeological Sites Requiring Further Study</b>
No Build	0	0
Alternative 2	13	2
Alternative 3	15	2
Alternative 22	4	2
Alternative 16a	0	0
Alternative 16b	0	0
Alternative 16c	0	0
<b>Alternative 17*</b>	<b>0</b>	<b>0</b>
Alternative 18	13	2
Alternative 19	15	2
Alternative 23	4	2

\*Preferred Alternative

### **ES-7.6 Natural Resources (Chapter 11)**

#### **Water Resources**

##### ***No Build Alternative***

Under the No Build Alternative, minor changes in water quality could occur as a result of increased impervious surface area from other development in the project area. These potential changes would be limited by existing regulations for stormwater control.

##### ***VT 2A Alternatives***

Under the VT 2A Alternatives, loadings of sediment, nutrients and metals would be reduced in comparison to existing conditions as a result of the treatment of stormwater from existing untreated impervious surfaces. The magnitude of the pollutant loading changes under the VT 2A Alternatives is on the order of one-half of one percent or smaller. The VT 2A Alternatives would result in a 8.5 to 14.5 mg/l increase in the average annual chloride concentration in the Unnamed Tributary of Muddy Brook at RM 0.2 (South Brownell Road). At RM 0.2 the existing mean chloride concentration is 453 mg/l, in excess of the 230 mg/l EPA recommended criterion for chloride aquatic life toxicity. Mitigation for this impact could include the use of deicing salt application best management practices by all public and private sources in the watershed (VTTrans has already implemented a Smart Salting program for state roads, see Section 11.3.1).

Under the VT 2A Alternatives, average annual chloride concentrations would increase by 2 mg/l or less in Allen Brook and the Winooski River. Based on measured background concentrations and the small magnitude of the predicted increases, Allen Brook and the Winooski River are not expected to exceed the EPA recommended criterion for chloride aquatic life toxicity. Therefore, the predicted chloride concentration increases are unlikely to have an adverse affect on aquatic biota.

### ***Circ A/B Alternatives***

Under the Circ A/B Alternatives loadings of sediment to Allen Brook and Tributary to the Winooski River (1) would be reduced in comparison to existing conditions as a result of the stormwater treatment provided. The magnitude of these loading changes is on the order of 0.75 percent or less. For nutrients and metals, the Circ A/B Alternatives could result in increases in pollutant loadings. None of the projected changes are expected to affect the attainment of water quality standards in the affected waterbodies and none of these waterbodies are impaired for these pollutants.

While specific requirements for stormwater permitting have not yet been determined, the Preferred Alternative would include an offset project to compensate for a minor increase in total phosphorus loadings to Allen Brook, Redmond Creek and Unnamed Tributary to the Winooski (1). It is recommended that the offset be located in the Allen Brook watershed because Allen Brook has a substantially higher existing total phosphorus concentration than Redmond Creek or Unnamed Tributary to the Winooski River (1), and is the focus of a stormwater TMDL.<sup>7</sup> Due to the small size of the projected loading (e.g. an increase of 15 pounds of phosphorus per year in the Allen Brook watershed) it should not be difficult to develop an effective offset plan. VTrans and FHWA are proposing a compensatory stream mitigation package that consists of replacing three culverts with bridges along Allen Brook, two on Talcott Road and one on Old Stage Road. In addition to addressing direct and secondary stream impacts, the stream mitigation package will also serve as phosphorus loading offset for the project by eliminating stream geomorphic conditions contributing to excessive erosion.

The Circ A/B Alternatives are not expected to contribute to any waterbodies exceeding the EPA recommended criterion for chloride aquatic life toxicity (230 mg/l). The largest potential increase in chloride concentrations would occur in the Unnamed Tributary of the Winooski (1) at a chloride monitoring site downstream of Mountain View Road (the concentration would increase from 106 to 201.8 mg/l), however the total estimated chloride concentration in this waterbody would be less than the 230 mg/l criterion. Therefore, the predicted chloride concentration increases are unlikely to have an adverse affect on aquatic biota. It is important to note that the assumptions used in the chloride analysis are very conservative. For example, the analysis uses a deicing salt application rate based on the highest recorded average rate between 1981-2005 for VTrans District 5.

