Exit 16 DDI
Diverging Diamond Interchange

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FINAL

COLCHESTER HES 5600(14) TRANSPORTATION MANAGEMENT PLAN

1.7.2020

PREPARED FOR:
VERMONT AGENCY OF TRANSPORTATION

SUBMITTED BY:
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AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway Transportation Officials
ATMS	Advanced Traffic Monitoring System
CCRPC	Chittenden County Regional Planning Commission
CCV	Community College of Vermont
DDI	Diverging Diamond Interchange
GMT	Green Mountain Transit
LED	Light-Emitting Diode
MM	Mile Marker
MUTCD	Manual on Uniform Traffic Control Devices
NB	Northbound
NCHRP	National Cooperative Highway Research Program
OBDS	Official Business Directory Signs
PAC	Primary Area of Concern
PCMS	Portable Changeable Message Sign
PIO	Public Information Officer
PIP	Public Involvement Plan
RE	Resident Engineer
RWIS	Roadway Weather Information System
SB	Southbound
SWZ	Smart Work Zone
TCP	Traffic Control Plan
TMP	Transportation Management Plan
TTC	Temporary Traffic Control
TTCD	Temporary Traffic Control Device
UTO	Uniformed Traffic Officer
UVM	University of Vermont
VTrans	Vermont Agency of Transportation

EXECUTIVE SUMMARY

This Transportation Management Plan (TMP) includes guidance to assist in the safe and efficient movement of people, goods, and services in and around the Interstate 89 (I-89) Exit 16 Diverging Diamond Interchange (DDI) Construction Project, project number Colchester HES 5600(14). The TMP documents the existing transportation system, potential impacts due to construction activities, work zone management strategies, and performance measures to monitor and document the effectiveness of transportation management during construction.

This TMP assists the contractor in developing a construction phasing and activity schedule. The contractor shall use this document to determine acceptable transportation impacts and monitoring requirements. However, it is the responsibility of the contractor to prepare a daily traffic control plan (TCP) to include construction activities and durations, work zone and presence lighting as necessary, deployment of temporary traffic control devices (TTCDs), flaggers, and uniformed traffic operators (UTOs), modifications to existing traffic control devices, and other relevant items. The contractor should maintain a historical log of the daily TCPs and implemented transportation management strategies and implementation activities.

The TMP will assist the Vermont Agency of Transportation (VTrans) and adjacent stakeholders to understand the existing transportation system; clarify their role in monitoring, documentation, and communication; and ensure appropriate actions are taken by the contractor in the case of failure to meet the performance measures or other requirements of this TMP.

TRANSPORTATION MANAGEMENT PLAN SUMMARY

Construction is expected over two warm-weather construction seasons, or approximately 18 months. The TMP identifies the primary temporary traffic control (TTC) strategies, devices, and operational coordination during this construction period (Table 1).

TABLE 1: PRIMARY CONTROL STRATEGIES

PRIMARY CONTROL STRATEGIES	
Night Construction	From South Park Drive to a point approximately 500 feet north of Mountain View Drive, construction that impacts traffic should only occur during night hours (8:00 p.m. to 6:00 a.m.). Outside of this area, construction may proceed during daytime hours. All lanes should remain fully open and unrestricted from 6:00 a.m. to 8:00 p.m. unless otherwise noted.
Lane Reductions During Active Construction	During active construction, one lane must remain open in each direction at all times; the lane must be wide enough to accommodate bicycles and pedestrians, even if dedicated alternative infrastructure (sidewalk

	or shared-use path) is provided. Delay as a result of lane closures should not exceed 110% of the existing peak hour delay as documented in Section 8 of the TMP.
Construction Phasing	The contractor is expected to phase construction activities to minimize impacts; bicycle and pedestrian paths should be constructed early to remove nonmotorized traffic from the roadway; traffic crossover should be scheduled to minimize disruption, etc.

TABLE 2: PRIMARY CONTROL DEVICES

PRIMARY CONTROL DEVICES	
Lighting for Night Work	Nighttime work zones shall be lit in accordance with National Cooperative Highway Research Program (NCHRP) Report 476, including enhanced lighting for intersections. A lighting plan should be prepared in conjunction with and support of the daily TCP whenever night work zones are deployed.
High Visibility/Retroreflectivity	In accordance with NCHRP 476, all traffic control devices shall be retroreflective in accordance with applicable standards; site personnel shall wear high-visibility apparel. Workers must be recognized as workers over the entire range of motions and positions.
Channelizing Devices	High-visibility drums and cones.
Visual Barrier	If needed, to prevent rubbernecking at critical locations during unavoidable daytime construction activities, particularly under existing highway bridges.
Standard Application of Devices	TTC devices shall be deployed per state and federal standards in accordance with the MUTCD and other applicable documents.
Uniformed Traffic Officers	Uniformed Traffic Officers (UTOs) should be deployed to warn approaching motorists of the construction site and at signalized intersections when signals are off or in flash mode during construction activities.
Smart Work Zone (SWZ) Applications	Real-time traffic data should inform deployment of TTC devices, including queue detection and advanced warning signs.

TABLE 3: PRIMARY TRANSPORTATION OPERATIONAL COORDINATION

PRIMARY TRANSPORTATION OPERATIONAL COORDINATION	
SWZ Infrastructure	SWZ infrastructure should include queue detection on I-89 off-ramps; Bluetooth travel time monitoring; connected portable changeable

	message signs (PCMS), static signs with beacon, and online data portals.
Traffic Signal Modifications	Traffic signals within and nearby the construction site should be modified to accommodate changing traffic patterns throughout construction; may be disabled or set to flash mode during construction.
Enhanced Enforcement	UTOs are required to direct traffic at signalized intersections that are either in red flash mode or turned off and where there are multiple lanes. UTOs should be positioned as noted in the contractor's daily TCP and at the discretion of the engineer.

Additional discussion on TTC strategies and measures are documented in Section 7.0.

PUBLIC INFORMATION AND OUTREACH SUMMARY

VTrans has assigned WSP as the Public Information Officer (PIO) for the duration of the Exit 16 DDI reconstruction project. The PIO is charged with providing project information to the public prior to and during construction of the project. Their primary duties should include the following:

- Curating a webpage/project email/social media presence/updates to 511vt.
- Maintaining construction site webcams.
- Preparing and distributing press releases.
- Updating the public through regular meetings and outreach.
- Distributing information to nearby employers and retailers.

Section 7.0 summarizes additional public outreach strategies. The full Public Outreach Plan can be found on the project website (http://www.exit16ddi.vtransprojects.vermont.gov/) and as Appendix 5 to this TMP.

TRANSPORTATION MANAGEMENT PLAN MONITORING

Performance measures ensure the safe and efficient movement of people, goods, and services through the construction project; Table 4 defines these measures.

TABLE 4: PERFORMANCE MEASURES

PERFORMANCE MEASURES	
Average Travel Time	Travel time should be monitored in real time along six travel routes documented in Section 8.0 using Bluetooth detection and an online portal for review; software should be compatible with PCMS and other SWZ applications; coordinate with regional ATMS system, as appropriate.
Queues	Queues should be monitored to avoid impacts to free-flow travel conditions on I-89 and spillback to the Winooski Circulator or the Severance Corners intersection.

Crash Frequency	The crash rate during construction should not exceed 110% of the current crash rate; all crashes should be reviewed within 24 hours.
Surface Condition	The travel surface conditions should be maintained to an acceptable condition as documented in Section 8.0.
Regional Intersection Congestion	AOT Traffic Signals Operations staff should periodically observe and adjust regional traffic signals (identified in Section 8.0) throughout construction to mitigate changes to regional traffic patterns.

TRANSPORTATION MANAGEMENT PLAN REPORTING

Reporting should be completed to ensure compliance with the intent of the TMP. Reporting may include the following: daily contractor TTC and contingency plans; daily resident engineer (RE) TMP monitoring; and incident summaries/reviews with the contractor, RE, and VTrans Construction Occupation Safety Technician.

1.0 INTRODUCTION

1.1 PURPOSE OF TRANSPORTATION MANAGEMENT PLAN

A significant interchange reconfiguration at Exit 16 on I-89 in Colchester, Vermont, is proposed by VTrans. Set to begin construction in 2020, this project should ensure the safety of construction workers and the traveling public; maintain optimal efficiency of the transportation network upstream, downstream, and through the construction site; and support efficiency of the construction process itself. This TMP establishes a set of coordinated transportation management strategies, and it describes how they would be used to manage the work zone impacts of the Exit 16 DDI construction project. Transportation management strategies for a work zone can include temporary traffic control (TTC) measures and devices, public information and outreach, and operational strategies such as detours, travel demand management, signal retiming, and traffic incident management.

GOALS OF THE TRANSPORTATION MANAGEMENT PLAN

The TMP encompasses the following goals:

- Address the broader safety and minimize mobility impacts of work zones.
- Inform construction phasing and staging of the project to minimize construction duration and cost.
- Provide clear guidance on acceptable traffic performance measures.
- Ensure all parties agree on safe work zone practices.
- Provide project leaders with resources to prevent and manage emergencies.
- Guide public awareness of the construction and its effects on the transportation network.
- Define ways to minimize impacts to local communities and businesses.
- Define the roles of the parties in various aspects of the construction process.
- Coordinate communication between each party.

1.2 TRANSPORTATION MANAGEMENT PLAN AREAS OF INTEREST

The proposed construction will be located at the I-89 Exit 16 interchange in Colchester, Vermont. At this interchange, I-89 crosses over US Routes 2 and 7/Main Street. The nearest exits on I-89 are Exit 15, a partial diamond interchange with only northbound (NB) off-ramps and southbound (SB) on-ramps approximately 1.3 miles to the south, and Exit 17, a full interchange approximately 6.5 miles to the north.

Three areas of interest along US-2/7 and I-89 related to construction of the DDI have been identified as follows:

1. **Immediate Construction Area**: US-2/7 between Tigan Street in Winooski and Rathe Road in Colchester.

2. **Primary Area of Concern (PAC) (most constrained/highest traffic volume)**: US-2/7 between South Park Drive through Mountain View Drive.
3. **Regional Traffic Diversion Road Network**: I-89 between Exit 14 (2.75 miles to the south in South Burlington) and Exit 17. This network includes VT 15, VT 2A, Mallets Bay Avenue, Susie Wilson Road, and Blakely Road.

These areas are shown in Figure 1.

FIGURE 1: PROJECT AREA WITH RESPECT TO REGIONAL ROAD NETWORK

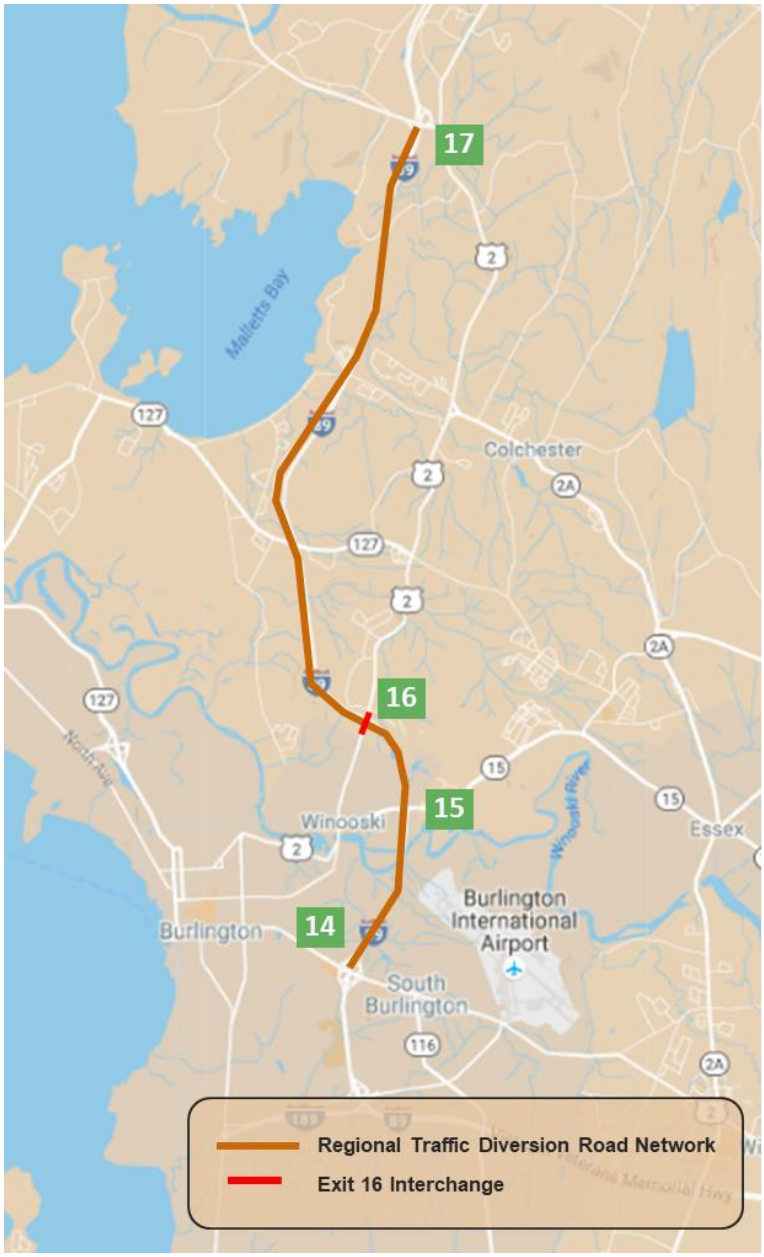
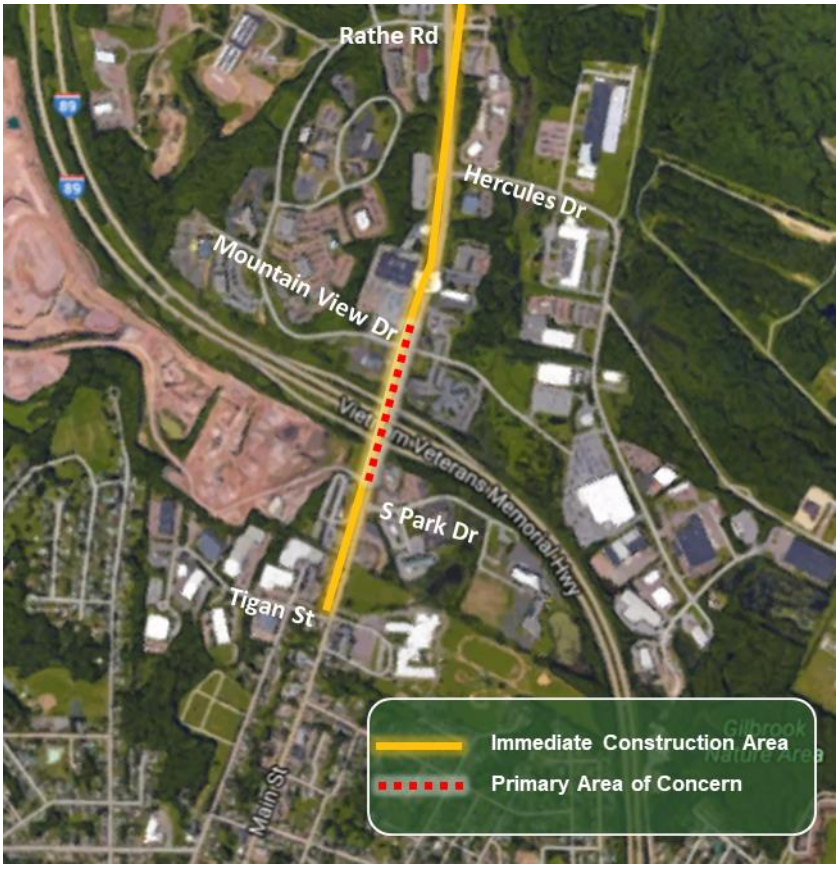


