Supplement 5: 2050 Metropolitan Transportation Plan (MTP)

Draft 12/18/2018

For a healthy, inclusive, and prosperous community

Chittenden County RPC
Communities Planning Together

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Metropolitan Transportation Plan

Introduction and Background

The MTP is the region's principal transportation planning document and sets regional transportation priorities. It consists of short- and long-range strategies to address transportation needs and that lead to the development of an integrated, inter-modal transportation system that facilitates the efficient movement of people and goods.

As mandated by federal regulations, the MTP must both articulate and work towards the region's comprehensive long-range land use plans, development objectives, and overall social, economic, environmental, system performance and energy conservation goals and objectives. It should also be consistent with the statewide transportation plan and the CCRPC is required to make special efforts to engage all interested parties in its development.

Federal regulations also mandate that the MTP considers the following:

- Ten planning factors:

  *"**(1)** Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;*

  ***(2)** Increase the safety of the transportation system for motorized and non-motorized users;*

  (3) Increase *the security of the transportation system for motorized and non-motorized users;*

  ***(4)** Increase accessibility and mobility of people and freight;*

  ***(5)** Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;*

  ***(6)** Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;*

  ***(7)** Promote efficient system management and operation;*

  ***(8)** Emphasize the preservation of the existing transportation system;*

  ***(9)** Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and*

  ***(10)** Enhance travel and tourism."*

- Look out a minimum 20 years into the future and be updated every five;

- Identify existing and proposed projects and strategies that together function as an integrated metropolitan transportation system;
- Maintain a multi-modal focus that includes transit and bicycle and pedestrian facilities;
- Estimate costs and identify reasonably available financial sources for operation, maintenance and capital investments;
- Identify measures and targets to gauge transportation system performance;
- Determine ways to preserve existing facilities and services and make efficient use of the existing system; and
- Discuss potential environmental mitigation of MTP projects and strategies.

The MTP is one of three primary responsibilities of Metropolitan Planning Organizations or MPOs (the CCRPC is the recognized MPO for Chittenden County). The others are the Transportation Improvement Program (TIP) and the Unified Planning Work Program (UPWP). The TIP is the annually updated four-year list of project priorities identified for federal funding. The UPWP, also updated every year, describes, and allots funding for transportation planning activities in the county by CCRPC staff, its consultants and other transportation and planning partner agencies conducting work in the region.

Following this introduction, here is the sequence of MTP elements of this ECOS Supplement:

- Transportation Goal, Issues, and Performance Measures
- Existing Metropolitan Transportation System
- Financial Plan
- Scenario Planning Review and Future Conditions
- MTP Corridors
- MTP Investments and Project List
- Environmental Impacts and Mitigation Report

Transportation Goal, Issues, and Performance Measures

Provide accessible, safe, efficient, interconnected, secure, equitable and sustainable mobility choices for our region's businesses, residents and visitors.

ISSUES, TRENDS, OBSERVATIONS

The CCRPC advocates for the concentration of 80% of future growth in 15% of Chittenden County's land area, at a minimum. Low-density development in rural areas will raise VMT, increase traffic congestion and contribute to more harmful air pollutants and greenhouse gases. Directing transportation investments to serve mobility and accessibility in compact settlements will result in a more cost-effective and efficient transportation system.

From mid-2014 through the beginning of 2016, fuel prices declined significantly and have likely contributed to increases in VMT and a reduction in transit ridership. Continued increases in VMT could increase congestion and traffic delays on our highways and have negative impacts on economic development, the environment and human health. As fuel prices rise, rural and low-income residents are disproportionately impacted by increases in household transportation costs.

Our rate of driving alone to work increased from 56% in 1980 to 73% according to the latest 5-year American Community Survey average. On the other hand, Vehicle Miles of Travel (VMT) per person has been on a downward decline. From 2007 to 2014, VMT per capita declined from 27 daily miles driven to 25. However, since 2014, it has increased slightly to 25.3 daily miles driven per capita. It is imperative that we continue to support efforts to reduce VMT per capita and single-occupancy vehicle travel to lessen congestion, decrease greenhouse gas emissions and more efficiently utilize all our transportation resources.

More robust investment in transit, walking/biking, carsharing and ridesharing, and other Transportation Demand Management (TDM) measures could reduce VMT, traffic delays and congestion and the use of single-occupancy vehicles; enhance the economic well-being of our residents, businesses and visitors; reduce social isolation and improve public health. The lack of safe and convenient alternatives to automobile travel disproportionately affects vulnerable populations.

Some population segments – youth, the elderly, low-income, minorities and new Americans– lack access to viable public and private transportation options. The lack of safe, reliable, and complete connections within the transportation system and between transport modes reduces access to employment, and social, economic, and recreation opportunities; and limits access to basic needs by means other than a personal vehicle.

There is a significant link between transportation choices and public health. The degree to which individuals in a community are physically active is directly dependent on transportation opportunities, infrastructure and community design. Walkable communities with safe and contiguous infrastructure to support active transportation and a robust transit network, generally encourage physical activity and

have a lower dependency on automobiles. The health benefits of physical activity and its role in reducing risk for chronic disease has a cross-cutting societal impact.

According to the 2017 VTrans Public Transit Route Performance Report, over half of all public transit trips in Vermont occur in Chittenden County. While access to public transit has improved in the greater Burlington area, some suburban and most rural populations lack access to transit. Implementing the recommendations from Green Mountain Transit's NextGen Transit Plan will improve the service levels, route directness and service convenience on their urban network.

The overall condition of the arterial highways in Chittenden County has improved significantly since 2013. In 2013, over 50% of Chittenden County arterials were rated poor or worse in terms of roadway condition. Today, that figure has dropped to just under 28%. While roadway conditions have improved, there is still a concern that transportation funding is overly reliant on the state and federal gas taxes, which are decreasing in value as inflation lowers purchasing power and revenues decline due to improved vehicle fuel efficiency and a growing number of electric and hybrid vehicles.

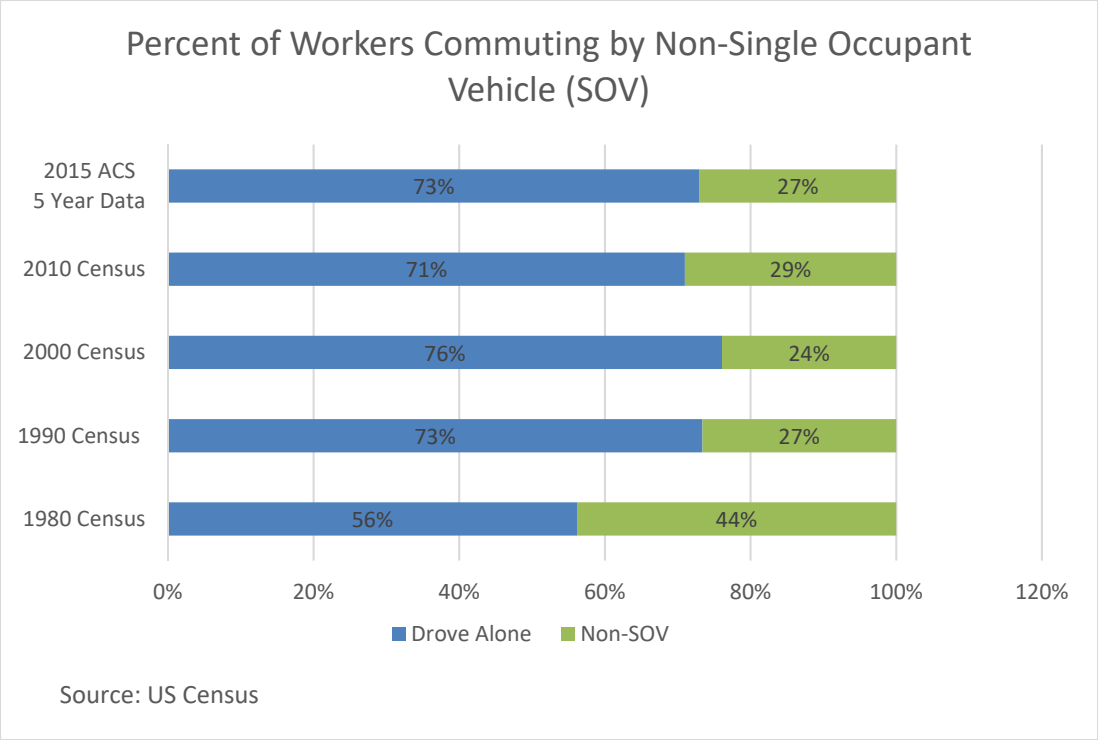
The cost of preserving, maintaining and operating our current transportation system lessens our ability to effectively fund transit improvements, infrastructure for walking/biking, and TDM programs. The prospect of less funding in a time that increases in transportation investment are needed is a disconcerting trend that has not been adequately addressed at the federal or state level.

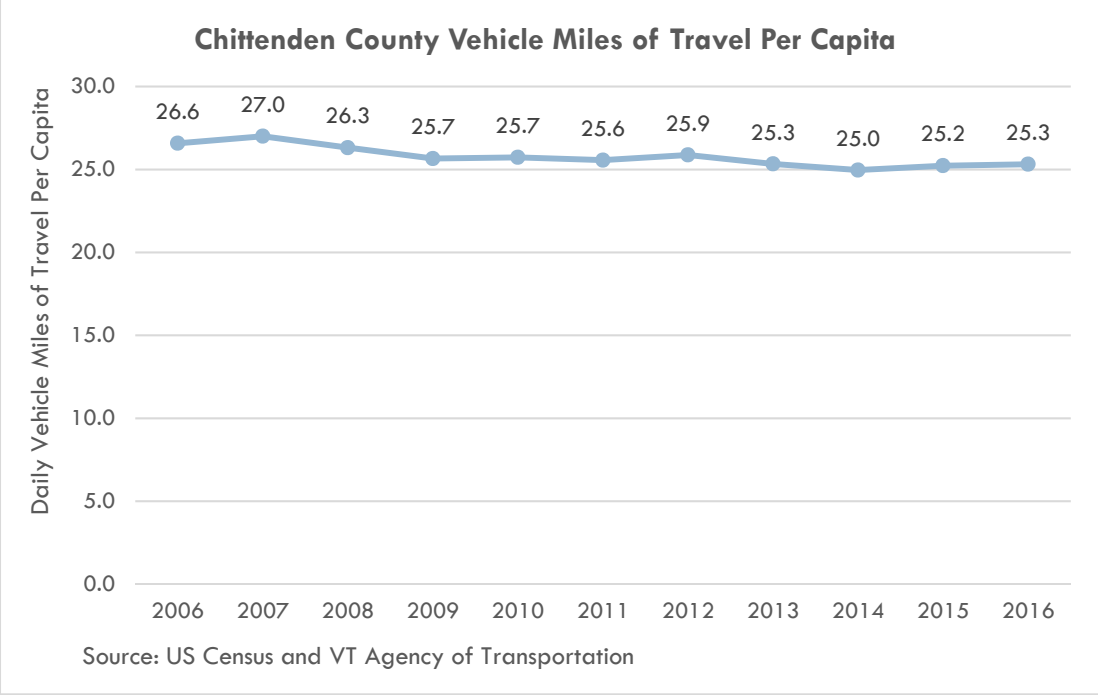
The MTP must be fiscally constrained to the funding anticipated for investment in the planning horizon through 2050. The following table outlines the funds anticipated to be available to address transportation needs in Chittenden County through 2050.

Future Funding Estimates (Federal, State and Local Funds)	**Cost in Millions (2016$)**
Total Available Funding for Transportation System	$1,744.72
Funding to Paving, Bridge and Transit Operations and Maintenance	$1,221.30
Cost of 2017 Transportation Improvement Program (TIP) Construction Projects	$102.75
Total Available New Funding to address new transportation needs excluding TIP	$420.67
Estimated Cost of Anticipated New Projects (the sum of all items on the MTP Project List)	To Be Determined
Funding Deficit (Transportation Need minus Total Available)	To Be Determined

KEY INDICATORS

Percent of workers commuting by non-Single Occupant Vehicle (SOV) mode (walk, bike, transit, carpool, telecommute). Recent data suggests a leveling off from a negative trend going back at least 30 years and probably longer.





PERFORMANCE MANAGEMENT

The most recent federal law on transportation authorization (FAST-ACT) places considerable emphasis on system performance and directs State Departments of Transportation (DOTs) and MPOs to evaluate how well the system is doing. At the national level, Performance Management has become part of the Federal Highway Administration's (FHWA)Transportation Performance Management (TPM) program. The TPM program is a strategic initiative implemented to achieve national transportation performance goals. The intent is to measure progress against the national goals through a reliable data-driven process. FHWA has established measures in the following areas:

- Safety
- Infrastructure Condition
- Congestion
- System Reliability
- Freight
- Air Emissions

The established performance measures under each of these categories are:

- Safety
    1. Number of Fatalities
    2. Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT)
    3. Number of Serious Injuries
    4. Rate of Serious Injuries per 100 million VMT
    5. Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries
- Infrastructure Condition

  Pavement
    1. Percentage of pavement on the Interstate in good condition
    2. Percentage of pavement on the Interstate in poor condition
    3. Percentage of pavement on the non-Interstate National Highway System (NHS) in good condition
    4. Percentage of pavement on the non-Interstate National Highway System (NHS) in poor condition

  Bridges
    1. Percentage of NHS bridges in good condition
    2. Percentage of NHS bridges in poor condition
- Congestion

  NOTE - Not required in Vermont because we don't exceed national air quality standards
- National Highway System Reliability
    1. Interstate travel time reliability
    2. Non-Interstate NHS travel time reliability
    3. Freight reliability measure (truck travel time)
- Air Emissions – percent change in tailpipe carbon dioxide (CO2) emissions on the National Highway System (**NOTE**: FHWA now proposes repeal of this measure)

Having established the measures, it's up to state DOTs and MPOs to set quantifiable targets to gauge progress toward national goals. The schedule to establish targets, varies by measure. Federal regulations generally have state DOTs set specific due dates for performance targets in the various categories and then give MPOs another six months to either agree with the State targets or establish their own.

In addition to the FHWA performance management program, the Federal Transit Administration (FTA) has one as well. Their program establishes a system to monitor and manage public transportation assets for improved safety, reliability and performance with the goal of maintaining transit assets in a State of Good Repair (SGR). Green Mountain Transit (GMT), under this program, is tasked with developing a Transit Asset Management (TAM) Plan to include the following elements:

- An inventory of their capital assets.
- Condition assessment of these assets
- Description of the analytic or support tool used to prioritize investments
- Investment prioritization

GMT will develop their TAM plan, establishing performance targets, in cooperation with the CCRPC.

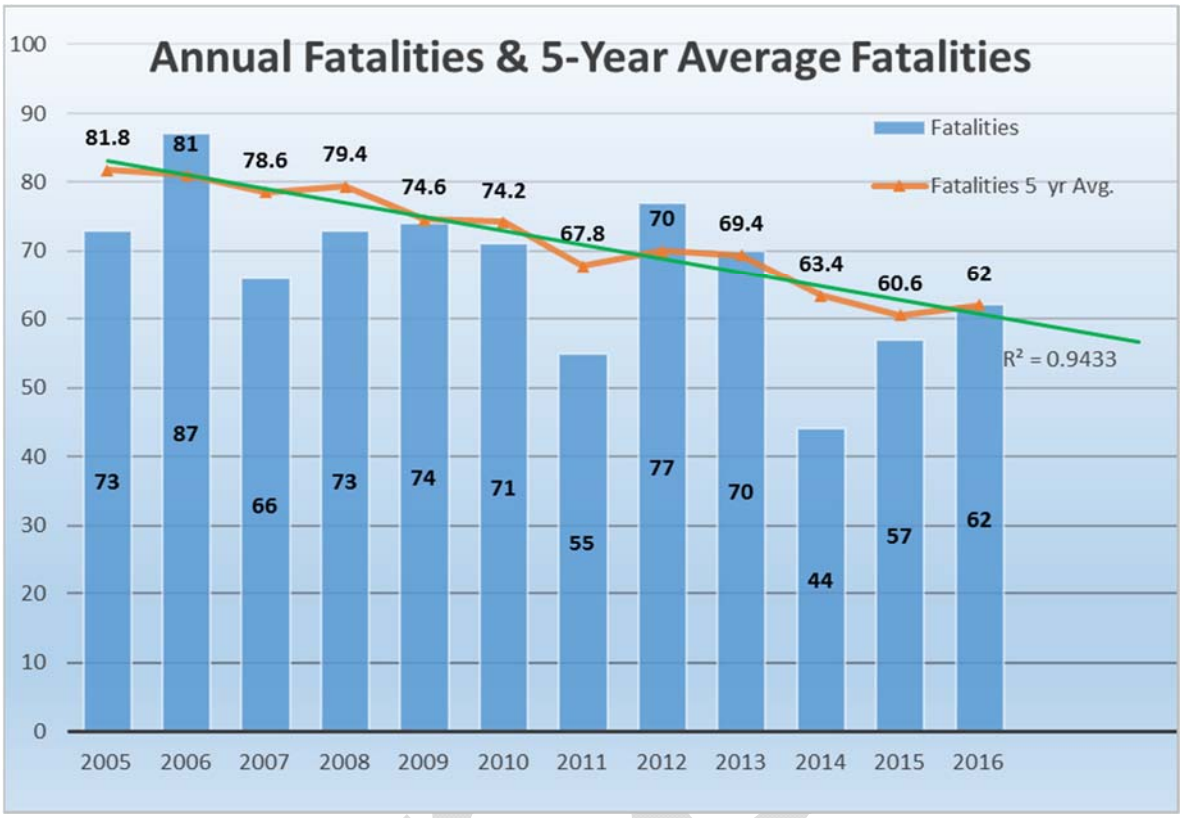
Along with target setting comes reporting progress to FHWA and FTA. Currently reporting dates for the various measures varies by measure. Several national transportation organizations have request that USDOT extend by one year some reporting deadlines in order to establish a common reporting date for all measures and their targets.

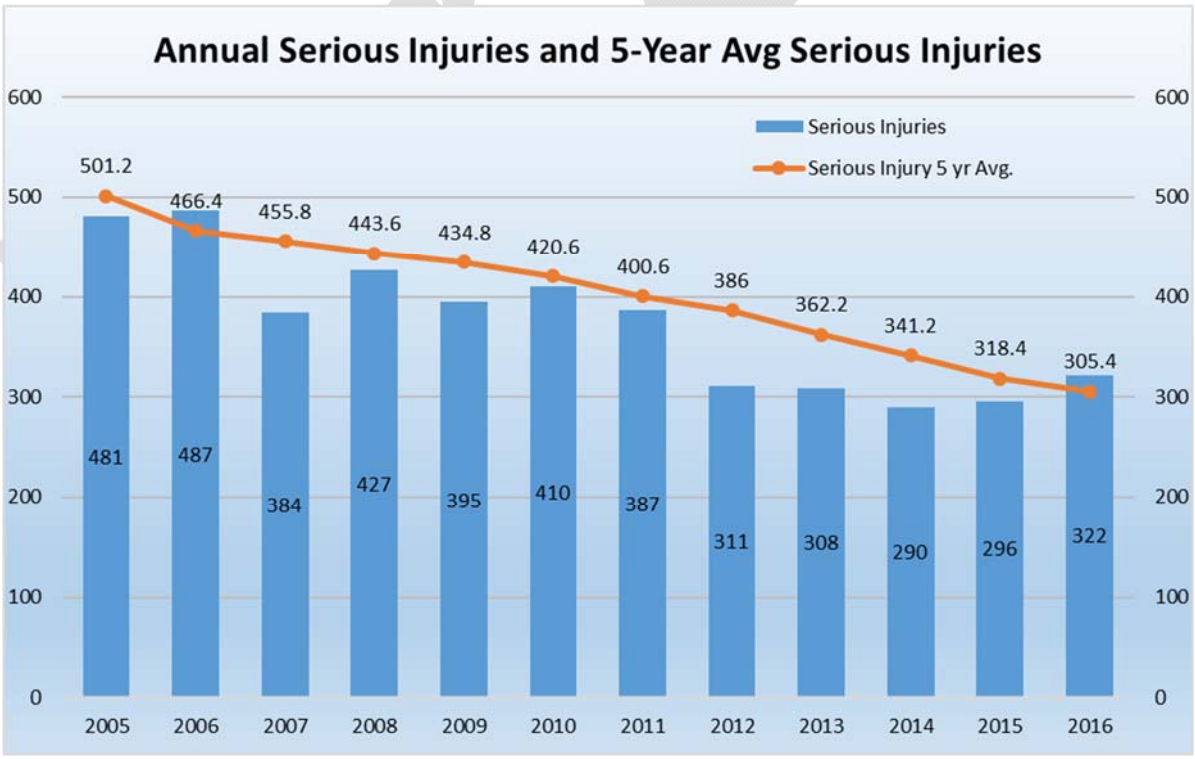
Safety Performance Management

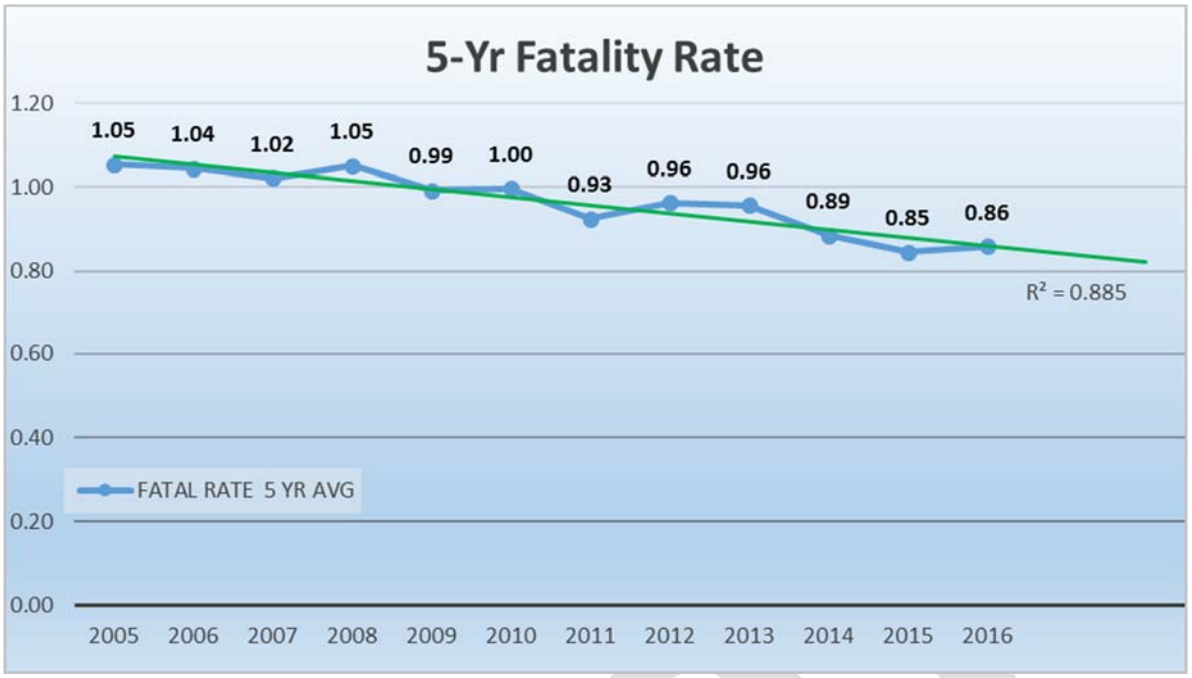
Five measures were established under the first measure, Safety, to monitor fatalities and serious injuries on all public roadways – see list below. Targets were set by DOTs and MPOs to evaluate performance on reducing fatalities and serious injuries on our highways. The CCRPC is considering adopting the following safety performance measures that were established by Vermont Agency of Transportation (VTrans):

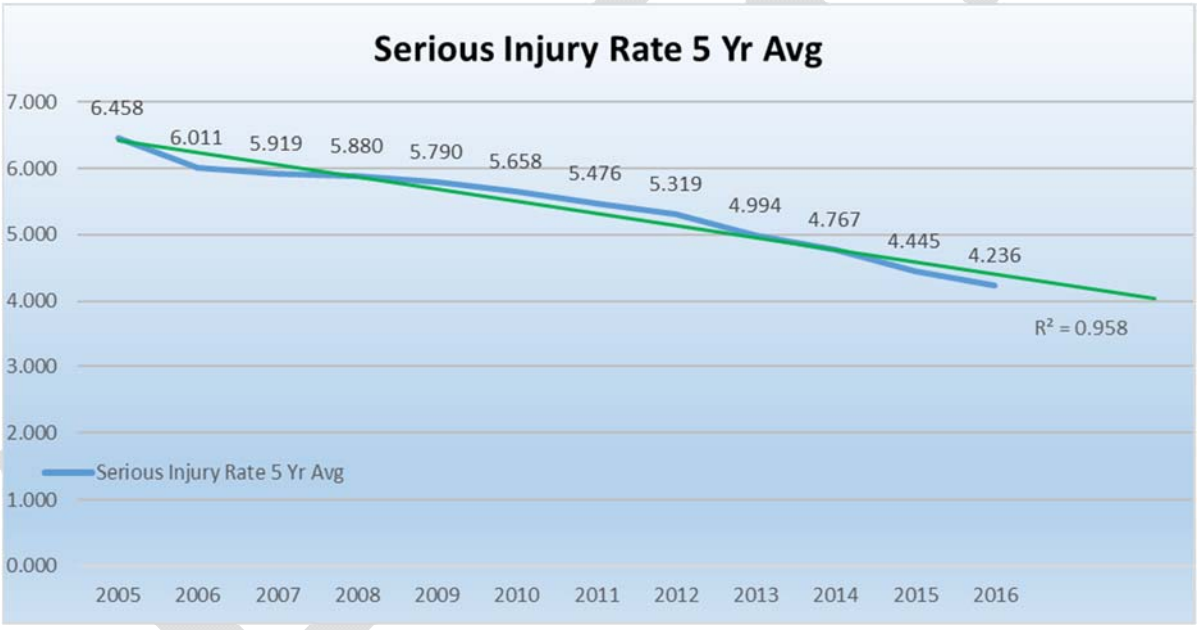
1. 5-Year Average Fatalities, 2018 Target: 57.0
2. 5-Year Fatality Rate, 2018 Target: 0.830
3. 5-Year Average Serious Injuries, 2018 Target: 280.0
4. 5-Year Average Serious Injury Rate, 2018 Target: 4.0
5. 5-Year Average Non-Motorized Fatalities and Non-Motorized Serious Injuries, 2018 Target: 39.4

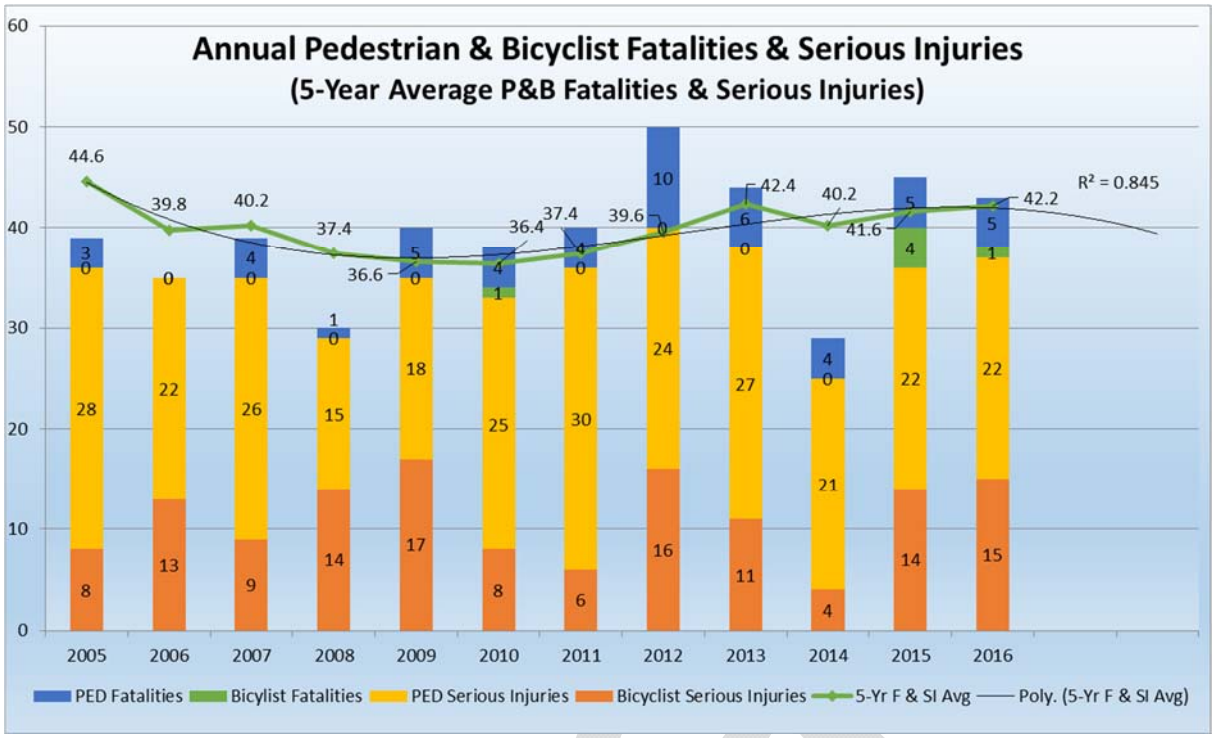
The following charts illustrate the statewide data tracked to help establish VTrans' safety targets:






5-Yr Fatality Rate
1.20
1.00
0.80
0.60
0.40
0.20
0.00
1.05
1.04
1.02
1.05
0.99
1.00
0.93
0.96
0.96
0.89
0.85
0.86
R² = 0.885
FATAL RATE 5 YR AVG
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016


Serious Injury Rate 5 Yr Avg
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
6.458
6.011
5.919
5.880
5.790
5.658
5.476
5.319
4.994
4.767
4.445
4.236
R² = 0.958
Serious Injury Rate 5 Yr Avg
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016



Other Performance Measures

The CCRPC will continue to coordinate and collaborate with VTrans to set targets for performance measures under the general categories of Infrastructure Condition and System Reliability to ensure that that national and state transportation performance goals are achieved.

