FINAL REPORT

VT 116 / Kimball Avenue / Tilley Drive Area Land Use & Transportation Plan

South Burlington, Vermont

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Table of Contents

Introduction **5**

1.1 Area-Wide Vision 7

Existing Transportation System **8**

2.1 Land Use Characteristics 10

2.2 Crash Assessment 13

Meetings & Public Outreach **15**

3.1 Steering Committee Meetings 15

3.2 Public Meetings 15

3.3 Public Opinion Survey 16

Future Conditions **18**

4.1 Coordination with Property Owners/Developers 18

4.2 Incremental Build Out 19

4.3 Connector Roads 19

4.4 Mode Share 21

Transportation System Evaluation **22**

5.1 Transportation Evaluation 22

5.1.1 Swift Street Extension 23

5.1.2 Exit 12B 25

5.2 Summary of Transportation Evaluation Results 26

5.3 Public Transit 31

5.4 Bicycle and Pedestrian Infrastructure 32

5.5 Conceptual Cost Estimates 34

Conclusions **35**

List of Figures

Figure No.	Description	Page
Figure 1:	Project Study Area Map	6
Figure 2:	Project Study Area Intersections	9
Figure 3:	Zoning Districts within the Project Study Area	11
Figure 4:	Overlay Districts within the Project Study Area	11
Figure 5:	Study Area Reported Crashes	14
Figure 6:	Connector Roads Included in Evaluation	20
Figure 7:	Swift Street Extension	23
Figure 8:	Change in Network Traffic with Addition of Swift Street Connector (with Full Build-Out)	24
Figure 9:	Potential I-89 Exit 12B Configuration	26
Figure 10:	Intersection Mitigation Summary (Full Study Area)	28
Figure 11:	Intersection Mitigation Summary (Tilley/Kimball Focus Area)	29
Figure 12:	Public Transit Routes Proximate to the Study Area	31
Figure 13:	Proposed Bicycle & Pedestrian Network Improvements	32

List of Tables

Figure No.	Description	Page
Table 1:	Incremental Build-Out Assumptions & Estimated PM Peak Hour Trip Generation	19
Table 2.	Cost Estimate of Proposed Shared Use Paths	33
Table 3.	Conceptual Cost Estimates for Transportation System Improvements (100% Build Alternatives)	34

Appendices

1 Natural Resources Map
2 Existing Conditions Assessment Memorandum
3 Trip Generation Full Build Out
4 Transportation System LOS Summary
5 Incremental Build-Out Analyses
6 Public Outreach Summary

1 Introduction

The Chittenden County Regional Planning Commission (CCRPC) and City of South Burlington recognize the need to develop a long-range transportation plan for the area in the vicinity of Tilley Drive, Kimball Avenue and Hinesburg Road that supports the City's long-term vision. Current zoning in the area is predominantly (1) mixed industrial and commercial, (2) industrial and open space, and (3) residential. The area has a high concentration of undeveloped land, therefore, the plan evaluates a number of scenarios envisioning the future development of the area parcels.

This Plan evaluates how proposed land development affects the transportation network in the project area to help inform future land use and transportation decisions. The Plan was developed with input from the City of South Burlington, CCRPC, study area property owners, area stakeholders, and the public. The Plan evaluates potential future scenarios in this area, their impacts to the existing transportation network, and develops recommendations for transportation improvements within the project area to accommodate the envisioned growth consistent with local and regional planning goals.

The project Study Area can be seen in **Figure 1**.

Figure 1: Project Study Area Map

1.1 Area-Wide Vision

Purpose and Need Statement

Purpose

The Purpose of the VT116 / Kimball Avenue / Tilley Drive Area Land Use and Transportation Plan is to identify and develop cost effective, multimodal transportation strategies to support planned development within the study area in a compact, bicycle- and pedestrian-friendly, and mixed-use manner.

Need

Project needs, as defined by the City of South Burlington, Chittenden County Regional Planning Commission (CCRPC), project team members, and the public are summarized below

- **Transportation Infrastructure Insufficient to Accommodate Anticipated Growth:** The current transportation infrastructure is not anticipated to adequately handle the level of new person trips generated by anticipated development within and adjacent to the study area. New development in the Hinesburg Road / Tilley Drive area between 2020 and 2035 is anticipated to generate approximately 5,800 new trips during the evening peak hour.

- **Lack of Comprehensive Bicycle and Pedestrian Network:** The study area is currently served by a disconnected system of sidewalks (primarily in residential neighborhoods) and segments of shared use paths (along Kennedy Drive, Tilley Drive, Community Drive, and portions of Kimball Avenue). However, to create a truly multi-modal system, additional sidewalk and shared use path connections (including a crossing of I-89) are needed.

- **Limited Public Transportation Options:** Despite the presence of major employment hubs (e.g. Tilley Drive, Technology Park, and Meadowland Business Park) and residential neighborhoods (e.g. Butler Farms, O'Brien Farm), the study area is only served by two bus routes: the Purple route which runs along Kennedy Drive and the VT 116 Commuter route which runs along VT 116.

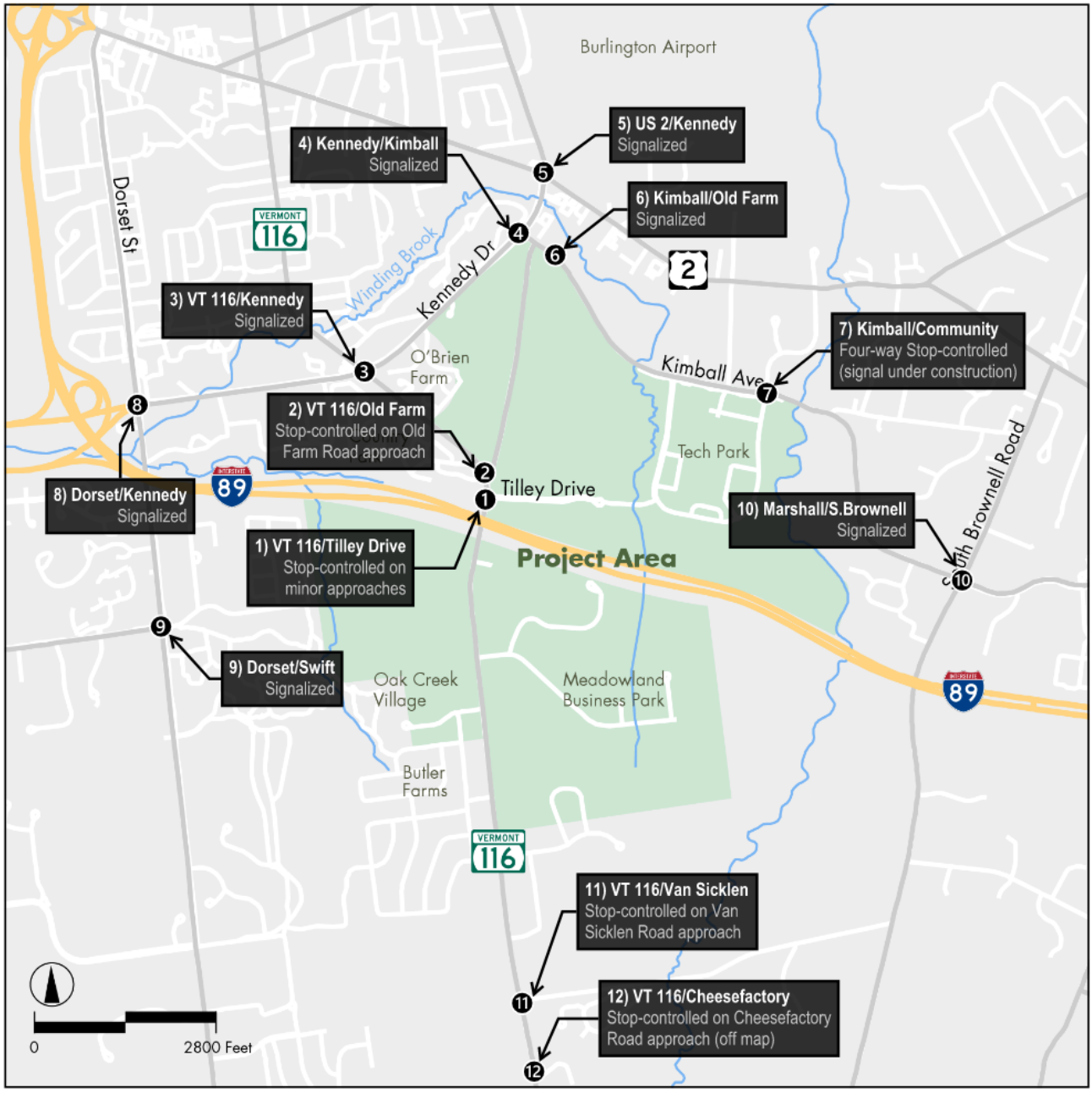
2 Existing Transportation System

The major roadways through the project area are Hinesburg Road (VT 116) traveling north-south through the length of the project area, Kimball Avenue traveling east-west along the northern boundary of the project area, Kennedy Drive forming a portion of the western boundary, and Tilley Drive, traveling east from VT 116 north of I-89. I-89 travels east-west through the center of the project area. The average annual daily traffic (AADT) along roadways in the area range from approximately 40,000 vehicles per day on I-89 to between 10,000 to 20,000 on US 2, Kennedy Drive, and Kimball Avenue, to just under 10,000 vehicles per day on VT 116.

This study includes evaluation of the twelve intersections identified in **Figure 2**. These intersections extend beyond the limits of the core study area to capture travel patterns and potential impacts resulting from improvements identified within the Study Area. Several additional intersections were evaluated during the development of alternatives and are further defined in **Chapter 5** of this report.

A detailed discussion of each intersection can be found in the Existing Conditions Assessment memo included in the **Appendix**.