FIGURE 2: EXIT 16 DDI IMMEDIATE CONSTRUCTION AREA AND PAC



1.3 TRANSPORTATION MANAGEMENT PLAN ORGANIZATION

This TMP is organized into the following sections:

- Introduction: The current section; introduces the objectives of the TMP.
- TMP Roles and Responsibilities: Identifies key stakeholders, project partners, and other nearby projects that may affect traffic flows.
- Project Description and Background: Describes the proposed project and nuances of the project area; identifies neighboring land uses and predominant traffic flows; provides site-specific project information.
- Construction Considerations: Documents the existing traffic conditions and anticipated construction challenges.
- Construction Phasing: Identifies significant construction activities and the projected phasing. This section will be coordinated with the contractor prior to and during construction.
- Work Zone Impacts Assessment: Identifies impacts to properties, land uses, and travelers through and near the project area.
- Work Zone Impact Management Strategies: Develops a series of strategies for mitigating transportation impacts through construction; identifies potential TTC

applications; recommends outreach opportunities to manage demand during construction.

- TMP Monitoring: Documents the TMP monitoring requirements and methodology and identifies criteria for acceptable traffic and transportation maintenance during construction.
- Estimated Implementation Quantities: Provides a draft schedule of quantities associated with implementing and maintaining the TMP during construction; actual quantities will vary based on the contractor's application of traffic control.

1.4 TRANSPORTATION MANAGEMENT PLAN EVOLUTION

The TMP is intended to be a "living document" that will be updated and refined throughout the course of the project. This will allow the TMP to remain current and useful to all parties throughout the project's development. The contractor, RE, VTrans, and other key stakeholders will update and refine the document to best achieve the goals outlined herein.

2.0 TMP ROLES AND RESPONSIBILITIES

Table 5 identifies likely roles to implement the TMP. This table will be modified throughout the project. The TMP Manager will coordinate the diverse stakeholder groups.

TABLE 5: TMP ROLES AND RESPONSIBILITIES

TEAM MEMBER	CONTACT INFORMATION	ROLE/RESPONSIBILITY
Design Project Manager	Michael LaCroix michael.lacroix@vermont.gov (802) 371-9528	Overall project development and implementation
TMP Manager	VTrans: Consultant: Corey Mack corey.mack@rsginc.com (802) 861-0513	Development and implementation of the TMP
Public Relations/Information Officer	WSP USA Inc. Megan Savage, Public Outreach Project Manager Annabelle Dally, Public Outreach Coordinator Project Hotline: (802) 595-4399	Public and institutional outreach, construction updates, traffic alerts
VTrans District 5 Transportation Administrator	David Blackmore David.Blackmore@vermont.gov (802) 655-1580	
VTrans Regional Construction Engineer	Doug Bonneau Northwest Regional Construction Engineer douglas.bonneau@vermont.gov (802) 522-6096	
VTrans Regional Administrative Services Technician	Donna Ginnett (802) 654-0726	
VTrans Regional Technician	Dave Hosking (802) 654-0792	
VTrans Construction Occupation Safety Technician	Robert Dabrowski Robert.Dabrowski@vermont.gov (802) 989-9363	

TEAM MEMBER	CONTACT INFORMATION	ROLE/RESPONSIBILITY
VTrans District 5 Garage	5 Barnes Avenue, Colchester (802) 654-1725	
Vermont Division of Emergency Management and Homeland Security	Erica Borneman, Director erica.bornemann@vermont.gov (800) 347-0488 Haz. Mat. Hotline: (800) 641-5005	Emergency Response—Situational Awareness
Vermont ANR DEC Waste Management and Prevention	Charles Schwer, Director chuck.schwer@vermont.gov (802) 249-5324 Haz. Mat. Hotline: (800) 641-5005	
Vermont State Police—Williston Barracks	Lieutenant Garry Scott Williston Station Commander (802) 878-7111	Emergency Response
Colchester Town Manager	Aaron Frank afrank@colchestervt.gov (802) 264-5509	
Colchester Director of Public Works	Bryan Osborne bosborne@colchestervt.gov (802) 264-5625	
Colchester Police Department	Doug Allen Chief of Police info@colchesterpdvt.prg (802) 264-5555	Emergency Response
Colchester Center Volunteer Fire Fighters' Association	Michael Chmielewski Fire Chief chiefccvfc@gmail.com Nonemergency: (802) 878-8961	Emergency Response
Colchester Rescue Squad	Scott Crady Rescue Chief scrady@colchestervt.gov Nonemergency: (802) 264-5590	Emergency Response
Colchester Director of Economic Development	Kathi O'Reilly koreilly@colchestervt.gov (802) 264-5508	

TEAM MEMBER	CONTACT INFORMATION	ROLE/RESPONSIBILITY
Winooski Town Manager	Jessie Baker City Manager jbaker@winooskivt.gov (802) 655-6410, ext. 23	
Winooski Director of Public Works	Jon Rasucher Public Works Director jrauscher@winooskivt.gov (802) 655-6410, ext. 18	
Winooski Police Department	Rick Hebert Chief of Police rhebert@winooskipolice.com	Emergency Response
Winooski Fire Department	John Audy Fire Chief jaudy@winooskivt.gov (802) 373-7891	Emergency Response
Winooski Community and Economic Development Office	Heather Carrington hcarrington@winooskivt.gov (802) 655 6410, ext. 20	
Green Mountain Transit	Jon Moore Director of Maintenance and Planning jmoore@ridegmt.com (802) 540-2527	Transit Operator
Green Mountain Power	Scott Fraser fraser@gmpvt.com (802) 655-8511 (office) (802) 355-1970 (mobile)	Utility—Electric
Comcast		Utility—Telecom
Consolidated Communications		Utility—Telecom
Vermont Gas		Utility—Natural Gas

TEAM MEMBER	CONTACT INFORMATION	ROLE/RESPONSIBILITY
Champlain Water District	Andy Legg andrew.legg@champlainwater.org (802) 864-7454, ext. 4813	Utility—Public Water
Spillane's Service Center	(802) 863-7900	Towing Service 1
R.R. Charlebois	(802) 655-5040	Heavy-Duty Towing Services 1
		Towing Service 2
		Heavy-Duty Towing Services 2
Contractor		
Contractor's Construction Superintendent		
Contractor's Competent Person		
Contractor's Safety Officer		

3.0 PROJECT DESCRIPTION AND BACKGROUND

3.1 PROJECT DEVELOPMENTAL HISTORY

The Town of Colchester first initiated a review of the Exit 16 interchange on I-89 after decades of regional land-use development and traffic volume growth. With the potential for more regional growth, a reconstruction plan became necessary to address concerns of significant congestion at the interchange.

RSG and the Chittenden County Regional Planning Commission (CCRPC) completed a circulation study of the project corridor in July 2009. The alternatives it proposed included adding new approach lanes, retiming signals, and adding exclusive right- and left-turn lanes. The study did not consider alternatives that would involve substantial impacts or construction costs.

A scoping study completed in December 2011 considered more substantial design alternatives. In addition to a "conventional alternative" (a refined alternative from the circulation study), a double crossover diamond (DCD)—now referred to as a DDI—and a roundabout were proposed. The DDI was selected as the preferred alternative; in terms of capacity, congestion, and safety, it was found to perform substantially better than the other alternatives at Exit 16, and it allowed the existing I-89 NB and SB overpass bridges to remain. This alternative also includes improvements at intersections south to Tigan Street in Winooski and north to Rathe Road in Colchester.

3.2 PROJECT DESCRIPTION

The existing I-89 Exit 16 interchange is a traditional "tight diamond" interchange, consisting of two signalized intersections: one at the NB ramps and one at the SB ramps. A DDI is a unique design that results in vehicles driving on the opposite side of the travel way in the middle of the interchange between the ramp entrances and exits (under the freeway in this case at Exit 16); they reach this position by way of a "crossover" at a signalized intersection. Two signalized intersections are typically part of a DDI; however, the Exit 16 DDI signalizes some ramp approaches for pedestrian access. Figure 3 is a schematic of traffic flow in a DDI, and Figure 4 shows the conceptual plan for the DDI at Exit 16.

In addition to the highway reconfiguration, the project proposes widened on-ramps and off-ramps to accommodate the new design, improved stormwater treatment, construction of new retaining walls, new sidewalks, replacement of a primary water line, necessary ledge removal and rock blasting, and associated construction activities. The entire project is estimated to require 18 months of construction. Potential construction sequencing and phasing is discussed in Section 5.0 and in greater detail in Appendix 3.

FIGURE 3: DDI DIAGRAM (FLORIDA DOT) (FOR REFERENCE ONLY, REFER TO DESIGN PLANS FOR CURRENT HIGHWAY LAYOUT)

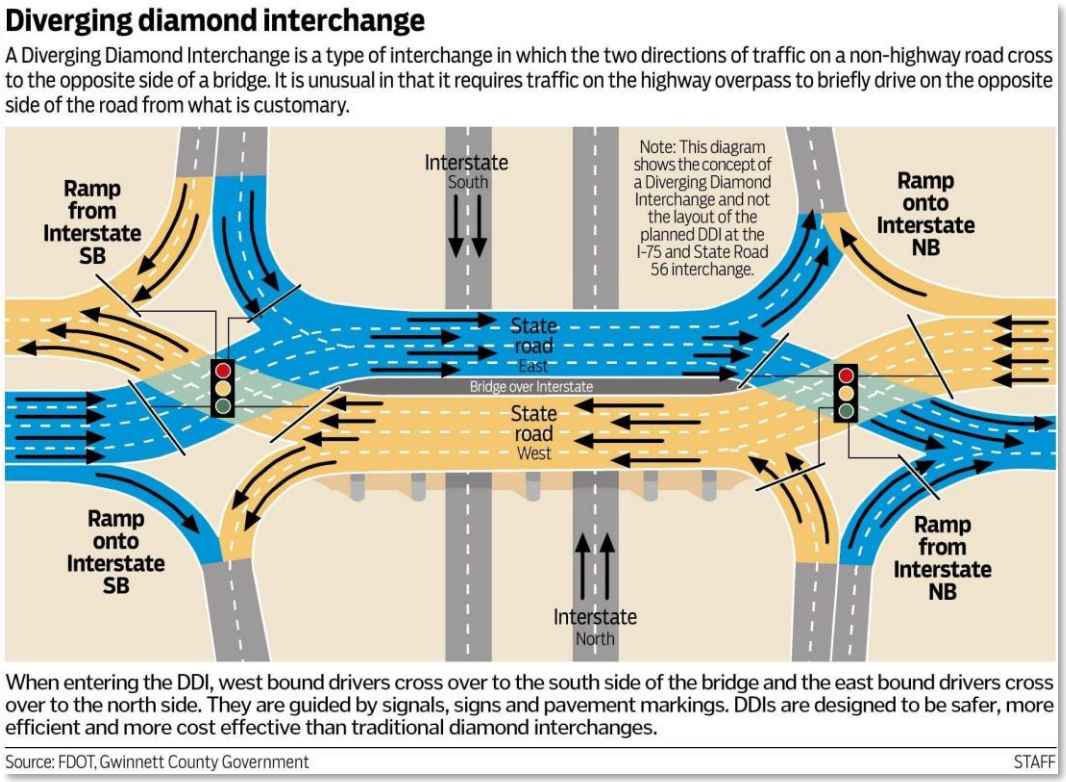
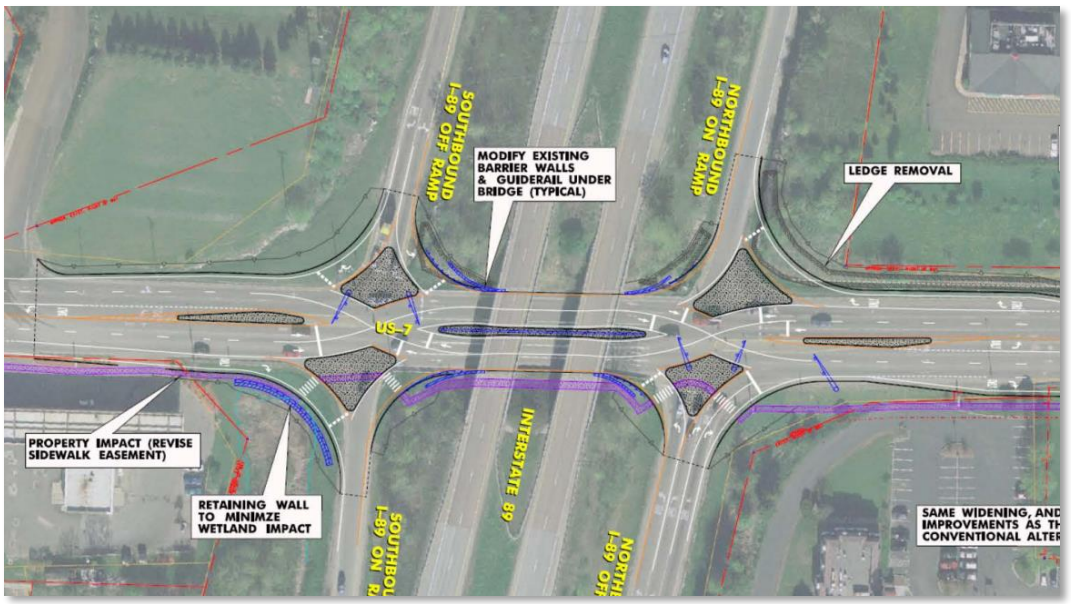


FIGURE 4: CONCEPTUAL DDI DESIGN AT EXIT 16 (FOR REFERENCE ONLY, REFER TO DESIGN PLANS FOR CURRENT HIGHWAY LAYOUT)



3.3 OPERATIONAL CONDITIONS

This TMP incorporates several analyses on construction phasing and vehicular traffic conditions within the project area and within the PAC. The February 2017 technical memorandum[1] on construction scenario modeling, prepared by RSG as supporting documentation and included as Appendix 4, outlined several conditions and operating assumptions used throughout the development of this TMP.