### ***Hybrid Alternatives***

Under the Hybrid Alternatives, loadings of sediment, nutrients and metals would be reduced in comparison to existing conditions as a result of the treatment of stormwater from existing untreated impervious surfaces. The magnitude of the pollutant loading changes under the Alternatives is on the order of 1.42 percent or less. The Hybrid Alternatives would result in a 8.5 to 14.5 mg/l increase in the average annual chloride concentration in the Unnamed Tributary of Muddy Brook at RM 0.2 (South Brownell Road). At RM 0.2 the existing mean chloride concentration is 453 mg/l, in excess of the

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<sup>7</sup> The Total Maximum Daily Load (TMDL) for Allen Brook was approved by EPA on August 21, 2008. Section 303(d) of the Federal Clean Water Act requires each state to identify waters not attaining water quality standards, and to establish TMDLs for such waters for the pollutant of concern. The TMDL establishes the allowable pollutant loading from all contributing sources at a level necessary to attain the applicable water quality standards.

230 mg/l EPA recommended criterion for chloride aquatic life toxicity. Mitigation for this impact could include the use of deicing salt application best management practices by all public and private sources in the watershed (VTTrans has already implemented a Smart Salting program for state roads, see Section 11.3.1).

Under the Hybrid Alternatives, Allen Brook, Winooski Tributary (1) and the Winooski River are not expected to exceed the EPA recommended criterion for chloride aquatic life toxicity (230 mg/l). The largest increase in chloride concentrations would occur in the Unnamed Tributary of the Winooski (1) at the chloride monitoring site downstream of Mountain View Road (19.9 mg/l increase), however the total estimated chloride concentration in this waterbody would be less than the 230 mg/l criterion. Therefore, the predicted chloride concentration increases are unlikely to have an adverse affect on aquatic biota.

### **Floodplains**

#### ***No Build Alternative***

Under the No Build Alternative, floodplain encroachment in the VT 2A and Circ A/B corridors would be minor due to the development restrictions of floodplain zoning along Allen Brook and Winooski River.

#### ***Build Alternatives***

In general, adverse impacts to floodplains and stream geomorphology would be avoided through appropriate bridge and culvert structure design, and stormwater treatment practices that would be implemented as part of any of the Build Alternatives. For example, the Vermont Stormwater Management Manual provides standards for channel protection control (1-year storm), overbank flood control (10-year storm), and extreme flood control (100-year storm) that would be met as part of the proposed project. Incompatible floodplain development is not expected due to local zoning restrictions on floodplain development.

The potential encroachment of the Build Alternatives (including the Preferred Alternative) on the FEMA 100-year floodplain and floodway is minor due to the use of bridge spans at the Allen Brook and Winooski River crossings along the VT 2A and Circ A/B corridors. No “significant encroachment” as defined by 23 CFR 650A would occur and therefore an “Only Practicable Alternative Finding” is not required for the Preferred Alternative in this FEIS. The quantification of potential 100-year floodplain encroachment by alternative is provided in Table ES-6. Under the Preferred Alternative, one bridge pier would be placed within the Winooski River FEMA floodway (0.04 acres of encroachment). Two bridge piers would be placed in the Allen Brook FEMA 100-year floodplain.

During final design of the Preferred Alternative, detailed hydraulic studies and coordination with FEMA and DEC would be conducted to further minimize potential impacts and ensure compliance with the applicable floodplain management requirements. If necessary, compensatory flood storage areas would be constructed and/or FEMA procedures for floodplain map revisions followed.

## **Wetlands**

### ***No Build Alternative***

Under the No Build Alternative, impacts to wetlands could occur as a result of future development. This impact is expected to be limited by the regulatory protections afforded wetlands.

### ***VT 2A Alternatives***

Direct permanent wetland impacts associated with the VT 2A Alternatives would be 0.93 to 1.39 acres (see Table ES-6). The majority of the impacts are to emergent wetland systems adjacent to the existing roadway and other development. Secondary wetland impacts under the VT 2A Alternatives would be minor because no fragmentation impacts would occur and the affected systems are already adjacent to a roadway.