The CCRPC will include a system performance report in subsequent MTP updates that evaluates safety, condition and reliability of the transportation system and discusses how the CCRPC is meeting the established targets for all relevant measures. Since most of the performance targets have yet to be established and the five safety performance measures were only recently adopted, the system progress updates will be added in the next MTP report. The CCRPC will also include a description of Performance Management within the Transportation Improvement Program (TIP) that details how future investment priorities will be linked to various measures and targets.

Lastly, the CCRPC has an agreement with VTrans and Green Mountain Transit (GMT formerly CCTA) dated May 18, 2016 that describes our intent to work collaboratively in carrying out the performance based planning as outlined in the discussion above.

Existing Metropolitan Transportation System

The primary focus of the MTP is the Metropolitan Transportation System (MTS). The MTS is the multimodal network of highways, arterial and major collector roadways, transit services, traffic signal systems, rail lines and stations, walk/bike facilities, park-and-ride facilities, Burlington International Airport, and other intermodal facilities critical to the movement of people and goods in the region. It is also the system (with the inclusion of all public bridges over twenty feet in length) eligible for federal transportation funding investment. **Map 8** depicts the existing Chittenden County MTS. To examine in detail, see the larger scale version here: https://map.ccrpcvt.org/ChittendenCountyVT/

While not specifically addressed in this plan, local roads are also an important part of the road network in Chittenden County. Local roads are owned and maintained by the municipality in which they are located and are generally not eligible for federal transportation funding investment.

Evaluating transportation facilities on a system-wide basis using the MTS framework facilitates identifying problems, developing solutions, and evaluating performance across the entire interrelated transportation system. The MTS distinguishes locally important transportation facilities and services from those that are strategically significant at the regional, state and even federal levels. The regionally significant facilities and services form the modal components critical to Chittenden County's mobility needs. As the transportation system evolves and grows over time based on the recommendations later in this MTP, the MTS continues to change to accommodate those new facilities and services. The MTS is not stagnant but a dynamic system requiring periodic updates.

This MTP recognizes that by addressing the transportation system as a single entity of interrelated elements, we become more aware of and address potential conflicts at the planning stage, rather than finding unexpected consequences later in the project implementation phase.

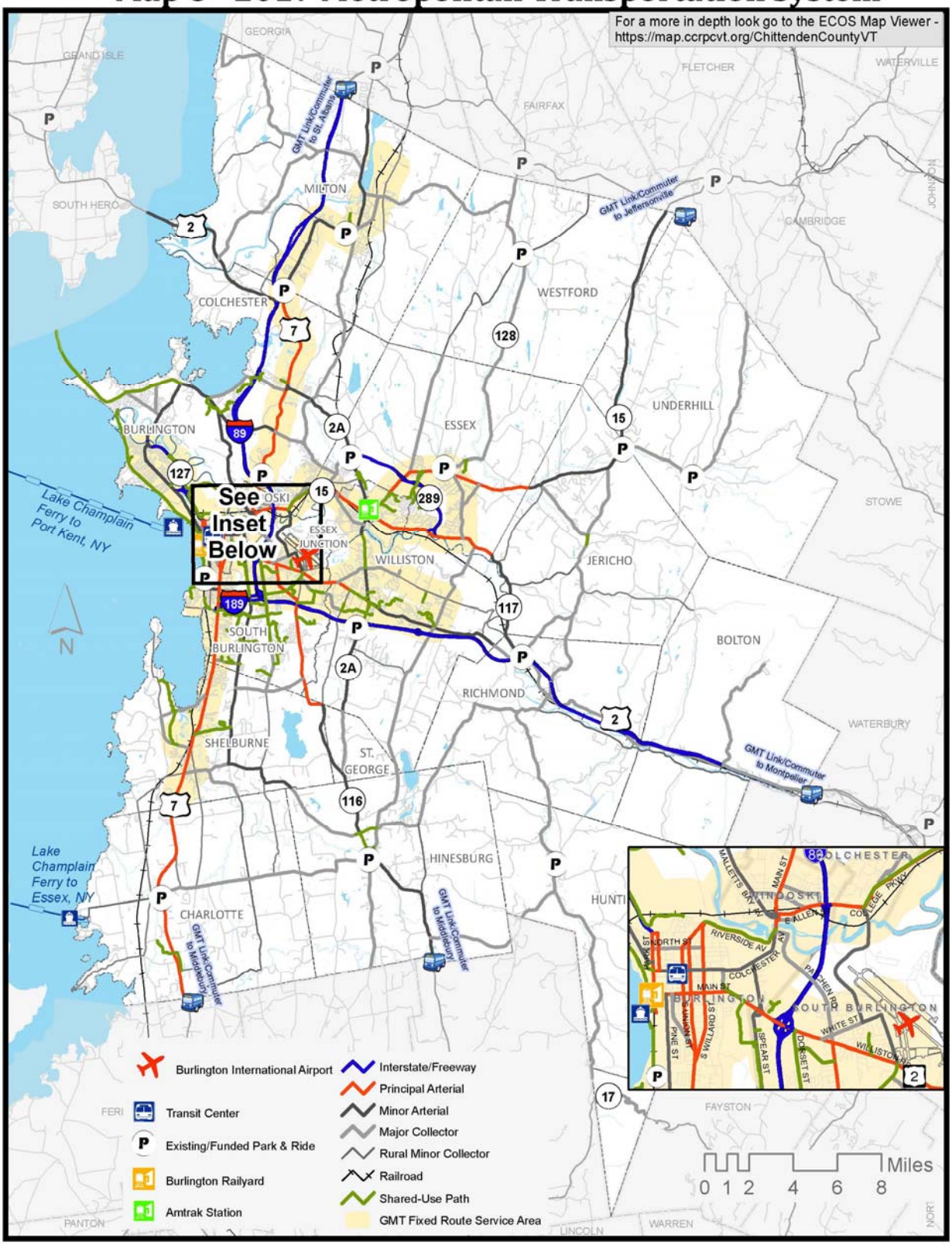
CURRENT TRANSPORTATION CONDITIONS

The current condition of the region's Metropolitan Transportation System is assessed in the following sections. This assessment supports the need for maintaining the existing MTS, and also highlights the major issues and concerns about the system condition and identifies areas where improvements are necessary.

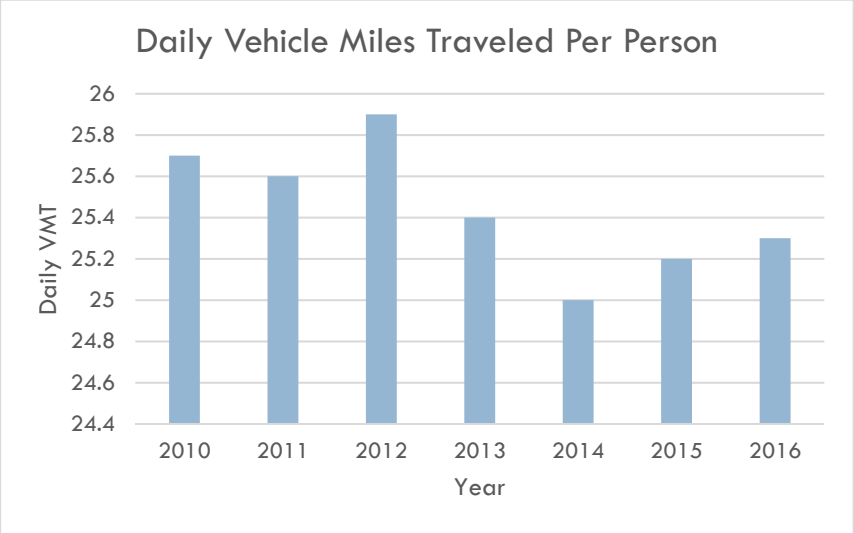
Arterial Roadways, VMT, and Congestion

The MTS in Chittenden County consists of highways classified as Interstate Highways, Principal Arterials, Minor Arterials, Major Collectors, and Minor Collectors. The classification system is organized as a hierarchy of facilities based on the degree to which the roadway facility serves mobility and access to adjacent land uses. Interstates and Arterials make up just over 12 percent of County road mileage, yet carry 67 percent of all vehicle miles traveled (see: VTrans 2015 VMT data: http://vtrans.vermont.gov/sites/aot/files/2015_Extent_and_Travel_Report.pdf).

Map 8 - 2017 Metropolitan Transportation System



Vehicle Miles Traveled(VMT) is a measurement of miles traveled by all motor vehicles in a specified region over a specified period of time. VMT data are collected at the state level and disaggregated down to the County level. As historic auto ownership spread along with the construction of our roadway system, VMT rose year after year, especially post WWII. More recently, that rise slowed and then appeared to fall as less driving, other mode use and economic conditions seemed to impact the long-term trend. As part of the ECOS Regional Sustainability Plan, the CCRPC tracks both Chittenden County VMT and VMT per capita. The last several years of driving per person is revealed in the chart below.



While no clear trend is evident, recent history has shown that we are generally driving less than just a few years ago. However, current fuel prices appear to be leading to a rise in VMT.

Using the congestion measure of volume to capacity ratio (V/C) the CCRPC's Transportation Demand Model identifies congestion problems in the morning or afternoon peak hours on several road segments identified in the table below. However, it's also important to note that there will be some operational issues on arterial corridors that the model doesn't effectively identify. The combination of truck and automobile traffic on arterials can further exacerbate congestion, primarily due to slow truck acceleration at traffic signals and in stop-and-go traffic.

NOTE: Table of 2015 V/C or delay problem areas will be prepared and inserted here following updates to the Chittenden County Transportation Demand Model and analysis of subsequent model runs.

High Crash Locations

High Crash Locations (HCLs), as defined by VTrans, are road segments and intersections where the rate of crashes exceeds an established threshold known as the critical rate. Locations are ranked by calculating a ratio between the critical rate and actual rate. According to the VTrans High Crash Location Report for 2012 through 2016, there are 113 HCL road segments in Chittenden County, and 47 HCL intersections. Fourteen of the top 20 intersections in Vermont with the highest crash ratios are located in Chittenden County. On the other hand, only three of the top 20 road segments in Vermont with the highest crash ratios are located in Chittenden County.

The location of Chittenden County's high crash intersections and road segments are identified in **Maps 9 and 10**. The most severe intersection sites are located in Burlington, Winooski and Essex. The most severe road segments for crashes are in Buel's Gore and South Burlington. Nearly all high crash intersections fall within the urban or suburban towns, while the road crash segments are spread throughout both urban and rural communities. Since 2011, the total number of vehicle crashes in Chittenden County has been declining, with the exception of a small spike upward in 2015 (see **Figure 1**). The number of crashes that resulted in injuries declined from 2011 through 2014, but increased slightly in 2015 and 2016 (see **Figure 2**). During this same period of time, there were an average of 6.5 annual fatalities on Chittenden County roadways.

FIGURE 1 - 2011-2016 CHITTENDEN COUNTY VEHICLE CRASHES

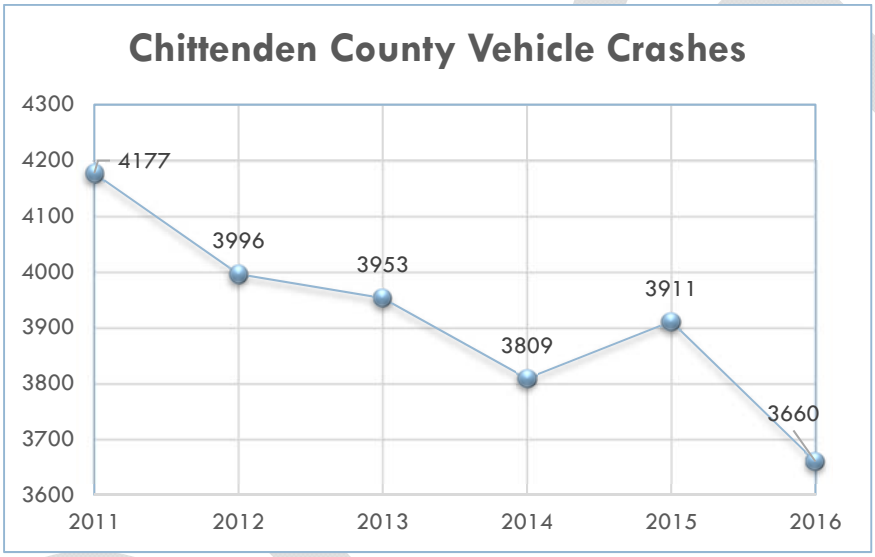
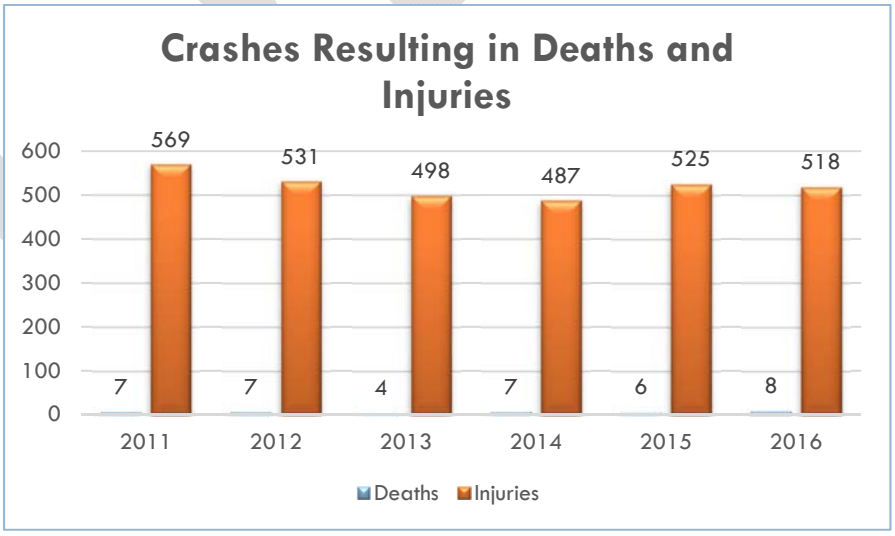
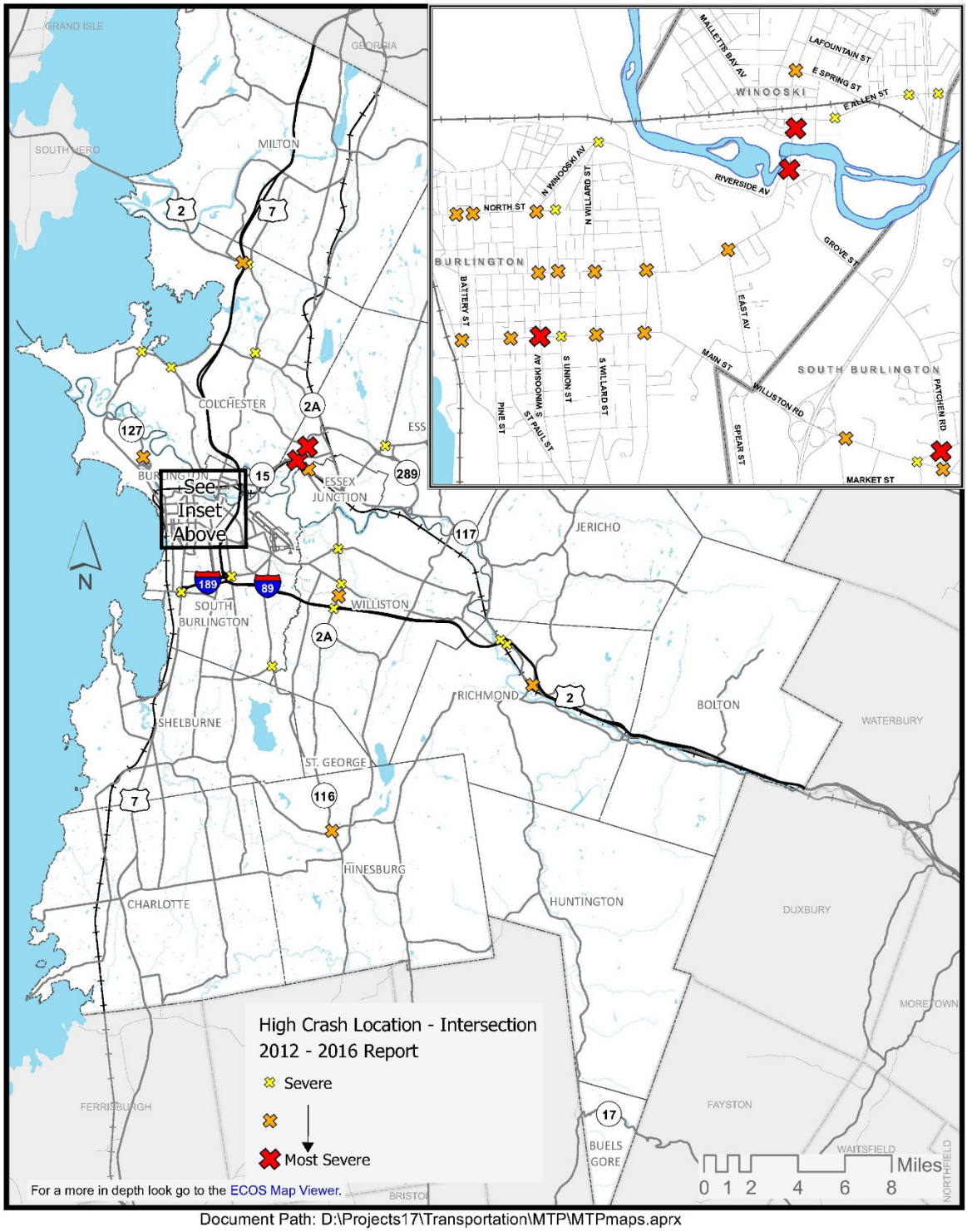


FIGURE 2 - 2011-2016 CRASHES WITH FATALITIES AND INJURIES



MAP 9 - 2012-2016 HIGH CRASH LOCATIONS-INTERSECTIONS



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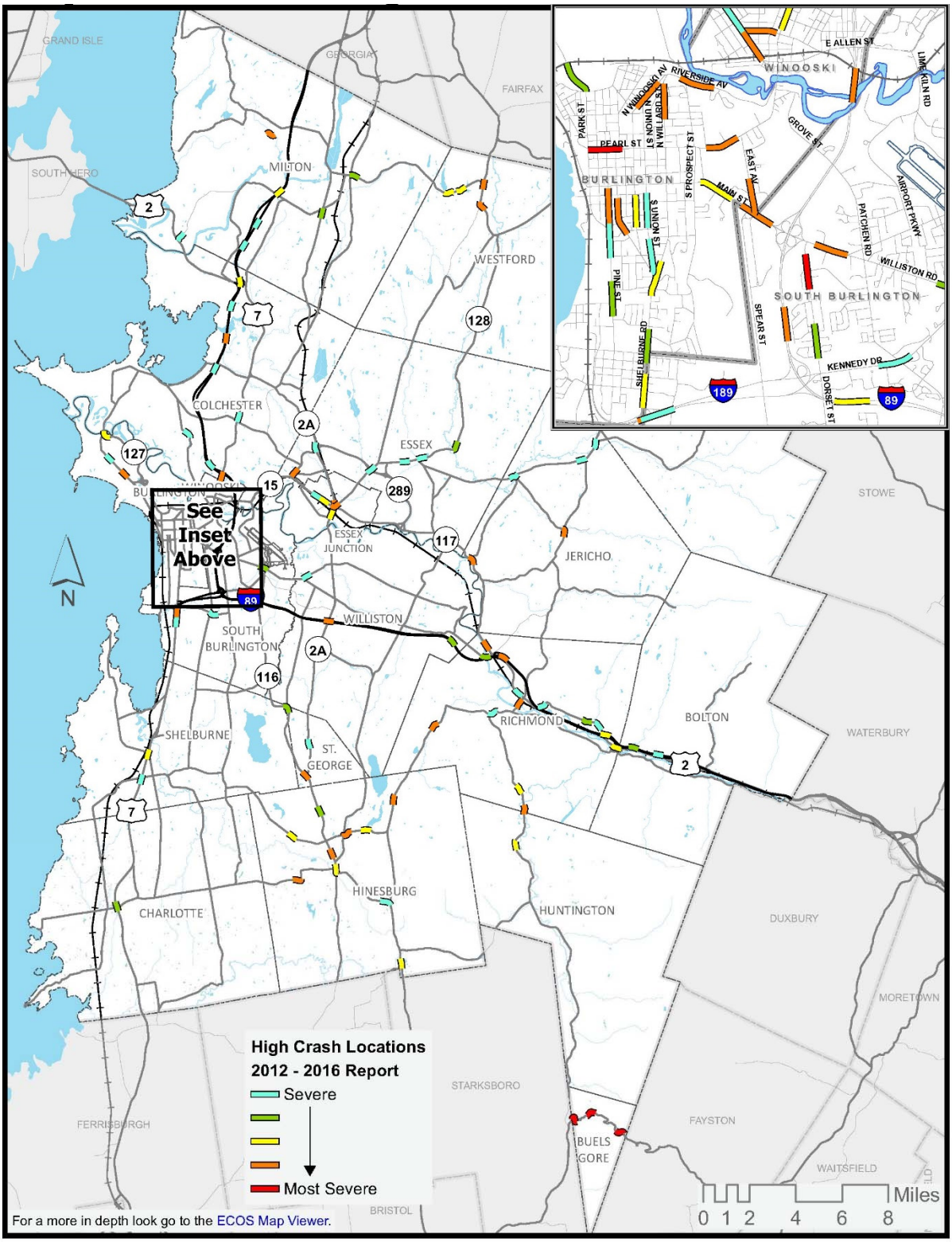
MAP 10 - 2012-2016 CRASH LOCATIONS-SEGMENTS



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Public Transit

In 2016, after completing a merger with the Green Mountain Transit Authority, the Chittenden County Transportation Authority (CCTA) became Green Mountain Transit (GMT). This regional public transit provider has been providing transit services in parts of Chittenden County since 1974, and with the merger, now all of northwestern Vermont. GMT currently serves the Chittenden County communities of Burlington, Essex, South Burlington, Shelburne, Williston, Winooski, Milton, Hinesburg, Jericho, Underhill and a section of Colchester with over a dozen scheduled transit routes. Additionally, GMT operates LINK Express routes that connect Chittenden County communities with Montpelier, Middlebury, and St. Albans. School tripper service, limited Sunday service, and targeted shuttle services round out GMT's transit offerings.

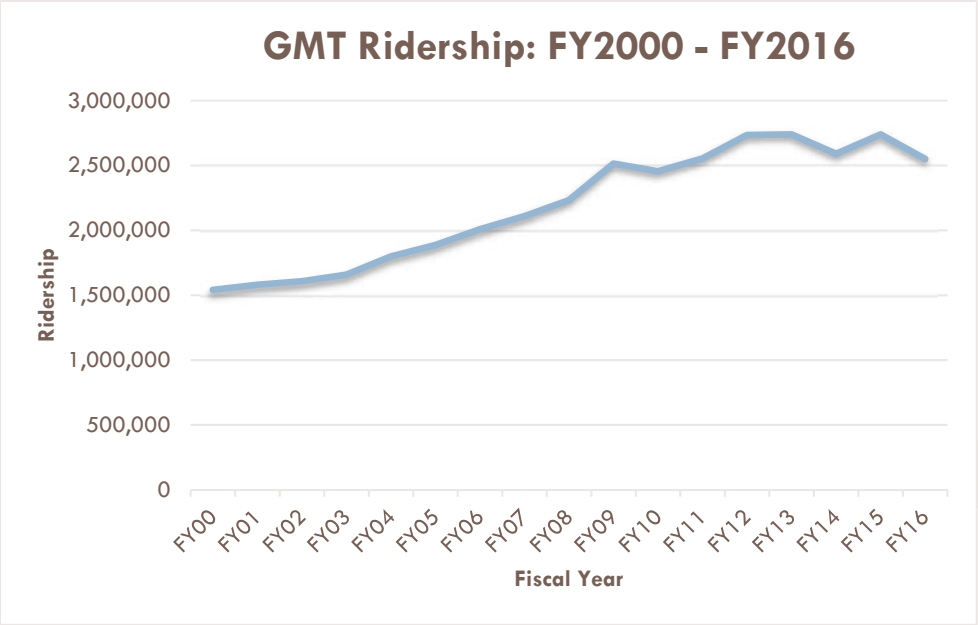
GMT is also responsible for providing Americans with Disabilities Act (ADA) paratransit services for persons unable to use the GMT fixed route bus system because of a disability. Paratransit services are required to be provided to areas within three-quarters of a mile of each side of each fixed transit route. The ADA service is currently contracted out to the Special Services Transportation Agency (SSTA), a private not-for-profit paratransit operator whose service area covers most of Chittenden County. Of SSTA's total 136,000 rides in 2016, 40% were ADA trips. SSTA is also the contracted transportation provider to a number of other client groups through a variety of social service agencies.

GMT also runs a program with area colleges - UVM, Champlain and St. Michael's - called Unlimited Access, allowing faculty, staff, and students to use their college ID cards as fare-free unlimited transit passes. This privately funded program was first initiated in 2003 through a collaborative partnership with GMT and the Chittenden Area Transportation Management Association (CATMA). Additionally, GMT also partners with the Go! Chittenden County program to provide employers with support and information to facilitate transportation benefit offerings to their employees with support from CATMA, CarShare Vermont, and Local Motion. More information on these organizations is provided in later sections of this plan.