These general assumptions include the following:

- Construction in the PAC will take place at night unless otherwise noted.
- All lanes of traffic should be fully open from 6:00 a.m. to 8:00 p.m. unless otherwise noted.
- A winter shutdown period is expected from November 15 through April 15. During this winter shutdown period, the roadway should be restored to the fully functioning, six-lane, traditional traffic pattern and should have a consistent, paved surface and highly visible pavement markings.
- Max noise at adjacent properties should be 80 dB; drilling for explosive charges or nonexplosive ledge removal (loudest construction activities) may be required during daytime hours; refer to FHWA Construction Noise Handbook[2].
- Lateral unpaved surfaces should not span more than two lanes in the fully open travel condition; all lane markings should be reestablished with temporary asphalt and striping. The maximum acceptable lateral unpaved and unpainted surface should be 20 feet in width, and all unpaved surfaces should be treated for dust control prior to receiving traffic.
- Unpaved surface conditions should be monitored and maintained to ensure traffic can operate efficiently through the construction zone. Temporary asphalt and striping should be placed over unpaved surfaces for weekend and holiday periods.

These general assumptions were evaluated using the Chittenden County Regional Transportation Demand Model and a Vissim microsimulation traffic modeling tool from PTV Group. Key findings include the following:

SUMMARY OF REGIONAL MODELING

- Vehicles traveling on I-89 toward Exit 16 must be alerted of possible construction impacts before Exit 14 (NB) and Exit 17 (SB) to make alternate route decisions.
- Due to the distance between Exit 16 and Exit 17 and limited parallel route options, vehicles from/to the north are likely to continue to use Exit 16 during construction. If travelers to/from the north are rerouted away from the construction area, the alternate route would follow:
  - From sites north of the construction area: US-2/7 north to NB I-89 Exit 17.

[1]Technical Memorandum #4—Construction Scenario Modeling, February 22, 2017.
[2] https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook07.cfm

  - From sites south of the construction area: Main Street in Winooski south to NB I-89 Exit 14.

  Neither of these alternate routes are likely to result in a shorter travel time.

- Exits 14 and 15 both provide alternate routes for vehicles traveling to points near the Exit 16 interchange. Alternate routes travel through congested surface streets in Burlington, South Burlington, and Winooski, and many drivers are likely to choose to travel through the delayed construction corridor rather than the congested surface streets.
- The most likely diverted motorists would be traveling between Malletts Bay and Colchester Point to destinations south along I-89 (South Burlington, Williston, and beyond). Rather than accessing I-89 SB from Exit 16 via Blakely Road and US-7, motorists could be reasonably detoured into Winooski and Exit 15 via Malletts Bay Avenue, Spring Street, or West Allen Street. The upcoming Main Street Reconstruction Project in Winooski (see Section 5.4) may also divert traffic onto this Malletts Bay Avenue/Spring Street/West Allen Street network, reducing its capacity to function as an alternate route.
- Traffic diversion is likely to be minimal during daytime commuter periods due to the congested adjacent surface streets and the lack of alternate route options. Monitoring key regional intersections during construction is recommended to ensure impacts outside of the immediate construction area are mitigated. Section 8.0 documents the intersections recommended for monitoring.

SUMMARY OF MICROSIMULATION MODELING

- Adjacent construction activities with all lanes open (approximated as a 10% reduction in lane capacity) will result in negligibly increased congestion. This delay results in maximum travel times significantly lower than the VTrans maximum allowable delay of 10 minutes.
- Removing a SB through lane will increase congestion in the PM peak hour for SB US-7 vehicles traveling to I-89 SB, and in the AM peak hour for vehicles from I-89 SB traveling to US-7 SB. The AM peak hour congestion may be mitigated by maintaining the two I-89 SB right-turn lanes and two related US-7 SB receiving lanes south of the intersection.
- The construction zone has been shown to operate acceptably in the nighttime peak hour (8:00 p.m. to 9:00 p.m.) with one lane in all directions under stop control and UTO control.
- Stop-controlled nighttime operations will increase travel times through the corridor. This is considered acceptable given the low volume of vehicles experiencing delay and because the analysis indicates that queuing will not extend onto the interstate.

In addition to these findings, the Appendix 4 provides guidance for developing alternative construction phasing and contingency plans.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 EXISTING CONDITIONS

ALONG US-2/7

Surrounding the Exit 16 interchange along US-2/7 and on adjacent road network are hotels/motels, restaurants, grocery stores, and several office parks. More recently, a park-and-ride off US-2/7 opposite Hercules Drive has been constructed. South of the interchange, the land uses change to a denser residential and commercial urban mix in Winooski that includes the Winooski High School. North of the interchange, along Lower Mountain View Drive, is a high-traffic-volume wholesale club.

Table 6 shows the roadway characteristics along US-2/7 surrounding the Exit 16 DDI project area, including annual average daily traffic (AADT). The three highlighted rows are those segments within the PAC.

TABLE 6: US-2/7 CHARACTERISTICS (NORTH TO SOUTH)

NORTHERN BOUNDARY	SOUTHERN BOUNDARY	NUMBER OF THROUGH LANES	SPEED LIMIT	2015 AADT*	NOTES
Rathe Rd.	Hercules Dr.	2 lanes each direction	40 mph	15,400	
Hercules Dr.	Mountain View Dr.	2 lanes each direction	40 mph	14,900	
Mountain View Dr.	I-89 NB ramps	3 lanes SB 2 lanes NB	40 mph	22,900	
I-89 NB ramps	I-89 SB ramps	2 lanes SB 3 lanes NB	30 mph	18,700	
I-89 SB ramps	South Park Dr.	2 lanes SB 3 lanes NB	30 mph	16,500	
South Park Dr.	Tigan St.	1–2 lanes NB 1 lane SB	30 mph (Colchester) 25 mph (Winooski)	16,500	Transition from state highway (Colchester) to town highway (Winooski)

**2015 volumes are shown to be consistent with previous analyses. Traffic volumes regionally have grown by approximately +1% between 2015 to 2018.*

The project area does not include bike lanes; sidewalks are incomplete in the area and only extend south from South Park Drive. However, bicycle and pedestrian traffic is common and can be expected throughout the project area.

ALONG I-89

I-89 consists of two lanes in each direction through and adjacent to the project area. Locations/mile marker (MM) and AADTs between each exit are shown in Table 7. The two highlighted rows are those segments immediately adjacent to the Exit 16 DDI project area.

TABLE 7: REGIONAL I-89 SEGMENTS

SOUTHERN EXIT (MM)	NORTHERN EXIT (MM)	DISTANCE BETWEEN EXITS	2015 AADT**
Exit 12 (83.960) *Williston*	Exit 13 (87.490) *South Burlington*	3.53	39,700
Exit 13 (87.490) *South Burlington*	Exit 14 (88.730) *South Burlington*	1.24	45,200
Exit 14 (88.730) *South Burlington*	Exit 15* (90.480) *Winooski*	1.75	54,200
Exit 15* (90.480) *Winooski*	Exit 16 (91.490) *Colchester*	1.01	37,100
Exit 16 (91.490) *Colchester*	Exit 17 (97.870) *Colchester*	6.38	30,900
Exit 17 (97.870) *Colchester*	Exit 18 (106.550) *Georgia*	8.68	22,400

**Exit 15 is a partial interchange with a NB off-ramp and a SB on-ramp. Travelers to and from points north near VT-15 in Winooski generally use Exit 16.*

***2015 volumes are shown to be consistent with previous analyses. Traffic volumes regionally have grown by approximately +1% between 2015 to 2018.*

4.2 EXISTING PROJECT AREA CONDITIONS

DRIVEWAY AND SIDE ROAD ACCESS

Within the **immediate construction area**, there are several driveways and side roads off US-2/7. A higher density of driveways is present south of the interchange than to the north. However, the fewer driveways and side roads north of the interchange concentrate traffic demand at these points.

Two driveways exist within the PAC: Whitcomb Street on the west side of US-7 and the gas station/fast food restaurant on the east side of US-7:

- **Whitcomb Street** exclusively serves the Whitcomb Quarry and Hot Mix Plant, providing aggregate and asphalt for construction projects throughout the region. Vehicle traffic is most common during daytime hours, beginning approximately from 5:00 a.m. to 5:00 p.m. The roadway is commonly used by heavy, multi-axle vehicles transporting aggregate and hot mix products.
- The **gas station driveway** serves a Shell gas station and Dunkin Donuts fast food restaurant. Two driveways provide circulating options for customers and delivery trucks. Deliveries of gasoline and other products may occur on any day.

Both drives are between South Park Drive and the SB ramp interchange. Driveways and primary destinations within the project area are shown in Figure 5 and Figure 6.

FIGURE 5: DRIVEWAYS AND SIDE ROADS OFF US-7 NORTH OF I-89 INTERCHANGE

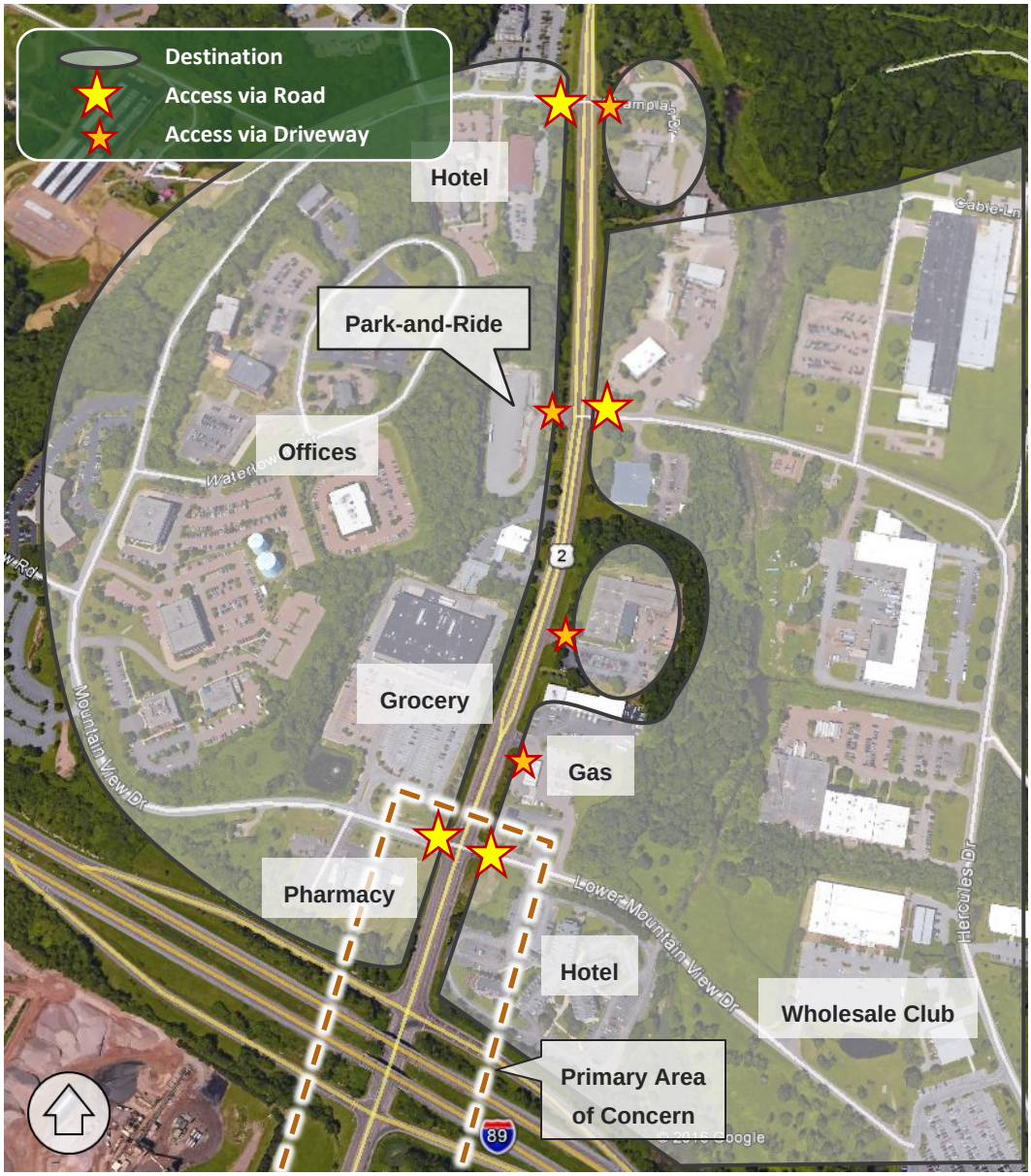
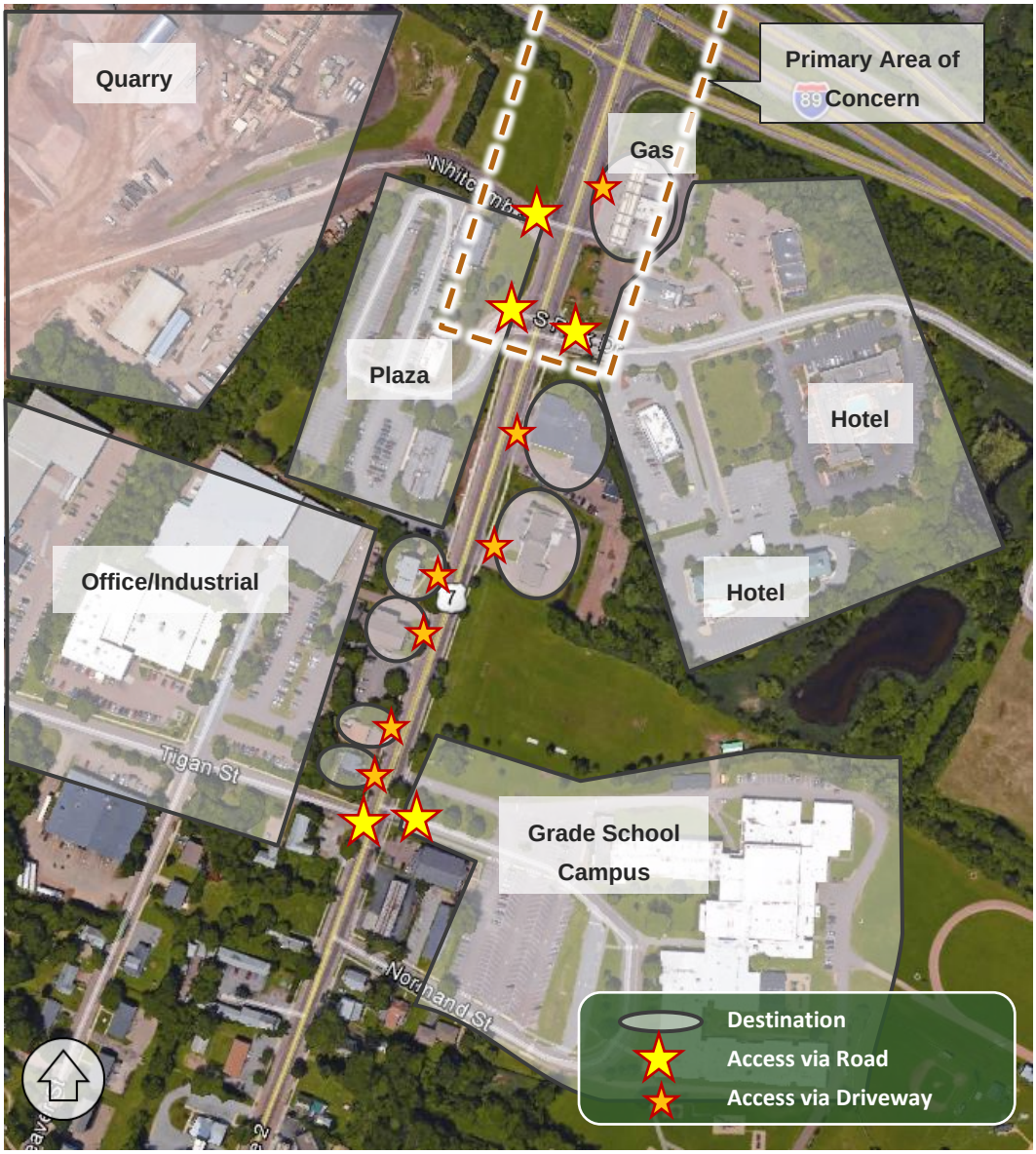