Figure 2: Project Study Area Intersections



2.1 Land Use Characteristics

According to the South Burlington Land Development Regulations (2019), there are five zoning districts within the project area. The zoning districts are shown in **Figure 3** on the following page and are generally described as follows:

- **Industrial and open space (IO)**
  - High-quality, large-lot office, light industrial and research uses
  - High-quality planned developments that preserve a generally open character and enhance the visual quality of approaches to the City while providing suitable locations for employment and business growth.
  - The location and architectural design of buildings in a manner that preserves these qualities is strongly encouraged.
- **Mixed industrial and commercial (IC)**
  - General industrial and commercial activity in areas served by major arterial roadways with ready access to Burlington International Airport.
  - Major commercial uses, such as supermarkets and shopping centers shall not be permitted.
- **Commercial 1 – limited retail (C1-LR)**
  - Higher density residential and general retail at specific intersections to serve nearby residential areas. These areas are intended to serve the convenience shopping needs of local residents and employees which can be accessed by either driving or walking.
- **Residential 1 PRD (R1)**
  - Lower-density residential uses. A Planned Unit Development (PUD) may be permitted at a maximum of four units per acre.
- **Residential 12 (R12)**
  - High-density residential use near shopping areas, schools, and public transportation facilities.
  - Offices and other commercial uses may be permitted in locations that have direct access to arterial and collector streets so as not to adversely affect residential properties.

In addition to standard zoning maps, the City of South Burlington has developed several overlay districts which are specific to either environmental resources, areas of high traffic volumes and congestion, or to the City Center area. **Figure 4** shows the existing overlay and protection zones in the vicinity of the project area.

Figure 3: Zoning Districts within the Project Study Area

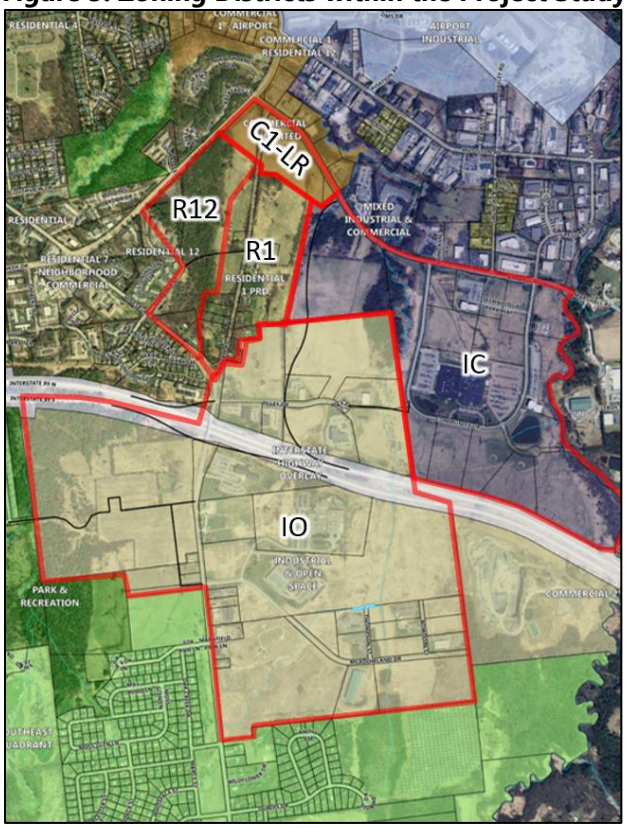
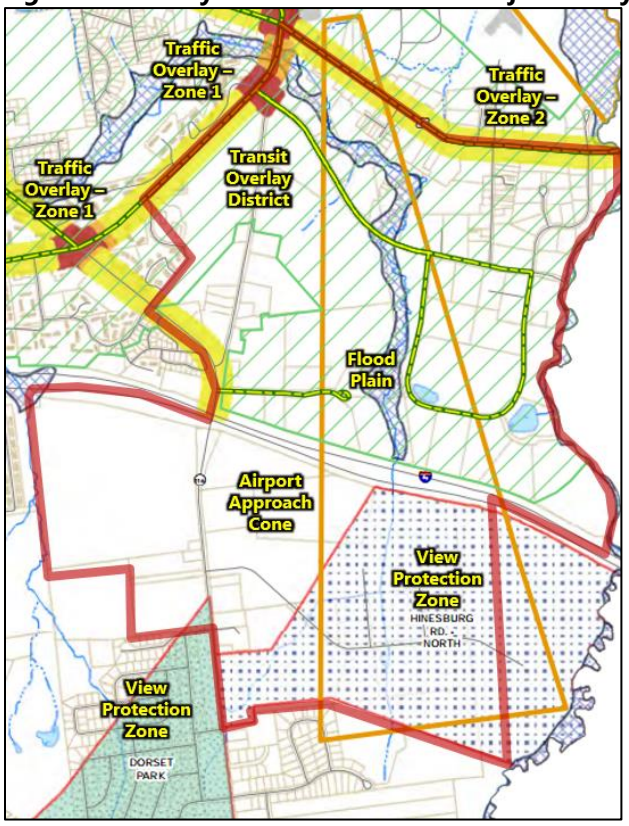
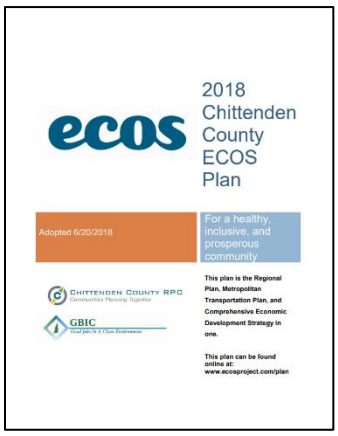


Figure 4: Overlay Districts within the Project Study Area





The Chittenden County ECOS Plan (2018) and South Burlington Comprehensive Plan (2016) both identify the opportunity for growth within the project area. The two plans classify the project area and identify goals for future development in the following ways:

- **Chittenden County ECOS Plan – Future Land Uses**
    - Enterprise (portion of project area to the east of Old Farm Road and south of I-89)
        - Areas that accommodate a future concentration of employment uses that attract workers from the County and multi-county region.
    - Metro (northwest portion of the project area surrounding Old Farm Road and west to Kennedy Drive)
        - Areas that accommodate jobs and housing in a compact development pattern that supports transit service and pedestrian activity.

- **South Burlington Comprehensive Plan – Land Use Planning Areas**

  Northeast Quadrant (portion of the project area that is north of I-89 and east of Old Farm Road)
    - Future land use in this area should:
        - Focus on employers and ancillary services;
        - Support multi-modal transportation;
        - Access to City Center;
        - Balance conservation of natural resources and open space with employment opportunities; and,
        - Consider the potential for a new Interstate interchange ("12B"). With no interchange the overall transportation and development capacity of the area could be limited.
    - This area is predominantly identified as medium to higher intensity land use that is principally non-residential.

  Northwest Quadrant (project area west of Old Farm Road)
    - Future land use in this area should:
        - Maintain housing stock;
        - Support evolving needs of residents;
        - Improve multimodal connectivity;
        - Support infill development that aligns with current use.
    - This area is predominantly identified as medium intensity land use with residential to mixed use.

  Southeast Quadrant (project area south of I-89)
    - Future land use in this area should:
        - Provide east-west connectivity;

        - Balance conservation of natural resources, contiguous open space, and recreational opportunities with residential, complementary non-residential, and
    - This area is predominantly identified as medium to higher intensity land use that is principally non-residential.

In addition to the future land planning areas, the South Burlington Comprehensive Plan also makes reference to a Projected Maximum Build Out analysis and Planned Infrastructure Improvements plan which were considered in the development of analyses for this study. The Projected Maximum Build Out for this area indicates that the majority of parcels will have one additional dwelling unit with greater than 100,000 square feet of non-residential floor area. There are a few parcels that stand out as exceptions to this projected land use, including the zoned residential parcels west of Old Farm Road and between Old Farm Road and Kimball Avenue, which are projected to have over 100 additional dwelling units.

The planned infrastructure improvements included a number of proposed connector roads throughout the study area. These proposed connections include Exit 12B, Tilley Drive Extension, Tilley/Kimball Connector (previously referred to as Medical Center Drive), Swift Street Extension, and Cider Mill Extension.

2.2 Crash Assessment

VTrans evaluates annual crash data and identifies High Crash Location (HCL) intersections and sections that meet the following two criteria: 1) have a minimum of five reported crashes in five years, and 2) have an actual-to-critical ratio greater than 1.0. VTrans' most recent High Crash Location (HCL) Report (2012-2016) was reviewed to identify HCLs in the project area.