GMT currently provides over two and a half million trips per year, a 65% increase over the past seventeen years. However, in recent years, GMT has experienced a downward trend in ridership, which matches the overall national trend due in large part to low gasoline prices. (See **Figure 3** - GMT Ridership, FY2000 – 2016 below). Note that the ridership dip in FY14 was likely due to the three-week drivers' strike when virtually all service was halted. In the past, public transit service in Chittenden County had served mostly non-driving segments of the population (low income, seniors and children) with a limited ability to attract people with access to cars. However, GMT has made significant strides to improve passenger amenities and services with onboard Wi-Fi, fifteen-minute frequencies at peak times on select local routes (Essex Junction, Williston and Pine Street) and enhanced multimodal coordination. GMT's entire fleet is also equipped with bike racks to encourage this type of multimodal trip making.

During the fall of 2016, GMT unveiled its new Downtown Transit Center on St. Paul Street in Burlington. The Downtown Transit Center replaced the former Cherry Street station, which was originally constructed over 30 years ago. Plans for a new transit center in Burlington date back to 1992. The Downtown Transit Center features free wireless internet, a climate-controlled indoor waiting area, bathrooms, real-time electronic bus monitors, radiant heating, and a roof that covers the outdoor platform. Moreover, long-distance transit providers such as Megabus, Vermont Translines, and Greyhound have included the new Downtown Transit Center for regional pickups and drop-offs.

FIGURE 3 - GMT RIDERSHIP, FY2000 - FY2016



GMT is in the process of developing its NextGen Transit Development Plan to improve transit service throughout its northern Vermont service area. The NextGen Plan will identify methods to enhance public transportation by making it more convenient, direct, and simple to use. GMT will also evaluate ways to better integrate urban and rural services throughout its service area. A comprehensive service analysis will also be conducted to improve outdated service routes and address shifting demographics. Furthermore, GMT will gather extensive public and stakeholder input throughout the development of the NextGen Plan. For more information see: http://ridegmt.com/nextgen/

A complement to transit and paratransit services is Neighbor Rides, a volunteer driver program of the United Way of Northwestern VT. Neighbor Rides uses a collective impact approach, partnering with multiple organizations, to improve access to transportation for elders and persons with disabilities in the region. The program began in 2013 with initial funding from the ECOS project and others with the intent to improve efficiencies of the transportation system. By utilizing volunteer drivers, Neighbor Rides is lowering the cost of trips while providing needed transportation for those without other transport options.

Passenger Rail

Passenger rail service available in Chittenden County consists of Amtrak's Vermonter train, with Vermont stops in Essex Junction, Brattleboro, White River Junction, Montpelier, Waterbury, and St Albans. This service was established in April 1995 as a reconfiguration of the discontinued Montrealer train from Montreal to Washington, D.C. The Vermonter service runs daily between Washington, D.C., and St. Albans, with numerous stops including Baltimore, Philadelphia, and New York City. **Figure 4** blow provides the most recent history of ridership on this service. As with GMT's public transit ridership, Amtrak has also experienced a decrease in ridership from 2015 to 2016.

FIGURE 4 - AMTRAK VERMONTER RIDERSHIP, FY2008 – 2016

YEAR	2008	2009	2010	2011	2012	2013	2014	2015	2016
RIDERS	72,655	74,016	86,245	77,783	82,086	84,109	89,640	92,699	89,318

Source: Amtrak annual ridership

In recent years, the State of Vermont has been pursuing multiple initiatives to expand passenger rail service. Planning is underway to extend Amtrak's Vermonter service north to Montréal. In 2015, U.S. and Canadian officials signed an agreement to develop a preclearance facility for both U.S. Customs and Border Protection and the Canada Border Security Agency at Central Station in Montréal. This facility would allow Amtrak passengers to clear the customs and immigration process without the need to physically stop at the border between the U.S. and Canada. While the U.S. Congress signed the necessary legislation into law in December 2016, the Canadian Parliament must still pass the enabling legislation prior to constructing the preclearance facility. Additionally, there are several operating agreements that must be finalized with various stakeholders before this cross-border service can be officially reinstated.

Another top priority for VTrans has been to reconnect Rutland to Burlington through the Ethan Allen Express, which currently operates between Rutland and New York City by way of Albany. In 2016, Vermont's congressional delegation announced that they had secured a $10 million Transportation Investment Generating Economic Recovery (TIGER) grant to fund three new passenger platforms, replace numerous crossing gates, and upgrade 11 miles of track. After the track improvements are made, passenger trains will be able to reach a maximum speed of 59 miles per hour while traveling from Rutland to Burlington's Union Station.

Commuter Rail

While no commuter rail service currently operates within Vermont, there has been renewed interest in establishing a commuter rail transit network. In early 2017, VTrans published the Montpelier to St. Albans Commuter Rail Service Feasibility Study to examine the feasibility of developing a commuter rail line between Montpelier, Burlington, and St. Albans. Conceptual capital cost estimates to establish commuter rail service were between $300 million and $363 million for upgraded rail infrastructure, stations, new rolling stock and additional implementation costs. Moreover, the annual operating expenses were projected to be up to $9 million. There are currently about 7,814 daily commute trips within the Montpelier to St. Albans corridor. When evaluating existing daily transit demand, the study envisioned a system-wide transit demand of between 135 transit users on the low end and 2,850 users in the highest percentage scenario. The higher ridership estimate factors in an aggressive promotional campaign along with new transit-focused policies. In response to this study, several rail advocates have asserted that the cost of this service could be dramatically reduced by purchasing refurbished rolling stock, which was not evaluated in this study.

Intercity Bus

There are currently three carriers that provide intercity bus services in Chittenden County: Greyhound Lines, Megabus, and Vermont Translines. These services carry passengers, baggage and packages on fixed routes and schedules. Greyhound runs four daily trips between Montreal and Boston with stops at Burlington International Airport and GMT's Downtown Transit Center. Megabus connects Burlington (at

Downtown Transit Center) to both Montpelier and Boston with one trip daily. In the past, Megabus had operated a route from Burlington to New York City, but the carrier recently cut this service due to dwindling demand. Vermont Translines is the most recent addition to the intercity bus options available to Vermonters. Founded in 2013 by Premier Coach and funded in part by VTrans, Vermont Translines offers three Chittenden County pickup and drop-off locations; in Colchester, Burlington, and South Burlington, with service along the Route 7 corridor to Albany, New York.

Freight: Rail and Truck Facilities

Since the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, MPOs have been strongly encouraged to include freight planning as part of the metropolitan transportation planning process. Freight plays a fundamental role in the economic health of Chittenden County communities. About 6.3 million tons of freight flow into, out of, or within the region each year, far more than in any other region of Vermont. According to the 2012 Vermont Freight Plan, over 9 million tons of freight will pass through Chittenden County annually by 2035. Burlington and Winooski are the only two Chittenden County municipalities that have designated truck routes. As reported by the 2001 CCMPO *Regional Freight Study and Plan* (the most recent detailed look at freight in the region), more than 91 percent of the freight tonnage moved in the County moves by truck, while rail moves 5.7 percent. Rail has historically been used to carry large volumes of bulk materials, such as fuel, stone, wood chips, and salt. Nearly 60 percent of the region's freight flows to or comes from nearby – other parts of Vermont, New Hampshire, or New York.

In recent years, the County's freight distribution system has had to adapt to a changing and more competitive marketplace. With the advent of new information technologies truck containers, rail cars and airplanes are increasingly viewed as mobile warehouses that feed goods into the production process or on to market shelves to meet immediate demand.

The *Regional Freight Study* noted that the freight infrastructure in Vermont does not meet national industry standards for motor carriers and railroads and this affects freight access to Chittenden County. These freight system deficiencies were also cited in the more recent 2010 Western Corridor Study. For example, US 7 and VT 22A do not meet industry standards and are the only north/south highways in western Vermont. Further, part of the Essex-Burlington rail line has weight and clearance limits that affect its ability to function effectively in the regional, national and North American rail systems. The amount of freight transported by rail has decreased over the last few decades and, as a result, the number of direct rail sidings and transload facilities – facilities that connect rail to trucks in order to transfer goods – has reduced. However, a new transload facility opened in late 2010 in the Vermont Railway yard in Burlington.

Since the *Regional Freight Study* was completed, there have been numerous upgrades to address freight-related deficiencies. In 2010 Vermont received a $50 million federal grant award which, combined with the NECR's $19.5 million match, provided a sizeable reinvestment opportunity for the entire NECR line through the state. Now completed, the improvements allow 286,000 pounds gross weight rail car capacity from St. Albans to the VT/MA state line, bringing this entire line up to the national standard. These improvements do not apply to the NECR spur from Essex Junction to Burlington, where track and bridge repairs are still needed.

There are two rail freight operators in Chittenden County: 1) The Genesee & Wyoming who purchased the New England Central Railroad (NECR)/RailAmerica and currently has a base in St. Albans. The former NECR was Vermont's largest privately owned and operated rail operating freight service from

Alburgh, VT to New London, CT. NECR, now G&WR, also operates on the spur line that connects their mainline in Essex Junction to Burlington. 2) The Vermont Railway is based on the waterfront in Burlington and operates on state owned lines south to Bennington, branching off in Rutland to Whitehall, NY and Bellows Falls, VT.

In 2017, representatives from the CCRPC, FHWA, and VTrans formed a Vermont freight working group to evaluate freight provisions of the FAST Act, identify national goals and plans that are relevant to Vermont, and discuss ongoing freight issues. In addition to monitoring national freight policies and strategies, the working group will also evaluate potential corridors to designate as Critical Urban and Rural Freight Corridors. These corridors provide access and connection to the Primary Highway Freight System and the Interstate with ports, public transportation centers, and intermodal transportation facilities. The Primary Highway Freight System is an identified network of highways that contain the most vital portions of the U.S. freight transportation system, based on measurable and objective national data.

Active Transportation Facilities

Active transportation networks create opportunities to increase physical activity, support healthy communities, enhance economic development, and promote environmental sustainability. Furthermore, communities that support walking and biking provide transportation access to all residents regardless of age, gender, or socioeconomic status. Chittenden County has a range of dedicated transportation facilities to accommodate bicyclists, pedestrians, and other physically active forms of transportation. Facilities dedicated to non-motorized uses (such as sidewalks and off-road, shared use paths) are concentrated in and around the metropolitan core. Non-dedicated facilities that bicyclists and pedestrians share with motorized users are located throughout the region. According to ECOS Scorecard data (link to be inserted) since the last comprehensive inventory in 2008, there has been an increase in the shared use path mileage. Most shared use paths (except for portions of the Burlington Bike Path) were recently built and are currently in good condition. There are also about 404 miles of existing sidewalks in Chittenden County. These mileage figures are expected to increase annually as planned bicycle and pedestrian projects continue to be implemented.

Between 2005 and 2015, the CCRPC facilitated a municipal sidewalk grant program to provide communities with access to federal funds to improve public sidewalk systems. The program was established to advance the development of an integrated sidewalk system and encourage connections between neighborhoods, schools, parks, town centers, and other public spaces to support active transportation in Chittenden County. Since 2005, 12 Chittenden County municipalities have received a total of nearly $3 million for 38 new sidewalk projects. Sidewalk projects have been, and continue to be, funded through two VTrans programs: Transportation Alternatives and the Bicycle & Pedestrian Program.

Community support for non-motorized facilities is substantial, as surveys in 2000, 2006, and 2012 revealed. These facilities have rated second highest (only following transportation system maintenance) on the list of transportation improvements the public desires. This survey will be replicated again in 2018 to evaluate the transportation-related attitudes and opinions of Chittenden County residents.

The CCRPC has regularly updated its regional Pedestrian/Bicycle Plan, most recently in 2017 – see: http://www.ccrpcvt.org/our-work/our-plans/regional-bikeped-plan/. The updated Chittenden County Active Transportation Plan (ATP) identifies its goal as creating a safe, comfortable, and connected

regional network of pedestrian and bicycle routes that appeal to all ages and abilities. After a robust public input process, detailed existing conditions assessment, and a Level of Traffic Stress model analysis, the ATP outlines recommendations for both non-infrastructure and infrastructure improvements to enhance network connectivity for active transportation in Chittenden County. The ATP recommendations focus on priority corridors as opposed to defining detailed facility types in specific places.

Intermodal Facilities

There are numerous strategically located intermodal transportation facilities in Chittenden County. These multi-functional facilities serve as hubs where connections occur between transportation systems and various travel modes. The CCRPC is committed to advancing the development of new and existing intermodal facilities to support the efficient movement of people and goods throughout Chittenden County. Current facilities fitting this category are the Downtown Transit Center on St. Paul Street in Burlington, the Essex Junction Amtrak station, University Mall in South Burlington, Burlington International Airport, the Vermont Railway Yard in Burlington, two privately operated ferry terminals (Charlotte and Burlington), and eight designated park-and-ride facilities scattered around the region.

Park-and-ride facilities span a spectrum from small undesignated lots to large, federally funded, high-capacity facilities like the one at I-89 Exit 11 in Richmond, which was enlarged in 2014 with 53 new spaces and improved bus accommodations. The most common intermodal connection made by commuters at park-and-ride facilities is transferring to a shared carpool. However, some facilities such as the Richmond and Colchester park-and-ride facilities off of I-89 also offer links to public transportation. VTrans' 2015 Park-and-Ride Facilities Plan (http://vtrans.vermont.gov/sites/aot/files/planning/documents/planning/Appendix_2015-12.pdf) calls for enhanced transit access at State-owned facilities.

The CCRPC regularly updates a regional park-and-ride plan, most recently in 2011, see: http://www.ccrpcvt.org/wp-content/uploads/2016/01/Parknride_InterceptFacility_FinalPlan_20110615.pdf. The 2011 Park- and-Ride & Intercept Facility Plan details high-priority sites and projects, while also offering recommendations to support a regional network of park-and-ride facilities that are accessible by multiple modes of transportation. A robust network of strategically spaced and located park-and-ride facilities will help to promote multimodal transportation options, decrease carbon emissions, and reduce traffic congestion.

The Railyard Enterprise Project in Burlington is a current and significant intermodal planning projects. The project encompasses the Burlington Railyard, which is a National Highway System (NHS)-designated intermodal facility located on City's south waterfront. The overall purpose of the project is to expand a network of multimodal transportation infrastructure to support economic development, improve neighborhood livability, and enhance intermodal connections to the Burlington Railyard.

Air Service Facilities

Burlington International Airport (BTV) is the largest airport in the State of Vermont. BTV is located in South Burlington and owned by the City of Burlington. It is governed by an Airport Commission that oversees general airport operations and guides future development. The airport is accessed primarily from US 2 (Williston Road), and serves as a vital link to the national air transportation system for the residents and businesses of northwestern Vermont and northern New York State. Additionally, about

40% of BTV's passengers are from Quebec, Canada. There are currently five commercial airlines that provide 31 daily departures directly serving 12 destinations from BTV. The airport is also serviced by UPS Air Cargo and FedEx Express commercial parcel carriers, two general aviation/fixed base operators, and two airframe and power plant maintenance facilities. The airport also serves as home to a unit of the Air National Guard fleet of F-16s (soon to be upgraded to F-35s), a National Guard Blackhawk helicopter air ambulance service and a maintenance and repair facility for Blackhawks and F-16s. There are 94 aircraft based at BTV, which includes both general aviation and military aircraft.

Since it saw a record of 759,021 enplanements in 2008, BTV has experienced a steady decline in passenger volumes through 2015. However, from 2015 to 2016, enplanements rose by 1.77% to 604,576, ending the seven-year decline. The 2016 enplanements data represent a 20% drop since 2008, which is in contrast with the 2011 BTV Airport Master Plan vision of 1.6 million annual enplanements by 2030.

Landside connections to the airport are provided by private auto, taxi, GMT fixed route service, and intercity bus via Greyhound Lines and Vermont Translines. The State's recent Statewide Intercity Bus Study (2013) noted that there is a public transportation service gap between the airport and GMT's Downtown Transit Center as this trip is not direct, requiring a transfer at University Mall.

Bridges

There are 178 bridge structures greater than or equal to 20 feet in length in Chittenden County. Of these, 85 are owned by the State and the remaining 93 by local governments. Nearly all of the State-owned bridges over 20 feet long are located on major highways, i.e. principal arterials and major collectors. The majority of municipally owned bridges over 20 feet long are located on less heavily traveled highways, i.e. minor collectors and local roads. Note that many bridges and other structures less than 20 feet long are also owned and maintained by both the State and municipalities.

The condition of every local and State bridge is evaluated every two years by VTrans. Using a sufficiency rating system developed by the U.S. Department of Transportation, bridges are assigned a value between 0 and 100. Ratings are based on evaluations in three areas – structural adequacy and safety, essentially for public use, and serviceability and functional obsolescence – with special reductions given for extreme safety problems and lack of alternative routes.

Since the sufficiency rating of a bridge is a single aggregate number that is based on a variety of factors, a low sufficiency rating does not necessarily mean that a bridge is unsafe or in need of immediate repair but indicates that upgrades may be necessary. Based on this system and VTrans' latest inspection reports, just over 4 percent (8 of 178) of Chittenden County bridges have a sufficiency rating below 50, or in poor condition, and nearly half of the total number of bridges hold a rating between 50 and 80 (87 of 178) indicating that rehabilitation may be necessary. The remaining 83 bridges (47 percent) are deemed sufficient with ratings above 80. Since 2010, there has been a marked improvement in the number of bridges with a sufficiency rating below 50, down to 8 from 18, a 56 percent improvement. Bridge rating data can be found here: http://vtransparency.vermont.gov/#.

Other Transportation Demand Management Programs

Transportation Demand Management, or TDM, is a general term for policies, programs or strategies that result in more efficient use of transportation resources. Two organizations in the region have

notable programs generally fitting this broad category. These are 1) CarShare Vermont, and 2) the Chittenden Area Transportation Management Association (CATMA).

CarShare Vermont, a non-profit organization founded in 2008, strives to provide an accessible and affordable car sharing service to reduce the need for individual to own vehicles and to improve mobility for people of all income levels. CarShare Vermont currently has a fleet of 17 vehicles at 11 locations around the Greater Burlington area. Vehicles are available 24 hours a day, 7 days a week and can be used to drive to any destination. CarShare members pay for vehicle use based on how much they drive. The organization provides routine maintenance, roadside assistance, car washes, insurance, gas, and parking. The program is designed to save members money (less need to own a vehicle) and reduce unnecessary trips that impact the environment. Since 2013, CarShare Vermont has added seven vehicles to its fleet and 166 new members, for a total of 1,046 members in 2016. CarShare Vermont recently expanded into Winooski by adding a vehicle pod behind Winooski City Hall. In 2015, CarShare Vermont partnered with VTrans to implement a two-year pilot project to add two vehicles outside Montpelier's City Hall. However, a year after the start of the pilot, CarShare Vermont announced that it would cease service in Montpelier because of declining membership and revenues.

CATMA, also a non-profit membership based organization, was formed in 1992 to jointly address, plan and manage a viable, cost-effective and sustainable transportation and parking network in and around Burlington's educational institutions. CATMA's founding members -- UVM, UVM Medical Center, Champlain College and American Red Cross – worked to efficiently coordinate land use planning, share resources, and administer transportation and parking programs, infrastructure and associated facilities through CATMA, while minimizing environmental impacts. In order to effectively promote and administer transportation demand management programs at a larger scale, CATMA expanded its service area to businesses and developers throughout Chittenden County starting in 2015. CATMA TDM strategies include: free and reduced-cost transit pass, bike-walk rewards program, the guaranteed ride home program, CarShare Vermont campus membership program, staggered work and class scheduling, coordinated carpool and vanpool services, frequent drawings and contests, and outreach and consistent messaging.

In 2011, after receiving a grant from the Transportation, Community and System Preservation program (TCSP), the CCRPC established Go! Chittenden County. Go! Chittenden County is a regional TDM program that serves as a one-stop resource for information about transit, carpooling, vanpooling, car-sharing, bicycling, and walking. The Go! Chittenden County project was a comprehensive effort to achieve regional transportation goals outlined in the ECOS Regional/Metropolitan Transportation Plan, as well as address national policy objectives including the need to conserve energy, reduce reliance on energy imports, lessen congestion, and clean our nation's air. With specific TDM projects funded by the TCSP grant successfully completed, and with the countywide expansion of CATMA, specific promotion of Go! Chittenden County as a brand and resource will cease at the end of 2017. The goal of Go! Chittenden County to connect individuals and businesses with transportation resources and solutions will continue through individual partners including CATMA, CarShare Vermont, Local Motion, and Green Mountain Transit.

In addition to reducing roadway congestion and providing multiple ways to get around, the impact of widespread TDM program implementation could significantly benefit Chittenden County municipalities by enhancing mobility, reducing dependence on fossil fuels, improving air quality, and supporting high levels of community livability. While only 5.9% of Chittenden County workers currently work from home (2011-2015 American Community Survey), the CCRPC's 2012 Transportation Survey revealed that

over 23% of Chittenden County employees work for an employer that allows them to work from home. Employers need encouragement and support to implement an employee commute program that will assist in reducing congestion and parking demand, resulting in less strain on our existing roadways and influencing individual transportation behavior. There is an opportunity to focus on shifting transportation costs to a sustainable model and better integrating land use and transportation.

Transportation and Climate Change

The overwhelming majority of scientists agree that changes in climate worldwide can be mainly attributed to human activities, primarily the burning of fossil fuels. In Vermont, the largest contributor of greenhouse gas (GHG) emissions is the transportation sector – mostly carbon dioxide (CO_2) coming from the combustion of petroleum-based fuels, like gasoline and diesel in internal combustion engines. Transportation's 45% statewide contribution to GHG emissions (see: http://climatechange.vermont.gov/climate-pollution-goals) is closely mirrored by our 49% Chittenden County estimate. These compare to a nationwide contribution share of 27% from transportation (according to 2015 EPA Greenhouse Gas Emissions data).

To address this continuing and growing environmental issue while also combating climate change, emissions from the transportation sector need to be reduced. By 2025, Vermont's Comprehensive Energy Plan has a goal to reduce statewide transportation energy by 10%. Reducing the number of vehicle miles traveled (VMT), increasing investment in alternative forms of transportation, and shifting to low or zero-emission fuels are strategies that could be implemented in order to achieve this goal. Transportation planning looks at the problem from two perspectives: 1) How to mitigate climate changes through policies, programs, and technologies, and 2) How to adapt transportation infrastructure and services to the coming climate changes.

Climate change is only one of many factors to consider as we plan the region's future transportation investments, but we need to carefully monitor its potential impacts while implementing programs that will slow its progress. For more information go to the air quality and climate sections of the CCRPC website.

Transportation and Public Health

The ten principles that the ECOS Plan uses to guide planning efforts are integrally linked to community health. This connection underscores the need for public health professionals to be included in transportation and community planning. There is an extensive body of research that details the impact of transportation on health, particularly with regard to safety/injury, air quality, physical activity, equitable access to opportunities and noise.

Physical Activity - The degree to which individuals in a community are physically active is directly dependent on transportation opportunities, infrastructure and community design. The health benefits of physical activity and its role in reducing the risk for chronic disease has numerous positive societal impacts. Most risk factors for chronic disease do not occur randomly but are closely linked to the characteristics of neighborhoods in which people live, work, and play.

In Chittenden County, 71% of adults report using community resources for physical activity. Walkable communities with a reliable transit network generally have a lower dependence on automobiles and encourage physical activity. Hybrid commutes, that is, trips completed using several modes are an effective option when distance and areas not served by transit are barriers to a single-mode active commute. With few exceptions, proximity to public transit stops is linked to higher transit use and higher

levels of physical activity among adults. A study in the Journal of Preventative Medicine found that commuting by public transportation instead of by car increased energy expenditures equivalent to the loss of one pound of body fat per six weeks.

Access – Access to education, healthy food, healthcare, recreation, social interactions and employment all contribute to health and quality of life. A lack of safe and convenient alternatives to automobile travel limits an individual's options forcing trade-offs in money or time thereby compromising equitable choice. This dearth of options disproportionately affects vulnerable populations, the elderly, people living in poverty, persons with disabilities, and children. Improvements to walking and bicycling facilities benefit current and new users, particularly those who are living with physical disability and/or economic hardship, by providing hitherto unavailable or impractical access to essential services and activities.

Air Quality – Motor vehicle emissions are a major contributor of contaminants such as particulates, nitrogen oxides and carbon monoxide. Chemical reactions between nitrogen oxides and volatile organic compounds (VOC) in the presence of sunlight produce surface ozone which also compromises air quality. Overall, Vermont's air quality is good. Vermont has much less traffic congestion, commerce and industry that can contribute to poor air quality. Even so, there are days when high levels of fine particulate matter in the air make it risky to be outdoors and physically active, especially for older adults, children, and people with chronic conditions such as asthma. Chittenden County has a very low percentage of days per year when the surface ozone level and concentration of ambient particulate matter register above National Ambient Air Quality Standards (NAAQS). As the population of Chittenden County increases over the coming decades, bolstering the transit system, creating a contiguous infrastructure for active modes of transportation, and focusing on dense development patterns that encourage non-motorized trips will help to maintain healthy air quality.

Injury Prevention – Nationally, in 2015 nearly 190,000 pedestrians, just under 500,000 bicyclists and over 2,600,000 motor vehicle occupants were injured. The most current available data shows Chittenden county has the lowest non-fatal motor vehicle related injury rate in the state, but over decades the projected population increase may begin to have a bearing on that indicator. Motor vehicle crashes are a leading cause of injury in Vermont. Established safety measures such as safety belts, air bags and car seats and emerging safety technologies such as pedestrian detection systems, lane departure warnings and the like are improving safety on our roads. Policies to reduce VMT, increase investment in safe and efficient walking and biking facilities, transit and TDM programs will promote healthier behaviors by making the default choice the healthier choice. A health impact assessment (HIA) of public transportation estimated that increased spending on public transportation and sustainable modes of transportation can benefit health and reduce social inequalities.

The State of VT Health in All Policies Task Force has identified best practices that take into consideration the evolution and growth of our transportation system and the health of Vermonters. The task force recommends support for the development of cleaner bus and truck fleets and investment in freight rail infrastructure to reduce greenhouse gas emissions, improve local air quality, promote health, and foster energy independence. It is imperative to flex funds to increase investments in public transportation and walk/bike infrastructure improvements to support active transportation modes and emphasize accessibility instead of simply mobility, in transportation policies and programs.

Travel Patterns

Residents of Chittenden County make hundreds of thousands of trips every day by various means of transportation (driving, biking, walking, or bussing). Transportation planners often categorize travel as either peak or off-peak. Peak travel represents the trips that coincide with the typical commute to work in the early morning (AM peak) and back home in the late afternoon (PM peak) while off-peak trips represent the remaining hours of the day. Peak and off-peak trips make different demands on the transportation network. Peak period travel places the greatest strain on the transportation system and consequently exhibits the worst congestion seen throughout the day. The CCRPC's Travel Demand Model results reflect travel on a daily basis and has the capability of examining both peak and off-peak travel.

NOTE: When the Chittenden County Transportation Demand Model update is complete, this travel pattern will be revisited and reexamined and the section updated as needed.