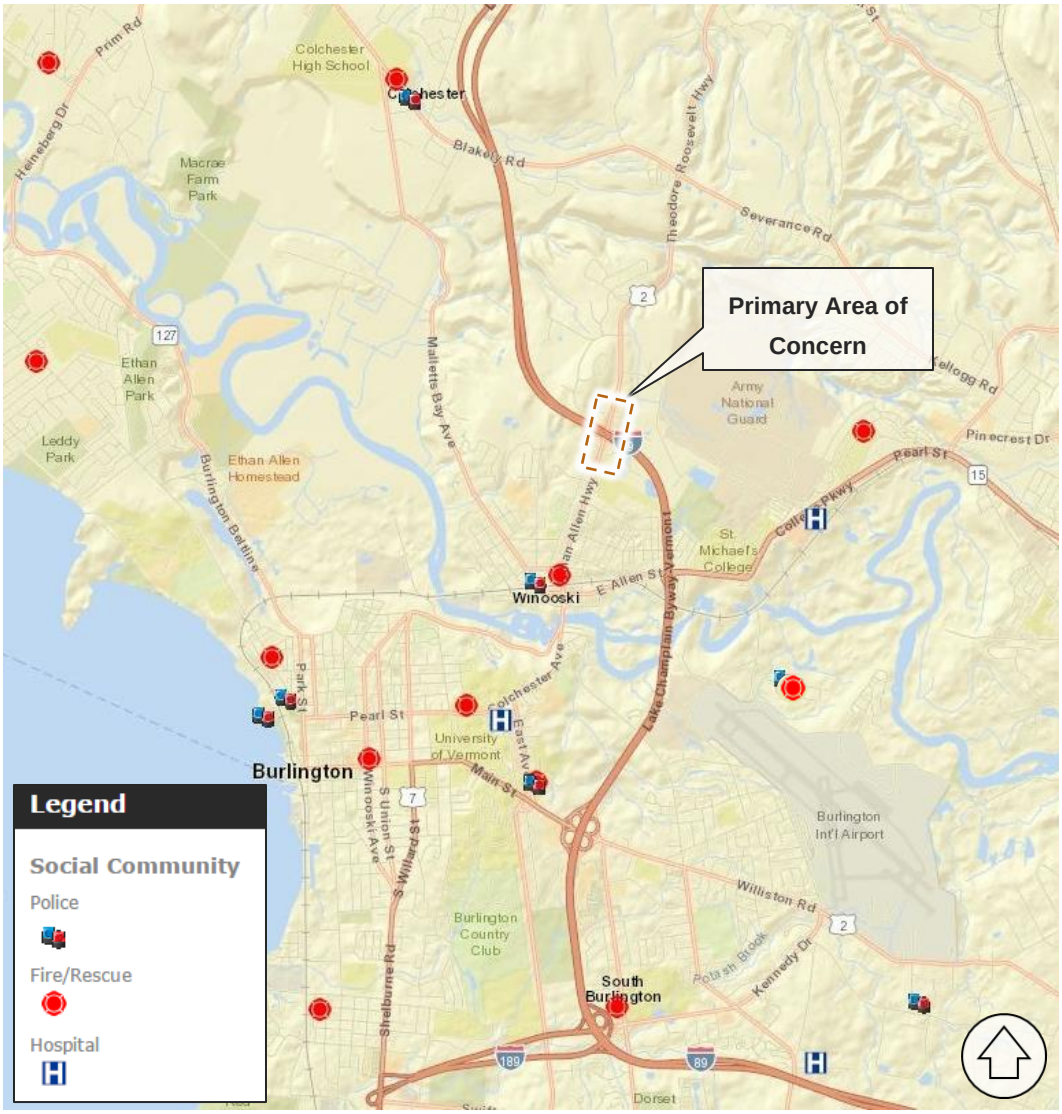
FIGURE 6: DRIVEWAYS AND SIDE ROADS OFF US-7 SOUTH OF I-89



AMBULANCE, POLICE, AND FIRE

Police stations, fire stations, and hospitals proximate to Exit 16 are shown in Figure 7. A concern of construction is slowing down emergency vehicles due to detours, in addition to ensuring access to the construction site itself. Exit 16 is an emergency vehicle route between the University of Vermont (UVM) Medical Center Fanny Allen Campus (VT Route 15) and points north.

FIGURE 7: POLICE, FIRE, AND HOSPITALS NEAR EXIT 16



MAIL, PACKAGE, AND DELIVERY SERVICES

Mailboxes are located on the west side of US-2/7 north of Rathe Road; all other mailboxes are located within driveways and lots. All mail and parcel deliveries should be unchanged.

Some businesses along the corridor may receive deliveries from large vehicles during night hours. The PIO should coordinate the delivery schedule and individual needs to maintain access for large trucks throughout construction.

TRASH AND RECYCLING SERVICES

Trash and recycling haulers operate along the corridor, typically from 6:00 a.m. to 8:00 p.m.

OFFICIAL BUSINESS DIRECTORY SIGNS

Businesses pay a fee to VTrans to have Official Business Directory Signs (OBDS) within the state's right-of-way. Such signs within the project area should be preserved or temporarily relocated during construction. If removal is necessary, the signs should be reinstalled as soon as feasible when construction activities no longer risk damage. Two OBDS assemblies exist within the project area: at MM 0.45 and MM 0.68 along US-2/7 in the NB direction.

The Contractor may need to contact Toni May at (802) 279-9599 to coordinate temporary removal of the OBDS assemblies. VTrans will be responsible for associated financial compensation.

FIGURE 8: AN OBDS IN THE PROJECT AREA

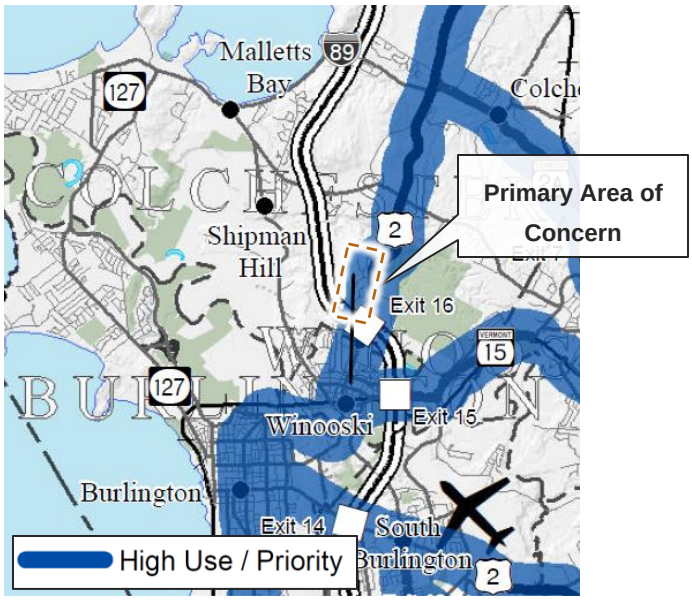
PEDESTRIAN ROUTES

An existing sidewalk, approximately 1,000 feet long, is in the construction area on US-2/7 between Tigan Street to the south and South Park Drive to the north. Pedestrians are present and common on the US-2/7 highway, including in the most constrained areas, such as under the I-89 bridge.

BICYCLE ROUTES

No designated bicycle accommodations exist along US-2/7. However, VTrans has identified this corridor as a high-use, high-priority bicycle route per the VTrans Bicycle Corridor Priority map (March 2016)[3]. The CCRPC has also identified the corridor as an on-road bicycle route.

FIGURE 9: EXCERPT FROM VTRANS BICYCLE CORRIDOR PRIORITY MAP.



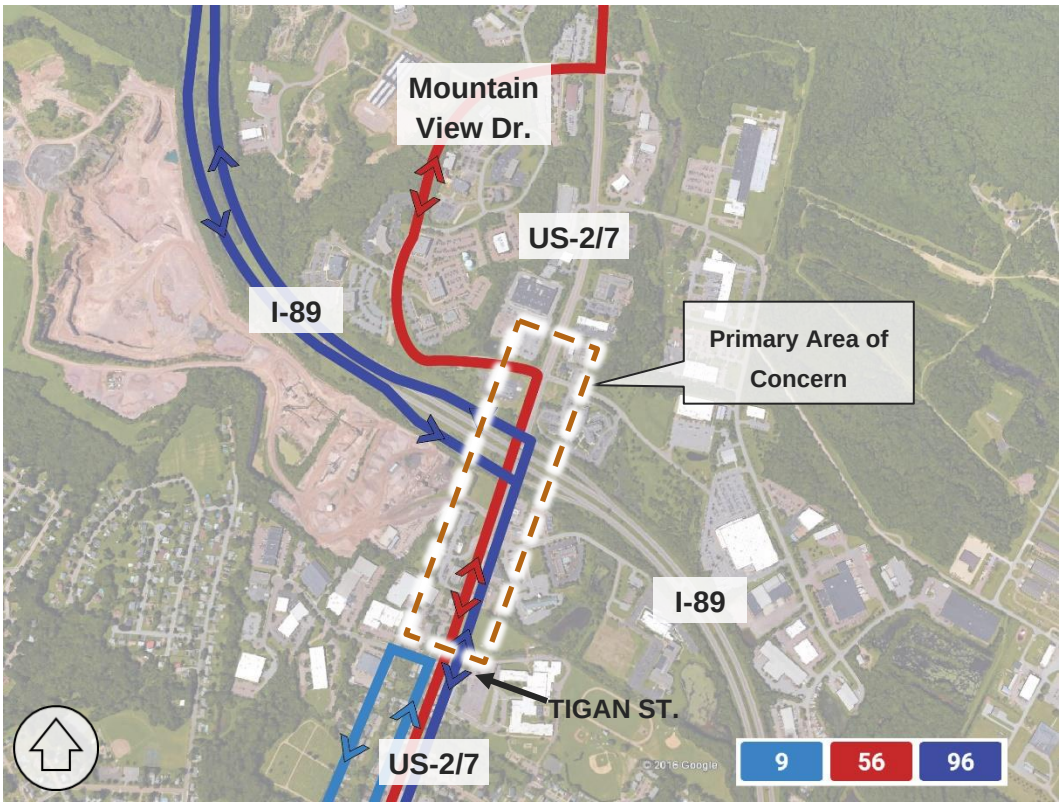
TRANSIT

Green Mountain Transit (GMT) operates three routes through the project area. The identified project area includes no stops, but several buses travel through the project area to service adjacent land uses along the route. The routes are described below and illustrated in Figure 10:

[3] Vermont Agency of Transportation. VTrans On-Road Bicycle Plan Maps, https://vtrans.vermont.gov/planning/bike-plan/maps.