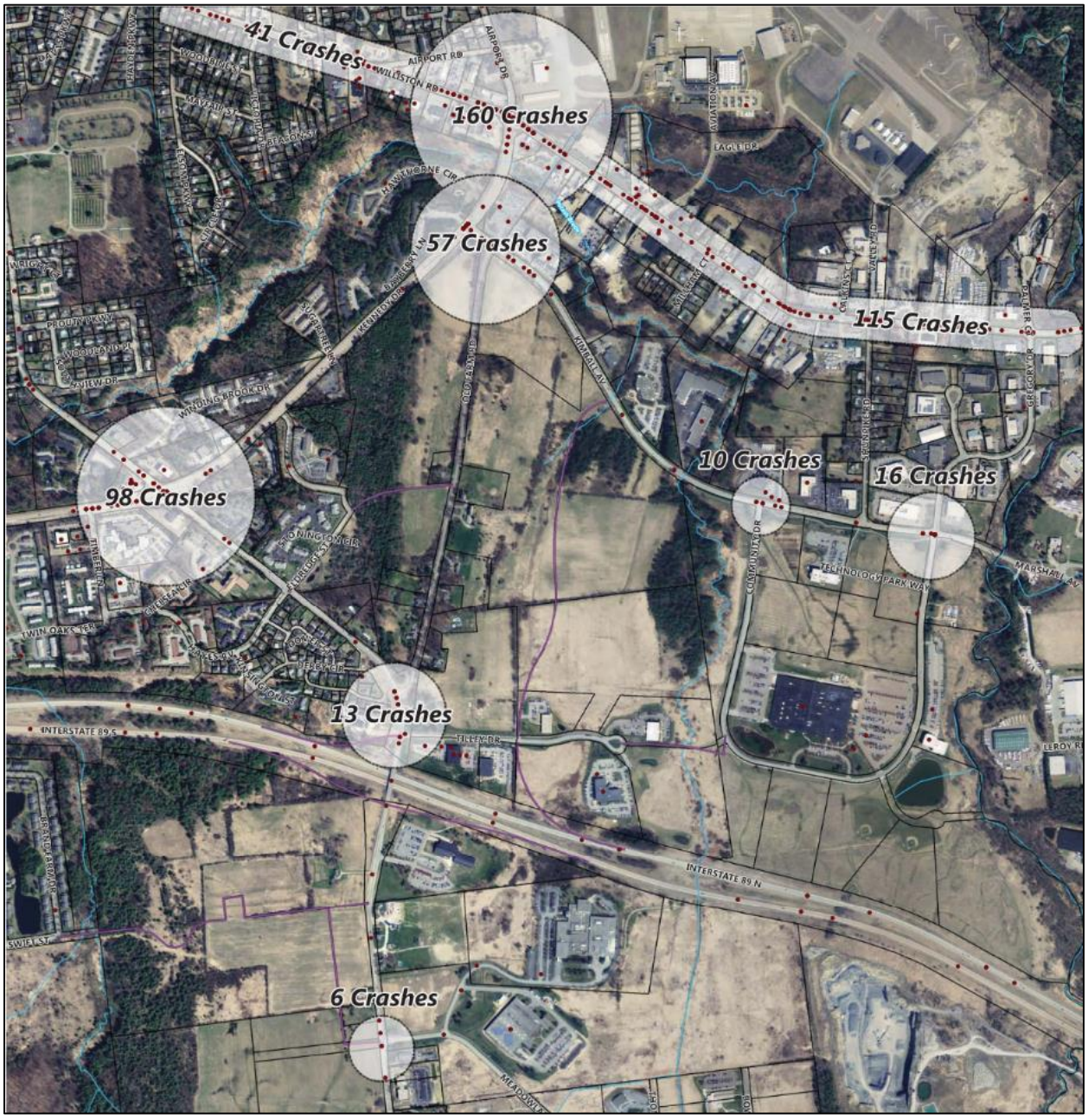
Identified High Crash Location intersections and segments within the project study area are summarized below:

- **High Crash Location Intersections**
    1. Kennedy Drive/Dorset Street
        - HCL Ranking: #49
        - Total Reported Crashes (2012-2016): 40
        - Actual/Critical Ratio: 1.375
    2. VT 116/Cheesefactory Road
        - HCL Ranking: #95
        - Total Reported Crashes (2012-2016): 14
        - Actual/Critical Ratio: 1.078
- **High Crash Location Segments**
    1. US 2/Williston Road (east and west of Kennedy Drive)
        - HCL Ranking: #444

- Total Reported Crashes (2012-2016): 75
- Actual/Critical Ratio: 1.298

2. <u>Kennedy Drive (east and west of VT 116)</u>
   - HCL Ranking: #724
   - Total Reported Crashes (2012-2016): 44
   - Actual/Critical Ratio: 1.040

Figure 5: Study Area Reported Crashes



3 Meetings & Public Outreach

The Public Involvement Plan for this project provided an opportunity to gather public input on the desired vision for the project area from a wide range of stakeholders including area property owners, City staff, Vermont Agency of Transportation (VTrans) staff, and the general public. Public engagement activities on this project included public meetings, presentations to South Burlington's planning Commission and City Council, and an online survey. These public outreach activities are summarized in this chapter.

3.1 Steering Committee Meetings

The project Steering Committee consisted of representatives from the CCRPC, the City of South Burlington, VTrans, and Green Mountain Transit. Ten Steering Committee meetings occurred over the course of the project. Steering Committee meeting agenda and notes can be found in the Appendix.

3.2 Public Meetings

There were four public meetings held over the course of the project as summarized below. Meeting notes and presentations can be found in the Appendix.

- The first public meeting on February 7, 2017 introduced the project area, provided a summary of existing conditions, summarized future land use expectations based on prior City Plan and studies, an overview of future

development based on developer and City input, and a summary of future traffic conditions with moderate development and no transportation infrastructure improvements. Potential transportation improvement packages were discussed, including variations of focusing on (1) transit, (2) interstate access, (3) connected streets, and (4) modest improvements.

- A second public meeting was held on August 8, 2017 hosted by the South Burlington Planning Commission which summarized information from the first meeting for those that did not attend the first public meeting, and two potential alternatives were presented which aimed to maintain adequate levels of service on the existing intersections in vicinity of the project area.
- The project team presented an update on the project to the South Burlington Economic Development Committee on June 24, 2019. This presentation included a project overview, a review of the alternatives evaluation process, and discussion about potential development patterns in the study area.
- The project team presented the draft Plan to the South Burlington City Council on July 6, 2020. The presentation included a review of the project's goals, public outreach, results of the alternatives evaluation, conclusions, and recommendations.

3.3 Public Opinion Survey

An online survey was conducted in February 2017 to gather general input on the overall vision for the project area. A total of 325 surveys were completed and the results are summarized below. Additional survey tabulations are included in the Appendix.

- A majority of responses came from South Burlington residents (88%), with 39% living in the project area.
- Almost three-fourths visited the project area at least 1-5 times per week; this includes the 30% that visited the project area daily.
- There was no clear preference regarding development density in the project area.
- There was no clear preference regarding the arrangement of future development in the project area, though the highest response leaned towards a clustered mix of uses.
- Land uses which more than 50% of those surveyed would like to see in the project area are parks and open space, multi and single-family housing, and office space. The land uses with the least support from those surveyed was hotels.

- The top four ranked choices for ways to enhance the transportation system were (1) connected network of sidewalks and paths, (2) construct a new I-89 interchange at VT 116, (3) increased transit service, and (4) expand the I-89 interchange at Exit 13.
- When given various potential transportation improvement packages, responders preferences included 34% for interchange access; 26% for a focus on transit, bike and pedestrian improvements; 25% for connected streets and paths, and 15% for modest improvements.

4 Future Conditions

4.1 Coordination with Property Owners/Developers

The Project Team met with representatives from most of the larger parcels within the study area to develop a better understanding of their future development plans, the anticipated scale and timing of the development, and any other issues or opportunities related to land use or transportation that came to mind.

Representatives associated with the following properties and/or projects were interviewed:

- Technology Park
- University of Vermont Medical Center
- O'Brien Brothers Realty
- Pizzagali Properties
- Meadowland PUD
- Rye Associates
- Hill Farm
- Dynapower

Based on the input provided by the development community, the project team estimated peak hour trip generation resulting from the build-out of the proposed parcels using Institute of Transportation Engineers' trip generation rates. Detailed information on anticipated trip generation based on future land uses is included in the Appendix.

4.2 Incremental Build Out

To better evaluate the incremental impact to the transportation network from potential development in the area, the development-related trip generation estimates were adjusted to represent 33%, 67%, and 100% build out of the development parcels in the Study Area.

Table 1 below summarizes the estimated evening peak hour trip generation estimates for each of the major development parcels within 33%, 67%, and 100% build-out scenarios. It should be noted that the rate of development on different development parcels was set based on input from the City of South Burlington to best reflect an estimate of market demand and saturation. As shown in the table below, after accounting for internal capture, pass-by and diverted trips, the full build-out of the development parcels in the study area is estimated to generate an additional 5,821 peak hour trips.

Table 1: Incremental Build-Out Assumptions & Estimated PM Peak Hour Trip Generation

	33% Build Out			67% Build Out			100% Build Out		
Development	**Total New Trips**	**Internal, Pass-By & Diverted**	**New Trips**	**Total New Trips**	**Internal, Pass-By & Diverted**	**New Trips**	**Total New Trips**	**Internal, Pass-By & Diverted**	**New Trips**
Technology Park	384	7	377	751	14	737	1,164	20	1,144
Tilley Drive	195	5	190	381	9	372	590	14	576
O'Brien Farm	555	85	470	833	171	662	1,110	256	854
Meadowland PUD	50	1	49	88	3	85	126	4	122
Dynapower	344	51	293	886	102	784	1,374	154	1,220
Rye	119	10	109	149	29	120	149	29	120
Hill Farm	501	74	427	1,293	146	1,147	2,004	219	1,785
TOTAL:	2,148	233	**1,915**	4,380	474	**3,907**	6,517	696	**5,821**