### ***Circ A/B Alternatives***

Under the Preferred Alternative, direct permanent wetland impacts total 21.81 acres, compared to 30.57 to 46.83 acres under other Circ A/B Alternatives. The Preferred Alternative would have substantially fewer direct wetland impacts than other Circ A/B Alternatives as a result of avoidance and minimization design measures (See Section ES-5).

Secondary impacts under the Preferred Alternative total 29.56 acres. While direct impacts represent the complete elimination of part of a wetland, secondary impacts typically represent a qualitative change in a particular function or service as a result of the project. The majority of the areas indicated as secondarily impacted would remain as wetlands with associated functions and services still present, though altered.

The majority of the wetland impacts of the Preferred Alternative (68 percent of direct impacts, 58 percent of secondary impacts) would affect relatively low value emergent wetlands formed on farmland abandoned when the right-of-way for the Circ A/B corridor was acquired in the early 1990's. Particularly for the portion of the corridor south of Mountain View Road, the impacted wetlands are located in a developed landscape setting. The land use surrounding the Circ A/B corridor in this area includes residential subdivisions, a school and a golf course.

Relatively higher quality wetlands with a greater array of functions and services are located in the portion of the corridor just north of Mountain View Road. The forested wetland complex in this area is 56 acres in size, contains a vernal pool used by wood frogs, and provides habitat for the woodcock. The Preferred Alternative would bisect the eastern portion of this wetland and result in 4.15 acres of direct impacts and 7.54 acres of secondary impacts. Numerous design measures were taken to avoid and minimize impacts in this area, including an easterly alignment shift and the use of a signalized intersection instead of an interchange with Mountain View Road or Redmond Road.

While a detailed quantitative secondary impact assessment was not conducted for other Circ A/B Alternatives (16a, 16b and 16c), the most substantial type of secondary impact associated with these alternatives (isolation of wetland areas within interchange ramp areas) has been incorporated into the direct impact estimates. These alternatives would

have additional secondary impacts similar to or larger than the secondary impacts of the Preferred Alternative.

### ***Hybrid Alternatives***

Direct permanent wetland impacts associated with the Circ Street portion of the Hybrid Alternatives would be 18.53 acres. The Hybrid Alternatives would also have wetland impacts in the VT 2A corridor, identical to those presented for the VT 2A Alternatives, with Alternative 2 corresponding to Alternative 18, Alternative 3 to Alternative 19 and Alternative 22 to Alternative 23. Adding the VT 2A portion and Circ Street portion of the wetland impacts together, the total direct permanent wetland impacts would be 19.92, 19.43 and 19.57 acres under Alternatives 18, 19 and 23, respectively.

A detailed quantitative secondary impact assessment was not conducted for the Hybrid Alternatives. In the VT 2A corridor, the Hybrid Alternatives would have minor secondary impacts due to the developed nature of the corridor. In the Circ A/B corridor, the Hybrid Alternatives would have secondary impacts similar to the secondary impacts of the Preferred Alternative between I-89 and Mountain View Road (approximately 20 acres of secondary impacts).

### ***Compensatory Wetlands Mitigation***

The DEIS presented information on a preliminary wetland mitigation site search and potential candidate mitigation sites. However, with the exception of the existing Lemire site, none of the most promising sites identified by the initial site search had landowners willing to sell their property to VTrans.<sup>8</sup> During agency coordination meetings in 2008, the resource agencies expressed concern that while the existing Lemire mitigation site previously created as part of the Section 404 permitting for the CCCH may be suitable for compensation for emergent wetland impacts, it may not be suitable for forested wetland restoration. Since the DEIS, an expanded wetland mitigation site search has been conducted to identify additional potential mitigation sites based on both natural resource suitability and landowner interest. Three candidate sites have been identified as a result of the mitigation site search and are described in Section 11.5.4. While the mitigation sites have not been designed in detail at this stage, the currently available information shows that the candidate sites will provide more than the required quantity and quality of wetland enhancement to meet the mitigation ratios established by ACOE. Both direct and secondary impacts of the Preferred Alternative will be compensated for in the wetlands mitigation package. Agency coordination will continue throughout the development of the mitigation design plans.