- **Route # 9: Riverside/Winooski**. Route 9 heads north along Main Street from Winooski, turns left at Tigan Street, and turns left again at Weaver Street SB. This route operates primarily between 6:15 a.m. and 7:00 p.m., Monday through Friday, with one late night bus leaving Burlington at 11:25 p.m.
- **Route #56: Milton Commuter**. Route 56 travels north and south through the project area along US-2/7. The route operates primarily between 6:25 a.m. and 6:50 p.m., Monday through Friday, with one late route in each direction each night between 10:00 p.m. and 11:00 p.m.
- **Route #96: St Albans Link Express**. Route 96 travels along US-2/7, using Exit 16 to and from points north. The route runs four round-trip services per day, Monday through Friday, traveling through the PAC at 5:40 a.m., 6:33 a.m., 4:33 p.m., and 5:13 p.m.

FIGURE 10: GMT BUS ROUTES IN TMP AREA



GMT may implement revised transit schedules as part of their NextGen Service Plan, an updated public transit service policy and plan. This service plan may affect routes in the project vicinity. The contractor should confirm the GMT routes prior to finalization of any TTC plans.

ON-STREET PARKING

On-street parking is allowed in the SB direction in the City of Winooski. The PAC does not have any on-street parking.

SCHOOLS

The Winooski School District Grade School Campus is located south of the project area, east of US-2/7 and opposite Tigan Street. The campus serves kindergarten through Grade 12. The district does not operate fixed school bus routes, but it does offer bus transportation to eligible students with special needs and to off-site locations. Many children of all ages walk and bike to school along Tigan Street and US-2/7 south of the project area, and vehicle pickup and drop-off periods generate localized peaks in traffic around 8:00 a.m. and 3:00 p.m., which are outside of the active construction period.

The Albany College of Pharmacy and Health Sciences operates a commuter school on Mountain View Drive. The school generates vehicle trips during the day, typically between 7:00 a.m. and 7:00 p.m., which are outside of the active construction period.

Community College of Vermont (CCV) operates a campus in downtown Winooski, and Saint Michael's College is a large, higher education institution in Colchester along VT-15, east of downtown Winooski. Exit 16 is the primary access to these campuses from the north, generating most vehicle trips during the day, typically between 7:00 a.m. and 7:00 p.m., which are outside of the active construction period. CCV offers evening courses Monday through Thursday, typically ending at 9:00 p.m.

4.3 CONSTRUCTION CHALLENGES

This TMP identifies several construction challenges and includes associated expected construction management actions to address the challenges:

- **Volume of traffic**. Exit 16 and US-2/7 through the project area serves a critical regional traffic link with significant traffic volumes. Section 3.3 identified the operational conditions in the project area that are assumed to be maintained throughout construction. To minimize disruption to the traveling public, construction activities are expected to occur primarily between 8:00 p.m. and 6:00 a.m. Between 6:00 a.m. and 8:00 p.m., all existing traffic lanes are expected to remain open and traversable.
  In the event that a traffic lane must be closed from 6:00 a.m. to 8:00 p.m., the southbound US-7 direction is the least critical movement. However, the two right turn lanes from southbound I-89 Exit 16 and associated US-7 southbound receiving lanes should remain open in the a.m. peak hour to avoid queueing onto I-89.
- **Limited I-89 crossing locations**. Reasonable alternate routes from one side of I-89 to the other do not exist without requiring significant detour distances. Therefore, full closure of US-2/7 is not recommended. Advanced signage and other methods of public outreach (see Section 7.2, Public Information) should be used to notify the public of activities within the construction area, potential for closure and delay, and notify infrequent travelers of other route options.
- **Ledge/solid rock removal**. Exposed rock and ledge are visible along the west side of US-2/7, south of the SB off-ramp, through the interchange, and north beyond Mountain View Drive. Excavation for roadway widening and retaining wall

construction will likely require drilling and blasting. Blasting operations will require a clear work zone free of traffic, rolling roadblocks along I-89 (refer to Section 7.1), intersection control at Mountain View Drive, and possible time-of-day restrictions to minimize impacts to neighboring land uses.

- **Water line replacement**. The existing water line in the outermost SB lane will be replaced as part of this project. The deep excavation will likely encounter ledge and rock excavation and require blasting. All excavations should be backfilled at the end of each workday to allow all lanes of traffic to be reopened.
- **Inversion of crown**. To accommodate the designed DDI cross section, the crown must be inverted to drain stormwater and snow melt into the center of the road. The transition between traditional normal crown to inverted crown will require special drainage consideration.
- **Presence of pedestrians and bicyclists**. Bicyclists and pedestrians currently use the existing roadway, primarily between the dense residential Winooski neighborhoods to the south of the project area and the retail uses, grocery store, and pharmacy north of the I-89 interchange. All reasonable efforts should be made to maintain and/or replicate pedestrian and bicycle travel patterns. This can include, but is not limited to, a dedicated pedestrian escort (not a flagger on duty), signage, and pedestrian channelizing device walkways that meet ADA requirements. The contractor should ensure that obstacles, equipment, construction materials, traffic control devices, etc. do not encroach into the bicycle path of travel, and that these pedestrian and bicycle routes are free of ruts, sand and mud to prevent cyclist crashes and preserve accessible characteristics.

  Construction of a path to remove pedestrians and bicyclists from the construction zone is recommended early in the project.
- **DDI crossover/traffic pattern transition considerations**. The construction of the DDI will necessarily require the transition of traffic from the traditional, drive-on-right traffic pattern to the ultimate DDI drive-on-left traffic pattern. This will need to be managed with temporary traffic signals and movable barriers. Construction phasing and traffic control patterns will require consideration of construction zones in both traditional and DDI traffic patterns. The PIO and contractor should work with VTrans and other parties to conduct an awareness and education campaign on how to drive the DDI well before the physical transition occurs.
- **Truck/large vehicle traffic**. Many of the adjacent retailers receive deliveries from large vehicles through the project area. These vehicles often arrive and depart the retail sites during the nighttime hours (during the construction activity period). Truck access should be maintained to all properties; the contractor should consider truck tracking and turning movements during placement of temporary traffic control devices, particularly at driveways and intersections.

The contractor's construction phasing plan should address these challenges and attempt to align with these expectations. If these expectations cannot be met due to sudden, unforeseen circumstances, refer to Section 7.3 for guidance on development of a contingency plan.

5.0 CONSTRUCTION PHASING

The construction sequencing detailed in this TMP is based on the proposed construction sequence VTrans and RSG developed in March 2016 and refined as the project continued to develop.[4] It is expected to be adjusted as necessary, once a contractor has been identified and as more information becomes available. The contractor may identify changes to the phasing or sequence and will be responsible to evaluate those changes to traffic capacity in the project area in line with the measures identified within this TMP.

The construction sequencing described herein is focused on the PAC, from South Park Drive through Mountain View Drive, including both I-89 ramp intersections. This segment of the project is the most constrained and congested segment along the corridor.

Construction sequencing for the project areas outside of the PAC (south of South Park Drive and north of Mountain View Drive) is not described in detail in this TMP. The sequencing for construction in these segments may follow a more conventional roadway widening construction process. The project plans illustrate additional sequencing and phasing details.

5.1 PROJECT SCHEDULE

Construction is expected to occur over 18 months and two construction seasons, April 15–November 15, separated by a winter shutdown period (November 15–April 15, or as weather and permitting allow). The contractor should coordinate the construction process with the REs and stakeholders. Particular attention should be paid to changing traffic patterns, seasonal variation in traffic, and special events.

During the winter shutdown period, the roadway should be restored to its fully functioning, six-lane, traditional traffic pattern. During the winter shutdown period, the project area should be left in an acceptable manner for road clearing and maintenance operations to function; sufficient clear spaces should be provided to allow plow trucks with wings to operate and throw snow, particularly at intersections.

The most convenient time for the winter shutdown would be before the completion of Sequence 7 in Table 8 in Section 5.2, prior to conversion to the inverted roadway crown. The construction sequencing prepared by the contractor should accommodate this period of traditional traffic operations.

Reasons for changing traffic demands, examples of seasonal variation, and anticipated special events may include, but are not limited to, the following:

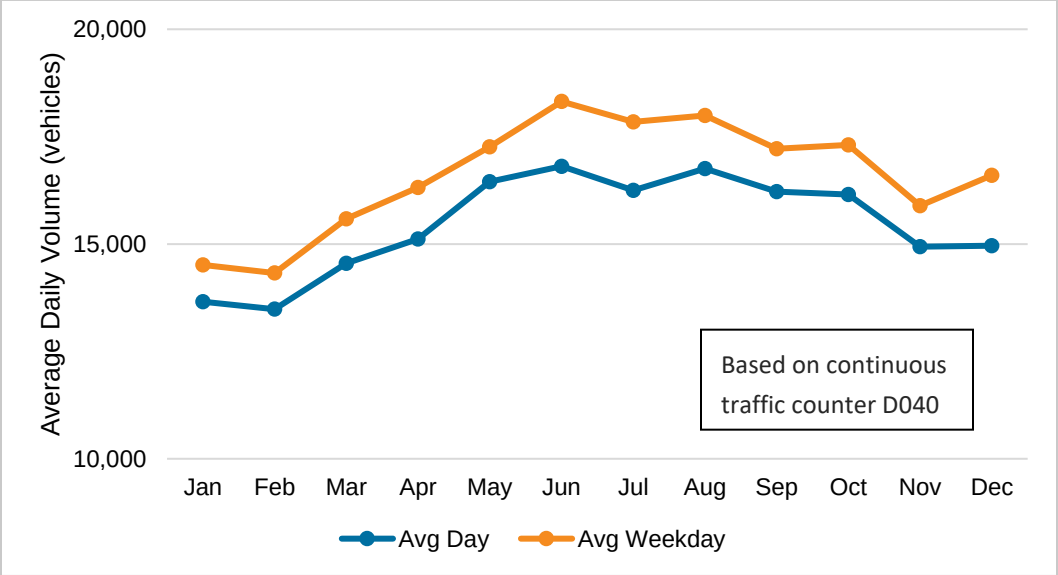
1. Elementary, middle, and high school traffic (August–June)
2. College student traffic (September–May)
3. Peak tourism (June–August)

[4] Initial phasing provided by VTrans and updated by RSG.

4. High school graduation events (June)
5. College graduation events (May)
6. Downtown Burlington events (July 3 fireworks, concerts, events, etc.)
7. Champlain Valley Fair events (August–September)
8. Champlain Valley Exposition events (any time of year)
9. Peak shopping periods (holiday, annual sale weekends, etc.)
10. Peak foliage weekend (Indigenous Peoples Day, October)

To illustrate the overall traffic volume pattern near the project area over the course of a year, a monthly summary of 2015 traffic volumes on US-2/7 north of the project area is shown in Figure 11. These data are based on continuous traffic counter D040, located approximately three-quarters of a mile north of the Exit 16 interchange.

FIGURE 11: 2015 MONTHLY TRAFFIC VOLUMES ON US-7 NORTH OF RATHE ROAD



As noted earlier in the TMP, the traffic analyses reference traffic volumes from 2015 to be consistent with background studies informing the TMP. The TMP considers 2015 traffic volumes to reasonably approximate 2020 construction year traffic conditions. The 2018 Continuous Traffic Counter Report estimates the growth rate in traffic at a similar location to be 2% from 2015 to 2020. Reviewing actual count data, the AADT of CTC D040 (cited in Figure 11) has declined from 15,400 vehicles per day in 2015 to 15,200 in 2018, or approximately -1.3%. Considering both traffic estimates, the 2015 traffic volumes are representative of 2020 construction year traffic.

The seasonal trend aligns with the general events and activities identified above. The summer construction period from May to October is higher than November through April. A general peak in traffic occurs in June. The traffic operations assessed for the purposes of

the operational analysis uses a Design Hour Volume, generally occurring within the early October time period, and representing the thirtieth highest PM peak hour of the year.

5.2 CONSTRUCTION SEQUENCING

Table 8 highlights the preliminary construction sequence, with modifications following the project technical meetings with VTrans and refined project plans. With each construction activity, the assumed number of lanes required for the work zone is noted. This sequencing is only a demonstration that construction of the project as planned is feasible. The contractor will be responsible for submitting a daily traffic control plan (TCP), stamped by a professional engineer, for approval by the RE. Requirements for this plan will be listed in the General Notes for Traffic Control in the project plans.