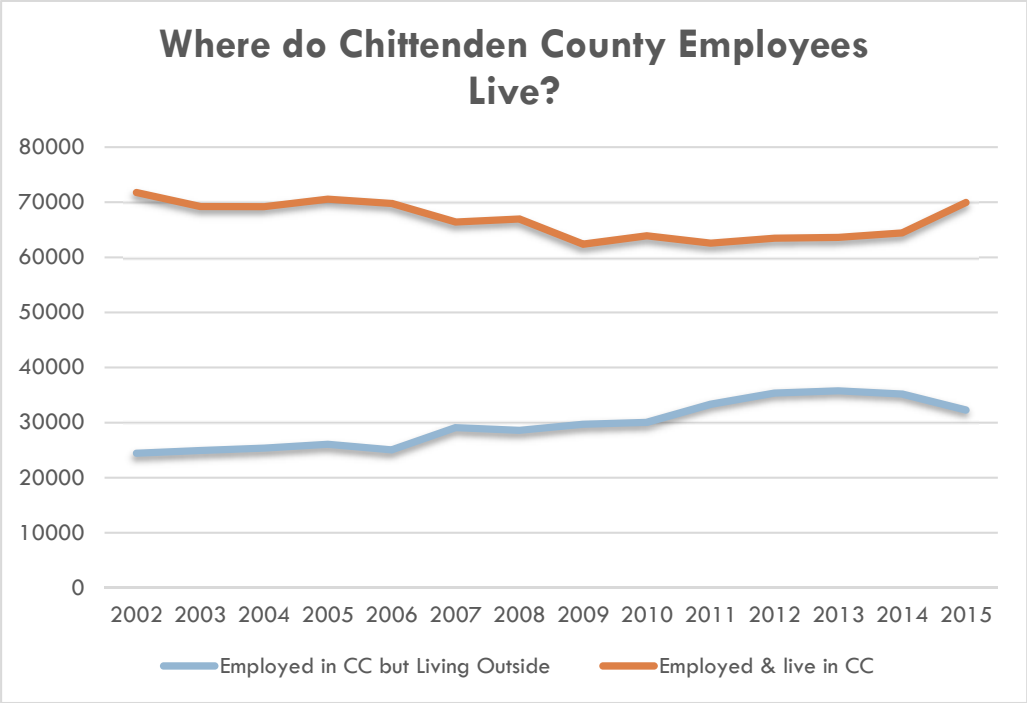
In Chittenden County, most trips (as measured in person-trips) are internal, meaning they do not cross sub-regional boundaries (e.g. urban, suburban, rural and external boundaries). The largest share (32 percent) of daily person trips begin and end in the region's urban communities (Burlington, South Burlington, and Winooski). A smaller share (18 percent) take place within suburbs (Milton, Colchester, Essex, Essex Junction, Williston and Shelburne) or from suburb to suburb.

Fewer daily trips begin and end within rural communities (less than 2 percent). Roughly the same amount of travel occurs within rural areas as takes place between rural areas and other sub-regions. These travel patterns reflect lower levels of economic activity in rural areas resulting in rural residents traveling longer distances to the suburbs or urban core for employment, shopping, and other activities.

The Larger Northwest Vermont Region

Chittenden County is the population and jobs center of a larger area encompassing all of northwestern Vermont. Its economic and cultural impacts spread well beyond the county lines. Data from the U.S. Census Bureau's Longitudinal Employer-Household Dynamics show that 32,295 residents from our neighboring counties come to Chittenden County for work, while 69,948 Chittenden County residents are employed and live within Chittenden County. Proximity and easy access to Chittenden County have been determinants as to which towns in our neighboring counties have grown the fastest. Franklin County's fastest growing towns are those along the I-89 corridor and/or bordering our northern municipalities. The northern tier communities in Addison County have likewise grown at faster rates than other county towns, and in Lamoille County, Cambridge and Stowe have been two of the most rapidly growing communities.

FIGURE 5 - CHITTENDEN COUNTY EMPLOYEE COMMUTING



2016 Statewide Transportation Public Opinion Survey

In 2016, VTrans initiated an update to its Long-Range Transportation Plan (LRTP) to guide multimodal transportation initiatives and investments through 2040. The public participation process for the LRTP included a statewide transportation survey that was conducted by Resource Systems Group, Inc. (RSG). The survey had four focus areas (Travel Behavior, Customer Satisfaction, Policy and Funding, Emerging Trends and Technology) and was administered in five distinct geographic regions through an address-based random sample. Chittenden County residents were grouped within the Champlain Valley region, which also included residents from Addison, Franklin, and Grand Isle Counties.

In total, nearly 900 respondents completed surveys in the Champlain Valley region. Results from the survey showed that the Champlain Valley region had the lowest percentage of respondents who drove alone (79%) when compared to the other regions. Furthermore, the Champlain Valley region also stands out as the region with the highest percentage of respondents reporting that they walk, bike, or take public transit. Additionally, while less than 14% of statewide respondents reported biking frequently, 20% of Champlain Valley respondents reported biking frequently. When asked about congestion frequency, the Champlain Valley region had the lowest proportion (32%) of respondents reporting that traffic congestion has no negative effect on their overall quality of life. Within the policy and funding section, the questionnaire prompted respondents to rate the importance of a variety of services or issues. Champlain Valley respondents reported that ensuring the safety of the traveling public was the most important transportation-related issue.

Financial Plan

INTRODUCTION

The CCRPC's long range transportation plan must incorporate a financial section that estimates how much funding over the life of the plan will be needed, how much will be available for the recommended transportation investments, and the costs to maintain and operate the existing system. The financial section must outline how the CCRPC can reasonably expect to fund all included projects and programs within a fiscally constrained environment, drawing on all anticipated revenues from the federal and state governments, regional or local sources, the private sector and user charges.

Federal regulations establish the requirement for the financial plan in *23 CFR 450.324(g)(11)*[1]. The operative requirements of that regulation are summarized here. The adopted MTP shall include:

> *(11) A financial plan that demonstrates how the adopted transportation plan can be implemented. Key components of this plan to include:*
>
> *(i) System-level estimates of costs and revenues to adequately operate and maintain Federal-aid highways and public transportation.*
>
> *(ii) Agreed upon estimates of funds that will be available to support plan implementation.*
>
> *(iii) Recommendations on any additional financing strategies with strategies for ensuring their continued availability.*
>
> *(iv) Funding to include all federally funded projects, both highway and transit. Projected funds to reflect "Year of Expenditure dollars." (YoE)*

The financial projections extend to the MTP planning horizon of 2050.

The completed financial plan will contain three parts:

1. The overall level of fiscal constraint including projection of future transportation funding in Chittenden County and factors that are anticipated to affect this.
2. The base level of investment required for system operations and maintenance as called for under 23 CFR 450.324(g)(11)(i).
3. An estimate and analysis of the costs associated with MTP recommended improvements themselves.

FINANCIAL PLAN PART 1: OVERALL CONSTRAINT

CCRPC MTP funds, guided by the contents of the 2050 MTP, are limited to federal transportation funds allocated to the Chittenden County metropolitan area under federal transportation acts. The Fixing America's Surface Transportation Act or "FAST Act" is the current law governing the use of federal

[1] For more details on federal regulations regarding MPO long range planning, see

https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=e2662fc63c225d496d1fa6ce22ea6cb8;rgn=div5;view=text;node=23%3A1.0.1.5.11;idno=23;cc=ecfr#sp23.1.450.c

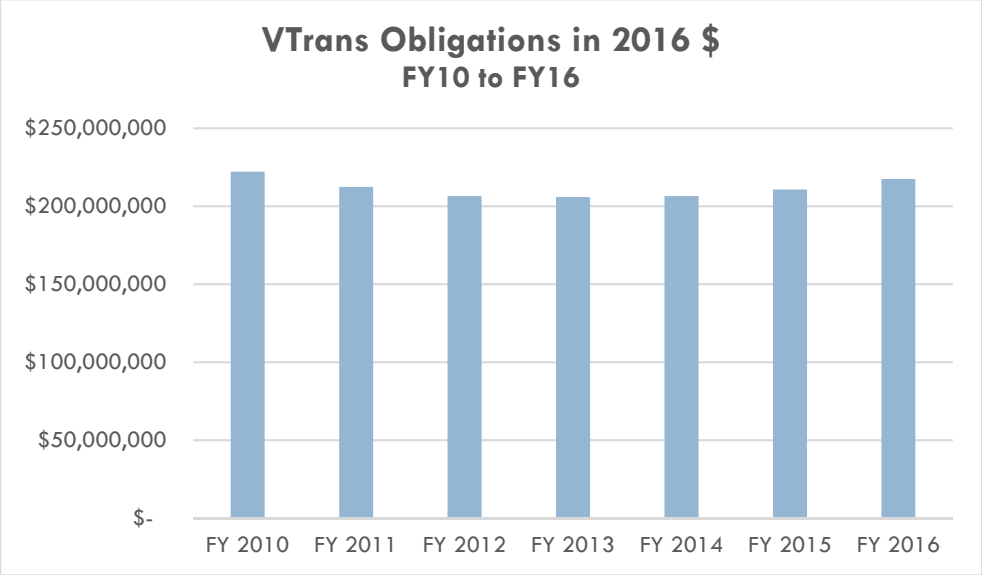
transportation funds. FAST Act was signed into law on December 4, 2015 and largely maintains previous program structures and funding shares between highways and transit.

The Chittenden County region does not currently access other sources of transportation funding such as tolls or private contributions. The primary funding source for significant transportation projects on highways, and transit eligible for federal aid, is expected to be federal funds plus state and local match.

The single most critical issue for establishing how much MTP funding will be available between 2016 and 2050 is therefore the future availability of federal funds. For the purposes of this plan, an estimate of available future funding has been developed based on the history of statewide federal funding and CCRPC's historic share of that funding. This methodology represents the most reasonable estimate of funding availability for two reasons:

- Actual funding available to the CCRPC over the past ten plus years is variable and has depended on the timing of specific projects. Statewide spending patterns exhibit a more consistent trend, and
- The FAST Act will continue funding programs at levels similar to what its predecessors MAP-21 and SAFETEA-LU previously provided.

Vermont Federal Transportation Funding History FY2010 - 2016



Total statewide federal funding was projected for future years based on historical funding levels as depicted on the chart above. NOTE: The estimates began in FY2010 because FY2009 was distorted with the infusion of additional funding from the American Recovery and Reinvestment Act (ARRA)

Over the last seven years there was no discernable increasing or decreasing trend in constant dollar funding to Vermont. Therefore, the MTP assumes flat statewide funding over the 25-year planning horizon at the level of $211,609,103 per year in 2016 dollars. See table below for recent history.

VTRANS OBLIGATIONS BY YEAR

	Year of Expenditure (YOE)	Constant 2016 $
FY 2010	$201,834,075	$222,152,066
FY 2011	$199,004,872	$212,335,621
FY 2012	$197,467,517	$206,423,453
FY 2013	$199,746,293	$205,791,234
FY 2014	$203,614,734	$206,428,095
FY 2015	$208,080,804	$210,705,770
FY 2016	$217,427,482	$217,427,482
	AVG	**$211,609,103**

The next step is to calculate CCRPC's estimated share of the statewide federal funds. As shown in the table below, CCRPC's share of the total statewide funds has fluctuated significantly between 7.5% (FY14) and 40.6% (FY05) between 1999 and 2016.

Federal Fiscal Year	FHWA and FTA Formula Funds	Chittenden County Obligations	CC as Percentage of State
FY1999	$141,644,879	$20,716,152	14.6%
FY2000	$137,475,720	$34,124,215	24.8%
FY 2001	$141,162,474	$26,574,888	18.8%
FY 2002	$153,992,216	$37,213,939	24.2%
FY 2003	$149,892,007	$42,359,853	28.3%
FY 2004	$161,396,138	$55,511,396	34.4%
FY 2005	$147,008,522	$59,717,025	40.6%
FY 2006	$149,970,687	$32,022,092	21.4%
FY 2007	$156,335,139	$24,053,735	15.4%
FY 2008	$157,949,734	$25,990,323	16.5%
FY 2009	$156,442,879	$27,373,347	17.5%
FY 2010	$222,152,066	$27,663,934	12.5%
FY 2011	$212,335,621	$26,643,026	12.5%
FY 2012	$206,423,453	$32,458,183	15.7%
FY 2013	$205,791,234	$43,519,161	21.1%
FY 2014	$206,428,095	$15,517,128	7.5%
FY 2015	$210,705,770	$18,450,521	8.8%
FY 2016	$217,427,482	$31,321,866	14.4%
AVERAGE			**19.4%**

The average proportion of statewide federal funding going to CCRPC projects over the 1999 - 2016 period was 19.4%[2]. This is a bit lower than Chittenden County's proportion of statewide population at 25.8% (US Census, 2016 estimate) and Vehicle Miles of Travel (VMT) at 20.3% (VTrans, 2016) and appears to represent a reasonable estimator of available funding in the County. As a result, CCRPC's annual funding is estimated to be 19.4% of the total federally supported transportation funding coming to Vermont. This nearly one fifth share results in $41,052,166 (in 2016 dollars) for Chittenden County projects annually.

The table below presents CCRPC's estimated annual funding beginning in 2016 and at five-year intervals from FY20 to FY50. This is based on the projected flat statewide funding and the County's 19.4% historic share of statewide funds. In constant year 2016 dollars the annual 5-year increments accumulate over the 34 years to $1.395 billion. The year-of-expenditure (YoE) row applies an annual inflation rate of 3%[3]. Adjusting for inflation, and compounding over 34 years, results in significantly higher annual amounts – particularly closer to 2050 when the compounding effect is more pronounced.

PROJECTED ANNUAL AND CUMULATIVE FUNDING AVAILABLE FOR CHITTENDEN COUNTY PROJECTS (MILLIONS) AT 3% ANNUAL INFLATION

Federal Fiscal Year		2016	2020	2025	2030	2035	2040	2045	2050
Annual	Constant 2016 $	$41.05	$41.05	$41.05	$41.05	$41.05	$41.05	$41.05	$41.05
	Year of Expenditure $	$41.05	$44.86	$52.00	$60.29	$69.89	$81.02	$93.92	$108.88
Cumulative	Constant 2016 $	$41.05	$164.21	$369.47	$574.73	$779.99	$985.25	$1,190.51	$1,395.77
	Year of Expenditure $	$41.05	$171.75	$417.05	$701.43	$1,031.10	$1,413.28	$1,856.33	$2,369.95

Potential Adjustments to Projected Funding

While there are a number of factors that could change the projected level of funding detailed in the table above, the likelihood of significant changes is low. Looking back over the past 20 years, there have been efforts, discussions, and other initiatives to increase the funding for transportation. These have occurred on the regional, state, and national levels. For example, the CCRPC established a Blue-Ribbon Commission in 2007 to identify alternative and/or innovative funding, especially to boost transit funding and reduce its reliance on the property tax. That work concluded without any firm implementation measures, therefore new potential funding sources were deemed too uncertain to include in this estimation of future available funds. The Vermont Legislature has also tinkered with transportation finance, allowing limited bonding and modest fuel tax increases for transportation uses and, while these funding sources could lead to an increase in funding for the MPO region, they are too small or inconsistent to reliably count on for a 35-year planning horizon.

At the federal level, given the passing of the FAST Act in late 2015, it appears that funding from this source should remain stable for the near future. However, we shouldn't ignore the long-term health of the national transportation trust funds that are currently subsidized from the general fund. Any long-term solution will likely need new revenues from some other source in the future.

[2] This percentage is intended to represent a best estimate of available funding, and is in no way intended to be construed as a CCRPC "entitlement" or "rightful share" of statewide funds.

[3] 3% is the most recent 10-year average inflation construction cost increase from the Engineering News Record (ENR)

In general, the above factors related to funding adjustments and potential uncertainty are too questionable or short lived to significantly impact the quantitative estimates of future transportation funding for Chittenden County. The discussion is intended to highlight some of the uncertainties which may affect CCRPC's ability to fund transportation projects into the future.

Overall Funding Constraint Conclusion

Funding for CCRPC transportation projects is presently dependent on federal funding, which is generally matched on an 80% federal / 20% non-federal basis at the state and local levels. Historically, CCRPC has accounted for 19.4% of the annual federal transportation funds available statewide. A review of funding levels over the past seven years reveals that funding is essentially flat in constant dollar terms. Total funding available, over the coming 35 years, is estimated to be $1,395.8 million in constant 2016 dollars, however budget decisions in Washington DC could impact future funding levels. Additional funding sources, especially for transit operating, will be critical for the preservation and future expansion of transit services in the region.

FINANCIAL PLAN PART 2: SYSTEM OPERATIONS & MAINTENANCE ELEMENT

The operations and maintenance element is a fundamental component of the MTP financial plan. As directed by federal regulations, the estimate of funds available to implement new plan initiatives is the total constraint amount as detailed in Part 1 minus the funds necessary to operate and maintain the existing investment in transportation infrastructure to an acceptable standard of service. Defining the acceptable standard and the appropriate programs to operate and maintain facilities and services is the purpose of this element of the financial plan.

To calculate anticipated future maintenance and operations funding for the existing system, we have looked at historical expenditures in the relevant funding categories from annual Transportation Improvement Programs (TIPs). See the table below. When reviewing the TIP obligation history over the past 17 years (FY00 – FY16) and using the categories of Bridge, Paving, Slope and Ledge Improvements, and Transit Operations and Maintenance, as our maintenance/operation proxies, the average percent of the overall funding to those categories is just under 55.1%. However, if we examine a shorter recent window of time, the past 7 years (FY10 – FY16), and, we feel, a more likely scenario, the maintenance/operations share goes to 73.6%. Projecting this higher share into the future defines a reasonable, if conservative, standard of system operation and maintenance investment.

Given the significant historical fluctuation in the share of funding for operations and maintenance, and to simplify our analysis of future funding, we've rounded the 73.6% down to 70%. (For historical comparison we used 64% in our last MTP). The total annualized costs (applying the 70% to the projected $41+ million) for system operations and maintenance are $28.74M in 2016 dollars.

COMPARISON OF CHITTENDEN COUNTY OBLIGATION HISTORY BY PROJECT USE CATEGORIES

Use Category	FY2000 - FY2016 No Earmarks	% of Total	FY2010 - FY2016 No Earmarks	% of Total
Paving	$83,348,715	17.3%	$42,917,307	22.8%
Bridge	$103,223,336	21.5%	$57,186,462	30.4%
Slope and Ledge Improvements	$5,098,295	1.1%	$3,179,610	1.7%
Transit Operations & Maintenance	$73,141,240	15.2%	$35,341,817	18.8%
Preservation Total	**$264,811,586**	**55.1%**	**$138,625,196**	**73.6%**
Roadway Corridor Improvements	$19,095,871	4.0%	$4,491,984	2.4%
Safety/ Traffic Operations/ ITS	$28,106,086	5.9%	$13,734,842	7.3%
New Facility/Major Roadway Upgrades	$105,422,522	21.9%	$8,522,390	4.5%
Bike & Pedestrian/ Enhancement	$29,217,067	6.1%	$10,908,684	5.8%
Intermodal	$7,265,577	1.5%	$4,762,049	2.5%
Stormwater/ Environmental	$280,538	0.1%	$188,000	0.1%
Rail	$7,920,000	1.6%	$0	0.0%
Transit Expansion	$10,109,672	2.1%	$7,009,935	3.7%
Other	$8,210,543	1.7%	$0	0.0%
Other Total	**$215,627,876**	**44.9%**	**$49,617,884**	**26.4%**
Grand Total	**$480,439,462**	**100.0%**	**$188,243,080**	**100.0%**

*These are in Year of Expenditure dollars

Operations and maintenance funding comes from a variety of sources depending on the type of facility. Interstate highways and bridges receive federal funds through special programs, state highways receive funding through both federal and state programs, and local highways and bridges on the federal aid system receive maintenance funding through local, state, and federal programs. Transit purchases of new and replacement rolling stock are often supported with federal funds through the Federal Transit Administration (FTA) and FHWA Congestion Mitigation & Air Quality (CMAQ) funds and, in past years, earmarks. Municipal contributions and farebox revenues are also important sources of ongoing transit operations and maintenance costs.

The next calculation in Part 2 of the financial plan is determining funds available for new projects, after accounting for system maintenance and operations. This subtracts the estimated $28.74 million in annual operations and maintenance costs from the funds available to Chittenden County established earlier - $41.05 million. This results in an estimated $12.32 million per year. The total funding available for new (as well as already committed TIP – see next section) projects is shown in 5-year increments below. The forecast funding resources available for planned improvements in the MTP is estimated at $418.73 million in 2016 constant dollars.

PROJECTED ANNUAL FUNDING FOR NEW OR COMMITTED CHITTENDEN COUNTY PROJECTS (MILLIONS)

Federal Fiscal Year		2016	2020	2025	2030	2035	2040	2045	2050
Annual	Constant 2016 $	$12.32	$12.32	$12.32	$12.32	$12.32	$12.32	$12.32	$12.32
	Year of Expenditure $	$12.32	$13.46	$15.60	$18.09	$20.97	$24.31	$28.18	$32.67
Cumulative	Constant 2016 $	$12.32	$49.26	$110.84	$172.42	$234.00	$295.58	$357.15	$418.73
	Year of Expenditure $	$12.32	$51.52	$125.12	$210.43	$309.33	$423.98	$556.90	$710.98

Notes: Inflation based on 3% annual and system preservation requirements are estimated at $28.7 million annually in 2016$.

CONCLUSION AND PROPOSED FUTURE ALLOCATIONS

This financial plan concludes that Chittenden County has $12.32 million per year for new transportation investments and for projects already committed to as identified in our TIP (see more on this below). This level of funding is expected to remain fairly stable in terms of buying power to 2050. By the plan horizon year in 2050 CCRPC expects to have $418.73 million (2016 $) in cumulative **federal only** funding available for new projects. When factoring inflation into the calculation of the cumulative funding available, the total amount of funds increases to $711 million in year of expenditure dollars.

There is, however, one more factor to take into account before finalizing the level of funds available for new projects. Maintenance and operations needs have been well documented but the CCRPC has other funds committed to projects not accounted for here, namely those non-preservation projects identified in our Transportation Improvement Program (TIP). The table below summarizes all anticipated revenues and costs out to 2050, including the new factor of already committed TIP funds.

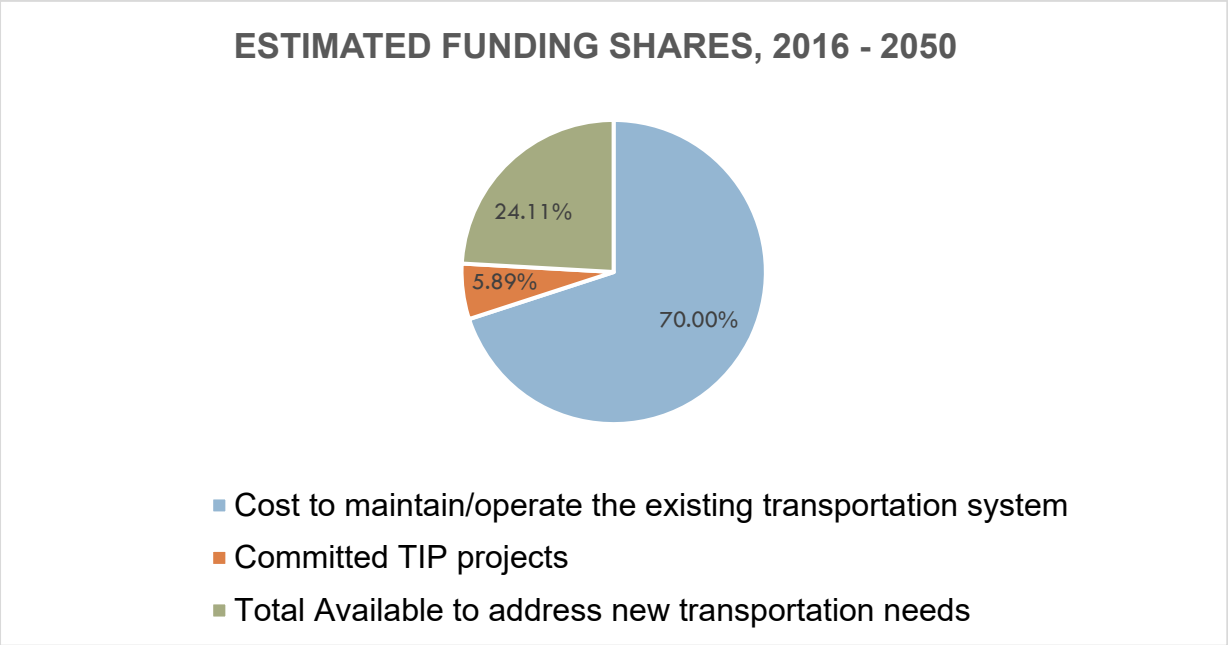
NOTE: All of the calculations above only included funds from the federal government. As stated earlier however, these represent only 80% of total costs. The non-federal match of 20% is added into the table below and all subsequent financial plan content. The total committed to TIP projects is calculated at $102.75 million in 2016 constant dollars.

ESTIMATED FEDERAL FUNDING FOR CHITTENDEN COUNTY: 2016 - 2050

COMPARISON OF MAINTENANCE FUNDING OPTIONS

Future Funding Estimates (Includes State and Local Match)	70 Percent to System Preservation* Millions (2016$)	55 Percent to System Preservation* Millions (2016$)
Total Funding for Transportation System	$1,744.72	$1,744.72
Funding to Paving, Bridge and Transit Operations and Maintenance	$1,221.30	$959.59
Cost of 2017 Transportation Improvement Program (TIP) Construction Projects	$102.75	$102.75
Total Available New Funding to address new transportation needs excluding TIP	**$420.67**	**$682.38**

Maintaining and operating the existing transportation system is a critically important task and it has been estimated that $1,221.30 million will be required to accomplish this – nearly three quarters of the total (see the pie chart below) The plan also identifies $102.75 million for projects listed in the current Transportation Improvement Program (TIP) including transit projects funded with CMAQ funds. The remaining funding available for new transportation needs is estimated at a little over $420 million. Shares for each category are illustrated in the chart below.



Having determined the we have $420.67 million available for investment in new projects (maintenance and committed projects factored out) out to 2050, we propose allocating that total as follows:

PROPOSED 2050 PROGRAM ALLOCATIONS

Program Category	MTP Allocations	Percent	FY00-16 TIP Obligation Percentages
Interstate and Interchange Projects	$74,300,000	17.7%	12.6%
Multimodal Roadway Improvements (includes Corridor Improvements, New Facilities/ Major Roadway Upgrades, and Safety/ Traffic Operations/ ITS)	$214,700,000	51.0%	61%
Bike/Pedestrian/ Enhancement	$70,000,000	16.6%	14.1%
Transit Expansion	$40,000,000	9.5%	4.9%
Park &Ride/ Intermodal	$5,700,000	1.4%	3.5%
Rail	Outside our Fiscal Constraint		3.8%
Stormwater/ Environmental	$16,000,000	3.8%	0.1%
New Improvements	$420,700,000	100.0%	100.0%

Total Funding (2050): $1,744.72 million

TIP/Capital Program Frond of the Book Projects: $102.75 million

Preservation Projects (Operate and Maintain Transit, Pavement, Bridges): $1,221.30 million

The last column showing 17 years of historical obligations has been added for comparison purposes and reveals that while not a radical departure from historic norms, we do propose significant increases to transit and environmental projects.

Scenario Planning Review and Future Conditions

INTRODUCTION

The previous section examined our transportation system conditions as they are today. This section will look into the future (2050) and evaluate different land use and transportation scenarios using recently approved Chittenden County population, housing and employment numbers (see **Figure 6**).