### ***Threatened and Endangered Species***

Agency coordination and field studies were conducted to determine if any threatened or endangered species exist in the VT 2A and Circ A/B corridors. No threatened or endangered species are known to exist along the VT 2A or Circ A/B corridors, therefore no impacts would occur under the No Build or any of the Build Alternatives and mitigation is not necessary.

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<sup>8</sup> While condemnation of land for wetlands mitigation is an option, it is not preferred by VTrans if alternative sites with willing landowners are available.

## **Vegetation and Rare Plants**

### **No Build Alternative**

Minor impacts to vegetation would occur as a result of future development under the No Build Alternative.

### **VT 2A Alternatives**

Long-term minor impacts to the habitat of the rare plant *rough avens* on shorelines of Allen Brook and rare bryophytes on the rock islands in the Winooski River could occur due to increased shading associated with the proposed wider bridges. Mitigation options for *rough avens* that could be affected by construction would include, but are not limited to, transplanting to a similar habitat along Allen Brook, in coordination with VANR. Rare bryophyte mitigation options, such as transplanting to a suitable microhabitat, would also be considered if a VT 2A Alternative was selected.

The largest vegetative cover type impacted under the VT 2A Alternatives would be residential/commercial areas. Forest cover impacts would total less than one acre (See Table ES-6).

### **Circ A/B Alternatives**

Long-term minor impacts to *rough avens* habitat at the Circ A/B crossing of Allen Brook could occur due to increased shading associated with a new structure. Mitigation options for *rough avens* that could be affected by construction would include, but are not limited to, transplanting to a similar habitat along Allen Brook, in coordination with VANR.

The largest vegetative cover type impacted would be deciduous forest under Alternatives 16a, 16b and 16c, and old field under the Preferred Alternative. At 55.6 acres, the Preferred Alternative has substantially smaller area of forest cover disturbance than other Circ A/B Alternatives as a result of design measures to avoid and minimize impacts (e.g. narrower median, signalized intersections at US 2 and Mountain View Road).

### **Hybrid Alternatives**

Long-term minor impacts to the habitat of the rare plant *rough avens* along the shorelines of Allen Brook (at the VT 2A and Circ Street crossings) and rare bryophytes on the rock islands in the Winooski River (near the VT 2A crossing) could occur due to increased shading associated with the proposed wider bridges. Mitigation options for *rough avens* that could be affected by construction would include, but are not limited to, transplanting to a similar habitat along Allen Brook, in coordination with VANR. Rare bryophyte mitigation options, such as transplanting to a suitable microhabitat, would also be considered if a Hybrid Alternative was selected.

The largest vegetative cover type impacted would be residential/commercial areas. Forest cover impacts would total approximately 17 acres.

## ***Mitigation***

Compensatory mitigation for permanent vegetative cover impacts (other than regulated wetlands) is not required. Upland vegetative cover impacts (e.g. forest cover) will be compensated for through preservation and enhancement of upland buffer areas surrounding wetland mitigation sites and through any mitigation required for wildlife habitat impacts (e.g. deer wintering habitat mitigation).

## **Wildlife Habitat**

### ***No Build Alternative***

Impacts to wildlife habitat would occur as a result of future development under the No Build Alternative. Examples of planned future developments that would impact wildlife habitat include the proposed multi-use path on the west side of VT 2A between River Cove Road and the Winooski River and the Chittenden Solid Waste District regional landfill in the Circ A/B corridor.

### ***VT 2A Alternatives***

Overall, impacts to wildlife habitat will be minimal for the VT 2A Alternatives, given the developed nature of the VT 2A corridor. Therefore, no mitigation is proposed for the VT 2A Alternatives.

In terms of aquatic habitat, approximately 250 linear feet of Allen Brook would be relocated to accommodate a widened VT 2A, representing a permanent impact to stream-bottom habitat. Detailed mitigation/restoration measures would be considered if a VT 2A Alternative was selected.