TABLE 8: CONSTRUCTION SEQUENCING

CONSTRUCTION SEQUENCE	ASSUMED WORK ZONE
1. Temporary Pedestrian Route Construct sidewalk on east side (NB) of US-7 behind existing bridge piers; temporary walk between ramps, not necessary for fully accessible (Americans with Disabilities Act) route when not feasible. Walk should be lit and protected with a fence. Temporary pedestrian route should connect through the construction project area, with access to adjacent properties and roadways, including the businesses on Mountain View Drive. Install underground telecommunications conduit to prepare for removal of existing utility poles for aerial relocation of electric service over I-89.	Two NB Lanes Most work outside of roadway Night work
2. Replace Water line/Longitudinal Blasting May require longitudinal blasting for 16-inch water line. Water line is being placed up to 12 feet below grade; trench excavation may require at least adjacent lane closure. Water line is along center of westernmost SB lane. Drilling for blasting would ideally be done during daytime hours, with charges set before 10:00 p.m. and the roadway surface restored overnight. Blasting will require full temporary closure of US-7 and rolling roadblocks of I-89. Assume 50 feet of water line can be replaced per day following blasting. Progress is expected to be slow due to potential blasting, deep excavations, and the requirement that all traffic must be restored on the following day. One SB through lane may be closed during daytime, provided SB Exit 16 off-ramp maintains two SB US2/7 receiving lanes during the AM peak hour. SB queues will be significant and unpredictable. The contractor and RE should monitor spillback onto the highway and adjacent roadways.	Two SB lanes for excavations and water line replacement (night work) Outermost SB may be closed for drilling during day Temporary full closure of US-7 and rolling roadblocks of I-89 for blasting and aerial relocation

CONSTRUCTION SEQUENCE	ASSUMED WORK ZONE
Set new utility poles north/west of interchange; relocated aerial crossing of utilities over I-89.	
3. Blasting/Ledge Removal/Retaining Walls/Sidewalk—West Drilling for blasting would ideally be done during daytime hours, with charges set before sunset and the roadway surface restored overnight. Blasting will require full temporary closure of US-7 and rolling roadblocks of I-89; may be coordinated with blasting for water line. Blasting and associated rolling roadblocks may have a short work window of less than five minutes, as defined by TEI 18-601; refer to Section 7.1 Roadway should be cleared immediately to allow for resumption of traffic; nighttime work hours may be used for cleanup and removal of blasted material outside of roadway. Need for and deployment of lighting equipment should be coordinated with drilling, blasting, and clearing activities, and documented in the daily lighting plan supplement to the daily TCP. Nonexplosive ledge excavation may be performed during daytime as approved by the RE. One SB through lane may be closed during daytime, provided SB Exit 16 off-ramp maintains two SB US2/7 receiving lanes during the AM peak hour. SB queues will be significant and unpredictable. The contractor and RE should monitor spillback onto the highway and adjacent roadways. Following blasting, subgrade for full west-side development should be prepared, including retaining wall under I-89 bridge, sidewalks, and subgrade for DDI limits, as needed. The west-side blasting will need to be staged to allow for the relocation of the NB I-89 ramp intersection signal. The segment of ledge between the NB ramps and Mountain View Drive may need to be excavated first to allow for a temporary ramp signal. It may be advantageous to place this temporary signal to allow for the future temporary DDI signal in later construction sequences (see Sequence 7). This sequence should prepare the subgrade for the full width of the DDI interchange on the west side of US-7.	Outermost SB may be closed for drilling during day Two SB lanes needed for excavation and debris removal following blasting (night work) Two SB lanes needed for backfilling construction of retaining wall, sidewalks (night work) Temporary full closure of US-7 and rolling roadblocks of I-89 for blasting.
4. Retaining Walls/Sidewalk—East Reroute pedestrians to west side of roadway. Walk should be lit and include fence and visual barrier to work zone/roadway. This sequence should prepare subgrade for full width of DDI interchange on the east side of US-7.	Two NB lanes for excavation, backfill, formwork Night work

CONSTRUCTION SEQUENCE	ASSUMED WORK ZONE
5. Overhead Signs Overhead signs are proposed at the NB and SB approaches to the DDI, on the side of the existing bridges, and over the I-89 NB off-ramp. The overhead signs may be installed immediately when the final footprint is available, with changeable light-emitting diode (LED) signs temporarily installed over each lane to assist in directing traffic in the construction periods or informing motorists of upcoming construction activity in the non-construction periods.	Outermost NB and SB lanes, as needed Temporary full closure of US-7 as needed to install LED signs Night work
6. New Stormwater Outfalls Three stormwater outfalls are on the east side of US-7: south of SB I-89 on-ramp, north of SB I-89 on-ramp, and south of NB I-89 off-ramp. Most work is outside of the roadway.	Outermost NB lane Night work
7. New Stormwater System/Roadway Base/Temporary Pavement This sequence involves the full-depth reconstruction of the roadway, including inverting the crown to drain to center. Work is anticipated to begin in the center of the road, placing storm system infrastructure at final grade, covering openings, and placing temporary subbase and asphalt to restore traditional crown. The temporary traditional crown would be removed and the new stormwater system would be operational after the entire roadway has been reconstructed to the full DDI width, the new stormwater system is complete, and all underground conduit has been placed. The base courses of pavement should be placed and temporarily striped for traditional traffic patterns.	Two lanes of traffic at a time: • Center two lanes • Two SB lanes • Two NB lanes Night work
8. Temporary Signals Temporary span wire traffic signals and associated signs should be placed for vehicles in the DDI traffic pattern at the two ramp intersections. The temporary pole locations should not interfere with the existing span poles or future strain poles. The temporary signal may have already been placed for the NB ramp intersection as part of Sequence 3. Most of this work should be outside of the roadway, except for the placement of the span wire and signal heads.	Outermost NB and SB lanes, as needed Temporary full closure of US-7 as needed to span wire and adjust signal heads Night work
9. Traffic Crossover The traffic crossover should include removal of existing temporary pavement markings, placement of new temporary pavement markings, and placement of TTC devices to direct traffic to the new DDI traffic pattern. Consider coordination with the public information campaign to promote the upcoming change in traffic patterns prior to implementation of crossover.	Two lanes of traffic at a time: • Center two lanes • SB two lanes • NB two lanes

CONSTRUCTION SEQUENCE	ASSUMED WORK ZONE
Specific features may include the following: • **Advanced warning of "NEW TRAFFIC PATTERN."** • **Runway-style progressive warning lights on the TTC devices that lead in the correct direction.** • **Red reflectors on TTC devices in the wrong direction.** • **Temporary guide, warning, and regulatory signs.** • **Temporary traffic lights for DDI pattern should be activated.** All work to transition between traditional and DDI traffic patterns should be completed in one night. Contractor should consider conducting the crossover on Saturday night to provide the greatest buffer to high volume weekday traffic conditions. Traffic flow should be monitored for at least 12 hours to ensure DDI and associated signal operations are acceptable. Once the DDI traffic pattern is established, it is assumed traditional traffic patterns will no longer be utilized under the I-89 bridges.	Night work
10. Splitter Islands/Center Barrier/Final Traffic Signals Splitter islands are proposed in the center of the four ramps and the US-7 mainline approach to the DDI. All construction should occur in the empty space, with a single lane closure of the US-7 DDI mainline in both directions. Particular attention should be given to the truck-turning movements at the ramps. The center barrier is a three-beam guardrail, which can be constructed by closing one or both inner US-7 mainline DDI lanes.	One lane of the US-7 DDI mainline in both or either NB or SB directions Night work
11. Final Pavement/Signs/Striping/Landscaping The final course of pavement, striping, signs, and landscaping may be installed by a single lane closure of the US-7 DDI mainline in either or both directions, as needed. The temporary LED overhead signs should be replaced with the permanent static signs.	One lane of the US-7 DDI mainline in both or either NB or SB directions; full closure for overhead signs, as needed Night work

5.3 CONSTRUCTION WORK ZONES

At a minimum, the contractor should maintain at least one travel lane in each direction adjacent to the construction work zone. Along with this requirement, the contractor should ensure that minimum maintenance of traffic performance measures is attained; these performance measures are described in greater detail in Section 8.0 and include maximum queue lengths, travel time through the corridor, and other performance measures.

The contractor may alter the existing traffic signal systems, install temporary traffic signals, implement stop-controlled intersections, or use a UTO to direct traffic at intersections, as appropriate. Flaggers may be used to stop and release traffic for temporary interruptions in traffic, such as vehicle maneuvering. In all cases, all existing traffic control devices that conflict with the TTC devices must be covered[5] or otherwise rendered ineffective during construction activities and fully operable and visible during non-construction hours (6:00 a.m. to 8:00 p.m.).

In general, it is preferable to maintain a fully open work zone condition during non-construction hours. If it is determined unfeasible to return the project site to a fully open condition due to on-going work, time-constrained activities (drilling/blasting/rock removal), or emergency, the two SB through lanes are least critical to traffic operations; one SB lane may be closed during the day with approval of the RE. If one SB lane is closed, the contractor and RE should be aware of the following operational characteristics:

- Significant and unpredictable queuing is likely along SB US-2/7, I-89 off-ramps, and the intersecting roads.
- The contractor and RE should monitor queues to ensure spillback does not impact the operations on I-89.
- UTOs should be employed to manage queues should spillback impact I-89.
- In the a.m. peak period, two southbound lanes should be maintained to allow the two right-turn lanes to operate. In this time period, one of the NB through lanes south of the SB I-89 on-ramps may be closed.

Construction zones for the traditional traffic patterns should follow established standard TTC details for lane closures, lane shifts, or other temporary measures, depending on the work zone and construction activity. Additional consideration may be needed for construction zones during and after the "Traffic Crossover" sequence. Particular attention should be given to when the DDI traffic pattern is implemented.

In every case, the contractor should prepare drawings for the application of TTC devices to achieve the desired work zone, making note of setup and take-down time to ensure the site is fully open during daytime hours.

[5] Sign covering shall not damage the retroreflectivity of the sign face. The sign cover shall not deteriorate for the duration that the sign is covered.

5.4 NEARBY PROJECTS

Several significant transportation construction projects have been identified as proximate to the Exit 16 DDI construction site. These projects include the following:

TABLE 9: NEARBY CONSTRUCTION PROJECTS

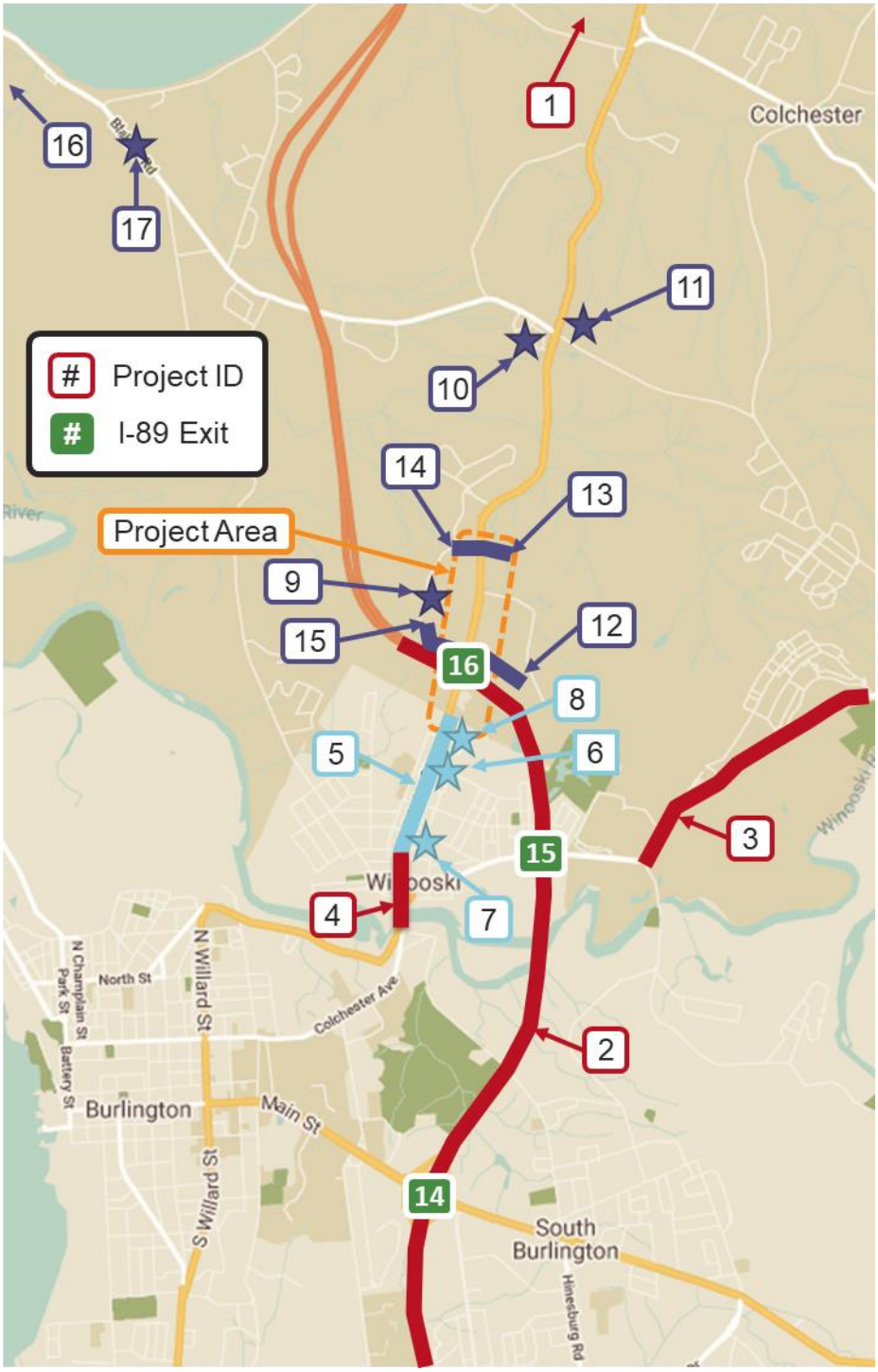
	VTRANS PROJECTS	
1	COLCHESTER IM 089-3(69)	Construction: April 2019 to June 2020
	Replace deck and railing on bridges along I-89 in Colchester.	
	Contact: Annabelle Dally, (802) 595-4399, annabelle.dally@wsp.com	
2	RICHMOND-COLCHESTER IM SURF(63)	Construction: July 2019 to June 2020
	Resurfacing I-89 from Richmond to Colchester (through Exit 16).	
	Contact: Matthew Bogaczyk, (802) 793-5321, matthew.bogaczyk@vermont.gov	
3	COLCHESTER-ESSEX NH 030-1(34)	Construction: June 2020 to November 2020
	Bicycle and pedestrian improvements along VT-15 from Lime Kiln Road to Susie Wilson Road.	
	Contact: Erin Parizo, (802) 828-2046, erin.parizo@vermont.gov	
4	WINOOSKI NH PC21(2)	Construction: April 2021 to October 2021
	Concrete slab repair on approaches to and through downtown circulator.	
	Contact: Matthew Bogaczyk, (802) 793-5321, matthew.bogaczyk@vermont.gov	

	LOCALLY MANAGED/PRIVATE PROJECTS: WINOOSKI	
5	Winooski Main Street/Mansion Street Development	Construction: Estimated 2020
	Private development project on Main Street.	
	Contact: Eric Vorwald, (802) 655-6410, EVorwald@winooskivt.gov	
6	401 Main Street	Construction: Estimated 2020
	Private development project on Main Street.	
	Contact: Eric Vorwald, (802) 655-6410, EVorwald@winooskivt.gov	
7	Winooski Main Street Reconstruction Project / WINOOSKI TAP TA 17(2)	Construction: Estimated 2020 to 2021
	Reconstruction of Main Street from downtown circulator to Colchester town line.	
	Contact: Jon Rauscher, (802) 655-6410, JRauscher@winooskivt.gov	
8	Winooski School District Campus Renovation	Construction: Summer 2020
	Contact: Eric Vorwald, (802) 655-6410, EVorwald@winooskivt.gov	

	LOCALLY MANAGED/PRIVATE PROJECTS: COLCHESTER	
9	Water Tower Hill Hotel 93-room hotel. Contact: Sarah Hadd, (802) 264-5602, SHadd@colchestervt.gov	Construction: 2021
10	Severance Corners Village Development 29-unit private residential development at US 2/7 and Severance Road. Contact: Sarah Hadd, (802) 264-5602, SHadd@colchestervt.gov	Construction: Estimated 2020
11	Severance Park Development 475-unit private residential development at US-2/7 and Blakely Road. Contact: Sarah Hadd, (802) 264-5602, SHadd@colchestervt.gov	Construction: Estimated 2025
12	Lower Mountain View Drive Culverts and Paving Contact: Bryan Osborne, (802) 264-5621, bosborne@colchestervt.gov	Construction: Summer 2020 to Summer 2021
13	Champlain Drive Paving Contact: Bryan Osborne, (802) 264-5621, bosborne@colchestervt.gov	Construction: Summer 2021
14	Colchester Fire District #3 Rathe Road to US-2/7 Waterline Replacement Contact: Bryan Osborne, (802) 264-5621, bosborne@colchestervt.gov	Construction: Not Programmed
15	Mountain View Drive Sidewalk Construction Contact: Bryan Osborne, (802) 264-5621, bosborne@colchestervt.gov	Construction: Not Programmed
16	COLCHESTER STP 5600(20) Improvements to the Prim Road / West Lakeshore Drive intersection. Contact: Ande Deforge, (802) 595-6657, ande.deforge@vermont.gov	Construction: Estimated 2021 to 2022
17	COLCHESTER STP 5600(21) Improvements to the VT-127 Blakely Road / Laker Lane intersection. Contact: Ande Deforge, (802) 595-6657, ande.deforge@vermont.gov	Construction: Estimated 2020 to 2021

The projects listed in the tables above are illustrated in Figure 12.