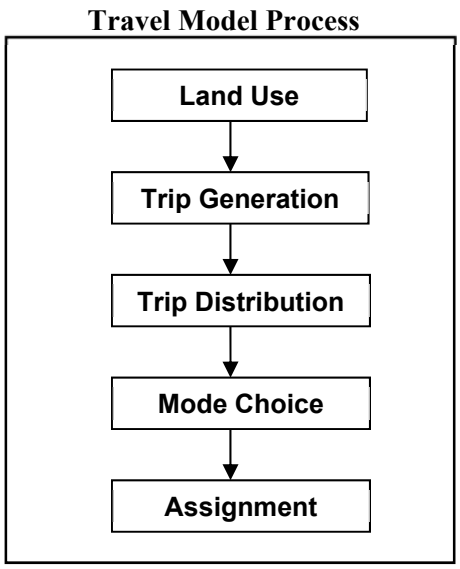
FIGURE 6

Demographics	2015	2050	2015 to 2050 % increase
Population	161,382	183,172	**14%**
Employment	135,511	182,688	**35%**
Household	63,498	79,151	**25%**

CCPRC staff evaluated a total of nine transportation and land use scenarios as part of this plan. This was done using the regional travel demand model (the model) of Chittenden County. By looking at numerous scenarios we were able to better understand the impacts of land use and transportation investment decisions. The scenarios are described in **Figure 7** in the following section.

Transportation models have been used in Chittenden County since the mid-1980's. The current model framework was developed in 1994 and has been updated and enhanced in 1998, 2011, and 2017. It uses custom designed computer software to examine travel impacts throughout the county. The model is a sophisticated tool that simulates the interaction between housing and employment on the transportation system and is sensitive to how congestion impacts trip making decisions.

The model can analyze morning (AM) and afternoon (PM) peak hour as well as daily conditions. Daily results are typically used to gauge scenario performance relative to one another. The AM & PM peak hour results allow staff to identify specific network problems of a particular scenario. The AM & PM peak hours are used for this purpose since they represent the time in which the network exhibits the greatest levels of congestion. It is important to look at both AM and PM peak hours to ensure potential future problems are not overlooked.



The model follows a five-step process as shown at left**.** This process is built first to replicate existing travel conditions and then adapted to simulate future scenarios.

The five model steps break-down the relationship between the land use, economic activity and travel behavior. Trip generation, for example, estimates the total number of trips to be taken and trip distribution estimates where these trips will go. Both of these steps are based on economic activity and land use patterns. The mode choice model evaluates how people will travel (i.e. drive, bike, walk, or bus) and trip assignment estimates which route or path travelers will use.

The Chittenden County Transportation Model is a powerful and important analytical tool, but it is just that – a tool for helping us to better understand transportation issues. The model does not make decisions, but is one of numerous resources the CCRPC calls upon to help make more informed choices about how to invest limited resources in the region's transportation system.

Careful input data, combined with powerful software analysis and real-world calibration make the model a reliable tool to assess our potential future.

FUTURE TRANSPORTATION SCENARIOS

Descriptions of the various transportation and land use scenarios that were analyzed using the model are provided in **Figure 7** below.

FIGURE 7 - SCENARIOS FOR TRANSPORTATION

Scenario Name	Scenario Elements/Assumptions /Description
1. 2050 Base	• 2050 housing and employment growth plus: – TIP projects that are also front of the book in VTrans' Capital Program
2. Scenario A: Road Capacity Scenario	• 2050 Base plus: – All TIP Projects and MTP roadway projects as listed in the 2013 ECOS/MTP Plan (http://www.ecosproject.com/plan/).
3. Sub-Scenario A – Interstate-89 Interchange Improvements	• 2050 Base plus: – Discrete I-89 interchange improvements or additions: 12B (new interchange at VT116), full Exit 13, full Exit 15, 14N (new interchange north of the Patchen Road overpass)

4. Scenario B1: Connected and Autonomous Vehicles (CAVs) – Partial market penetration	• 2050 Base plus: – Substantial deployment (80% Market Penetration) of connected and autonomous vehicles (CAVs) – 50% of person trips are with privately owned CAVs and 50% are with a shared service – Increased Interstate and signalized intersection capacities due to more efficient vehicle operations and use of roadway space – Induced demand associated with increased mobility for the youth and the elderly. – Accounting for Zero Occupancy Vehicle (ZOV) trips circling the block while people run errands for areas that parking is at a premium and ZOV trips traveling to and returning from remote parking areas
5. Scenario B2: Connected and Autonomous Vehicles (CAVs) – Total market penetration & increased benefits of higher percentages of people sharing trips	• 2050 base plus: – 100% of vehicle fleet is comprised of CAVs – 35% of person trips are with privately owned CAVs and 65% are with a shared service – Shared CAVs operate with an average occupancy of 2.5 people per car (higher than scenario B1). – Substantial increase in Interstate, roadway and intersection capacities due to more efficient vehicle operations and use of roadway space – Induced demand associated with increased mobility for the youth and the elderly. – Accounts for Zero Occupancy Vehicle (ZOV) trips circling the block while people run errands for areas that parking is at a premium and ZOV trips traveling to and returning from remote parking areas
6. Scenario C: Transportation Demand Management	• 2050 Base plus: – Increased transit service including: ▪ 20-minute headways for all existing transit routes ▪ New VT-127 to Colchester transit loop service. ▪ Bus Rapid Transit (10-minute headways) on a dedicated lane/ROW for the following corridors: US 2 (University Place in Burlington to Taft Corners); VT 15 (Exit 15 to Five-Corners); US 7 (Shelburne Street Roundabout in Burlington to Webster Road in Shelburne); Colchester Avenue (University Place in Burlington to Winooski River Bridge) – Increased numbers of walk/bike trips in Center and Village planning areas

7. Scenario D1 – Increase land use density	• 2050 Base with following land use: – 90% of adopted 2050 household growth is allocated to the Center and Village planning areas for all towns
8. Scenario D2 – Increase land use density	• 2050 Base with following land use: – 90% of the approved 2050 household growth is allocated to Areas Planned for Growth with concentration in the Urban Centers and Village planning areas
9. Scenario D3 – Increase households in the county to improve our jobs/housing balance	• 2050 Base with following land use: – County population and households are increased by 10% over adopted projections. – Additional household growth is allocated to Center and Village planning areas for all towns as in scenario D1

SCENARIO RESULTS

The capacity building scenario (A) resulted in reduced congestion and delay on the transportation system when compared to the 2050 Base. The sub-scenarios that looked at individual I-89 interchange expansions or additions did not have substantial reductions in countywide delay (see **Figure 8**). When the interchange sub-scenarios were analyzed in greater detail, results indicated that they all helped to decrease congestion at areas around the interchanges, with Exits 12B and 14N having the most benefit. On the downside the capacity building scenarios caused our vehicle miles traveled (VMT) to slightly increase compared to the 2050 Base since the reductions in delay made it easier to travel.

The Connected and Autonomous Vehicle (CAV) scenarios (B1 & B2) were developed to initiate the conversation of the possible ways that this technology could affect our transportation system, land use patterns and our communities overall. Scenarios B1 and B2 are two vastly different possible futures. Scenario B1 exhibited the greatest increases in vehicle miles traveled (VMT), delay, and trip making. Scenario B2 also saw increases in VMT and trip making but saw decreased delay when compared to the 2050 Base (see **Figures 8 to 11**). This was due to the assumptions of CAV proliferation, 80% vs 100%, and private ownership, 50% vs 35%, for Scenarios B1 and B2 respectively. The jump to 100% CAV proliferation in Scenario B2 allowed for significant increases in the carrying capacity of existing roadways and intersections. Drivers currently keep anywhere from 1 to 3 seconds distance behind the vehicle in front of them whereas CAVs can reduce this time to a half a second or less. Scenario B1 was not as efficient as B2 due to the assumption that 20% of vehicles remained unconnected and prone to human error. The ownership assumptions in Scenario B2 helped reduce congestion because of the increase in the number of shared trips (2-3 people sharing a vehicle at a time) whereas the assumption is that a privately owned vehicle typically moves one person. The zero-occupancy vehicle (ZOV) trips assumed with privately owned CAVs also contributed to the poor performance of Scenario B1.

The Transportation Demand Management (TDM) scenario (C) was interesting in that it reduced an individual's delay as much as the capacity building scenario (A) (see **Figure 8**). This is directly related to the resulting increase in mode shift shown in **Figure 12**. This scenario also had a slight decrease in VMT when compared to the 2050 Base.

The land use scenarios (D1, D2, and D3) analyzed the effects on transportation of concentrating and increasing the density of land use. Generally, these scenarios decreased delay and VMT when compared to the 2050 Base (see **Figures 8 and 9**). This was due to the increased viability of transit, walking and biking that occurs when more people live closer to transit routes and there is transportation infrastructure that supports walking and biking. Scenario D3 is the only scenario that analyzed an increase in households and consequently, population in the county beyond the adopted population forecasts. This scenario was designed to see what might happen if Chittenden County were able to reverse the trend of increasing number of people living outside and commuting in to the county for work. Results of Scenario D3 indicated that despite a 10% increase in households, the delay and VMT per capita decreased (see **Figures 8 and 9**).

FIGURE 8 - COUNTYWIDE DAILY DELAY PER CAPITA

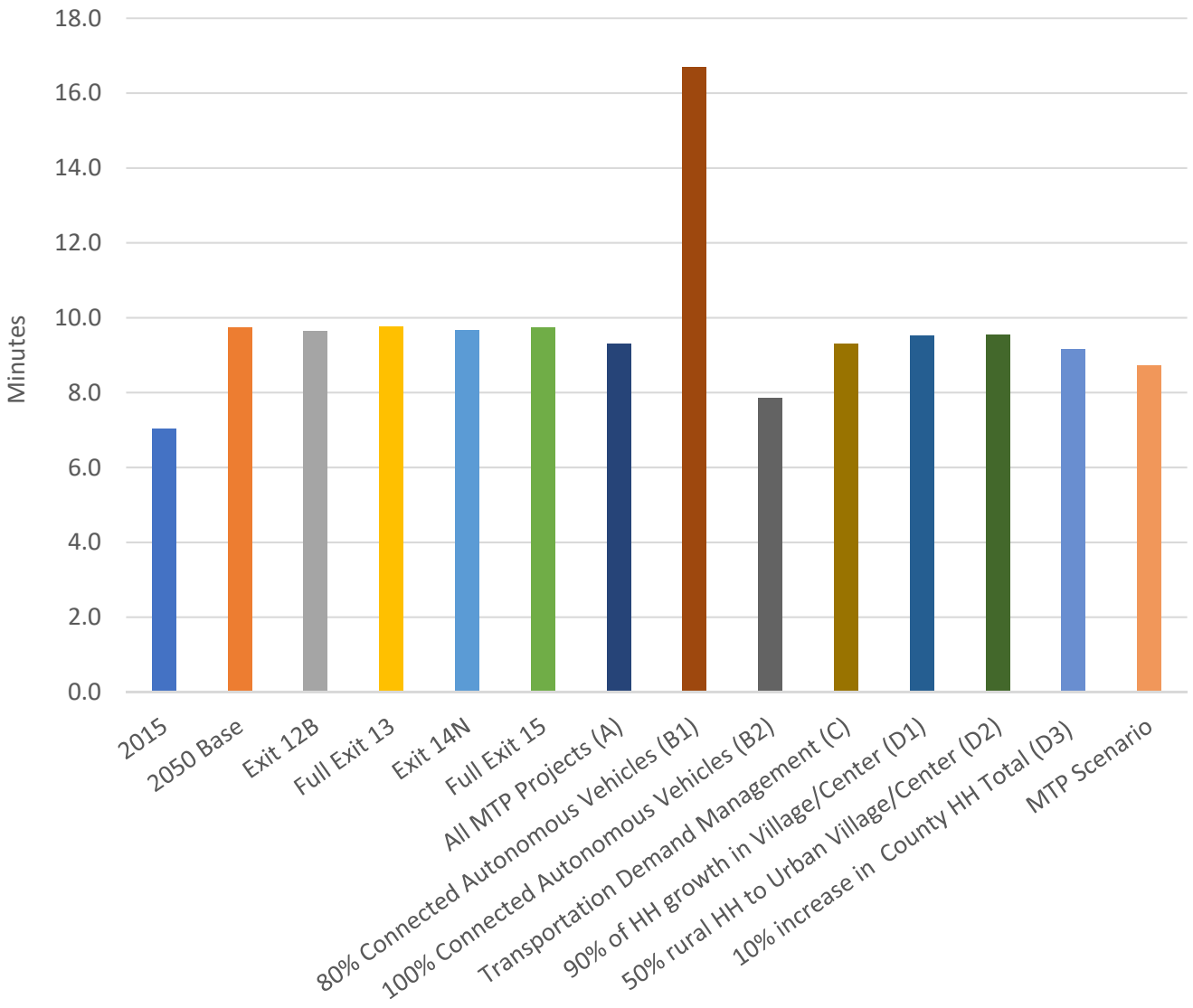


FIGURE 9 - COUNTYWIDE DAILY VEHICLE MILES TRAVELED (VMT)

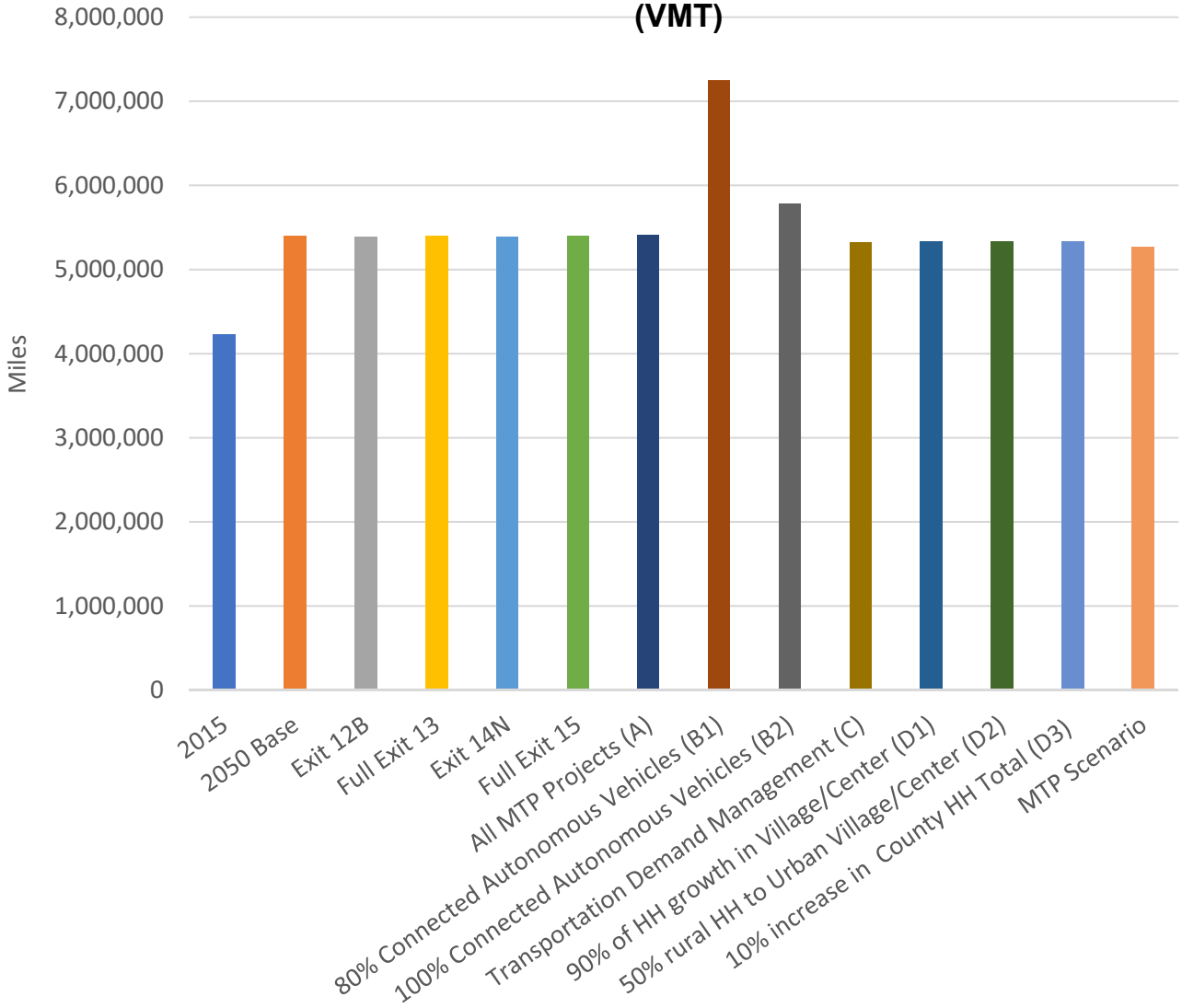


FIGURE 10 - COUNTYWIDE DAILY TOTAL VEHICLE TRIPS

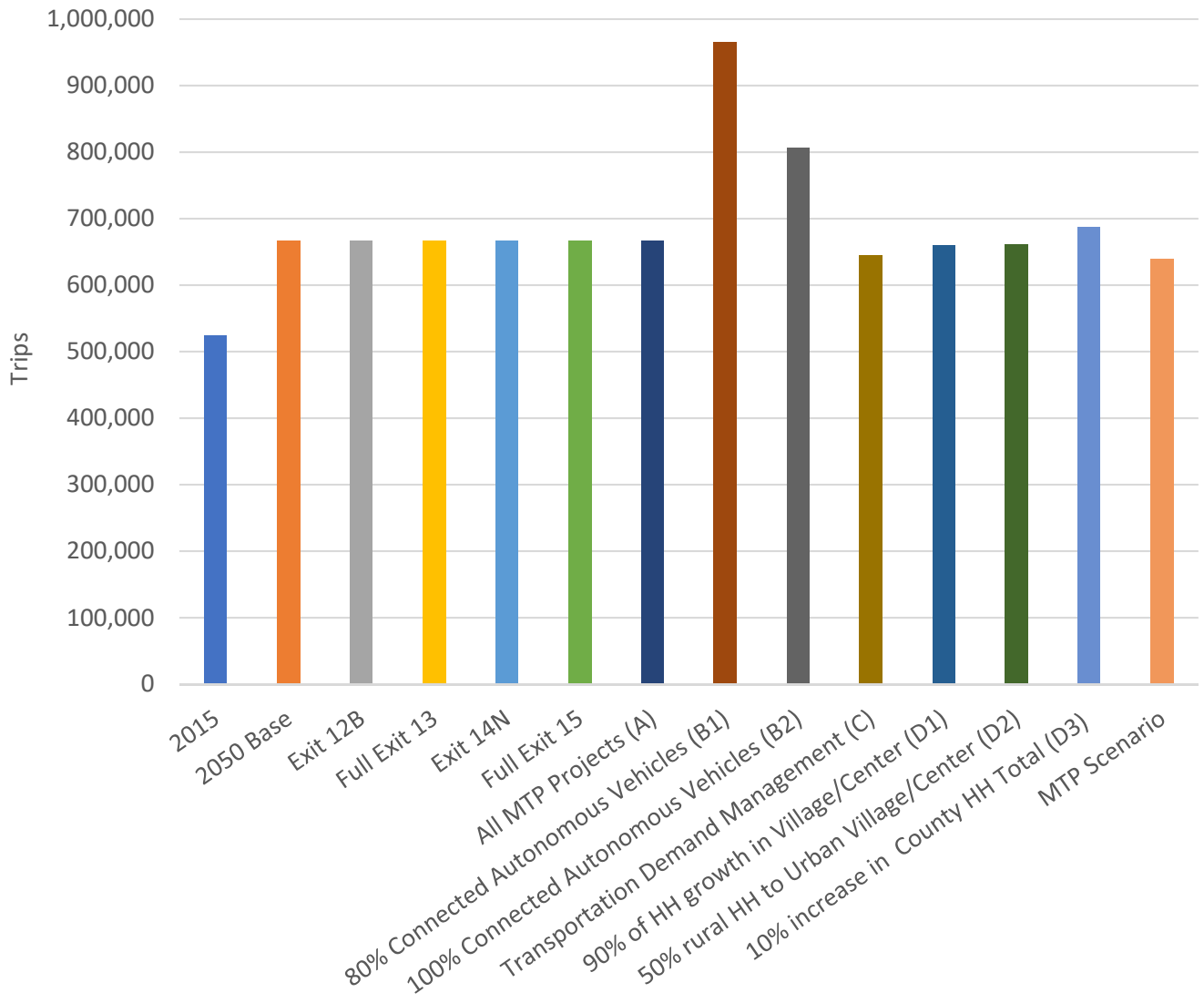
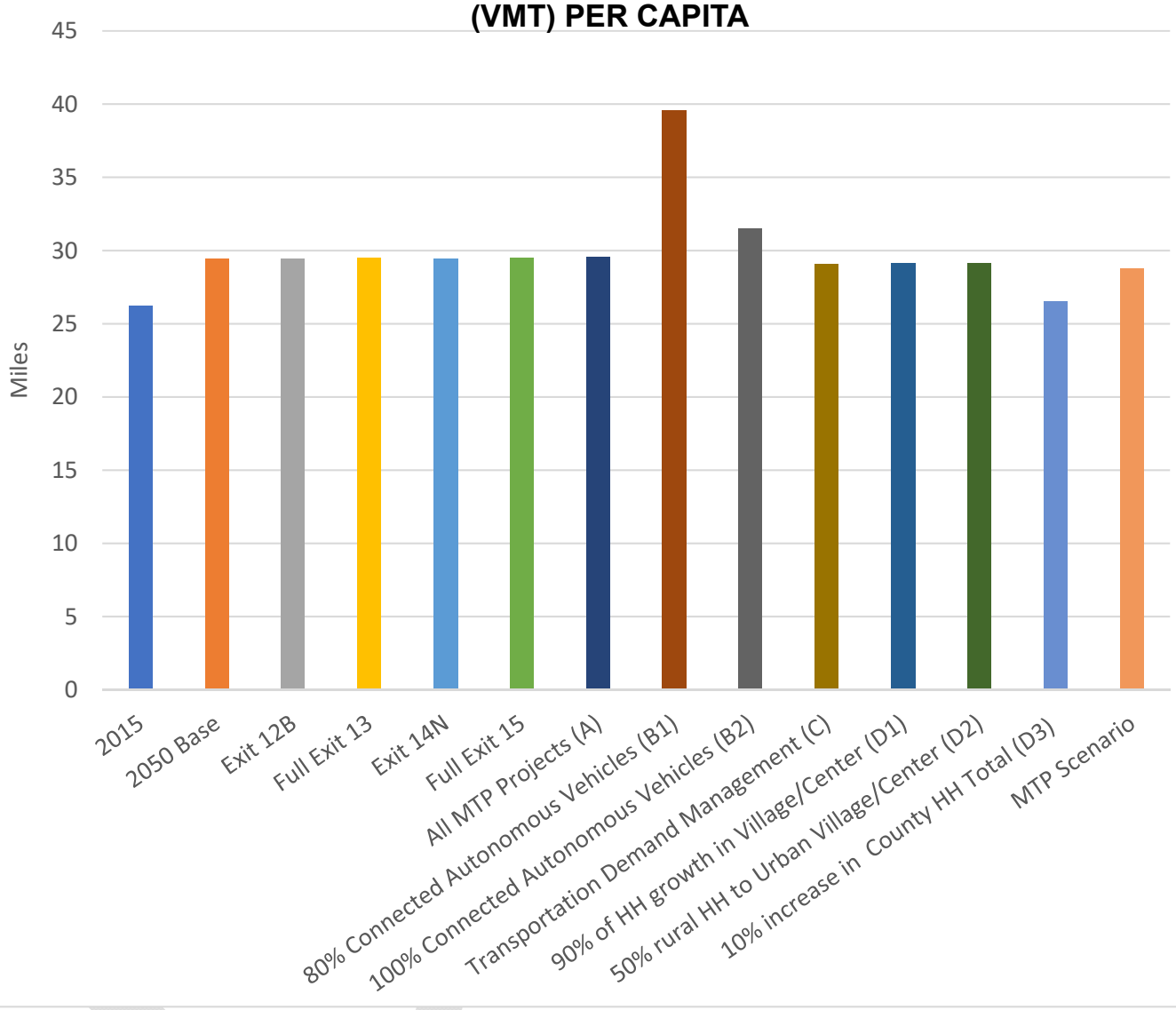
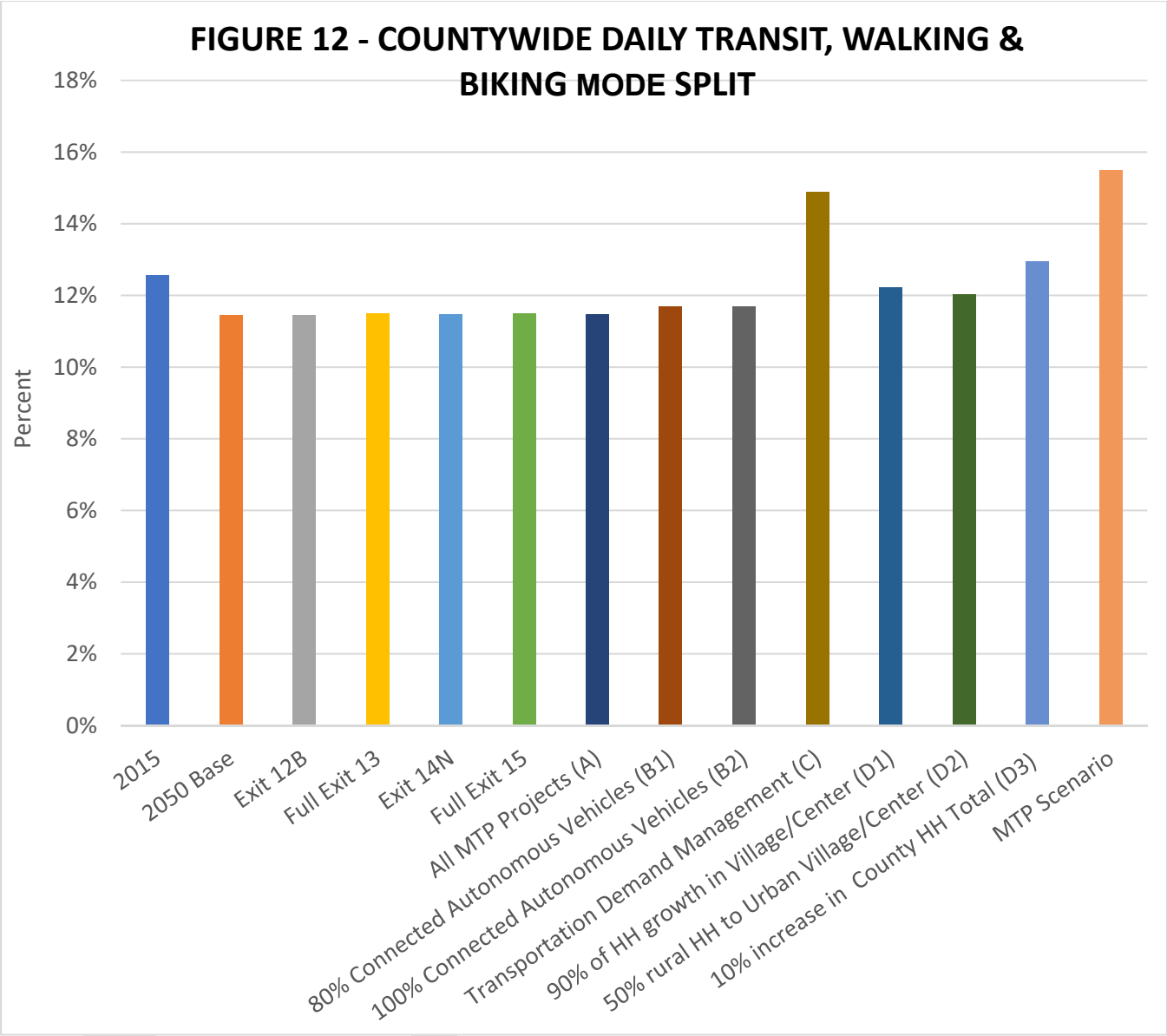


FIGURE 11 - COUNTYWIDE DAILY VEHICLE MILES TRAVELED (VMT) PER CAPITA





MTP SCENARIO

All future scenarios developed and evaluated are starkly different from one another and from the past historical programmatic transportation investments, and unlikely to proceed in the manner outlined in each individual scenario. However, results from the various scenarios helped frame the conversation about what to include in our MTP Scenario so it is a more balanced, achievable and sustainable future transportation program. The MTP Scenario is described in **Figure 13** below.