### ***Circ A/B Alternatives***

Additional studies of the secondary wildlife habitat impacts of the Circ A/B Alternatives were conducted subsequent to the DEIS at the request of the resource agencies. While secondary impacts were described qualitatively in the DEIS, these impacts have been quantified for the FEIS. As described below, the wildlife habitat impact analyses consider the habitat requirements of certain individual species or groups of species (e.g. deer wintering habitat, vernal pool habitat), as well as a more generalized evaluation of potential secondary habitat impacts applicable to multiple species. The impact descriptions are focused on the Preferred Alternative. For information on the other Circ A/B Alternatives, refer to Chapter 11.

#### ***Deer Wintering Habitat***

A 633-acre deer wintering area crosses the Circ A/B corridor at Redmond Creek. Direct impacts to this deer wintering area under the Preferred Alternative would total 5.17 acres. Two habitat fragments would be created on the west side of the Circ A/B corridor, a 12.01-acre fragment on the south side of the former sandpit and 16.00 acre fragment on the north side of the former sandpit (See Figure 11.8-3 in Chapter 11). This impact has been minimized by the use of a bridge span over the Redmond Creek riparian corridor. A 50-foot wide unaltered natural area would be provided between the edges of the rip-rap that would stabilize the slopes under the bridge structure. The height of the

bridge above ground level over the riparian corridor would be approximately 35 feet; therefore deer should be comfortable crossing in this location. As a result, the 16-acre fragment would still be accessible from the larger habitat area remaining on the east side of the corridor (approximately 600 acres).

#### *Vernal Pool Habitat*

A field survey for potential vernal pools was conducted for the Circ A/B corridor. One vernal pool would be directly impacted and the habitat area surrounding an additional three confirmed vernal pools would be impacted by the Preferred Alternative. Based on guidance received from the resource agencies, the impact assessment methodology considers the forested habitat within 100 feet and within 750 feet of each confirmed and potential pool.

The Preferred Alternative substantially reduces impacts to Vernal Pool 1 (located north of Mountain View Road on the west side of the alignment) through the introduction of an easterly alignment shift at Mountain View Road which preserves a larger habitat area on the west side of the corridor and increases the distance between the roadway and the vernal pool (360 feet minimum). The improvements to Mountain View Road associated with the Preferred Alternative would impact 0.02 acres or less than half a percent of the southern portion of the 100-foot buffer area. The Preferred Alternative would result in 6.3 acres of direct impacts within the 750-foot buffer area or 14 percent of the existing habitat area. Although the quality and quantity of habitat is impacted, sufficient forested habitat will remain available for Vernal Pool 1 to support a population of wood frogs under the Preferred Alternative.

#### *General Habitat Edge Effects and Fragmentation*

When interior forest and/or grassland habitat areas are converted to edges as a result of fragmentation, several types of indirect effects can occur. These indirect effects may include increased penetration of light and wind into the forest and the establishment of invasive plants and other competing and predatory species. Particularly for forested habitats, changes in the microclimate (air temperature, humidity, wind, solar radiation, soil temperature, soil moisture, etc.) tend to occur along the newly created edge. Microclimate changes are small scale variations caused by the alteration of the forest's physical characteristics, including tree height, percent canopy closure and forest structure. As a result, changes in the microclimate have the potential to affect species diversity and density within the habitat edge area.

These general habitat edge effects were quantified using a 200-meter "edge effect zone" around existing development and the proposed roadway. The 200-meter distance was recommended by the U.S. Fish and Wildlife Service. The results of the analysis show that the majority of the edge effects of the Preferred Alternative would be additive effects in areas already impacted by existing development. Approximately 17.5 percent (70.47 acres) of the forest edge effects from Alternative 17 would affect existing forest interior habitat blocks (areas greater than 200 meters from existing development). Approximately 7.5 percent (16.61 acres) of the grassland edge effects of Alternative 17 would affect existing interior grassland habitat blocks. Of the four interior habitat areas impacted, the largest fragmentation impact would split an existing 194.8 acre interior habitat into two smaller interior habitat areas (28.5 acres on the west side of the corridor and 114.6 acres on the east side of the corridor).

### *Aquatic Habitat*

Under the Preferred Alternative, direct impacts to streams total 6,255 linear feet, while secondary impacts total 7,917 linear feet. The majority of the stream impacts (76 percent of direct impacts and 89 percent of secondary impacts) are associated with a hillside groundwater seep system located south of I-89. The hillside would be impacted by the construction of the interchange between the Circ A/B Boulevard and I-89.