4.3 Connector Roads

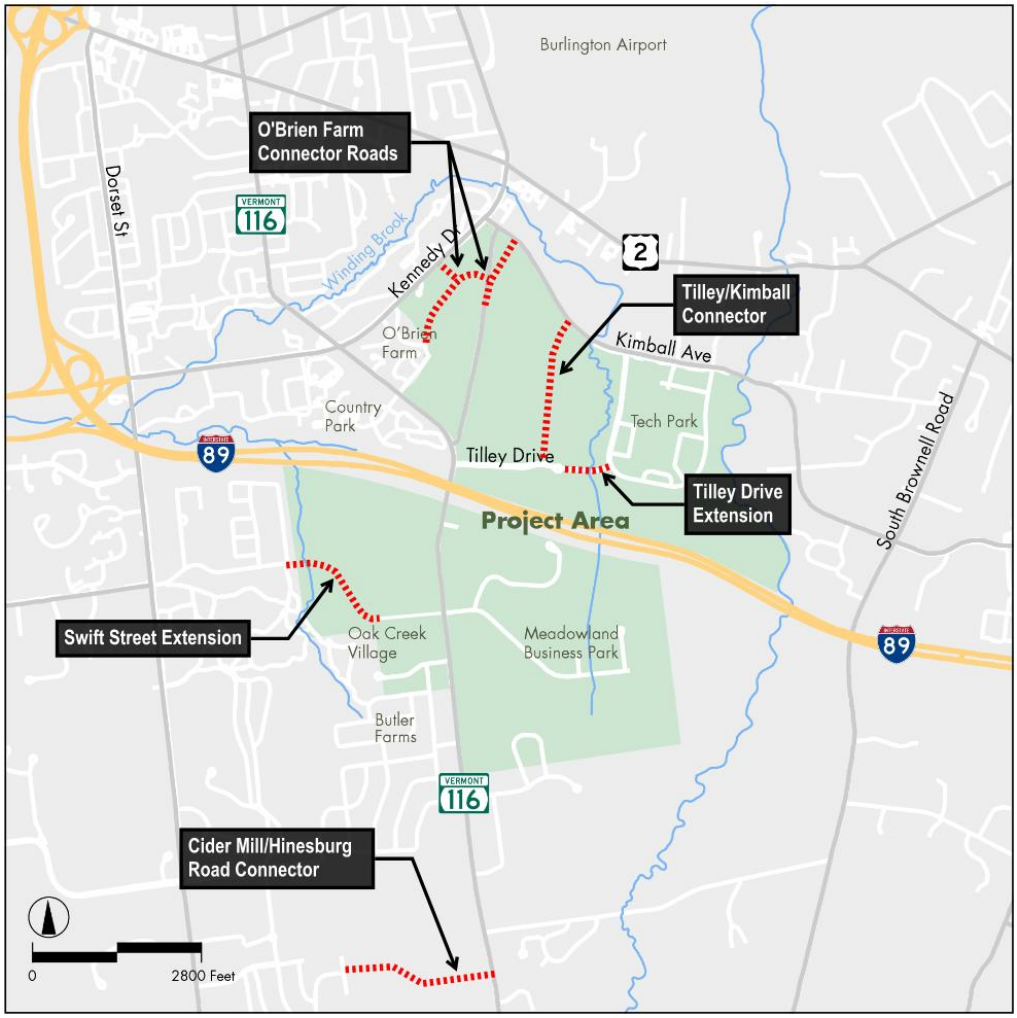
There are a number of proposed, planned, and/or permitted future connector roadways within and immediately adjacent to the study area that have been incorporated into the analysis. Evaluation of future transportation scenarios for the study area required consideration of these proposed and/or permitted connections as they will have an impact on access and movement in the area.

The connector roads summarized below and shown in **Figure 6** have been included in the transportation network evaluated in this Plan.

- O'Brien Farm Connector Roads: These two connector roads, O'Brien Farm Road and Two Brothers Drive would provide connectivity between Eldredge Street, Kennedy Drive, and Old Farm Road. These connectors roads were under construction at the time this report was prepared as the Hillside at O'Brien Farm neighborhood builds out.
- Tilley Drive Extension: The Tilley Drive Extension, which connects Tilley Drive to Community Drive, is included in the City of South Burlington's Official Map.

- Tilley/Kimball Connector: This planned connector road, which would connect Kimball Avenue to Tilley Drive, is included in the City of South Burlington's Official Map.
- Swift Street Extension: The Swift Street Extension, which would connect Swift Street at its current easterly terminus to Hinesburg Road, is included in the City of South Burlington's Official Map. The inclusion of the Swift Street Extension was evaluated as a separate scenario, as described in the next chapter.
- Cider Mill Connector: The connection between Cider Mill Drive and Hinesburg Road is included in the City of South Burlington's Official Map.
- Allen Road Extension: The Allen Road Extension Connector, which is outside of the area shown in **Figure 6**, is a connection from Spear Street to Dorset Street via Allen Road East and Midland Avenue. The Allen Road Extension is included in the City of South Burlington's Official Map.

Figure 6: Connector Roads Included in Evaluation



4.4 Mode Share

A stated transportation goal in South Burlington is to provide improved access for the movement of individuals via non-motorized modes. This goal is particularly relevant in the study area where a concentration of clustered, mixed-use, walkable development is anticipated. As such, the system evaluation for the study area builds on the reductions targeted in the CCRPC's Metropolitan Transportation Plan (MTP), which established county-wide goals for non-motorized mode share (15% non-motorized trips). This plan assumes an additional reduction of vehicle-based trips beyond the MTP investments. It was assumed that an additional 5% reduction of single-occupancy vehicle trips within 1 mile of the study area would be targeted, above and beyond the 15% reduction embedded in the MTP scenario. The study's recommendations include provisions for increased transit service and bicycle and pedestrian infrastructure to support this mode share target for the study area.

5 Transportation System Evaluation

A transportation system evaluation provides the opportunity to identify and prioritize various infrastructure improvements in the study area given anticipated land use changes and proposed new roadway connections. A number of scenarios were developed to evaluate the implications of incremental build out, additional connectivity in the network, and larger proposed infrastructure projects. The methods and assumptions for the assessment of each future scenario are discussed in the chapter below.

5.1 Transportation Evaluation

The transportation system evaluation incorporated incremental land use growth in the study area while considering larger proposed or planned transportation infrastructure improvements like new connector roads and interchanges. Although scenarios with a model year of 2035 were analyzed, the focus on incremental build out scenarios provided development milestones that could be considered as trigger points for various infrastructure improvements over time. Additionally, considering the access and movement implications of new connectivity at various stages of future development provided insights into what additional transportation infrastructure investments would be needed in the future.

The CCRPC Regional Model was used for the evaluation of the identified scenarios. The analysis assumed the transportation investments proposed in the 2018 ECOS Plan were made within the future year time horizon. The 2035 future land use

scenario initially held the development in the study area zones constant. The new trips for the 33%, 67%, and 100% build out scenarios were then added to the 2035 future land use scenario. The new trips from each build out scenario were distributed onto the network according to the regional model's distribution of trips within the study area.

In addition to evaluating transportation network impacts of varying levels of development in the study area, two additional alternatives were examined at the full build-out level that included: 1) the Swift Street Extension, and 2) Exit 12B.

5.1.1 Swift Street Extension

The proposed Swift Street Extension would extend Swift Street from its current easterly terminus at Brand Farm Drive south and east to connect with the westerly terminus of Rye Circle (approximately 2,100 feet in length). **Figure 7** below shows the approximate alignment of the Swift Street Extension as it is currently shown in South Burlington's Official Map (magenta line). The impacts and implications of this new connector road are evaluated within this study and described later in this section. Also shown in **Figure 7** is a potential secondary connector (purple line), which may be constructed in this location as part of any development on this currently undeveloped parcel (known as the "Hill Farm" parcel).