FIGURE 13 - MTP SCENARIO DESCRIPTION

2050 Metropolitan Transportation Plan Approx. $420 million	• All MTP Projects including: – Third lane on I-89 between Exit 14 and Exit 15 – Exit 12B is included as a placeholder for a future interchange improvement between Exits 12 and 16 including new 12B or 14 N Interchange or reconstructing Exit 14. – Intelligent Transportation System investments and signal upgrades for major arterials in the county. – Local projects identified by municipalities and the CCRPC through various planning studies and plans. – 20-minute headways for all existing transit routes & new *VT-127 to Colchester* transit loop service. – Substantial increase in walk/bike infrastructure in Villages and City/Town Centers. – Land Use: 90% of the approved 2050 household growth is allocated to TAZs that correspond to areas planned for growth with concentration in the urban center and village planning areas. ▪ The 90% concentration of HH was deemed appropriate as the county has been averaging 86% - 89% HH growth in the areas planned for growth in the past five years.

MTP SCENARIO RESULTS

The MTP scenario was developed through an iterative approach and collaborative effort with the Transportation Advisory Committee (TAC), the Long Range Planning Committee (LRPC) and the CCRPC Board. Comments received by committee members and the Board were incorporated into the scenario to the degree possible. The MTP Scenario strives to strike a balance between improving roadway safety; increasing roadway capacity where demand is exceeded; increasing the viability of walking, biking, and transit; and concentrating land use in all areas planned for growth with a concentration in the urban centers and villages. Even though we acknowledge that CAVs have the potential to change travel as we know it today, this scenario does not incorporate any CAV assumptions of Scenarios B1 and B2 as it is extremely difficult to predicting the future of this technology at this point. As shown in Figures 8 through 12, the MTP Scenario reduces delays, trips, and VMT while the increases transit, walking and biking trips compare to the 2050 Base.

Insert MTP volume or delay maps?

MTP Corridors

This section presents the projects, programs, and strategies to implement MTP recommendations by roadway corridor—the most logical and easily understood method of describing and understanding the functional characteristics and impacts of Chittenden County's transportation system.

The broad priorities established here include:

- System maintenance, defined as keeping the existing transportation infrastructure of roads, bridges, transit, bicycle and pedestrian facilities, and intermodal facilities in acceptable operational condition. Future conditions will be evaluated by using the Performance Management measures and targets set by VTrans and the MPO as well as other infrastructure management systems such as VTrans' asset management.
- Encouraging higher density and mixed-use land development, as proposed by the CCRPC's ECOS Regional Plan to improve the efficiency of transportation investments.
- Completing all projects identified in the CCRPC's FY2018-2021 Transportation Improvement Program (TIP).
- Expanding the Green Mountain Transit's system for more reliable and productive service levels in urban and suburban areas and into adjoining regions.
- Expanding the bicycle and pedestrian networks with on- and off-road bike facilities and more sidewalks.
- Implementing Complete Streets as required on all roadway projects to facilitate multimodal travel by users of all ages and abilities.
- Employing more Transportation Demand Management (TDM) strategies through employer based trip reduction programs, an expanded network of park-and-ride facilities, and by supporting the efforts of the Green Mountain Transit (GMT).
- Implementing Transportation System Management (TSM) strategies and investing in Intelligent Transportation Systems (ITS) as well as access management along major arterials, to improve the operational efficiency of the system.
- Addressing corridor congestion and safety issues along key arterials with operational and capacity enhancements as needed.

Corridor-oriented planning considers the transportation connections between major settlement areas of Chittenden County. These corridors represent easily recognizable and dominant directional movements of persons and goods, while also accounting for localized travel. The corridor delineations identified below are based on the analysis of existing and emerging travel and land use patterns. They are tied to the various trip origins and destinations both within and outside of the region. The defining feature of each corridor is one or more major state highway.

Building the MTP around these corridors facilitates an inter-municipal/regional understanding of transportation conditions and priorities and can help decision-makers as they grapple with the diverse needs of a complex system. Corridor-oriented planning also strengthens the CCRPC's ability to look across municipal boundaries and beyond isolated single-mode solutions to holistically address

transportation issues on these corridors. As we invest in new projects and programs within the corridors listed below, it is important to repeat and stress that ***maintaining our existing transportation infrastructure is critically important and should remain the County's top priority*.**

Key corridors (see **Map 11** on the next page):

1. **Regional Core:** The transportation network in the Greater Burlington area;
2. **Northern Corridor:** US 2/7 and I-89 from Winooski to the County line, VT 127 through Colchester, and the rail line north from Essex Junction;
3. **Northeast Corridor:** Essex Junction to the County line along VT 128 and VT 15;
4. **Route 15 West Corridor:** Winooski to Essex Junction including Winooski Branch rail line;
5. **Southeastern Corridor:** Richmond to Buels Gore, including Huntington Road and Main Road;
6. **Route 116 Corridor:** VT 116, South Burlington, through Hinesburg, to the County line;
7. **Eastern Corridor:** US 2, I-89, VT 117, and the Burlington and Essex Junction rail line east to the County line;
8. **Southern Corridor:** US 7 and rail line from Burlington south to County line;
9. **Cross County Corridor:** VT 2A and VT 289 from St. George/Williston to Essex and Colchester.

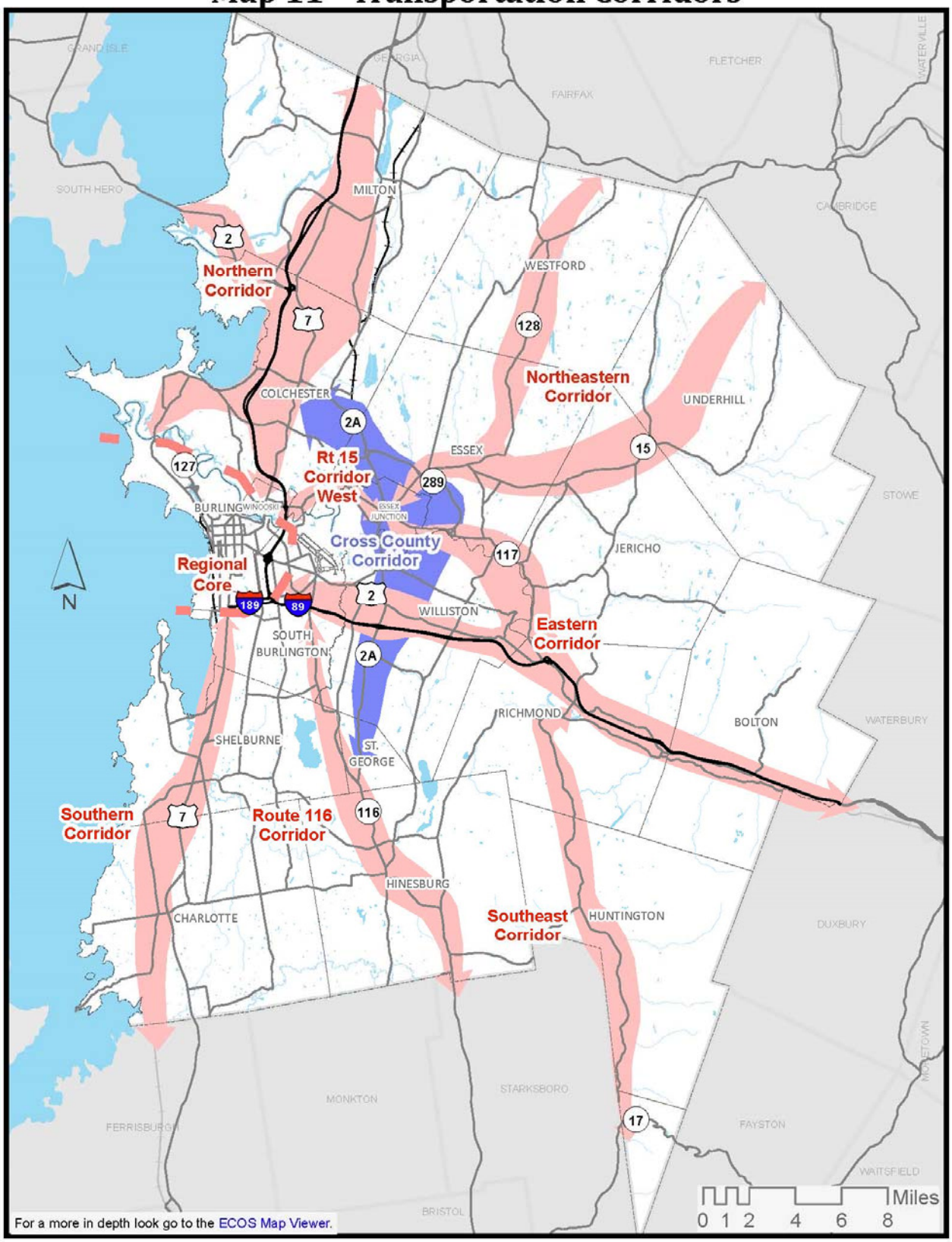
MTP CORRIDORS

Regional Core

The Regional Core is defined as the City of Burlington and adjoining areas of Winooski and South Burlington. This area is both origin and destination for much of the region's travel, and the evolution of the road network servicing it clearly demonstrates its relative importance in the state's economic and cultural history.

Multimodal options in the Regional Core are the best in the state. Part of the reason modes other than Single Occupancy Vehicles (SOVs) are attractive is due to the dense development and resulting volume of vehicles producing congested conditions. This is the region's primary activity center and congestion is a condition of its vibrancy and vitality. The walk/bike/transit modes will remain attractive as alternatives as long as the vehicle speeds remain relatively low.

Map 11 - Transportation Corridors



Establishing intercept park-and-ride facilities at the Regional Core's periphery that focus on commuter trips - intercepting SOV trips by employees and transferring them to other modes - is a strategy used currently for the Hill Institutions and is examined more closely to relieve this area's parking and congestion issues.

Because the Regional Core has a significant residential component, yet provides a conduit for high traffic volumes and possesses a well-connected grid street system, knowledgeable drivers can use neighborhood streets to avoid congested arterials. To minimize this practice, traffic-calming techniques should be used in those cut-through neighborhoods to maintain safety, enhance street life, encourage walking and bicycling, and direct the cut-through traffic back onto the arterials.

Parking is perceived as constrained despite inventory information to the contrary. However, parking costs are higher than elsewhere in the region, where undeveloped land is considerably less expensive. Locating, designing, and funding parking facilities poses a dilemma and businesses can be attracted by less costly and more welcoming expansion opportunities outside the Regional Core. Striking a parking balance between many competing interests is a vexing challenge here.

A well-developed sidewalk network already exists in the Regional Core, although due to its age it needs significant reinvestment to maintain its integrity and meet federal accessibility requirements. Bicycling is well provided for in the shared use path network around this area; however, many of these trips start and end in places served only by city streets. A well signed and designed on-street network, especially focusing on north/south travel, is needed to provide area-wide, safe, on-road bicycle travel.

Public transit coverage here is superior to anywhere else in the state. However, new services, with adequate funding, can improve this. Higher frequency levels, more hours of service during the day, and more weekend service, will help the system grow and attract a wider traveling public. GMT's new Downtown Transit Center is a welcome enhancement to transit service quality.

Go Vermont, Travel Smarter and TDM programs at the Hill Institutions and beyond, provided by CATMA, have helped promote transportation alternatives, reduce parking pressures, and have better managed traffic flow in and around these facilities served by their programs. Expanding these programs to additional Regional Core employers could help relieve congestion and parking demand.

VT Railway, operates a line within this corridor and has its headquarters and railyard on the Burlington waterfront. Another rail line, now owned by Genesee & Wyoming links the waterfront to their mainline in Essex Junction. Bringing Amtrak service into Burlington along the western rail corridor is a state goal and service is expected to begin in 2020.

Corridor Strategies/Projects

Because the character of the Regional Core significantly differs from the corridors that feed and sustain its vibrancy, the types of transportation strategies and projects recommended below, differ from those recommended in other corridors. The table below identifies the regional project and program priorities for this area. NOTE: Transportation Improvement Program (TIP) projects are listed first. These are the region's near term (next four years) project priorities. The listed sequence beneath the TIP projects does not denote priority rank.

Municipality	Project	Type
Burlington	Champlain Parkway -- **TIP Project**	Multimodal Roadway Improvement
Burlington	Shelburne Street Roundabout -- **TIP Project**	Multimodal Roadway Improvement
Burlington	Colchester Ave. Side Path -- **TIP Project**	Bike & Pedestrian
Burlington	Champlain Elementary Pedestrian Crossing Improvements -- **TIP Project**	Bike & Pedestrian
Burlington	North Ave. Crosswalks -- **TIP Project**	Bike & Pedestrian
Burlington	Railyard Enterprise Project -- **TIP Project**	Multimodal Roadway Improvement
Winooski	Gateways Crosswalk Enhancements -- **TIP Project**	Bike & Pedestrian
Burlington	Burlington Bike Path Rehabilitation	Bike & Pedestrian
Burlington	Colchester Avenue/East Avenue Intersection Improvements	Multimodal Roadway Improvement
Burlington	Colchester Avenue/Prospect Street Intersection Improvements	Multimodal Roadway Improvement
Burlington	Colchester Avenue/Riverside Avenue Intersection Improvements	Multimodal Roadway Improvement
Burlington	Depot Street Improvements for Waterfront Access	Multimodal Roadway Improvement
Burlington	Sherman to Depot Stairway Street	Bike & Pedestrian
Burlington	North Avenue Improvements	Multimodal Roadway Improvements
Burlington	Winooski Avenue Improvements	Multimodal Roadway Improvements
Burlington	Main St Great Streets project	Multimodal Roadway Improvement
Burlington	Battery St Improvements	Multimodal Roadway Improvement
Burlington	Shelburne St Complete Streets project	Multimodal Roadway Improvement
Burlington	Cherry St Complete Streets project	Multimodal Roadway Improvement
Burlington	Pearl St Complete Street	Multimodal Roadway Improvement
Burlington	Bike/Ped Crossing over the Winooski River in the vicinity of the Railroad bridge	Bike & Pedestrian

Burlington	Bike/Ped Crossing over the Winooski River near the US 2/7 Bridge (dependent on scoping for the adjacent road bridge)	Bike & Pedestrian
Burlington	Intervale Road access improvements	Bike & Pedestrian
Burlington	Champlain Elementary Safe Routes to School, Phase II	Bike & Pedestrian
Burlington	I-89 Exit 14 Intercept Park and Ride	Park-and-Ride
Winooski	Riverwalk East – Access to Casavant Park	Bike & Pedestrian
South Burlington	Three lanes on I-89 between Exits 14 and 15	Multimodal Roadway Improvement

Northern Corridor

The Northern Corridor serves north/south travel needs connecting the Regional Core area (and points further east and south) to Colchester, Milton, and Franklin and Grand Isle counties.

North/south, as well as east/west, movement in this corridor is currently relatively efficient and non-congested with some delays mostly at the major intersections of US 7. Future congestion problems will mostly be confined to I-89 and Exit 17 with some intersection delays along US 7 in both Colchester and Milton and along VT 127 in Colchester.

Bicycle and pedestrian accommodations are improving, especially within the village areas, although connecting travel between the more heavily settled areas by bicycle and on foot is encumbered by narrow road shoulders in some areas. By contrast, the road shoulders on US 2 from Chimney Corners to the Sandbar Causeway are exemplary examples of adequate width to accommodate cyclists and walkers.

Public transportation services here are limited. While Milton has become a GMT member and has commuter service to the Regional Core, Colchester remains a non-member but has begun partnering with GMT on limited service along US 7 from Milton to Water Tower Hill. Colchester also sees transit service from the Essex Route along VT 15 in the town's southeast corner as well as Link and Commuter stops at the park-and-ride near Chimney Corners.

The Genesee & Wyoming Railroad line travels through this corridor and is used for freight trains. While there are currently no passenger stations located along this corridor, there are freight rail sidings in both Colchester and Milton.

Recommended Corridor Strategies/Projects

The following projects and strategies are recommended for this corridor. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	Type
Colchester	VT2A/US7/Creek Road/Bay Road Intersection -- **TIP Project**	Multimodal Roadway Improvement
Colchester	Blakely Road/Laker Lane Intersection Improvements -- **TIP Project**	Multimodal Roadway Improvement

Colchester	Exit 16 Improvements -- **TIP Project**	Multimodal Roadway Improvement
Colchester	Severance Corners -- **TIP Project**	Multimodal Roadway Improvement
Colchester	West Lakeshore Drive/Prim Road Intersection Improvements –**TIP Project**	Multimodal Roadway Improvement
Colchester	I-89 Exit 17 Interchange Improvements	Multimodal Roadway Improvement
Colchester	US 7/I-89 Exit 16 Park-and-Ride -- **TIP Project**	Park-and-Ride
Colchester	Heineberg Blakely Bypass and Shared Use Path	Multimodal Roadway Improvement
Colchester	Mountain View Drive Sidewalk -- **TIP Project**	Bike & Pedestrian
Colchester	West Lakeshore Drive Path -- **TIP Project**	Bike & Pedestrian
Colchester	West Lakeshore Drive Path, Phase II - Harbor View to Boat Launch	Bike & Pedestrian
Colchester	West Lakeshore pedestrian tunnel at Bayside Park	Bike & Pedestrian
Colchester	VT127 Roadway and Intersection Improvements	Multimodal Roadway Improvement
Colchester	Roundabout at Bayside Park	Multimodal Roadway Improvement
Colchester/Winooski	ITS Improvements, US 7 Corridor	Multimodal Roadway Improvement
Milton	US7/Main Street Intersection Improvements	Multimodal Roadway Improvement
Milton	US7/Middle Road/Railroad Street Safety Improvements	Multimodal Roadway Improvement
Milton	US7/Racine/Legion/West Milton Rd Improvements	Multimodal Roadway Improvement
Milton	Cherry Street	Bike & Pedestrian
Milton	US7 Sidewalk – Nancy Drive to Haydenberry Drive	Bike & Pedestrian
Milton	Town Office Park-and-Ride	Park-and-Ride
Milton	I-89/West Milton Road new interchange	Multimodal Roadway Improvement
Winooski	Main Street (US7) Revitalization – Transportation, Utility, Stormwater	Multimodal Roadway Improvement

Northeastern Corridor

The Northeastern Corridor serves the municipalities of Essex, Westford, Jericho, and Underhill, providing a link to the employment and commercial centers of the greater Burlington area via VT 15 and VT 128. These roads also connect parts of Franklin and Lamoille counties to Chittenden County. Old Stage Road in Essex and Westford, and River Road/Pleasant Valley Road in Underhill form parallel collectors channeling traffic through this corridor as well.

Travel into this corridor from the outlying towns and counties flows relatively well today. However, it is expected that in the out years of this plan's horizon (2050), stretches of VT 15 through the Lang Farm/Essex Center/I-289 area will experience relatively high levels of traffic delay.

Bicycle and pedestrian improvements are advancing in this corridor, especially in the designated growth areas of Essex Junction, Lang Farm/Essex Center, and Underhill Flats. Roadway improvements to accommodate bicyclists are needed and are planned for when the arterials are rehabilitated or reconstructed. Currently, much of the corridor features inadequate shoulder width for safe bicycling but should see steady incremental improvements over the coming years.

There is peak hour high frequency public transportation available in the more densely populated southwestern part of the corridor linked to the Burlington area. Northeast from Essex Junction, transit is less frequent with two limited routes to Essex Center and Jeffersonville.

Minor intersection improvements and signal upgrades along the VT 15 corridor from Five Corners in Essex Junction through Essex Center are planned to improve traffic flow.

Corridor Strategies/Projects

The Plan identifies specific projects and strategies to meet existing and future needs. In this corridor these are identified below. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	MTP Category
Jericho	VT15/Browns Trace Intersection – **TIP Project**	Multimodal Roadway Improvement
Jericho	Browns Trace Multimodal Connection – Pratt Road to Lee River Road – **TIP Project**	Bike & Pedestrian
Jericho	Browns River Middle School and Union ID school Crossings –**TIP Project**	Bike & Pedestrian
Jericho	Lee River Road Sidewalk – **TIP Project**	Bike & Pedestrian
Jericho	VT RT 15 Park-and-Ride	Park-and-Ride
Jericho	Browns Trace Multimodal Connection – MMU to Lee River Road	Bike & Pedestrian
Jericho	VT 15/Dickinson St modifications	Multimodal Roadway Improvement
Essex	VT15/Sand Hill Road Traffic Signal – **TIP Project**	Multimodal Roadway Improvement

Essex Junction	Crescent Connector Road (*project also listed under Cross County Corridor and Eastern Corridor*)	Multimodal Roadway Improvement
Essex	Essex Center, VT15/VT289 Park-and-Ride	Park-and-Ride
Essex	VT 17 Sidewalk – Old Stage Rd to Essex Way	Bike & Pedestrian
Essex	Towers Road Sidewalk – **TIP Project**	Bike & Pedestrian
Underhill	Underhill Flats sidewalk	Bike & Pedestrian

Route 15 West Corridor

Parts of the roadway network from the Northeastern, Northern, and Eastern corridors intersect in the Route 15 West Corridor, and feed into the Regional Core area. This results in significant traffic volumes substantially put on one arterial roadway, VT 15 from Essex Junction to Winooski. One of the feeder roads, Susie Wilson Road in Essex Town, carries the majority of traffic to and from the Northern and Northeastern Corridors.

In contrast to the other major corridors discussed, significant traffic volumes travel on VT 15 west with no parallel alternative route available. Not surprisingly, the capacity of the little used Genesee & Wyoming freight rail line running by its side has, in the past, been examined for its potential to alleviate some of VT 15's traffic demands. Congestion problems have also spurred interest in Intelligent Transportation Systems (ITS) investments, such as improved signal coordination and enhanced real time traveler information, to improve traffic flow.

GMT's most heavily used route (the Essex Junction Route) follows VT 15 and features 15-minute headways in the peak hours.

The pedestrian environment is relatively good in this corridor with extensive sidewalk networks in Essex Junction and Winooski. Along VT 15, there is a sidewalk (along the north side primarily but both sides in Essex Junction) that provides safe pedestrian travel all along the corridor. However, the need for a parallel bicycle facility has been clear, as on-road bicycle travel on high-volume arterials make for a stressful experience for most cyclists. A shared use path from Susie Wilson Road to St. Michael's' College is on the TIP and should be constructed in 2019.

A corridor carrying such high traffic volumes—over 25,000 vehicles per day with no alternative routes—needs to be managed carefully to keep the traffic moving efficiently, including signal coordination, access management, and multimodal strategies. As development increases, access demands to VT 15 will increase as well. Effective access management, in combination with more and safer walking, biking and transit, will be crucial to keep people and goods moving safely and efficiently.

Corridor Strategies/Projects

The list that follows identifies each of the projects or strategies that are part of the 2050 MTP. These were analyzed and shown to be effective in addressing future transportation problem areas. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	Type

Essex Junction	Pearl Street/Post Office Square/Five Corners Improvements – **TIP Project**	Multimodal Roadway Improvement
Colchester	VT 15/Lime Kiln Rd Intersection Improvements	Multimodal Roadway Improvement
Colchester/Essex/Essex Junction	VT 15 Multi Use Path, Lime Kiln Rd to Susie Wilson Rd –**TIP Project**	Bike & Pedestrian
Colchester/Essex/Essex Junction	VT 15 Multi Use Path, I-89 Exit 15 to Lime Kiln Rd	Bike & Pedestrian
Colchester/Essex/Essex Junction	VT 15 Multi Use Path, Susie Wilson Rd to West St Ext.	Bike & Pedestrian
Colchester	Fort Ethan Allen Sidewalks – **TIP Project**	Bike & Pedestrian
Essex Junction	VT15/West Street Intersection Improvements	Multimodal Roadway Improvement
Essex	Pinecrest Drive Sidewalk	Bike & Pedestrian
Essex	Susie Wilson Road Improvements and intersections including VT 15 and Kellogg Road	Multimodal Roadway Improvement

Southeastern Corridor

The Southeastern Corridor serves the rural southern part of Richmond and the Huntington River Valley. Though the least-traveled of the corridors examined, the Southwestern Corridor is one of the most scenic. Most morning peak-hour traffic is headed north, then west to the greater Burlington area for jobs, shopping and other activities. There is some tourist traffic using the corridor to get to the recreational areas to the east in the Mad River Valley, accessing Camels Hump hiking trails or enjoying the fall foliage. There is also a notable use of the corridor by heavy log trucks bringing timber from the north to processing facilities to the south.

Traffic volumes are very low in this corridor by regional standards and congestion is only an issue in the morning peak hour at the Bridge Street/US 2 intersection in Richmond. No congestion problems are foreseen in this corridor over the life of this Plan. Heavy log truck use may lead to surface and subsurface road deterioration sooner leading to more frequent road maintenance.

Pedestrian opportunities will remain limited and increasing traffic volumes will likely impact walkers' safety. Similarly, with bicyclists, the potential for more vehicle conflicts exists with increasing traffic thereby reducing safety margins. The Huntington Road/Main Road and Hinesburg Hollow Roads are identified in the Active Transportation Plan and the towns are expected to find ways to accommodate bicyclists when major road rehabilitation or reconstruction work takes place.

No regular transit services currently exist or are planned, although paratransit service that focuses on the elderly and disabled populations is available

Corridor Strategies/Projects

This corridor's rural character, light traffic levels, and peripheral location, not surprisingly leads to few regional level transportation recommendations.

Municipality	Project	Type
Huntington	Lower Village Traffic Calming and Bike/Ped Improvements	Bike & Pedestrian

Vermont Route 116 Corridor

This corridor links the Town of Hinesburg and rural northeastern Addison County towns to Chittenden County's employment and commercial centers. Northbound traffic during the weekday morning peak hour and the reverse in the evening are the dominant traffic movements in this corridor.

Existing congestion levels throughout the corridor remain relatively low except during commuter peak hours through Hinesburg Village and towards the northern terminus in South Burlington. In the future, delay issues are expected to worsen only through Hinesburg Village north past CVU Road.

Along VT 116 shoulder widths are inconsistent and in some areas too narrow for safe bicycle and pedestrian travel. Over the long term, improvements are expected to accommodate bicyclists on Hinesburg's stretches of VT 116 and Silver Street, and improvements are also expected to the sidewalk network within and adjacent to Hinesburg Village. While on-road bicycle facilities are currently not planned north of the intersection of VT 116 and VT 2A, bicycle and pedestrian travel within South Burlington should be improved as their long-term commitment to provide these facilities through their development permitting process continues.

A peak hour public transportation service runs through Hinesburg Village connecting the regional core to the north and Bristol and Middlebury in Addison County to the south – GMT's 116 Commuter.

Corridor Strategies/Projects

In order to address future anticipated problems and needs in this corridor, the following are recommended (NOTE: The listed sequence does not denote priority rank.)