For the Circ A/B crossing of Allen Brook, extensive bridging is proposed to minimize both stream and wetland impacts. The 345-foot bridge span would avoid direct channel relocation impacts in this unstable/adjusting stream system, while also allowing for wildlife to utilize the riparian corridor. Secondary impacts to Allen Brook would be limited to 307 linear feet associated with shading under the bridge and the potential geomorphic effects from the bridge piers.

For the Circ A/B crossing of Redmond Creek, a 177-foot bridge span is proposed. As a result, a 50-foot natural corridor would be maintained along Redmond Creek and direct channel relocation impacts would be avoided. Secondary impacts would total 386 linear feet from shading and hydrologic impacts.

### **Hybrid Alternatives**

The VT 2A portion of the Hybrid Alternatives would have the minimal impacts on wildlife habitat as described above for the VT 2A Alternatives.

South of I-89, the Circ Street portion of the Hybrid Alternatives would impact habitat for forest-dwelling animals, including non-winter range habitat for white-tail deer. Direct impacts to the 335-acre deer winter range habitat south of I-89 would be approximately 3.17 acres. No fragmentation impacts to this deer winter range are anticipated, as the majority of the habitat (ninety-nine percent) would remain as intact and viable habitat.

From I-89 to US 2, Circ Street would impact habitat that supports mainly small rodents and their predators, such as raptors, fox and coyote. North of US 2, it would impact habitat along the Allen Brook corridor suitable for a wider diversity of animals, including rodents and their predators, as well as rabbit, beaver, raccoon and muskrat. From Allen Brook north to Mountain View Road, the Circ Street would impact habitat supporting mainly small rodents and their predators.

The Circ Street would directly impact one vernal pool south of Mountain View Road. The Circ Street would result in indirect habitat edge effects similar to the Circ A/B Alternatives between I-89 and Mountain View Road. While habitat edge effects were not quantified for the Circ Street, they would primarily be additive effects in grassland areas already impacted by existing development. The forest interior habitats north of Mountain View Road would not be impacted.

Aquatic habitat impacts in the VT 2A corridor would be the same as described for the VT 2A Alternatives. In the Circ A/B corridor, the Circ Street would impact the streams south of I-89 similar to the Preferred Alternative. The impacts to Allen Brook would also be similar to the Preferred Alternative (assuming a similar bridge span would be used).

**Table ES-6  
Summary of Natural Resource Impacts**

<b>Alternative</b>	<b>Sediment, Nutrient and Metal Loadings from Stormwater Runoff</b>	<b>Effect on Chloride Concentrations</b>	<b>Direct Wetland Impacts (Acres )</b>	<b>Stream Impacts (Linear Feet)</b>	<b>Forest Cover Impacts (Acres)</b>
No Build	**	**	**	**	**
Alternative 2	One-half of one percent or smaller decreases in pollutant loadings due to stormwater treatment of existing untreated impervious surfaces.	Increases chloride concentration in one stream currently exceeding the criterion for chronic aquatic life toxicity (Unnamed Tributary to Muddy Brook).	1.39	250†	0.97
Alternative 3			0.93	250†	0.75
Alternative 22			1.04	250†	0.76
Alternative 16a	Less than one-percent change in pollutant loadings to Allen Brook. Loading increases of up to 13 percent in Redmond Creek. None of the projected changes are expected to affect the attainment of water quality standards.	Increases in chloride concentrations, with the largest increases in smaller streams, but total chloride concentrations in the affected waterbodies would not exceed the 230 mg/l criterion for aquatic life toxicity.	37.0	6,255‡	91.6
Alternative 16b			46.83	6,600‡	91.6
Alternative 16c			30.57	6,255‡	74.1
<b>Alternative 17*</b>			<b>21.81</b>	<b>6,255‡</b>	<b>59.1</b>
Alternative 18	Decreases and increases of less than one-percent, none of which would affect the attainment of water quality standards.	Increases chloride concentration in one stream currently exceeding the criterion for chronic aquatic life toxicity (Unnamed Tributary to Muddy Brook).	19.92	5,023‡	16.91
Alternative 19			19.46	5,023‡	16.68
Alternative 23			19.57	5,023‡	16.69

\* Preferred Alternative

† Relocation of Allen Brook in VT 2A corridor

‡ Majority of impact from intermittent streams/groundwater seep system on the hillside south of I-89.