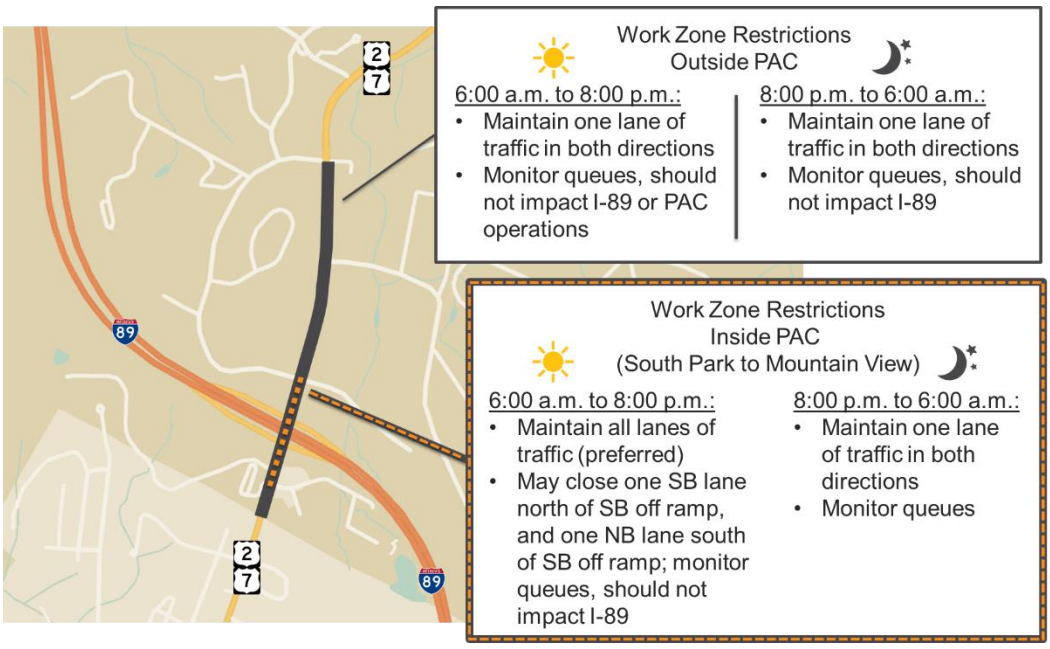
FIGURE 12: SIGNIFICANT CONSTRUCTION PROJECTS NEAR COLCHESTER NH HES 5600(14)



6.0 WORK ZONE IMPACTS ASSESSMENT

From 6:00 a.m. to 8:00 p.m. during the construction period, the existing roadway travel lanes from south of South Park Drive through Mountain View Drive should be fully open and traversable to the public. During this fully open roadway period, all construction activities should be limited to outside of the travel lanes or north of the PAC. Outside of the PAC (north of Mountain View Drive), lane closures are acceptable from 6:00 a.m. to 8:00 p.m., but if the effects of the work zone affect the operation of the PAC, the work zone should be modified or eliminated until traffic conditions allow.

FIGURE 13: SUMMARY OF EXPECTED WORK ZONE RESTRICTIONS BASED ON TIME OF DAY AND AREA OF IMPACT



During the nighttime work period, TTC devices may be deployed to establish work zones in the PAC. The work zones are expected to reduce the number of travel lanes and may require modifications to the existing traffic signal equipment; they may also necessitate temporary closure of driveways and side roads. Depending on the extent of signal modification and the expectation that the roadway should be restored to a fully open condition from 6:00 a.m. to 8:00 p.m., UTOs may be required to direct traffic during work periods. The work zones are expected to maintain the following minimum levels of access:

- Full access to pedestrians and bicyclists through the project area.
- At least one lane of traffic in each direction.
- Maintain minimum performance measures as set forth in Section 8.0.
- Maintain emergency service access to all side roads and driveways at all times.

Short-term driveway closures may be required for certain activities. The contractor, RE, and PIO are expected to coordinate the closure with the property owner.

6.1 WORK ZONE IMPACTS ON EXISTING CONDITIONS

DRIVEWAY AND SIDE ROAD ACCESS

Large vehicle turning radii will need to be provided during throughout construction of the DDI. Design vehicles should be able to successfully maneuver through the project area without causing significant back-ups of traffic or blocking lanes of travel.

In general, it is not anticipated that any temporary measures will need to be installed to maintain access to adjacent properties during construction. One potential exception may exist for the construction of the waterline through Highpoint Center and Whitcomb Street (quarry) driveways and the SB off-ramp. Access to these drives and roadways must be maintained during construction, with consideration for the design vehicles that may be utilizing the roadways during the construction period. Particularly at the SB off-ramps and the Whitcomb Road quarry, large truck/trailer combination vehicles (WB-67) should be expected at any time. Construction will need to be phased and staged at these intersections to allow unimpeded vehicle access.

AMBULANCE, POLICE, AND FIRE

When construction activities are underway, there should be a minimum of one lane open in each direction on US-2/7 at all times, and I-89 should be fully open throughout construction. In times of active construction, there should not be a need for an emergency vehicle to reroute due to traffic backups or street closures, and access to the site itself should always be possible. Active management and assessment of queues and traffic conditions can be relayed to emergency dispatch personnel, as necessary.

PEDESTRIAN ROUTES

A temporary path for pedestrians should be constructed early in the project to minimize pedestrian/motorist/construction vehicle conflicts. The pedestrian route must be at least 4 feet wide, and 5 feet is preferred. If the width is proposed at 4 feet, then at least one 5-foot by 5-foot passing space is required for every 200 feet of length. Even with this temporary path, established work zones should anticipate and accommodate pedestrian traffic.

All temporary pedestrian routes and accommodation through the work zone should be consistent with the latest version of the VTrans Bicycle and Pedestrian Work Zone Traffic Control Guide.[6]

BICYCLE ROUTES

A temporary path should be constructed early in the project to allow bicyclists to dismount and walk through the work zone, if desired. Even with the temporary path, established work

[6] VTrans Bicycle and Pedestrian Program. Vermont Bicycle and Pedestrian Work Zone Traffic Control Guide, July 2018, https://vtrans.vermont.gov/sites/aot/files/documents/VTrans%20PedBike%20WZ%20Guide%20-%20July%202018.pdf.

zones should allow for 11-foot travel lanes and 3-foot shoulders for bicycle use. Bicyclists should be expected at any time during the day.

All temporary bicycle routes and accommodation through the work zone should be consistent with the latest version of the Bicycle and Pedestrian Work Zone Traffic Control Guide.

TRANSIT

- **Route #9: Riverside/Winooski**. One night run service at 11:15 p.m., arriving at Tigan Street at 11:38 p.m., Monday through Friday. This bus run may encounter peripheral construction activities at this southernmost extent of the project area.
- **Route #56: Milton Commuter**. One night run service at 9:40 p.m., arriving at Mountain View Road/Water Tower Hill at 9:55 p.m. NB, and returning SB at 10:47 p.m., Monday through Friday. This bus must traverse the construction site to service the route, and no detours are possible.
- **Route #96: St Albans Link Express**. The earliest service run arrives at the project site at 5:50 a.m., potentially encountering construction activities; the remaining service is outside of the active construction period.

Impacts to the headways and route schedule are expected to be minimal, but it is recommended that the RE, contractor, and PIO communicate possible impacts to the transit agency prior to and throughout construction.

SCHOOLS

No specific impacts are anticipated as most associated uses at the schools will occur during the average weekday time period, from 7:00 a.m. to 7:00 p.m., which is outside of active construction periods. School events may need to be coordinated with the construction activities to minimize disruption for major sports or other events held at the school campuses.

SPECIAL EVENTS

Special events may occur throughout the year. Reasons for changing traffic patterns, examples of seasonal variation, and anticipated special events may include, but are not limited to, the events documented in Section 5.1.

UTILITIES

Several utilities will require relocation as a result of construction of this project:

- **Water Line Replacement**. The water line from South Park Drive to Mountain View Drive is to be replaced, requiring a deeper trench excavation along the outermost SB US-2/7 lane. The water service provider has indicated that enough redundancy exists within the water distribution system to not require temporary service during relocation. Replacement of the waterline may require lane closures during the 6:00 a.m. to 8:00 p.m. travel period due to the depth of excavation and potential blasting.

- **Relocated Aerial Electrical**. The primary aerial utility service north of the interchange is to be relocated, requiring coordination with several utility service providers. Service disruption is expected to be minimal as the new relocated poles can be set and hung prior to removal of the existing poles. Full roadway closure and rolling roadblocks may be required for the aerial service removal and relocation.
- **Underground Communications Conduit and Gas Line Replacement**. New conduit and gas lines are proposed in the existing outermost NB lane along US-2/7 from South Park Drive to Mountain View Drive. Service disruption is expected to be minimal as the new conduit and gas lines should be placed, pulled, and activated prior to removal of the existing service. Construction of the underground communications conduit may require lane closures during the 6:00 a.m. to 8:00 p.m. travel period to allow for concrete curing should the conduit require encasement in a concrete duct bank.
- **Underground Traffic Signal and Streetlight Conduit**. The existing NB ramp intersection and streetlights between this intersection and Mountain View Drive receives underground electrical service. The traffic signal systems between the SB ramps, NB ramps, and Mountain View Drive intersections are coordinated with an underground conduit hardwired connection. Functionality of these existing electrical and signal communication services will need to be maintained while installing the proposed streetlight and traffic signal system.

The RE should coordinate meetings with the contractor and utility representatives to ensure the timing of construction for the relocated utility systems while minimizing disruptions to existing service.

6.2 CONSTRUCTION STAGING AND MATERIAL TRANSPORT

A construction project of this size and scale typically requires a location for a jobsite trailer for construction administration purposes, portable toilets for construction workers, an equipment laydown area, material stockpile area, contractor parking, and other jobsite administrative and logistical considerations. A staging area has not been identified. Two potential locations for this activity may include:

- The property on the southwest corner of US-2/7 and Mountain View Drive.
- The newly constructed park-and-ride lot opposite Hercules Drive.

Many aggregate and asphalt materials may come from the quarry and asphalt plant located on Whitcomb Street within the PAC. All materials are expected to be delivered to the project site via US-2/7 or I-89, both principal arterials with a maximum allowable gross weight limits of 80,000 pounds. Refer to current Vermont Department of Motor Vehicle Motor Carrier Safety Regulations[7] for current size and weight regulations.

[7] Vermont Agency of Transportation, Department of Motor Vehicles. Administrative Rules, Administrative Rules of the Department of Motor Vehicles - APA Regulations, https://dmv.vermont.gov/enforcement-and-safety/administrative-rules.

7.0 WORK ZONE IMPACT MANAGEMENT STRATEGIES

This section provides an overview of the strategies to maintain safe and efficient travel through the work zone and reduce work zone impact on the road users, community, and businesses.

7.1 TEMPORARY TRAFFIC CONTROL

TTC consists of the following three elements to manage the traffic through the construction site: **traffic control strategies, traffic control devices,** and **innovative project coordination, contracting, and construction techniques**. The applicable TTC elements are explored below, and the application of any of these strategies, devices, and techniques should be documented by a daily TCP prepared by the contractor. The current and all previous daily TTC plans will be available for review by site safety representatives at any time.

TEMPORARY TRAFFIC CONTROL STRATEGIES

- **Night Work**. Most construction activities within the PAC are expected to occur during nighttime hours (8:00 p.m.–6:00 a.m.). This is due to the high volume of commuter traffic during daytime hours and to reduce vehicle/pedestrian/bicycle/ construction activity conflicts. The contractor should prepare a daily lighting plan to include work zone and presence lighting to inform and support the daily TCP.
- **Construction Phasing/Staging**. The project has been preliminarily phased into component sections to minimize work zone sprawl, construct features to reduce conflicts, and minimize construction duration. This phasing plan is discussed in greater detail in Section 5.0. Construction staging areas have not been identified, but two areas offer potential staging locations, as discussed in Section 6.2.
- **Lane Closures**. Lane closures are expected. Up to four lanes may be closed at any time on US-2/7, with the required associated ramp lane closures to ensure downstream lane capacity, as needed. There should be at least one lane open in each direction on US-2/7 at all times; full road closures or one-way operations are not recommended unless required for specific construction activities (utility relocation, overhead sign or signal installation). These activities should be assessed as to their level of impact on the traffic flow and mitigation proposed, as needed.
- **Rolling Roadblocks**. As required for blasting operations and utility relocation, rolling roadblocks along I-89 should be planned and executed in accordance with VTrans TEI 18-601.[8] Given the short distance between Exit 14 and Exit 16 (approximately 2.5 miles), work windows created by rolling roadblocks, as defined by TEI 18-601, may be less than 5 minutes.