Municipality	Project	Type
Hinesburg	VT116/CVU Road Improvements – **TIP Project**	Multimodal Roadway Improvement
Hinesburg	Village North Sidewalk – **TIP Project**	Bike & Pedestrian
Hinesburg	Village South Sidewalk – **TIP Project**	Bike & Pedestrian
Hinesburg	Richmond Road Sidewalk, CVU Road to North Street	Bike & Pedestrian
Hinesburg	VT116/Charlotte Road Signal Improvements	Multimodal Roadway Improvement
Hinesburg	Hinesburg Village Park-and-Ride	Park-and-Ride
Hinesburg	Route 16 East Sidewalk – Commerce Street to Mechanicsville Road	Bike & Pedestrian
Hinesburg	Mechanicsville Road Sidewalk	Bike & Pedestrian
South Burlington	VT 116 bike path – Us 2 to Kennedy Dr	Bike & Pedestrian
St. George	VT116/VT2A Intersection Improvements	Multimodal Roadway Improvement
St. George	VT116/VT2A Intersection Park-and-Ride	Park-and-Ride

Eastern Corridor

The Eastern Corridor serves east/west travel needs connecting suburban Chittenden County and points further east and south to the Regional Core area. The primary road facilities are Interstate 89, US 2, and VT 117, which branches off US 2 in Richmond and serves parts of Jericho and Essex before terminating in Essex Junction.

Traffic flow along US 2 is currently delayed through several intersections and along some segments, including Taft Corners, Industrial Avenue, Airport Drive/Kennedy Drive, Hinesburg Road and especially Dorset Street. These same areas are anticipated to be the main points of traffic delay in the future. VT 117 through parts of Jericho and Essex are not expected to see any significant areas of delay until reaching the 5 corners area in Essex Junction.

Bicycle and pedestrian travel is relatively low in the eastern part of the corridor, although adequate shoulder widths on US 2 through Bolton make for relatively safe conditions. Moving closer to Burlington, the level of bicycle and pedestrian travel increases, as well as the presence of off-road shared-use paths and sidewalks. Richmond, however, has some shoulder choke points especially

between the Village and I-89 Exit 11. US 2 lane widths are mostly adequate through Williston, and increasingly in South Burlington, despite the higher traffic volumes and more numerous curb cuts that can make for challenging on-road bicycling. Along VT 117 bicyclists and walkers face a less than ideal environment although with relatively lower traffic volumes and fewer curb cuts than US 2, trips are less daunting. Once into Essex Junction the environment changes markedly for the better with on-road designated bicycle lanes, slower vehicular speeds, and sidewalks. Both US 2 and VT 117 through Richmond/Jericho are scheduled for repaving in the near future and, to the extent feasible, additional shoulder width will be designated for bike lanes.

GMT transit services have expanded into Williston over the past decade. Additionally, the Link Express inter-regional commuter bus from Burlington to Montpelier now runs with a stop at the I-89 Exit 11 Richmond Park-and-Ride. The frequency of transit service diminishes the further east one travels in this corridor. Over time, growth and development in Williston will likely lead to demands for increases in transit service. In order to improve the multimodal travel options here, more investments in park-and-ride facilities are planned –a new facility at Exit 12 and possible another in the Taft Corners vicinity.

The Genesee & Wyoming rail line traverses the corridor moving freight and the Amtrak Vermonter to and from points north and south.

Corridor Strategies/Projects

In order to meet future transportation needs, while managing increased congestion, the following multimodal approach is recommended. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	Type
Bolton	US 2/Bolton Access Road Park and Ride	Park-and-Ride
Richmond	US 2 Path – Village to Exit 11 Park-and-Ride	Bike & Pedestrian
South Burlington	Market Street – **TIP Project**	Multimodal Roadway Improvement
Williston	US2/Industrial Avenue Intersection – **TIP Project**	Multimodal Roadway Improvement
Williston	Park-and-Ride South of I-89 – **TIP Project**	Park-and-Ride
Essex Junction	Crescent Connector Road	Multimodal Roadway Improvement
Essex	VT 117/North Williston Rd intersection improvements	Multimodal Roadway Improvement
Essex	North Williston Rd flood plain notification improvements	Multimodal Roadway Improvement
Williston	Exit 12 Improvements – All stages (*project also listed under Cross County Corridor*)	Multimodal Roadway Improvement
Williston	US7/Trader Lane Signal – **TIP Project**	Multimodal Roadway Improvement

Williston/South Burlington	Shared Use Path over Muddy Brook	Bike & Pedestrian
Williston	Industrial Avenue Sidewalks	Bike & Pedestrian
South Burlington	US2 – Dorset Street to Hinesburg Road Improvements	Multimodal Roadway Improvement
South Burlington	VT116 Sidewalk to Tilley Dr. – **TIP Project**	Bike & Pedestrian
South Burlington	Airport Drive Extension to Airport Parkway	Multimodal Roadway Improvement
South Burlington	I89 Interstate Access Improvements (Exit 12B or 13)	Multimodal Roadway Improvement
South Burlington	Bike/Ped bridge over I89 near Exit 14	Bike & Pedestrian
South Burlington	Airport Parkway shared use path, Kirby Road to Winooski River bridge	Bike & Pedestrian
South Burlington	Shared use path over Muddy Brook	Bike & Pedestrian
South Burlington	ITS – Signals and communications, US 2 Corridor	Multimodal Roadway Improvement
South Burlington	I-89 widening, Exit 14 to Exit 15, 3 lanes each direction	Multimodal Roadway Improvement
Williston	Taft Corners Park-and-Ride (*project also listed under Cross County corridor*)	Park-and-Ride
Williston	US2/North Williston Road/Oak Hill Road Intersection Improvements	Multimodal Roadway Improvement

Southern Corridor

The heart of the Southern Corridor is US 7, the main north/south arterial on the western side of the state. A 3.5-mile segment in South Burlington and Shelburne was reconstructed several years ago improving capacity and providing multimodal enhancements. To a lesser extent, the parallel local roads of Spear and Dorset Streets also provide a north/south route along the western edge of Chittenden County. While US 7 serves the majority of the traffic, and can experience significant delays during the peak hours, the two parallel roads increasingly serve as alternate routes, sometimes to the dismay of local officials and neighborhood residents. As the primary north/south route in western Vermont, US 7 also sees a considerable amount of truck traffic.

The improvements to Shelburne Road have significantly helped bicycle and pedestrian travel along the improved sections. However, north of this area bicycling will remain difficult and the sidewalk system will continue to require improvements to enhance walkers' safety. Any improvements to Spear and Dorset streets should include the needs of bicyclists and walkers in order to encourage the use of these modes. The GMT Shelburne bus route and Middlebury Link express are the primary public transportation services in the corridor.

The northern end of Shelburne Road (US 7) features some of the region's highest traffic volumes and is prone to delays in the morning and afternoon peak hours. Truck freight traffic adds to the US 7 corridor delays and finding ways to divert freight to the parallel rail line could help both congestion levels and wear and tear on the roadway.

Parallel to US 7 is the Vermont Railway's line whose primary role is to move freight and support their customers in its Burlington yard and move cargo to the Genesee & Wyoming's line via the Winooski Branch to Essex Junction. Future Amtrak service to Burlington connecting to points south is anticipated to begin in 2020 along the western rail corridor.

While the Southern Corridor moves north/south traffic relatively efficiently, it has long been recognized that east/west movement across the corridor is quite limited and inefficiently connected. As development has increased toward Williston, the need for better east/west connections has become evident. The City of South Burlington has recognized this need and proposed new roadways to address the problem. These connections are planned to coincide with residential developments in the City's Southeast Quadrant as this area grows and recognized on the City's Official Map.

Corridor Strategies/Projects

The following will address the longer term issues over the wider corridor. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	Type
Charlotte	US7 Reconstruction – **TIP Project**	Multimodal Roadway Improvement
Charlotte	US 7/Ferry Rd intersection improvements – **TIP Project**	Multimodal Roadway Improvement
Charlotte	Village Parking Improvements	Park-and-Ride
Charlotte	Town Link Trail	Bike & Pedestrian
Shelburne	Village sidewalks and crosswalks – **TIP Project**	Bike & Pedestrian
Shelburne	Falls Rd Bike/Ped Bridge	Bike & Pedestrian
Shelburne	Bay Rd pedestrian bike safety improvements	Bike & Pedestrian
Shelburne	Southern Gateway (south of Bostwick/Marsett)	Bike & Pedestrian
Shelburne	Town Center Park-and-Ride	Park-and-Ride
Shelburne	US7/Harbor Road Improvements	Multimodal Roadway Improvement
South Burlington	Implement Signal Control and Pedestrian Upgrades on Shelburne Road between IDX Drive and Queen City Park Road	Multimodal Roadway Improvement

South Burlington	Shelburne Road Streetscape and Bike/Ped Improvements from IDX Drive to Queen City Park Road	Multimodal Roadway Improvement
South Burlington	Swift/Spear Street intersection improvements	Multimodal Roadway Improvement
South Burlington	US7/I-189 Intersection Intercept Park-and-Ride	Park-and-Ride
South Burlington	Spear St Shared Use Path, south of US 2	Bike & Pedestrian
South Burlington	Lindenwood Drive Path and crossing improvements	Bike & Pedestrian
South Burlington	Spear St Bike/Ped Improvements – Allen Rd to US Forest Service	Bike & Pedestrian
South Burlington	Dorset St Shared Use Path, from Nowland Farm south	Bike & Pedestrian
South Burlington	Allen Rd Shared Use Path West From Spear Street	Bike & Pedestrian
South Burlington	Allen Rd shared use path – US 7 to existing path	Bike & Pedestrian

Cross County Corridor

The corridors discussed previously either directly link other parts of the region to the Regional Core or primarily feed those corridors. The Cross County Corridor is different. While it feeds other corridors to and from the Regional Core, it also provides links between activity centers separate from and bypassing the Regional Core. The corridor provides connections between points south and the activity and employment centers in Williston, Essex, and Essex Junction, and to the growing residential and mixed-use areas of Colchester.

The primary road in the corridor today is VT 2A complimented in part by completed segments of the Circumferential Highway – VT 289. Those segments of the Circumferential Highway through Essex, along with Kellogg Road and Severance Road, also form part of the corridor.

The pace and scale of growth in the Taft Corners area has led to peak hour traffic delays, most notably on VT 2A. This applies to segments and intersections from I-89 Exit 12 all the way to the Five Corners in Essex Junction and north into Colchester. The MTP's combination of intersection, Interchange, transit, park-and-ride, walk/bike and ITS/signal projects are anticipated to improve traffic delays throughout the corridor.

Corridor Strategies/Projects

The list below identifies the projects and transportation strategies designed to address the corridor's transportation needs. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	Type
Colchester	VT2A Colchester Village and Mill Pond/East Roads Intersection -- **TIP Project**	Multimodal Roadway Improvement
Colchester	Severance Road Shared Use Path	Bike & Pedestrian

Colchester	Mill Pond/Severance Roads Intersection Improvements	Multimodal Roadway Improvement
Essex	VT2A/VT289 Interchange Improvements TIP Project	Multimodal Roadway Improvement
Essex/Williston	Signal Upgrades on VT2A and VT15 TIP Project	Multimodal Roadway Improvement
Essex/Williston	ITS Improvements – Signals and Communications, VT2A	Multimodal Roadway Improvement
Essex Junction	Crescent Connector Road -- **TIP Project** (*project also listed under Eastern Corridor and Northeastern Corridor*)	Multimodal Roadway Improvement
Williston	Exit 12 Improvements – All stages (*also listed under Eastern Corridor*)	Multimodal Roadway Improvement
Williston	VT2A/James Brown Drive -- **TIP Project**	Multimodal Roadway Improvement
Williston	Taft Corners Park-and-Ride (*project also listed under Eastern corridor*)	Park-and-Ride
Williston	VT 2A/Industrial Ave Improvements and improvements to VT 2A to James Brown Drive -- **TIP Project**	Multimodal Roadway Improvement
Williston	VT 2A Infill sidewalks -- **TIP Project**	Bike & Pedestrian
Williston	Mountain View Road Multimodal Improvements: Old Stage to VT 2A	Multimodal Roadway Improvement
Williston	US2 – Taft Corners to Williston Village Shared Use Path	Bike & Pedestrian
Williston	Taft Corners Park-and-Ride	Park-and-Ride

While nearly all projects can be identified by the corridor(s) they're located in, some defy that categorization and are less place-specific. The table below identifies such projects whose precise location has yet to be determined or reflect a more regional scale strategy. NOTE: The listed sequence does not denote priority rank.

Municipality	Project	Type
Regional Sidewalks	Sidewalks and Paths in areas planned for growth	Bike & Pedestrian
Regional Transit	Capital needs to expand transit services in the urbanized area – 2o minute headways on all routes every day. –	Transit
Regional Rail	Burlington station upgrades	Rail

Regional Rail	Essex Junction station upgrades	Rail
Regional Rail	Upgrade all trackage in Chittenden County to Class 4 standard	Rail
Regional Rail	Freight improvements to bridges, sidings, railyards, crossings and clearance	Rail
Regional Rail	Essex Junction to Burlington 286 rail upgrade	Rail

Corridor Summary

The corridor approach to transportation system description and solutions was selected due to its simplicity and logical, systematic methodology. Traffic flow is easiest explained using this approach and multimodal strategies are easily presented and understood as solutions. This methodology also was previously used in the CCMPO's *1997 Long Range Transportation Plan,2005 Metropolitan Transportation Plan* and 2013 ECOS Plan

Each of the MTP's recommended projects and strategies was identified by the corridor to which they apply. A complete MTP project list is presented in the section below, including projects not identified as priorities in the corridor discussion above. This list is a comprehensive compilation of projects from many sources: The 2013 ECOS/MTP, recently completed CCRPC scoping and corridor studies, the Active Transportation Plan and Park-and-Ride Plan updates, GMT's Next GEN Transit Plan (in process), and input from each of the CCRPC member towns following their review of projects culled from regional plans/studies.

Metropolitan Transportation Plan Investments and Project List

MTP MAJOR INVESTMENTS

a. Adequately fund the maintenance and preservation of our existing transportation assets including roads, bridges, rail, transit, walking/biking, park-and-ride facilities, and transportation demand management (TDM) programs.

b. New transportation system investment should focus on the highest priority transportation projects as detailed in the ECOS/Metropolitan Transportation Plan (MTP) Project List. In the next five years, these projects will primarily be those that are included in the Transportation Improvement Program (TIP), as may be amended.

c. Future transportation investments will support a shift away from single-occupancy vehicle (SOV) trips by focusing on the following areas and programs:

    i. Encourage increased use of public transit by:

        1. Increasing investment in GMT transit services in the county to achieve 20-minute headways for all urban routes (excluding the Link Express) and increase the frequency of weekend services.
        2. Working in cooperation with GMT on their NextGEN Transit and Transit Development Plans to identify new and future opportunities for transit expansion. Integrate park-and-ride facilities with transit routes; including access to the Montpelier Link at the future Exit 12 Park-and-Ride.
        3. Invest in transit signal priority technology in partnership with GMT, VTrans and municipalities.
        4. Maximize ridership for public school busses and minimize use of private vehicles for student transport.

    ii. Expand walking and biking infrastructure to support active transportation and to provide interconnection with the region's transit system by:

        1. Implementing the strategies, projects and priorities identified in the 2017 Chittenden County Active Transportation Plan to provide safe and efficient facilities to connect common trip origins and destinations.
        2. Working with municipalities to update municipal road standards (for maintenance and new construction) to reflect complete streets principles.
        3. Reviewing state transportation projects to ensure that complete streets are implemented.
        4. Ensuring that site plans include adequate bike and pedestrian infrastructure and safety measures, through participation in the Act 250 hearing process.
        5. Assisting municipalities with scoping of future bike and pedestrian facilities to improve safety, accessibility, efficiency and continuity of the system. Municipalities could use the outcomes of the scoping studies to apply for various VTrans implementation grants.

iii. Expand the deployment of Intelligent Transportation Systems (ITS) to facilitate efficient flow of traffic on the roadway system which will improve safety, reduce delays and congestion and decrease transportation energy use.

iv. Promote Transportation Demand Management and Car Sharing programs:

1. Promote and support the Go! Vermont program that links travelers to a variety of transportation resources and choices and the TravelSmarterVT initiative.
2. Support the continued development and expansion of Chittenden County Park-and-Ride facilities as recommended in the 2011 Regional Park-and-Ride Plan.
3. Work with the Chittenden Area Transportation Management Association (CATMA) to support employer programs to encourage telecommuting, carpooling, vanpooling, walking, and biking for employee commute trips.
4. Support CarShare Vermont's initiatives.

v. Promote a shift away from gas/diesel vehicles to electric or other non-fossil fuel transportation options through the following actions:

1. Work with the Clean Cities Coalition to encourage municipal fleets to switch to biodiesel for heavy-duty vehicles.
2. Work with local employers and nonprofit partners such as the Vermont Energy and Climate Action Network and Vermont League of Cities and Towns to encourage broader implementation of EV incentives, such as free or reduced parking costs for EV and fuel-efficient vehicle owners and preferential access to parking spaces limited in supply.
3. Promote the Drive Electric Vermont webpage, which connects users to financial incentives dealers, and recharging stations for EVs.
4. In partnership with Drive Electric Vermont, Vermont Clean Cities Coalitions and other entities, increase awareness of the benefits of and access to EVs and alternative-fuel vehicles by:

- Organizing high-visibility events where people can see and test drive EVs, such as county fairs, energy fairs, and summer festivals. Events should also leverage local newspaper and public access coverage to showcase local residents and organizations that are helping to propel the transition to EVs.
- Encouraging municipalities and other entities that operate fleets to switch a portion of their vehicles to electric or biodiesel-fueled vehicles.
- Providing technical assistance and support to communities interested in accessing VW diesel settlement funds for EV charging and/or heavy-duty vehicle replacements according to VT ANR's mitigation plan that will detail eligible activities.
- Assisting with deploying EV Infrastructure at workplaces and key public locations.
- Assessing current access to public and workplace charging (to the extent known) in the community or region and identify strategic locations in busy areas (large employers or areas of high visitation in downtowns) where charging stations should be added or expanded.

- Encouraging electric utilities to invest in charging infrastructure, offer incentives to increase EV ownership, and build awareness of charging opportunities as part of their strategy for complying with the state's Renewable Energy Portfolio Standard.
- Seeking grants to fund the installation of DC fast-charging infrastructure at strategic locations along major travel corridors and in transit hubs such as park and-ride locations and along the Interstate 89 Alternative Fuels Corridor.
- Educating municipalities and providing technical assistance on amending zoning regulations to include electric vehicle charging infrastructure.

vi. Support and enhance our rail infrastructure for both passenger and freight by investing in Amtrak facilities and the Essex Junction to Burlington line (Winooski branch). Where needed, provide additional rail infrastructure for the support and promotion of more efficient and safe movement, handling and storage of goods by rail, thus helping relieve the burden on our existing roadway network.

MTP PROJECT LIST

Table to be inserted here on completion

Draft MTP Project List By Municipality & VTrans Capital Program Status
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	Municipality	Project Type	Project	Estimated Project Cost Seeking Federal Participation (includes required state+local match. Excludes funds spent prior to 10/1/16)	Time Frame (Short - 2025, Medium 2025-2035, Long 2035-2050)
	Bolton				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
1	Bolton	Park and Ride	US2/Bolton Access Road Park & Ride	$50,000	Medium
	Burlington				
	Capital Program - Front of the Book and On CCRPC TIP				
2	Burlington	Multimodal Roadway Improvements	Shelburne Street Roundabout	$2,460,000	Short
3	Burlington	Multimodal Roadway Improvements	Champlain Parkway	$25,000,000	Short
4	Burlington	Bike & Pedestrian	Champlain Elementary Pedestrian Crossing Improvements	$405,000	Short
5	Burlington	Bike & Pedestrian	Colchester Avenue Sidepath	$281,437	Short
6	Burlington	Bike & Pedestrian	North Avenue Crosswalks	$246,750	Short
	Capital Program - Development & Evaluation and On CCRPC TIP				
7	Burlington	Multimodal Roadway Improvements	Railyard Enterprise Project	$6,285,000	Short
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
8	Burlington	Bike & Pedestrian	Burlington Bike Path Rehabilitation - Oakledge to Maple Street ($10m project funded at 50% federal)	$5,000,000	Short
9	Burlington	Bike & Pedestrian	Depot Street Improvements (Bike/Ped) ($1.1m project funded at 50% federal)	$550,000	Short
10	Burlington	Bike & Pedestrian	Sherman Street Connection to Depot Street - Stairway Street (0.775m project funded at 50% federal)	$387,850	Short
11	Burlington / Winooski	Bike & Pedestrian	Bike/Ped Bridge Crossing of the Winooski River in the vicinity of the "Blue Bridge"	Further planning needed	Long
12	Winooski / Burlington	Bike & Pedestrian	Winooski River Bicycle/Pedestrian Bridge (dependent on outcome of Winooski Main Street Bridge scoping)	$1,680,500	Medium
13	Burlington	Bike & Pedestrian	Intervale Road Access Improvements	Further planning needed	Short
14	Burlington	Multimodal Roadway Improvements	Main Street Great Street ($10.3m project funded at 50% federal)	$5,150,000	Short
15	Burlington	Multimodal Roadway Improvements	Main Street Complete Street - US2 Section	$400,000	Medium
16	Burlington	Multimodal Roadway Improvements	Cherry Street Complete Street	$500,000	Short
17	Burlington	Multimodal Roadway Improvements	Pearl Street Complete Street ($3.3m project funded at 50% federal)	$1,650,000	Short
18	Burlington	Multimodal Roadway Improvements	Winooski Avenue Improvements ($12.9m project funded at 50% federal)	$6,450,000	Short
19	Burlington	Multimodal Roadway Improvements	Battery Street Improvements ($3.5m project funded at 50% federal)	$1,750,000	Medium
20	Burlington	Multimodal Roadway Improvements	Shelburne Street Improvements - Complete Streets	$12,900,000	Medium

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21	Burlington	Multimodal Roadway Improvements	Colchester Avenue/Riverside Avenue Intersection Improvements	$3,400,000	Medium
22	Burlington	Multimodal Roadway Improvements	Colchester Avenue/Prospect Street Intersection Improvements ($1m project funded at 50% federal)	$500,000	Short
23	Burlington	Multimodal Roadway Improvements	Colchester Avenue/East Avenue Intersection Improvements ($0.78m project funded at 50% federal)	$390,000	Medium
24	Burlington	Multimodal Roadway Improvements	North Avenue Improvements ($16.35m project funded at 50% federal)	$8,175,000	Short
25	Burlington	Park and Ride	I-89 Exit 14 Intercept Park & Ride Facility	Further planning needed	Long
26	Burlington	Bike & Pedestrian	Champlain Elementary Safe Routes to School - Phase II ($425,000 project funded at 20% federal)	$85,000	Short
	Charlotte				
	Capital Program - Front of the Book and On CCRPC TIP				
27	Charlotte	Multimodal Roadway Improvements	US7 Reconstruction	$2,500,000	Short
28	Charlotte	Multimodal Roadway Improvements	US7/Ferry Road Intersection Improvements	$535,000	Short
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
29	Charlotte	Park and Ride	Charlotte Village Parking	$215,000	Medium
30	Charlotte	Bike & Pedestrian	Town Link Trail	Further planning required	Long
	Colchester				
	Capital Program - Front of the Book and On CCRPC TIP				
31	Colchester	Multimodal Roadway Improvements	VT2A/US7/Creek Road/Bay Road Intersection	$5,754,281	Short
32	Colchester	Multimodal Roadway Improvements	Exit 16 Improvements - CIRC ALT PHASE I	$8,050,000	Short
33	Colchester	Multimodal Roadway Improvements	Severance Corners Improvements - CIRC ALT PHASE II	$3,848,257	Short
34	Colchester	Multimodal Roadway Improvements	W Lakeshore Drive / Prim Road Intersection Improvements - CIRC ALT PHASE III	$1,900,000	Short
35	Colchester	Multimodal Roadway Improvements	Blakely Road / Laker Lane Intersection Improvements - CIRC ALT PHASE III	$425,000	Short
36	Colchester	Park and Ride	US7/I-89 Exit 16 Park & Ride	$500,000	Short
37	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 1 Lime Kiln Road to Susie Wilson Road - CIRC ALT PHASE II	$1,430,066	Short
38	Colchester	Bike & Pedestrian	Ft Ethan Allan Sidewalks - FINISHED	Earmark	Finished
39	Colchester	Bike & Pedestrian	Mountain View Drive Sidewalk - FINISHED	$370,000	Finished
40	Colchester	Bike & Pedestrian	West Lakeshore Drive Path - Phase I	$1,800,000	Short
	Capital Program - Development & Evaluation and On CCRPC TIP				
41	Colchester	Multimodal Roadway Improvements	VT2A Colchester Village and Mill Pond Road/East Road Intersection and Multimodal Improvements - CIRC ALT PHASE III	$3,900,000	Medium

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	Capital Program - Candidate List				
42	Colchester	Multimodal Roadway Improvements	I-89 Exit 17/US2/US7 Interchange Improvements	$17,238,000	Medium
43	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 2, I-89 Exit 15 to Lime Kiln Road	$305,700	Long
44	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 3, Susie Wilson Road to West Street Extension	$537,500	Long
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
45	Colchester	Bike & Pedestrian	Severance Road Shared Use Path - CIRC ALT PHASE III	$2,086,500	Long
46	Colchester	Bike & Pedestrian	West Lakeshore Drive Path Phase II - Harbor View Plaza to Public Boat Launch	$900,000	Medium
47	Colchester	Bike & Pedestrian	West Lakeshore Pedestrian Tunnel at Bayside Park	$2,000,000	Long
48	Colchester	Multimodal Roadway Improvements	VT15/Lime Kiln Road Intersection Improvements	$1,030,000	Medium
49	Colchester	Multimodal Roadway Improvements	VT127 Roadway and Intersection Improvements	$24,000,000	Long
50	Colchester	Multimodal Roadway Improvements	Roundabout at Bayside Park Intersection	$3,310,000	Medium
51	Colchester	Multimodal Roadway Improvements	Mill Pond Road/Severance Road Intersection Improvements	$277,000	Long
52	Colchester	Multimodal Roadway Improvements	Heineberg-Blakely Bypass and Shared Use Path	$18,952,000	Long
53	Winooski, Colchester	Multimodal Roadway Improvements	Intelligent Transportation System Improvements - Signal and Communications - US7	$600,000	Medium
	Essex				
	Capital Program - Front of the Book and On CCRPC TIP				
54	Essex	Multimodal Roadway Improvements	VT2A/VT289 Interchange Improvements - CIRC ALT PHASE II	$1,467,400	Short
55	Essex	Multimodal Roadway Improvements	VT15/Sand Hill Road Signal - CIRC ALT PHASE II	$1,140,453	Short
56	Essex, Williston	Multimodal Roadway Improvements	Signal Upgrades on VT2A and VT15	$3,100,000	Short
57	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 1 Lime Kiln Road to Susie Wilson Road - CIRC ALT PHASE II	See Line 37	Short
58	Essex	Bike & Pedestrian	Pinecrest Drive Sidewalk	$242,770	Short
59	Essex	Bike & Pedestrian	Towers Road Sidewalk	$169,050	Short
	Capital Program - Development & Evaluation and On CCRPC TIP				
60	Essex	Multimodal Roadway Improvements	Susie Wilson Road Improvements and Intersections including VT15 and Kellogg - CIRC ALT PHASE III	$8,500,000	Medium
61	Essex	Multimodal Roadway Improvements	VT117/North Williston Road Intersection Improvements - CIRC ALT PHASE III	$3,175,000	Long