Figure 7: Swift Street Extension

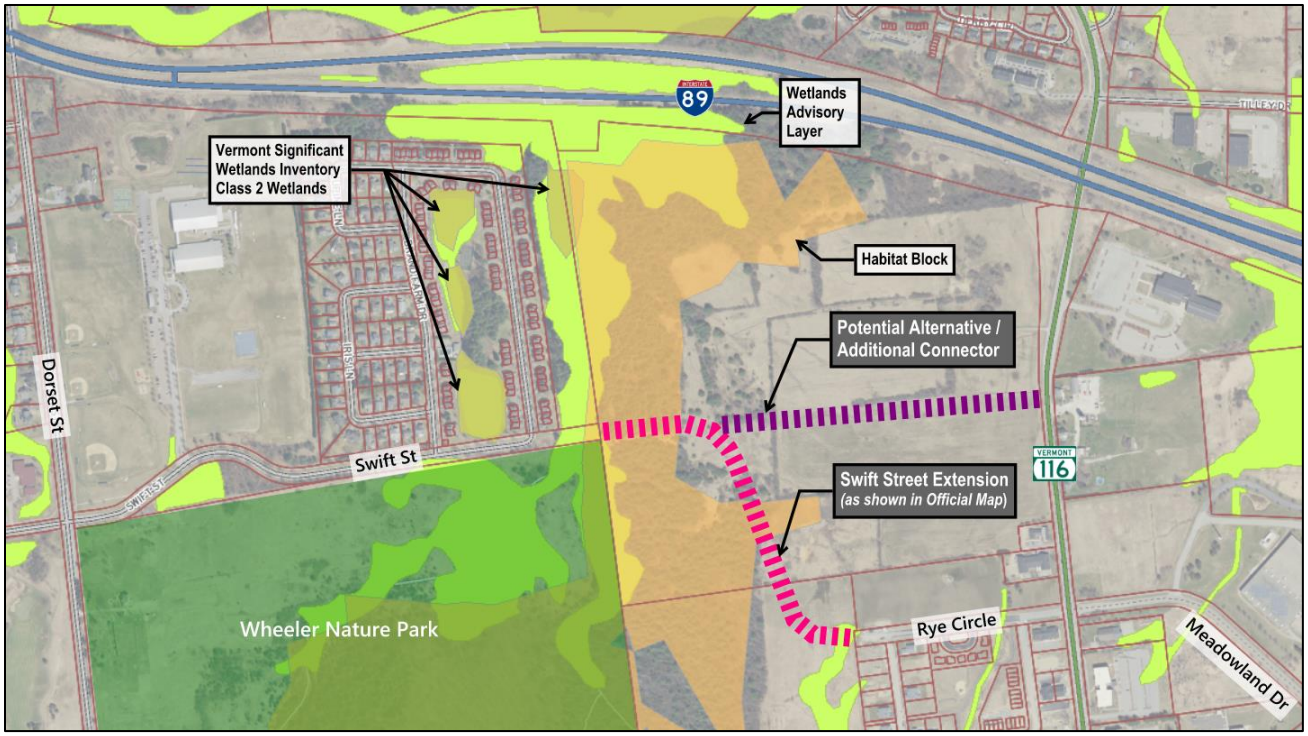
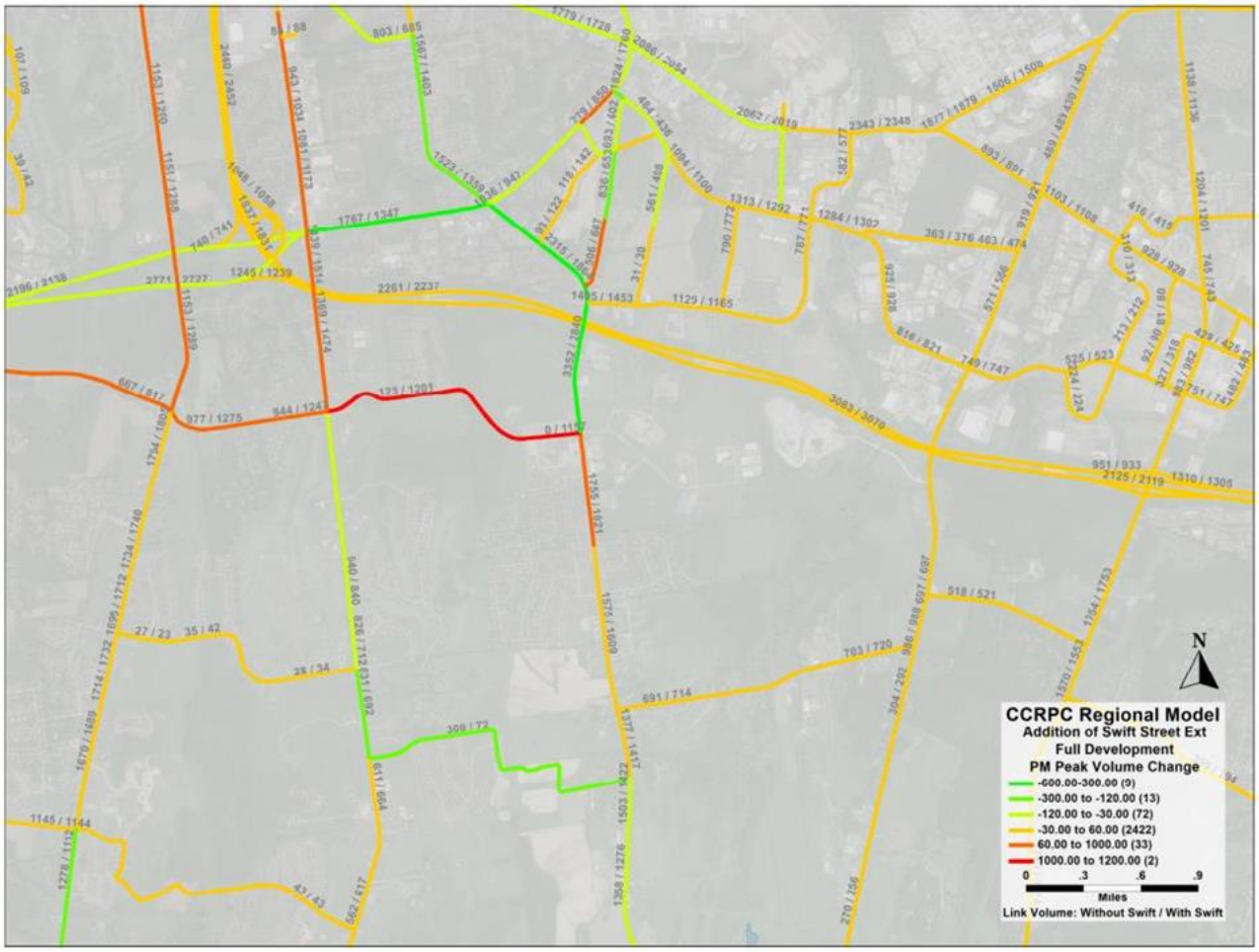


Figure 7 also shows that the proposed alignment of the Swift Street Extension would cross an identified Habitat Block as well as potential wetlands as indicated in the Vermont Agency of Natural Resources Atlas. In addition, the Natural Resources Atlas identifies a threatened vertebrate animal species habitat located in this area.

Figure 8 below shows the effect on traffic volumes (assuming full build-out) of adding in the Swift Street Extension to the transportation network. The numbers adjacent to each link in the figure indicate: 1) future PM peak hour volumes without the Swift Street Extension, followed by 2) future PM peak hour volumes with the Swift Street Extension in place. The red links indicate the roads expected to see the largest absolute increase in volumes.

Figure 8: Change in Network Traffic with Addition of Swift Street Connector (with Full Build-Out)



As shown in the above figure, the addition of the Swift Street Extension pulls traffic away from Kennedy Drive and Hinesburg Road and increases volumes along upper Dorset Street and Swift Street as traffic takes advantage of the new east-west connector. Traffic volumes along Kennedy Drive between Dorset Street and Hinesburg Road are expected to decrease by approximately 24% while volumes on VT 116 adjacent to Tilley Drive are expected to decrease by approximately 15% with the Swift Street Extension in place. Future evening peak hour traffic volumes on Swift

Street east of Dorset Street are expected to increase from approximately 125 PM peak hour trips to approximately 1,200 PM peak hour trips with the addition of the Swift Street Extension.

The easterly terminus of the Swift Street Extension would connect to Rye Circle and continue east to the existing two-way stop-controlled intersection of Meadowland Drive and Rye Circle with VT 116. With the addition of the Swift Street Extension (assuming 100% build-out), the VT 116 / Meadowland Drive / Rye Circle intersection would require a new signal or roundabout and a new eastbound left-turn lane (as shown below in **Figure 10**).

At full build-out with the Swift Street Extension in place, the Dorset Street/Swift Street signalized intersection could accommodate the projected volumes with minor signal timing and phasing adjustments.

5.1.2 Exit 12B

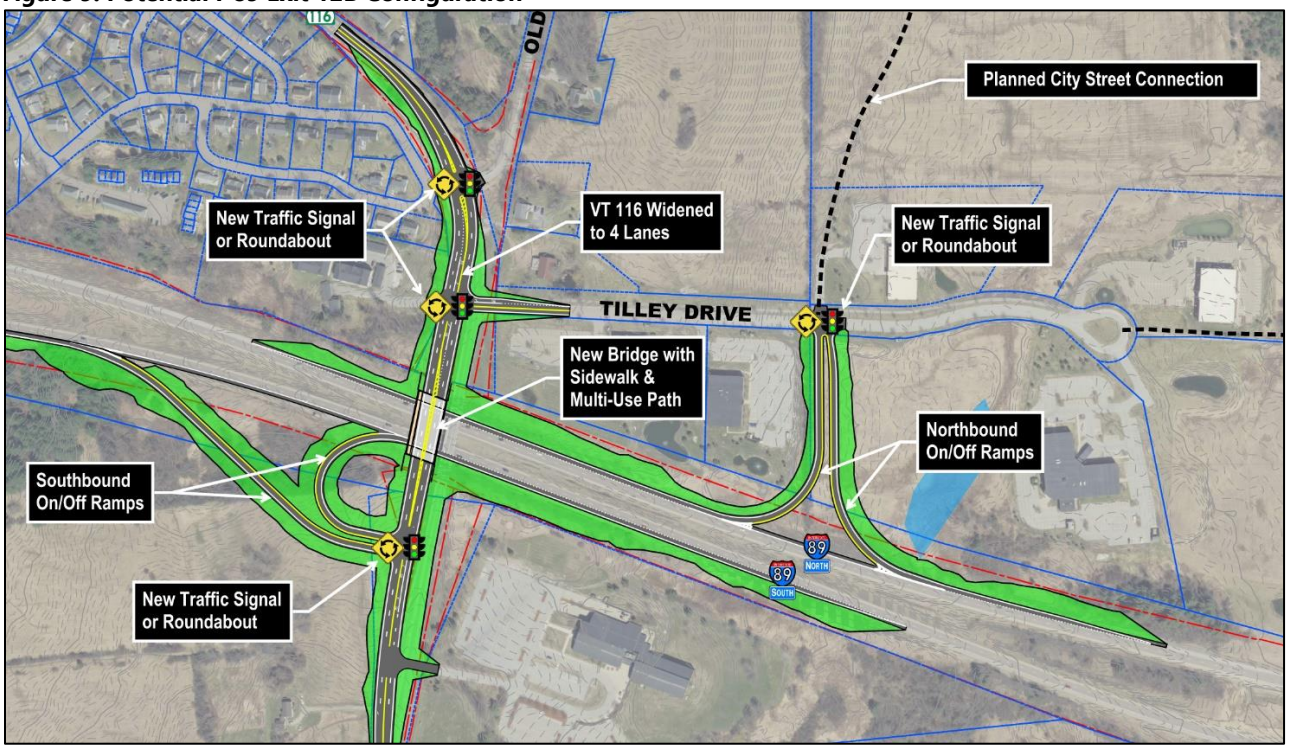
The final set of alternatives evaluated the implications of adding a new I-89 interchange at the existing VT 116 overpass of I-89 (Exit 12B). A new interchange at this location has been the topic of several studies in the past and is currently being evaluated in depth as part of the Chittenden County I-89 2050 Study, led by the CCRPC. In addition, the interchange ramps are included in the City of South Burlington's Official Map.

Figure 9 below shows the currently preliminary plans for Exit 12B as developed for the Chittenden County I-89 2050 Study. As shown in the figure, the northbound on- and off-ramps would connect to Hinesburg Road via Tilley Drive, while the southbound ramps would have direct connection to Hinesburg Road. The current Exit 12B plans also include both a sidewalk and a ten-foot shared use path across the interstate to better accommodate pedestrian and cyclist travel in this area.