\*\*Impacts associated with future development under the No Build Alternative would occur, but cannot be reasonably quantified at a local level of detail for comparison to direct impacts. The cumulative impacts of future development have been considered at a regional scale (See Chapter 17).











the immediate area in the vicinity of the alternatives (e.g., around interchanges, intersections, and connecting roadways).

### **Indirect Effects of the Build Alternatives**

The Vermont Statewide Model was used to analyze accessibility changes between the No Build Alternative and each Build Alternative. The results indicated that the Build Alternatives would produce a small change in travel times and accessibility to employment that would extend beyond the Chittenden County boundary. The increase or decrease in households and employment growth compared to the No Build for Chittenden County varies by alternative, but overall is very small— from between 0.01 percent and 0.30 percent of the total growth in households or employment for the county from 2000 to 2030. For example, under the Preferred Alternative 91 households and 114 jobs would locate in counties outside of Chittenden County as a result in the change in accessibility. This level of change is negligible in comparison to the overall level of growth expected under the No Build Alternative (29,130 households and 36,413 jobs added to Chittenden County between 2000 and 2030).

Within Chittenden County, the analysis indicates that the Build Alternatives will result in a small increase in the level of growth from 2000 to 2030 for Williston and small decreases in the level of growth for other towns. The increase in households for Williston varies from zero to two percent of the total growth from 2000 to 2030. Decreases for other towns range from zero to four percent, averaging five-tenths of one percent. Employment is expected to decrease in most locations with small increases in Colchester, Essex, and Essex Junction under most alternatives. Under the Preferred Alternative there would be 28 more households and 33 fewer jobs in Williston than under the No Build condition. The Preferred Alternative is estimated to slightly increase employment growth in Essex and Essex Junction relative to the No Build Alternative (57 jobs in Essex and 26 in Essex Junction). The projected changes in environmental impacts resulting from these shifts in future growth patterns are very small.

### **Cumulative Impacts of the Build Alternatives**

Chittenden County and the Northwest Vermont region are expected to experience continued growth and land development. Levels of growth anticipated for the future are largely consistent with past rates of growth. Development activity is expected to result in the intensification of existing urban, suburban, and village centers, and expansion of the suburban core and fringe to areas that are currently more rural in character. The level of anticipated development is likely to change some areas substantially while leaving the landscape in other area relatively unchanged. The Build Alternatives are not likely to alter these established trends.

Growth and development is expected to result in some cumulative impacts to agricultural lands, habitat areas, water quality, vegetation and forestland, social conditions, cultural resources, and visual resources. Some of these potential impacts will be moderated through review according to state environmental and development regulations. Other impacts can be avoided or minimized through municipal planning efforts, land use and zoning controls, subdivision requirements, design standards, taxation policies, and local roadway access management. The evaluation revealed no appreciable difference in the potential for cumulative impacts that would distinguish the Build Alternatives from one another or from the No Build Alternative at a regional scale.

Localized differences in cumulative impacts would occur within the project area as a result of differences in the direct impacts of the alternatives. The direct impacts of the Preferred Alternative on natural resources (including wetlands and wildlife habitat) will be addressed through mitigation.

## **ES-8 Federal, State and Local Actions Required**

The following sections list the state and federal permits that would be required for the Preferred Alternative. Agency coordination would be conducted during final design to determine which existing permits for the CCCH require modification or new applications to account for design changes from the previous limited access facility to the current proposed boulevard design.

### **ES-8.1 Federal**

- § 404 Corps of Engineers Permit (33 U.S.C. 1344 Clean Water Act, Section 404)
- § 401 Water Quality Certificate (33 U.S.C. Ch 26, Clean Water Act, Section 401)

### **ES-8.2 State of Vermont**

- § Act 250 Land Use Permit
- § Wetland Conditional Use Determination
- § National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit
- § Stormwater Discharge Permit
- § Stream Alteration Permit
- § Air Pollution Control Permit