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	Capital Program - Candidate List				
62	Essex	Multimodal Roadway Improvements	North Williston Road Flood Plain Notification Improvements - CIRC ALT PHASE III	$405,000	Medium
63	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 2, I-89 Exit 15 to Lime Kiln Road	See Line 43	Long
64	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 3, Susie Wilson Road to West Street Extension	See Line 44	Medium
65	Essex	Bike & Pedestrian	VT15 Sidewalk - Old Stage Road to Essex Way - CIRC ALT PHASE III	$160,000	Medium
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
66	Essex	Park and Ride	Essex Center, VT15/VT289 Park & Ride	$186,000	Long
	Essex Junction				
	Capital Program - Front of the Book and On CCRPC TIP				
67	Essex Junction	Multimodal Roadway Improvements	VT15 Improvements - Post Office Square to Five Corners Improvements - FINISHED - CIRC ALT PHASE II	$2,750,000	Finished
68	Essex Junction	Multimodal Roadway Improvements	Crescent Connector Road - VT2A to VT15 - CIRC ALT PHASE I	$6,000,000	Short
	Capital Program - Candidate List				
69	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 2, I-89 Exit 15 to Lime Kiln Road	See Line 43	Long
70	Colchester / Essex / Essex Junction	Bike & Pedestrian	VT15 Multi-use Path - Phase 3, Susie Wilson Road to West Street Extension	See Line 44	Long
	Needs Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
71	Essex Junction	Multimodal Roadway Improvements	VT15/West Street Extension Intersection - Additional NB lane on West Street Ext.	$206,000	Long
	Hinesburg				
	Capital Program - Front of the Book and On CCRPC TIP				
72	Hinesburg	Multimodal Roadway Improvements	VT116/CVU Road Improvements	$2,872,760	Short
73	Hinesburg	Bike & Pedestrian	Village North Sidewalk	$170,000	Short
74	Hinesburg	Bike & Pedestrian	Village South Sidewalk	$165,000	Short
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
75	Hinesburg	Bike & Pedestrian	Richmond Road Sidewalk, CVU Road to North Street	$2,485,000	Long
76	Hinesburg	Multimodal Roadway Improvements	VT116/Charlotte Road Improvements to facilitate Concurrent Signal Phasing	$150,000	Short
77	Hinesburg	Park and Ride	Hinesburg Village Park & Ride	$90,000	Long
78	Hinesburg	Bike & Pedestrian	Route 116 East Sidewalk - Commerce Street to Mechanicsville Road	$365,500	Medium
79	Hinesburg	Bike & Pedestrian	Mechanicsville Road Sidewalk	$142,000	Medium

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	Huntington				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
80	Huntington	Bike & Pedestrian	Huntington Lower Village Traffic Calming and Bike/Ped Improvements	$894,100	Medium
	Jericho				
	Capital Program - Front of the Book and On CCRPC TIP				
81	Jericho	Multimodal Roadway Improvements	VT15/Browns Trace Intersection	$2,004,190	Short
82	Jericho	Bike & Pedestrian	Browns Trace Multimodal Connection -- Pratt Road to Lee River Road	$410,000	Short
83	Jericho	Bike & Pedestrian	Browns River Middle School and Union ID School Crossing Improvements	$193,200	Short
84	Jericho	Bike & Pedestrian	Lee River Road Sidewalk	$350,000	Short
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
85	Jericho	Bike & Pedestrian	Browns Trace Multimodal Connection - MMU to Lee River Road	$471,300	Medium
86	Jericho	Multimodal Roadway Improvements	VT15/Dickinson Street Modifications	Further planning needed	Long
87	Jericho	Park and Ride	VT15 Park and Ride	$120,000	Long
	Milton				
	Capital Program - Front of the Book and On CCRPC TIP				
88	Milton	Multimodal Roadway Improvements	US7/Middle Road/Railroad Street Safety Improvements	$3,650,000	Short
89	Milton	Bike & Pedestrian	Cherry Street	$65,500	Short
90	Milton	Bike & Pedestrian	US7 Sidewalk - Nancy Drive to Haydenberry Drive	$1,078,000	Short
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
91	Milton	Multimodal Roadway Improvements	US7/Main Street Intersection Improvements	$1,030,000	Long
92	Milton	Multimodal Roadway Improvements	US7/Racine/Legion/Bartlett/West Milton Road Improvements	$515,000	Medium
93	Milton	Multimodal Roadway Improvements	I-89/West Milton Road New Interchange	$30,000,000	Long
94	Milton	Park and Ride	Milton Town Office Park & Ride	$870,000	Medium
	Richmond				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
95	Richmond	Bike & Pedestrian	US2 Path - Park and Ride to Richmond Village	$3,388,000	Long
	Shelburne				
	Capital Program - Front of the Book and On CCRPC TIP				
96	Shelburne	Bike & Pedestrian	Village Sidewalks and Crosswalks	$137,971	Short

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	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
97	Shelburne	Bike & Pedestrian	Falls Road Bike/Ped Bridge	$838,800	Medium
98	Shelburne	Bike & Pedestrian	Bay Road Pedestrian Bike Safety Improvements	$20,000	Medium
99	Shelburne	Multimodal Roadway Improvements	US7/Harbor Road Improvements	$1,420,000	Medium
100	Shelburne	Bike & Pedestrian	Shelburne Southern Gateway (south of Bostwick/Marsett)	$2,500,000	Medium
101	Shelburne	Park and Ride	Shelburne Village Park & Ride	$15,000	Medium
	South Burlington				
	Capital Program - Front of the Book and On CCRPC TIP				
102	South Burlington	Multimodal Roadway Improvements	Market Street ($5m project to be funded with earmark funds)	Earmark	Short
103	South Burlington	Bike & Pedestrian	VT116 Sidewalk to Tilley Drive	$173,000	Finished
	Capital Program - Candidate List				
104	South Burlington	Multimodal Roadway Improvements	Airport Drive Extension to Airport Parkway	$12,167,000	Medium
105	South Burlington	Multimodal Roadway Improvements	I-89 Interstate Access Improvements (12B, 13, 14 or 14N)	$37,302,000	Long
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
106	South Burlington	Bike & Pedestrian	Bike/Ped Bridge over I-89 in the vicinity of Exit 14 ($14m project to be funded at 50% federal (excludes possible future grants))	$7,000,000	Short
107	South Burlington	Bike & Pedestrian	Airport Parkway Bike/Ped Facility, Kirby Road to Winooski River Bridge	$1,647,400	Short
108	South Burlington	Bike & Pedestrian	Spear Street Shared Use Path, South of US2	$452,400	Short
109	South Burlington	Bike & Pedestrian	Lindenwood Drive Path and Crossing Improvements	$360,000	Short
110	South Burlington	Bike & Pedestrian	Spear Street Bike/Ped Improvements - Allen Road to US Forest Service/ I-89	$4,000,000	Medium
111	South Burlington	Bike & Pedestrian	Dorset Street Shared Use Path, Nowland Farm Road South 3.500 feet	$610,000	Short
112	South Burlington	Bike & Pedestrian	Allen Road Shared Use Path West of Spear Street - 800 foot gap	$283,600	Short
113	South Burlington	Bike & Pedestrian	Allen Road Shared Use Path - US7 to Existing Facility	$200,000	Short
114	South Burlington / Williston	Bike & Pedestrian	Shared Use Path Connection over Muddy Brook	$3,639,200	Short
115	South Burlington	Bike & Pedestrian	VT116 Bike Path - US2 to Kennedy Drive	$500,000	Long
116	South Burlington	Multimodal Roadway Improvements	Williston Road Intersection and Roadway Improvements - Garden Street to VT116 ($3.3m project to be funded with local funds)	Locally funded	Short
117	South Burlington	Multimodal Roadway Improvements	Williston Road Intersection and Roadway Improvements - Dorset Street to Garden Street ($10m project to be funded with 50% federal funds)	$5,000,000	Short

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118	South Burlington	Multimodal Roadway Improvements	Implement Signal Control and Pedestrian Upgrades, Shelburne Road between IDX Drive and I-189 ($1.236 m project to be funded with AID grant)	AID Grant	Short
119	South Burlington	Multimodal Roadway Improvements	Shelburne Road Streetscape and Bike/Ped Improvements - IDX Drive to Queen City Park Road	$5,000,000	Medium
120	South Burlington	Multimodal Roadway Improvements	Exit 14 Area Signal Upgrades	Earmark	Medium
121	South Burlington	Multimodal Roadway Improvements	Swift Street/Spear Street Intersection Improvements ($572,000 project to be funded with local funds)	Locally funded	Medium
122	South Burlington	Multimodal Roadway Improvements	I-89 Widening, Exit 14, South Burlington to Exit 15, Colchester (3 lanes in each direction)	$37,000,000	Long
123	South Burlington	Park and Ride	US7/I-189 Intercept Park & Ride	$5,000	Long
	St. George				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
124	St. George	Park and Ride	VT116/VT2A Intersection Park & Ride	$248,000	Medium
125	St. George	Multimodal Roadway Improvements	VT116/VT2A Intersection Improvements	Further planning needed	Long
	Underhill				
	Capital Program - Front of the Book and On CCRPC TIP				
126	Underhill	Bike & Pedestrian	Underhill Flats Sidewalk	$360,000	Short
	Williston				
	Capital Program - Front of the Book and On CCRPC TIP				
127	Williston	Multimodal Roadway Improvements	US2/Trader Lane Signal - CIRC ALT PHASE II	No Federal	Short
128	Williston	Multimodal Roadway Improvements	US2/Industrial Avenue Intersection	$5,760,000	Short
129	Williston	Multimodal Roadway Improvements	VT2A/James Brown Drive - CIRC ALT PHASE I	$1,889,189	Short
130	Williston	Multimodal Roadway Improvements	VT2A/Industrial Avenue Improvements and Improvements to VT2A to James Brown Drive - CIRC ALT PHASE III	$4,550,000	Short
131	Essex, Williston	Multimodal Roadway Improvements	Signal Upgrades on VT2A and VT15	See Line 56	Short
132	Williston	Park and Ride	Park and Ride South of I-89	$1,400,000	Short
133	Williston	Bike & Pedestrian	VT2A Infill Sidewalks	$86,083	Short
	Capital Program - Development & Evaluation and On CCRPC TIP				
134	Williston	Multimodal Roadway Improvements	Exit 12 Stage 1 - Shared Use Path and VT2A lane, Marshall to I-89 - CIRC ALT PHASE III	$2,000,000	Medium
135	Williston	Multimodal Roadway Improvements	Exit 12 Stage 2 - New Grid Streets and VT2A Intersection - CIRC ALT PHASE III	$9,300,000	Medium
136	Williston	Multimodal Roadway Improvements	Exit 12 Stage 3 - Diverging Diamond Interchange - CIRC ALT PHASE III	$22,900,000	Medium
137	Williston	Multimodal Roadway Improvements	Exit 12 Stage 4 - VT2A Boulevard - CIRC ALT PHASE III	$11,400,000	Long

Draft MTP Project List By Municipality & VTrans Capital Program Status
2017 - 2050
December 18, 2017

	Municipality	Project Type	Project	Estimated Project Cost Seeking Federal Participation (includes required state+local match. Excludes funds spent prior to 10/1/16)	Time Frame (Short - 2025, Medium 2025-2035, Long 2035-2050)
	Capital Program - Candidate List				
138	Williston	Multimodal Roadway Improvements	Mountain View Road Multimodal Improvements: Old Stage Road to VT2A - CIRC ALT PHASE III	$3,853,000	Long
139	Williston	Bike & Pedestrian	US2 - Taft Corners to Williston Village - Shared Use Path - CIRC ALT PHASE III	$2,900,000	Medium
140	Williston	Park and Ride	Taft Corners Park & Ride	$255,000	Long
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
141	South Burlington / Williston	Bike & Pedestrian	Shared Use Path Connection over Muddy Brook	See Line 114	Medium
142	Williston	Multimodal Roadway Improvements	US2/North Williston Road/Oak Hill Road Intersection	$989,000	Long
143	Williston	Bike & Pedestrian	Industrial Avenue Sidewalks	$421,600	Long
	Winooski				
	Capital Program - Front of the Book and On CCRPC TIP				
144	Winooski	Bike & Pedestrian	Gateways Crosswalk Enhancements	$360,580	Short
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
145	Winooski	Bike & Pedestrian	Riverwalk East- Access to Casavant Park	$1,800,000	Long
146	Burlington / Winooski	Bike & Pedestrian	Bike/Ped Bridge Crossing of the Winooski River in the vicinity of the "Blue Bridge"	See Line 11	Long
147	Winooski / Burlington	Bike & Pedestrian	Winooski River Bicycle/Pedestrian Bridge	See Line 12	Medium
148	Winooski	Multimodal Roadway Improvements	Main Street (US7) Revitalization - Transportation, Utility, Stormwater	Further planning needed	Medium
149	Winooski, Colchester	Multimodal Roadway Improvements	Intelligent Transportation System Improvements - Signal and Communications - US7	See Line 53	Medium
	Regional Stormwater				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
150	Regional	Stormwater	Regional Stormwater Projects	$16,000,000	Ongoing
	Regional Sidewalks				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
151	Regional	Bike & Pedestrian	Sidewalks/Paths In Areas Planned for Growth	$2,000,000	Ongoing
	Regional Transit				
	On CCRPC TIP				
152	Regional	Transit	Burlington-Montpelier Inter-Regional Bus Service	$152,166	
153	Regional	Transit	Burlington-Waterbury Inter-Regional Bus Service	$341,031	
154	Regional	Transit	Essex Evening	$186,869	
155	Regional	Transit	Hinesburg Route	$348,646	
156	Regional	Transit	Jeffersonville Commuter (CMAQ funding ending in FY18)	$172,000	

Draft MTP Project List By Municipality & VTrans Capital Program Status
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	Municipality	Project Type	Project	Estimated Project Cost Seeking Federal Participation (includes required state+local match. Excludes funds spent prior to 10/1/16)	Time Frame (Short - 2025, Medium 2025-2035, Long 2035-2050)
157	Regional	Transit	Milton Route	$880,958	
158	Regional	Transit	Milton/Colchester to Burlington (CMAQ funding ends in FY18)	$59,676	
159	Regional	Transit	North Avenue Increased Peak Frequencies (CMAQ funding begins in FY20)	$690,000	
160	Regional	Transit	US2 Corridor	$3,834,722	
161	Regional	Transit	Williston Mid-Day (CMAQ funding ends in FY18)	$30,670	
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
162	Regional	Transit	Transit Capital	$40,000,000	
	Regional Rail				
	Need Identified in a Scoping or Planning Study, Not in Capital Program or on TIP				
163	Regional Rail	Rail	Burlington Rail Platform Upgrades - $750,000	TIGER Funding	
164	Regional Rail	Rail	Essex Junction Train Station Upgrades - $3,000,000	$3,000,000	
165	Regional Rail	Rail	Bring all Tracks in Chittenden County to Class 4 standard - $67,000,000	FTA or FRA	
166	Regional Rail	Rail	Freight Improvements to bridges, sidings, railyards, crossings and clearance - $10,000,000	FTA or FRA	
167	Regional Rail	Rail	Essex Junction to Burlington 286 Rail Upgrade - $15,000,000	FTA or FRA	
			Total Cost of All Projects	**$523,582,625**	
			TIP/Capital Program Front of the Book Projects	**$102,747,675**	
			Costs Excluding TIP Projects	**$420,834,950**	
			Estimated Funds Available	**$420,669,379**	
			Excess Project Cost	**-$165,571**	

Environmental Consultation and Mitigation

INTRODUCTION

The construction and operations of any transportation infrastructure, facilities or services, while enhancing economic and social well-being, can also contribute to environmental degradation and cultural resource loss. Such impacts from transportation are not always clear however. They can be direct or indirect and can accumulate over time. They also have impacts at different geographic (local to global) and temporal (momentary to many years) scales. The chart below provides a broad overview from the causes behind transportation activities through consequent environmental and societal impacts. For our purposes in this regional level report we focus on the impacts from the infrastructure and travel activities – those that our planning can clearly influence.

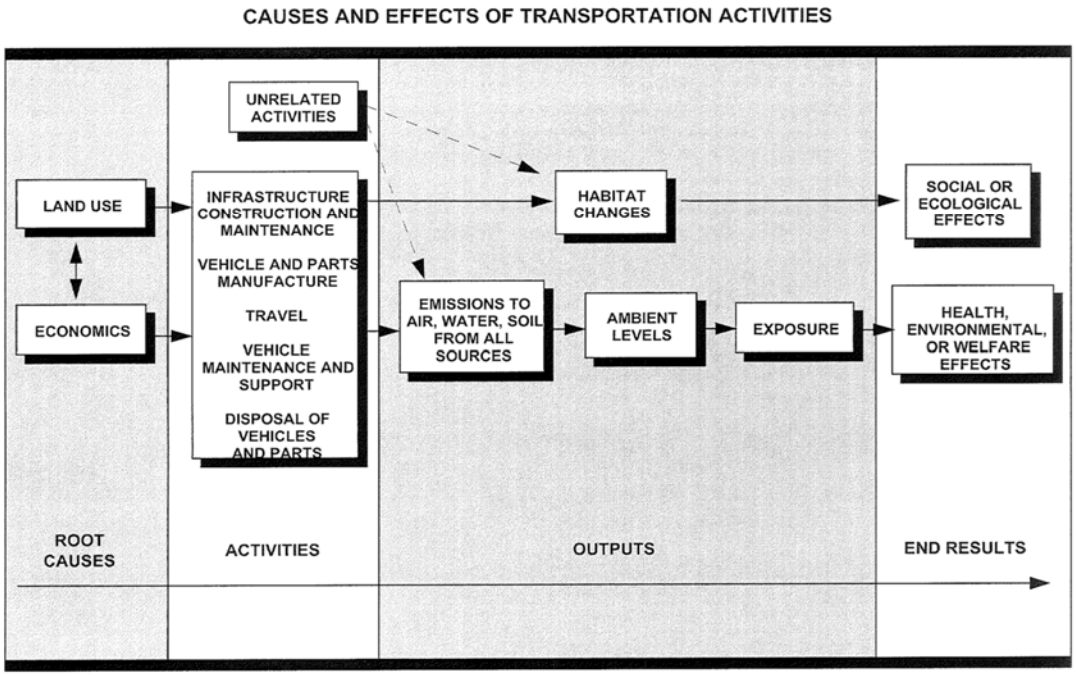

FIGURE 1 - INDICATORS OF THE ENVIRONMENTAL IMPACTS OF TRANSPORTATION, 1996

Source: EPA

A federal requirement for the MTP calls for a consultation process with groups that represent environmental and cultural resource constituencies and that the MTP also identify mitigation strategies for those planned projects or services that could impact those resources.

As noted previously, a significant thrust of this MTP is to 1) focus first on system preservation and maintenance, 2) focus less on system expansion and 3) turn more to alternative modes (walking, biking and transit) and to programs that improve the existing system's efficiency -(Transportation Demand Management – TDM and Intelligent Transportation Systems (ITS)).

CONSULTATION BACKGROUND

The CCRPC began its first environmental consultation process while updating the previous MTP in May 2009. A comprehensive list of natural resource related interest groups and government agencies was assembled, and their representatives invited to a meeting to inform/educate these groups on transportation plans and the CCRPC's responsibilities regarding environmental mitigation. RPC staff explained the federal guidelines requiring input from resource agencies, gave background information on CCRPC responsibilities, and presented the strategy areas from the previous MTP. Staff also explained that it was likely that many recommendations in the updated MTP could mirror those from previous plans.

In November 2017, staff repeated this process, inviting representatives from resource agencies to a consultation meeting to discuss potential resource impacts from the MTP update. The presentation included an overview of MTP content as well as development process. The draft chapters were also presented, and the following synopsis of its recommendations offered:

- Maintenance first – keep what's been invested in in acceptable operational condition
- Transit enhancements – more buses, more often, every day on all routes
- Intelligent Transportation System (ITS) Investments – employ computing and communications technologies to improve the existing systems efficiency, such as signal system upgrades
- Active transportation – more safe walking and biking facilities, especially in areas planned for growth
- I-89 improvements – three lanes between Exits 14 and 15 and possible interchange expansions
- Select roadway improvements to address localized congestion and safety issues – various locations around the County
- Concentrating land use development – continue the trend of up to 90% of all new housing growth in areas planned for growth.

Staff also described the financial element and briefly explained the regulations on resource consultation and mitigation. The 2013 ECOS Plan's environmental impact table was shown where each recommended project was identified along with its potential resource impacts. The comparison was done using CCRPC's GIS map viewer: http://map.ccrpcvt.org/ChittendenCountyVT/ A list of potential mitigation strategies from the last plan was also shown and discussed.

For this update the project specific approach was not used but rather a broader discussion of how MTP policies, programs and strategies will address the consultation and mitigation requirements

THE ECOS IMPACT IN DEVELOPING TRANSPORTATION STRATEGY

The thrust of the ECOS project, which our last MTP was a component of, was to look at transportation more comprehensively than before and with the intent to move transportation priorities in a more sustainable direction. The broad ECOS goal under which transportation was included states: *Make public and private investments in the built environment to minimize environmental impact, maximize financial efficiency, optimize social equity and benefits, and improve public health.*

As a result, the ECOS project pushed our recommendations further in a non- traditional direction. There's now a shift in project and strategy recommendations toward more alternative modes and efficiency program projects – and away from facility expansion. That shift is reflected in the financial plan's apportionment of funding assigned to these categories.

ENVIRONMENTAL MITIGATION

The MTP recommends a series of specific projects, and more broadly transportation strategies, to meet current and projected future transportation demand. These recommendations are designed to provide a safe system meeting the public's needs, while limiting any negative environmental and cultural impacts and thus more closely reflecting the overall values expressed in ECOS. Some impacts however may be unavoidable. The focus of this section is to highlight potential impacts in order to minimize the potential negative consequences when projects move to implementation.

Mitigating the environmental and cultural resource impacts of transportation projects and strategies covers a spectrum of possible actions. For example, mitigation can mean any of the following:

- Avoiding impacts altogether
- Minimizing impacts by limiting the extent of the action
- Repairing the impact through a restoration or rehabilitation process
- Reducing impacts through on-going preservation and maintenance operations
- Compensating for the impact by replacing or providing a substitute resource

Whichever option above is used, the intent is the same: Restore, enhance or preserve natural resources in order to compensate for the resource impacts, and to ensure ecosystems remain sustainable and productive into the future.

It should be noted that few of the MTP's recommendations appear to have significant environmental impacts that are place specific or, for that matter, harm the environment. In fact, some will likely make positive environmental contributions. For instance, the transit system improvements recommended would see more buses that should reduce the growing number of passenger cars and thereby reduce negative air quality impacts. These public transportation systems will use current roads, and therefore not impact natural resources through expansion projects outside existing rights-of-way. Similarly, the TDM and ITS projects are designed to postpone infrastructure expansion projects by facilitating the shift of people into alternative transport modes and making more efficient use of the transportation infrastructure already in place. This should reduce the growth in vehicle miles traveled with consequent air quality benefits.

Other MTP project recommendations will more clearly impact our natural environment and cultural resources, and some in negative ways should we fail to recognize them and identify appropriate mitigation strategies. The method to identify natural and cultural resource impacts is by employing the map viewer described earlier: CCRPC's Geographic Information Systems (GIS) resources inventory maps which can then be overlain with the recommended MTP transportation system projects. A series of natural and cultural resources data layers, including:

- rare plant and animal communities,
- natural areas, parks and other conserved lands,
- floodplains, wetlands,
- streams, deer wintering areas, historic sites/buildings, and
- historic districts

can be displayed over the locations of MTP projects. Transportation project locations that reveal potential resource conflicts can thus be identified. Other resources such as steep slopes, impaired watersheds, contaminated sites, and agricultural soils can also be considered in reviews.

The online mapping tool at the CCRPC, which includes the appropriate natural and cultural resource data layers, can reveal the potential impacts in considerable detail. These maps can be viewed at relatively large scales to more precisely detail the impacts and interested readers are encouraged to use this tool for their own analysis. (Again, see: http://map.ccrpcvt.org/ChittendenCountyVT/

While the MTP can point out some of the transportation/resource conflicts early on, defining more specifically what those impacts are will be part of the project development process and the permitting systems that go with that process – Phases that come after the MTP's identification of project recommendations. This would involve the National Environmental Policy Act (NEPA), the Federal Advisory Council on Historic Preservation's Section 106, FHWA's Section 4(F), and possibly Vermont's Act 250. In these regulatory proceedings the precise mitigation strategy, if needed, will be defined. Environmental reviews and permitting begin in the project definition phase of the VTrans project development process. For more detail on this process see: http://vtrans.vermont.gov/sites/aot/files/highway/documents/publications/ProjectDefinitionProcessGuidebook2017.pdf

In looking further down the planning road and the beginning phases of project implementation, project planners will need to start thinking about mitigating environmental and cultural resource impacts. Identifying the impacts is the first step in the mitigation process. The table below identifies the organizations that need to be involved in the respective resource issues and identifies possible mitigation strategies and locations. Through project definition and the project development phases beyond, these parties and activities will become more prominent.

Possible Mitigation Strategies

Resource	*Regulatory and Information Contacts*	*Mitigation Activities*	*Mitigation Areas*
Cultural and Historic Resources	VTrans Historic Preservation and Archeology Officers, VT Agency of Commerce and Community Development Historic Preservation Office	Avoid or minimize impacts; appropriate landscaping; excavation for archeological sensitive areas; project design exceptions; environmental compliance monitoring	Preserve in place; on-site landscaping; on-site mitigation of archeological impacts
Water Resources, Wetlands, Rivers and Floodplains	VT Agency of Natural Resources: Dept. of Environmental Conservation Watershed Management Division, Dept. of Fish and Wildlife. US Army Corps of Engineers, US Fish and Wildlife Service, US EPA's Green Infrastructure Collaborative, Lake Champlain Basin Program, Winooski Valley Park District	Mitigation sequence: avoid, minimize, compensate (could include preservation, creation, restoration, riparian buffers); design exceptions; environmental compliance monitoring; floodplain management for eligible activities; stormwater system retrofits; application of Green Stormwater Infrastructure; low-cost, low-tech infiltration improvements	On site to the extent possible/appropriate; off-site through mitigation banking program as permitting requires
Parks/Recreation Areas	VT Agency of Natural Resources Dept. of Parks and Recreation, Winooski Valley Park District, Municipal Parks and Recreation departments	Avoidance, minimization, mitigation; design exceptions; environmental compliance monitoring	On site screening or facility replacement; offsite replacement adjacent to existing
Conserved Lands/Natural Areas	Winooski Valley Park District, Nature Conservancy, Vermont Land Trust, Municipal Land Trusts, Dept. of Fish and Wildlife Natural Heritage Program	Avoidance, minimization; any replacement to be of equal value and of equivalent usefulness; design exceptions; environmental compliance monitoring	Landscaping within existing rights-of-way; replacement property to be contiguous
Endangered Plants or Animals	VT Agency of Natural Resources: Dept. of Environmental Conservation, Dept. of Fish and Wildlife Natural Heritage Program	Avoidance, minimization; time of year restrictions, construction sequencing/timing; design exceptions; environmental compliance monitoring	Species relocation to suitable habitat adjacent to project limits
Air Quality	VT Agency of Natural Resources Air Quality Division, Vermont Climate Collaborative, Vermont Energy Investment Corporation, VTrans Policy and Planning Division	Transportation Demand Management programs; ITS projects; No Idling ordinances	Throughout the region

The MTP's primary focus, as has been previously noted, is to maintain and preserve the transportation infrastructure and services already in place – and as recommended, three quarters of all future funding will go to that purpose. With the limited amount of anticipated funding available for new projects, and a higher proportion of that funding going to transportation alternatives – transit, walk/bike, TDM ITS – roadway expansion projects are relatively few and those projects should mostly be confined to existing roadway rights-of-way. This will result in fewer and less significant environmental and cultural impacts from the proposed projects. Nonetheless, impacts however small may occur and the purpose of this report is to make us aware of these as early as possible.