With the addition of an Exit 12B, at full build-out, the interchange would require new intersections and/or new configurations of existing intersections at locations on VT 116 and Tilley Drive. As proposed, the Exit 12B northbound on- and off-ramps would meet the Tilley / Kimball Connector to create a four-way intersection and would require a traffic signal or roundabout to meet the projected traffic demand and maintain a reasonable level of service. New traffic signals or roundabouts would also be needed at the southbound ramp terminal, at the VT 116/Tilley Drive intersection, and at the VT 116/Old Farm Road intersection. Mitigation associated with the construction of Exit 12B would need to be reevaluated depending on the ultimate configuration of the interchange design.

The addition of Exit 12B was found to reduce traffic by approximately 11% traveling through I-89 Exit 14 and by approximately 17% at Exit 12.

Figure 9: Potential I-89 Exit 12B Configuration[1]



5.2 Summary of Transportation Evaluation Results

The evaluation scenarios were developed to examine transportation needs over time as well as the specific implications of the Swift Street Extension and a new I-89 interchange at Hinesburg Road (Exit 12B). The following six scenarios were evaluated:

1) No Build
2) 33% Land Use Build-Out with New Connector Roads *(no Exit 12B or Swift Street Extension)*
3) 67% Land Use Build-Out with New Connector Roads *(no Exit 12B or Swift Street Extension)*
4) 100% Land Use Build-Out with New Connector Roads *(no Exit 12B or Swift Street Extension)*
5) 100% Land Use Build-Out with New Connector Roads plus Exit 12B *(no Swift Street Extension)*
6) 100% Land Use Build-Out with New Connector Roads plus Swift Street Extension *(no Exit 12B)*

The volumes and turning movements resulting from the six scenarios were extracted from the regional model. The intersections in the study area were then evaluated in

[1] Preliminary plan under development for *Chittenden County I-89 2050 Study*

Synchro according to the thresholds stipulated by the VTrans Level of Service (LOS)[2] Guidelines, where signalized intersections should perform at a LOS D or better with no LOS F approaches and unsignalized intersection stop-controlled approaches should operate at a LOS D or better. These evaluations identified mitigation necessary at the intersection level to meet the level of service targets.

The infrastructure improvements necessary to maintain acceptable levels of service for each scenario are summarized in **Figure 10** and **Figure 11** below, where necessary signal optimization, signalization/roundabout, and additional lane geometries are indicated by corresponding symbols. The specific scenario where the improvement is first triggered is identified in the image call-out boxes. Coordination of infrastructure improvements that align with anticipated land use and improved connectivity was the overarching goal of these additional scenario evaluations.

[2] Intersection Level of Service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. LOS is reported using A-F letter grades with LOS A generally describing free flow traffic conditions and LOS F describing over-capacity conditions.

Figure 10: Intersection Mitigation Summary (Full Study Area)

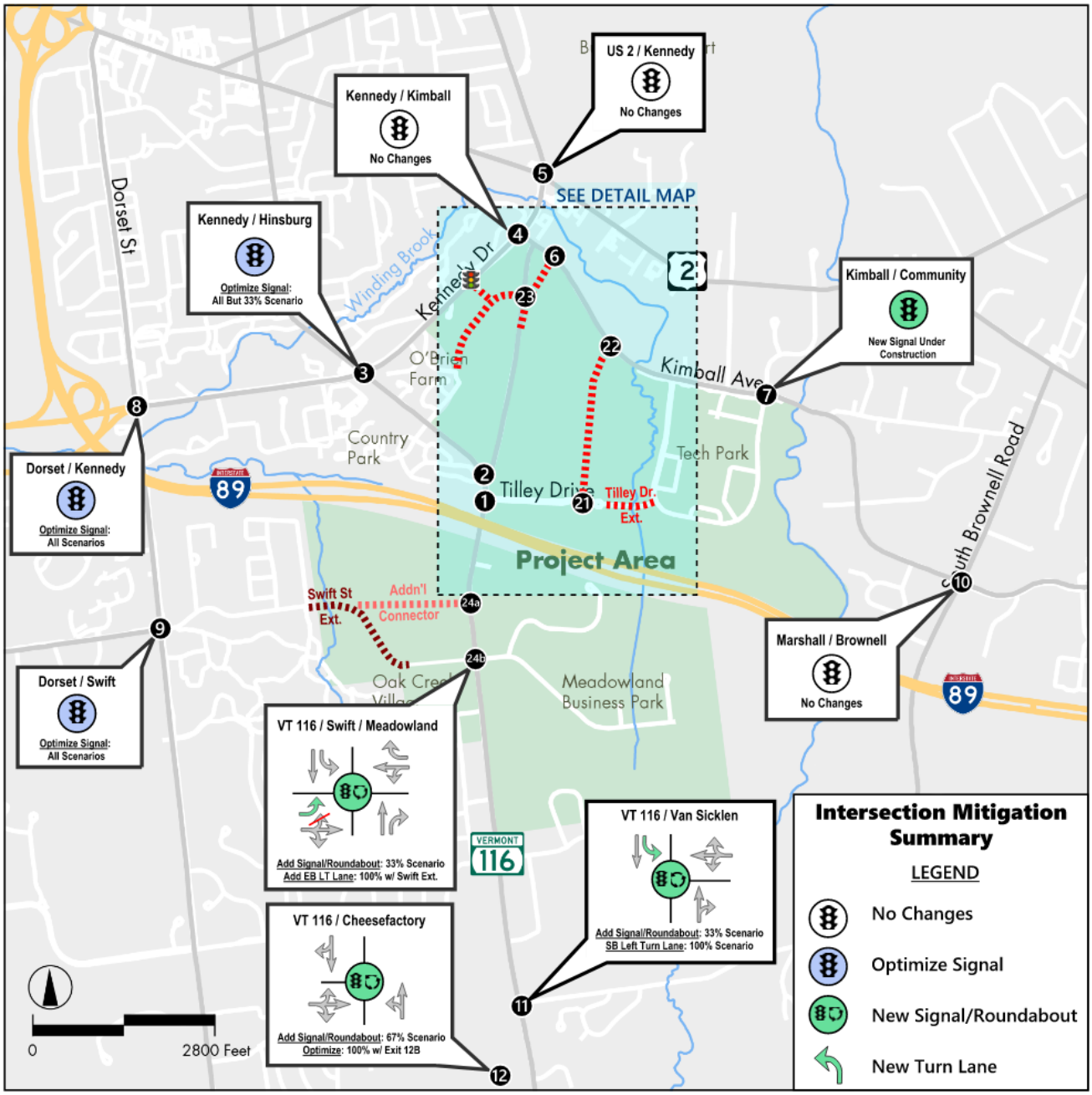
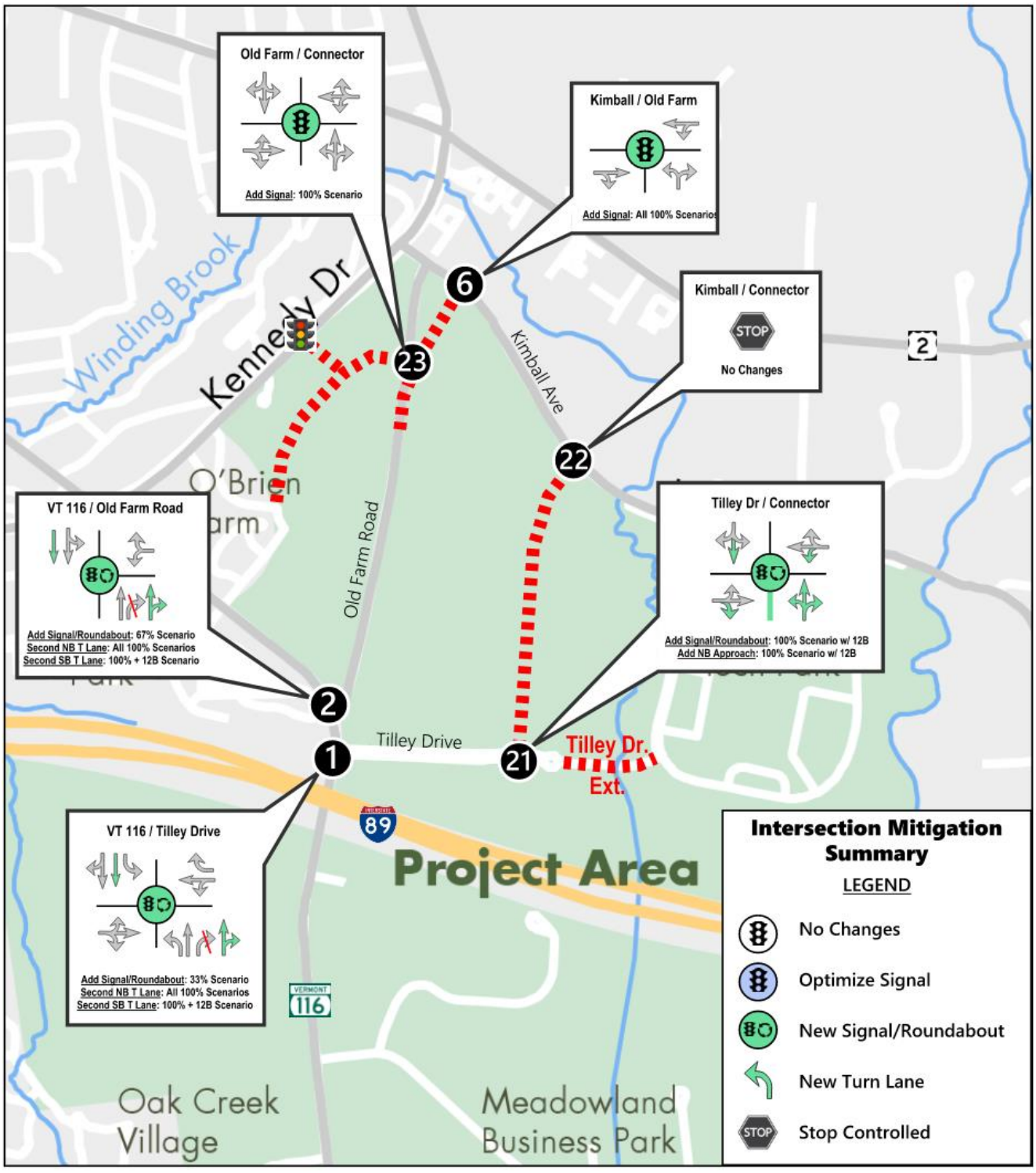


Figure 11: Intersection Mitigation Summary (Tilley/Kimball Focus Area)



For the existing signalized intersections in the study area, all build out scenarios require only optimization of existing signals with no additional lanes necessary. For these intersections, although no physical infrastructure improvements would be necessary, the new trips and travel patterns should be evaluated, and the signal phasing and timing should be adjusted accordingly over time.

For several unsignalized study intersections, future development would generate enough additional volume that a signal or roundabout should be considered with the appropriate intersection control and bicycle and pedestrian accommodations defined during the scoping process.

With one-third of the total build out (33%) in the study area, four of the study intersections would likely need a signal or roundabout, including:

- VT 116 (Hinesburg Road) /Meadowland Drive
- VT 116 / Tilley Drive *(expected to be constructed by end of 2021)*
- VT 116 / Swift Street Extension
- VT 116 / VanSicklen Road[3]

With two-thirds of the total build out (67%) in the study area, one additional intersection would likely need a signal or roundabout, as follows:

- VT 116 / Cheesefactory Road[4]

With full build out (100%) in the study area, three additional intersections become candidates for signalization or roundabout installation to maintain appropriate levels of service:

- Old Farm Road / O'Brien Connector
- Kimball Avenue / Old Farm Road
- VT 116 / Old Farm Road

At full build out, the following three study intersections would need additional lanes to provide capacity necessary to maintain acceptable levels of service:

- VT 116 / VanSicklen Road: Additional southbound left turn lane
- VT 116 / Tilley Drive: Additional northbound and southbound through lanes
- VT 116 / Old Farm Road: Additional northbound and southbound through lanes

[3] Although the VanSicklen Road approach to VT 116 reaches Level of Service E in the one-third build-out scenario (flagging the need for a new traffic signal or roundabout), it was noted that adding traffic control to this intersection may result in a significant increase in diverted traffic using VanSicklen Road as means to travel between Shelburne and Williston.

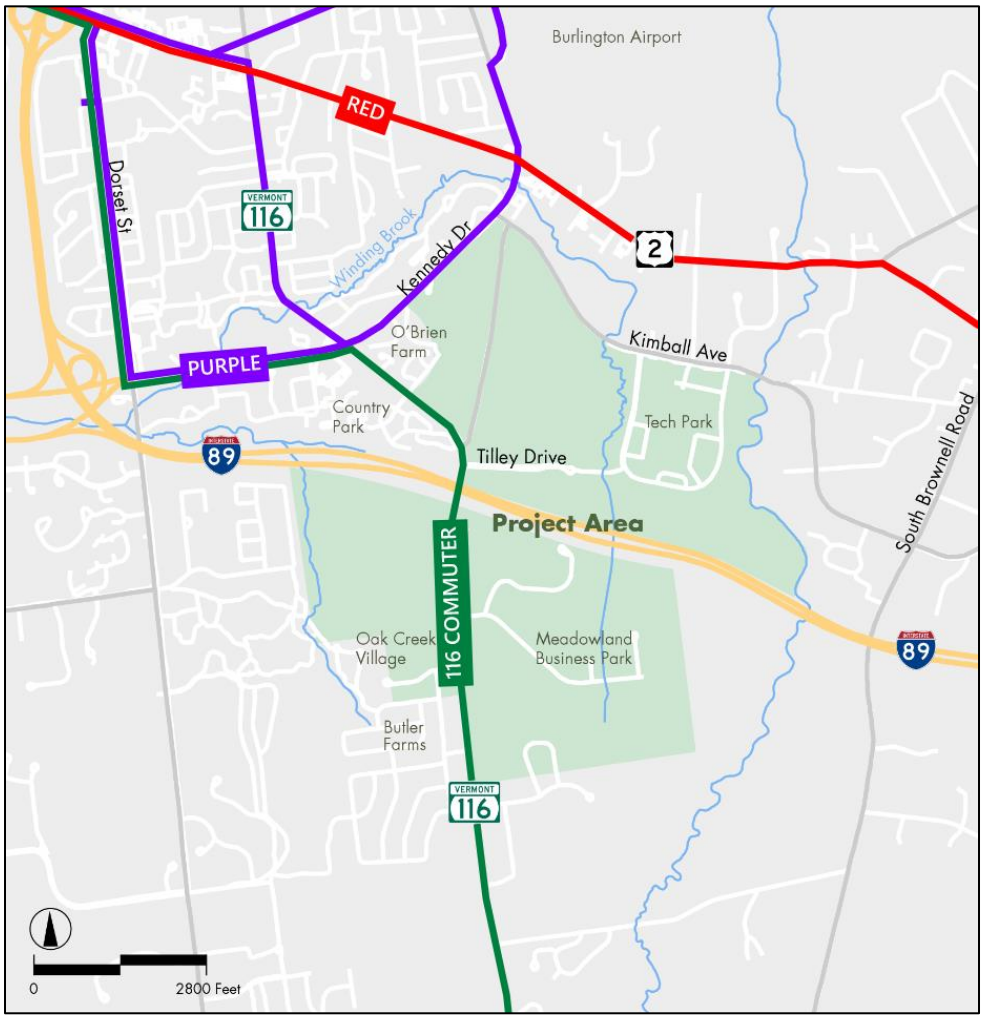
[4] Although the Cheesefactory Road approach to VT 116 reaches Level of Service E in the two-thirds build-out scenario (flagging the need for a new traffic signal or roundabout), it was noted that adding traffic control to this intersection may result in a significant increase in diverted traffic using Cheesefactory Road as means to travel between Shelburne and Williston.

5.3 Public Transit

Given the mode share target developed for this study of a 5% reduction in vehicular trips generated in study area beyond the 15% mode shift already planned within the MTP, strategies to improve movement of individuals via non-auto modes will be necessary. Investment in additional public transit service is integral to meeting the identified mode share target.

The investment in transit would include both capital and operating costs for three new Green Mountain Transit busses, with one new LINK bus to serve the VT-116 route and two new buses or shuttles to accommodate increased frequency on routes that serve the study area. Investments in transit service, coupled with land use patterns that are conducive to transit, will help to achieve the mode share targets. Transit hubs and shelters should be strategically located and paired with bicycle and pedestrian infrastructure in order to support these investments. A conceptual cost estimate for these investments is a start-up capital investment of $1,200,000 with an annual operating cost of $600,000.

Figure 12: Public Transit Routes Proximate to the Study Area



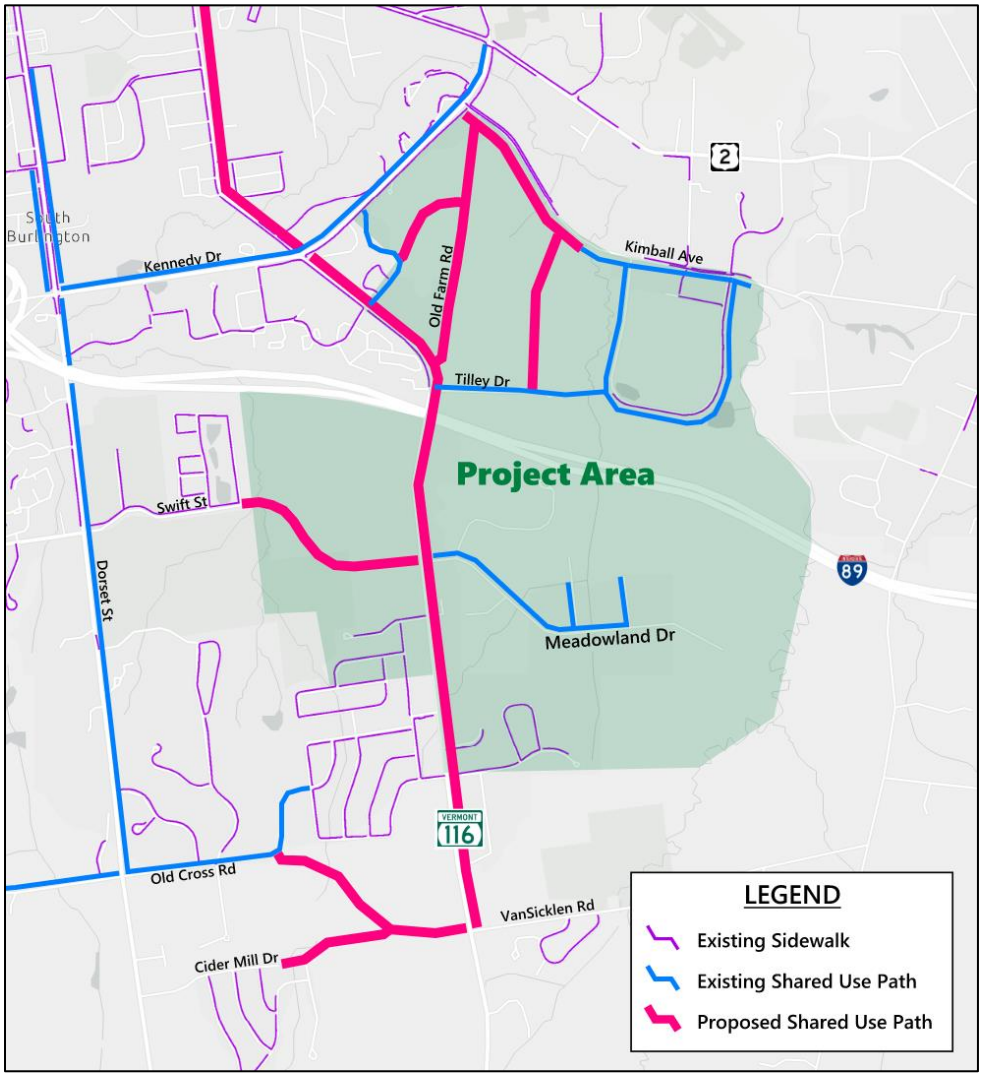
5.4 Bicycle and Pedestrian Infrastructure

In addition to investments in the public transit system, targeted reductions in vehicular trips will be achieved through additional bicycle and pedestrian infrastructure investments in the study area. Much like the transit-supportive designs to be employed in the study area, development in the area should be designed to support biking and walking infrastructure connectivity and accessibility.

With the assumption of an additional 5% reduction in vehicle-based trips within one mile of the study area, investments to accommodate a shift of these trips to biking and walking will be necessary. In order to reach this goal, strategies to accommodate cyclists and pedestrians will include new shared-use paths, protected bicycle lanes, enhanced bicycle and pedestrian accommodations over I-89, and sidewalks within developments to connect to existing facilities.

The proposed bicycle and pedestrian improvements are shown in **Figure 13** below.

Figure 13: Proposed Bicycle & Pedestrian Network Improvements



As shown in **Figure 13** above, the proposed expansion to the shared-use path network within and adjacent to the study area includes the following links:

- VT 116 (Hinesburg Road): Williston Road to VanSicklen Road *(includes separated overpass over I-89)*
- Kimball Avenue: Kennedy Drive to Potash Brook
- Old Farm Road: Hinesburg Road to Kimball Avenue
- O'Brien Farm Road: Eldredge Street to Old Farm Road
- Kimball-Tilley Connector Road: Kimball Avenue to Tilley Drive
- Swift Street Extension: Swift Street to Hinesburg Road
- Cider Mill Connections: Old Cross Road and Cider Mill Drive to Hinesburg Road

Given the level of focus for this study, proposed expansion to the existing sidewalk network is not included in this report but will be an important consideration to provide interconnectivity for pedestrians in this area.

A conceptual cost estimate for the proposed new shared use path infrastructure is summarized below in **Table 2**. These planning-level cost estimates were calculated assuming they were constructed as stand-alone projects and include costs for engineering, construction, and inspection services.

Table 2. Cost Estimate of Proposed Shared Use Paths

Roadway	Limits	Length / Area	Cost*
VT 116	Hinesburg Road to VanSicklen Road	16,200 ft	$7,660,000
	Separated I-89 Overpass	5,600 sf	$2,520,000
Kimball Avenue	Kennedy Drive to Potash Brook	2,850 ft	$1,350,000
Old Farm Road	Hinesburg Road to Kimball Avenue	3,800 ft	$1,800,000
O'Brien Farm Road	Eldredge Street to Old Farm Road	1,820 ft	$860,000
Kimball-Tilley Connector	Kimball Avenue to Tilley Drive	3,380 ft	$1,600,000
Swift Street Extension	Swift Street to Hinesburg Road	2,900 ft	$1,380,000
Cider Mill Connections	Old Cross / Cider Mill Drive to Hinesburg Rd	4,840 ft	$2,290,000

* Planning level cost estimates include engineering, construction, and inspection costs based on the following assumptions:
> Shared Use Path (10' Asphalt) = $350/foot (Report on Shared Use Path and Sidewalk Costs, VTrans, 2020)
> New Separated I-89 Bicycle Overpass = $400/square foot (Various Sources)

5.5 Conceptual Cost Estimates

Conceptual cost estimates for the transportation system recommendations identified for each of the following scenarios is summarized in **Table 3**:

- 100% Build-out Base Network *(No Swift Street Extension or Exit 12B)*
- 100% Build-out with Swift Street Extension *(no Exit 12B)*
- 100% Build-out with Exit 12B *(no Swift Street Extension)*

As summarized in **Table 3**, approximately $45 million in transportation system improvements have been identified to accommodate the additional system demands generated by full build-out of the study area (i.e. Base Network).

Full build out with the Swift Street Extension involves the addition of approximately $1.8 million to construct the new 2,100-foot connector road along with additional costs to expand the VT 116/Meadowland Drive/Ry Circle intersection. The addition of Exit 12B would bring the total cost for full build out improvements to approximately $68 million.

Table 3. Conceptual Cost Estimates for Transportation System Improvements (100% Build Alternatives)

	100% Build Alternatives		
	Base Network	**With Swift St. Ext.**	**With Exit 12B**
Intersection Capacity Enhancements			
Intersections & Approaches *(Assumed 1/2 new signals, 1/2 new roundabouts)*	$17,600,000	$17,810,000	$14,795,000
New Connector Roads			
O'Brien / Tilley / Kimball / Cider Mill / Allen *(Costs generally covered by private developers)*	$6,530,000	$6,530,000	$6,530,000
Swift Street Extension	N/A	$1,800,000	N/A
New Interchange			
Exit 12B	N/A	N/A	$28,000,000
Bicyle & Pedestrian Improvements			
Shared Use Paths	$16,980,000	$16,980,000	$16,980,000
I-89 Pedestrian Overpass *(Cost included in 12B)*	$2,520,000	$2,520,000	N/A
Public Transit			
Transit Start-up Costs *(Three new buses, does not include operating costs)*	$1,600,000	$1,600,000	$1,600,000
Total Cost	**$45,230,000**	**$47,240,000**	**$67,905,000**

6 Conclusions

Although the full build out of the study area is likely to occur over multiple decades (and may likely never hit the full build out levels evaluated in this study), the incremental development approach employed in this study allowed for the identification and evaluation of improvements at various phases of development to foster a compact, multi-modal, and mixed-use development pattern.

As shown through the analysis summarized in this report, the trips generated under the full build-out scenario can be accommodated with the construction of several connector streets, moderate intersection upgrades, bicycle and pedestrian infrastructure improvements, and transit enhancements totaling approximately $45 million. It is important to note that this cost estimate includes the construction of the five connector roads that were considered part of the base network in every scenario.

Growth in the study area is anticipated as parcel owners, as well as city and regional plans, target this particular area for development. The 33% and 67% development build out scenarios would create enough additional demand on the transportation infrastructure that infrastructure improvements would be required, regardless of whether the Swift Street Extension or Exit 12B are implemented. It is therefore recommended that the five intersections identified for a new signal or roundabout at these projected development levels be advanced through the scoping process. The intersections that are candidates for scoping include:

1. VT 116 / Tilley Drive

2. VT 116 / Meadowland Drive / Rye Circle
3. VT 116 / VanSicklen Road[5]
4. VT 116 / Cheesefactory Road[6]
5. VT 116 / Old Farm Road[7]

The first set of bicycle and pedestrian improvements should also be evaluated further based on the likelihood of development in the area regardless of proposed larger scale infrastructure projects. The new shared use paths that should be programmed for scoping include:

- VT 116 (Hinesburg Road): Williston Road to VanSicklen Road
- Kimball Avenue: Kennedy Drive to Potash Brook
- Old Farm Road: Hinesburg Road to Kimball Avenue

With the Swift Street Extension added in as an additional connector road, additional east-west connectivity would be provided in this area. The need for east-west connectivity, which has been identified in South Burlington's Comprehensive Plan, would be enhanced by this connection. In addition to meeting the east-west connectivity need, the Swift Street Extension would also enhance emergency vehicle access to the area.

However, the extension of Swift Street would also have implications for residents of the Village at Dorset Park who would see evening peak hour volumes along Swift Street increase from approximately 125 PM peak hour trips to approximately 1,200 PM peak hour trips with full land use build-out of the study area. The Swift Street Extension would also draw traffic off adjacent arterials designed to handle higher traffic volumes (e.g. Kennedy Drive is expected to see traffic volumes reduce approximately 24% with the Swift Street Extension in place). Additionally, as shown previously in this report, the Swift Street Extension would also have environmental impacts to potential wetlands, habitat blocks, and threatened species.

The Swift Street Extension could be designed and constructed in a manner that discourages cut-through trips (i.e. through traffic calming and/or curvilinear features), however the environmental impacts would remain. The decision of whether to proceed with the Swift Street Extension should be based on a wide-range of factors including both traffic and environmental impacts, along with broader policy implications (e.g. merits of enhanced connectivity vs. concerns over cut-

[5] Although the VanSicklen Road, Cheesefactory Road, and Old Farm Road approaches to VT 116 reach Level of Service E in either the one-third or two-thirds build-out scenario (flagging the need for a new traffic signal or roundabout), it was noted that adding traffic control to these intersections may result in a significant increase in diverted trips using these sidestreets as cut throughs. The effects of these potential traffic diversions should be weighed against public sentiment and City policy goals during the scoping process.

[6] See above

[7] See above

through traffic, connectivity to a future educational complex, future development of the Hill Farm parcel, emergency vehicle connectivity), costs, and public input.

Construction of Exit 12B at the current overpass of VT 116 would provide direct vehicular access to the study area from I-89. While a new interchange would likely provide enhanced bicycle and pedestrian accommodations through this area (the plan evaluated in this report included both a sidewalk and a shared-use path along VT 116 over I-89), it should be noted that the increased traffic volumes and vehicle conflicts triggered by the construction of a new interchange could adversely affect cyclists and pedestrians traveling through the interchange area. Although there are more regional benefits from this significant update to the transportation network such as reductions in traffic at Exits 12 and 14, the traffic capacity benefits in the immediate study area are limited. This new interchange will be further evaluated as part of the CCRPC's Chittenden County I-89 2050 Study to evaluate the potential benefits of this investment beyond the geographical scope of this present study.

Given the likelihood of development in the study area parcels, the higher priority investments recommended to meet the anticipated transportation demand should be integrated into the South Burlington Official Map, assessed for impact fees, and prioritized in the City's Capital Improvement Program.