  The contractor should develop a rolling roadblock plan to ensure sign placement and pacing distance is adequate for the required work time and traffic speeds.

[8] Vermont Agency of Transportation. Traffic Engineering Instructions (TEI), TEI 18-601, https://vtrans.vermont.gov/sites/aot/files/highway/documents/highway/TEI%2018%20-%20601%20Rolling%20Roadblock%20TTCP%20Guidance%20final.pdf.

- **Pedestrian and Bicyclist Path Installation**. No pedestrian or bicycle facilities exist in the project area. However, the contractor should construct a temporary path to separate pedestrian traffic outside of the roadway as early in the project as possible. The path should be a smooth, continuous, hard surface along the entire length of the temporary pedestrian facility. There should be no curb or abrupt changes to grade or terrain that could be a tripping hazard or barrier to wheeled travel.
- **Temporary Bridge-Mounted LED Lane-Use Control Signals.** The contractor may install temporary bridge-mounted LED Lane-Use Control Signals per the Manual on Uniform Traffic Control Devices (MUTCD) Chapter 4M to more clearly indicate closed lanes, relocated through and turn lanes, or other changing traffic patterns due to construction activities. The changeable signals may be advantageous due to the dynamic nature of the work zone.
- **Modification to Existing Traffic Operations**. The existing traffic signals in the primary area of construction (SB ramps, NB ramps, and Mountain View Drive) are coordinated and operate 24 hours a day in full control mode. It is recommended to place these signals in red flash mode and operate as three- or four-way stops in conjunction with lane reductions. Alternatives include temporary traffic signals and timing plans or UTOs directing traffic.

  Key regional intersections should be observed and monitored to evaluate the impact of diverted traffic. Signal timing changes may be warranted to mitigate the traffic pattern. Key intersections may include the following:

  - US-2/US-7 in Colchester (near Exit 17).
  - US-2/7/Blakely Road/Severance Road in Colchester.
  - I-89/VT-15 Ramps in Winooski.
  - US-2/7/Main Street/Spring Street in Winooski (to be coordinated with Main Street Reconstruction Project, if applicable).

TEMPORARY TRAFFIC CONTROL DEVICES

Temporary traffic control devices (TTCDs) are physical features placed in or near the roadway to guide and warn motorists, bicyclists, and pedestrians about the changing work zone conditions. All TTCDs shall be deployed in accordance with applicable Manual on Uniform Traffic Control Devices, VTrans, and American Association of State Highway Transportation Officials (AASHTO) standards and shall be deemed crashworthy per NCHRP Report 350 or the AASHTO Manual for Assessing Safety Hardware. Special consideration will be given to visibility in night work conditions; night work shall be in accordance with NCHRP Report 476. TTCDs should include, but are not limited to, the following:

- Lighting along roadway, intersections, and flagger and UTO stations for night work.
- Lighting along pedestrian walkways with overhead protection where necessary.
- Barricades, cones, barrels, and other channelizing devices.
- PCMSs and arrow boards.

- Rolling roadblocks with associated signs, UTOs, and other devices for implementation, per TEI 18-601.
- Flaggers and UTOs in high-visibility outerwear:
  - Flaggers are not permitted to control an intersection while a traffic signal is operational; flagging operations should not take place within 100 feet of an operational signal.
- Temporary pavement markings.
- Progressive warning lights.
- Red reflectors on TTC devices in the wrong direction.
- Temporary guide, warning, and regulatory signs.
- Temporary traffic lights.
- Temporary LED lane-use signals.

Applicable VTrans standards[9] should include, but are not limited to, the following:

- T-1: Traffic Control General Notes.
- T-2: Traffic Sign General Notes.
- T-10: Conventional Roads Construction Approach Signing.
- T-11: Construction Approach Signing Divided Highway One Lane Closed.
- T-12: Traffic Control Divided Highway One Lane Closed.
- T-17: Traffic Control Miscellaneous Details.
- T-21: Temporary Traffic Control for Three Lane Roadway Closure.
- T-28: Construction Sign Details.
- T-30: Construction Sign Details.
- T-31: Construction Sign Details.
- T-35: Construction Zone Longitudinal Drop-Offs.
- T-36: Construction Zone Longitudinal Drop-Offs for Paving.
- T-45: Square Tube Sign Post and Anchor.
- T-56: Standard Sign Placement.

Applicable MUTCD Typical Applications[10] of work zone TTCDs should include, but are not limited to, the following:

- TA-1: Work Beyond the Shoulder.
- TA-2: Blasting Zone.
- TA-21: Lane Closure on the Near Side of an Intersection.
- TA-22: Right-Hand Lane Closure on the Far Side of an Intersection.
- TA-23: Left-Hand Lane Closure on the Far Side of an Intersection.
- TA-24: Half Road Closure on the Far Side of an Intersection.
- TA-25: Multiple Lane Closures at an Intersection.
- TA-26: Closure in the Center of an Intersection.

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[9] Standard drawings may be downloaded here: http://vtrans.vermont.gov/cadd/downloads/standard-drawings

[10] US Department of Transportation, Federal Highway Administration. Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition Chapter 6H. Typical Applications, https://mutcd.fhwa.dot.gov/htm/2009/part6/part6h.htm.

- TA-27: Closure at the Side of an Intersection.
- TA-28: Sidewalk Detour or Diversion.
- TA-29: Crosswalk Closures and Pedestrian Detours.
- TA-30: Interior Lane Closure on a Multi-Lane Street.
- TA-31: Lane Closure on a Street with Uneven Directional Volumes.
- TA-32: Half Road Closure on a Multi-Lane, High-Speed Highway.
- TA-34: Lane Closure with a Temporary Traffic Barrier.

The daily TCP is site-specific and unique to each work zone and construction activity incorporating these and other standard drawings and typical applications as necessary. Additional VTrans Standard Drawings and MUTCD Typical Applications may be applicable based on the project plans, specifications, and specific construction activities.

PROJECT COORDINATION, CONTRACTING, AND INNOVATIVE CONSTRUCTION TECHNIQUES

It is possible to coordinate this DDI construction project at Exit 16 with several other construction projects, including the following:

- **Development of the Parcel at the Southwest Corner of Lower Mountain View and US-2/7**. This parcel may be a candidate for staging, equipment lay down, jobsite trailer, and employee parking if it remains undeveloped prior to construction of the DDI. It would be preferable to use the site prior to development to reduce the likelihood of damage during the construction process.
- **Utility Coordination**. This project is incorporating significant upgrades to the water line along US-2/7 and the aerial electric crossing of I-89 north of the project site.
- **Precast/Prefabricated Elements/Rapid Cure Materials**. Precast concrete blocks may be used for the retaining walls under the I-89 bridge and, if not applicable for this environment, rapid curing concrete may also be used, as specified. These products may reduce construction duration and traffic control demands.

TEMPORARY TRAFFIC CONTROL APPLICATIONS

All TTC applications must be approved by the RE in collaboration with the PM. The contractor should prepare a daily TTC plan with contingency for RE approval. At the end of the active construction period, the RE should prepare an evaluation report to document the effectiveness of the TTC plan at achieving the goal of the TMP.

7.2 PUBLIC INFORMATION

Public information strategies are intended to inform both the public **(public awareness strategies)** and those who are traveling through or near the construction area **(traveler information strategies)**. In general, both the content and the method of communication will be different between these two groups.

VTrans has assigned a PIO to be the official spokesperson of the construction project. The PIO has developed a Public Involvement Plan (PIP) addressing the components of the public awareness and traveler information strategies. Development, revision, and

implementation of the PIP should be transparent and available for review to maintain public confidence. The following discussion is intended to supplement the PIP, included as an Appendix 5 to this TMP.

PUBLIC AWARENESS STRATEGIES

Public awareness strategies are proactive outreach procedures developed for nearby residents, commuters, and businesses to disseminate project details, schedule, potential impacts, upcoming activities, and overall project progress leading up to and during construction. An effective public information campaign will also serve to reduce travel demand through the corridor.

The following public awareness strategies may be the responsibility of the designated Public Relations/Information Officer (see Table 5):

- Media spokesperson to prepare and distribute press releases and 511VT updates.
- Curated and updated project webpage/Facebook/Twitter/social media presence.
- Coordination with schools/businesses/universities and tabling events at nearby businesses.
- Movie theater ads/short videos.
- Webcams, drone footage, and time-lapse videos to allow interested parties to witness and monitor construction progress.
- Communicating potential work zone impacts to emergency service agencies, transit providers, and other stakeholders.
- Develop and distribute educational information on how to drive the DDI.
- Regular email updates and Front Porch Forum updates.
- Informational campaign leading up to traffic pattern transition.
- Regular updates to public officials in Colchester and Winooski.

A project website (http://www.exit16ddi.vtransprojects.vermont.gov/) describes the project, explains project history and development, provides educational materials, and answers frequently asked questions about the project. It is anticipated that this website will be updated frequently as the project proceeds through construction.

TRAVELER INFORMATION STRATEGIES

Traveler information strategies inform motorists, bicyclists, and people walking who have already embarked on an anticipated trip through the construction project site. The strategies should allow trip rerouting away from the project area (if possible), inform travelers of the approaching construction site, and maintain traveler safety, expectations, and perceptions while traveling through the work zone. All messages should be kept updated.

- Media alerts to incidents (Twitter, 511VT, Facebook, news outlets).
- PCMS, potentially integrated with Bluetooth travel time monitors to provide real-time travel conditions to motorists.
- Temporary motorist information signs.

The PIO will work with VTrans and the contractor to identify the range of monitoring that will be required to quickly and efficiently implement these strategies. During peak commute periods, information dissemination on actual travel conditions, particularly around incident management, are time sensitive and require quick execution.

7.3 TRANSPORTATION OPERATIONS

Transportation operations strategies are intended to mitigate the effects of construction and the work zone area on the transportation system. They include four main elements: **demand management strategies, corridor/network management strategies, work zone safety management strategies,** and **traffic/incident management and enforcement strategies**.

DEMAND MANAGEMENT

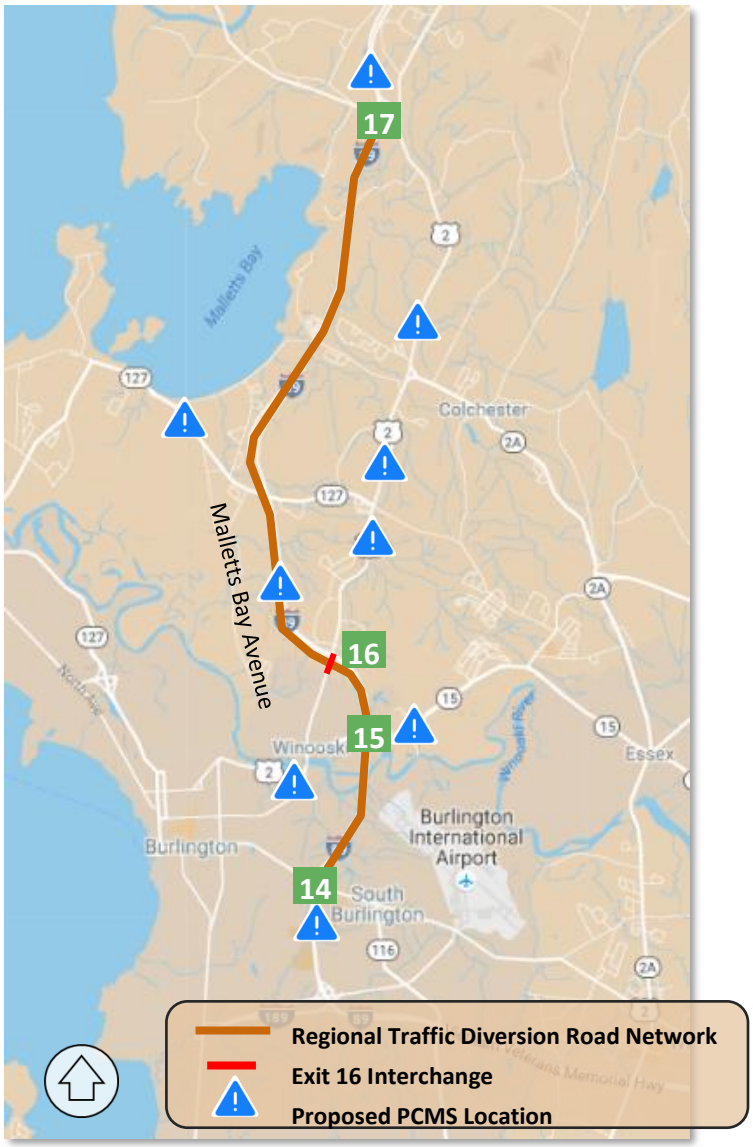
Demand management encourages strategies to reduce regional traffic volumes in the construction project area. The strategies include the following:

- **Increase public awareness** through the previously discussed public information process.
- **Promote transit and ridesharing opportunities** on the project webpage/Facebook page/social media presence and as part of the previously developed public information process. The contractor, PIO, and VTrans may investigate these as methods to reduce vehicle demand within the PAC:
  - Use of transit: Evaluate ways to increase transit demand to encourage multi-occupant vehicle trips during construction. Subsidized bus passes could be purchased for employees within a certain distance from the project area and retailers could provide trip validation or refunds for bus riders.
  - Use of ridesharing/carpooling.
- **Implement a SWZ system** to monitor queues and travel times. Significant elements of this SWZ should include the following:
  - Portable queue detection and video surveillance.
  - Bluetooth travel time detectors and processing.
  - Web-based control system and graphical user interface.
  - Traffic signal interconnection to adjust maximum green time, as needed.

  All SWZ hardware should be wirelessly interconnected and solar powered for continuous operation throughout construction. Real-time SWZ data should be collected and available to the RE and VTrans to evaluate work zone travel performance measures.
- **Deploy PCMS in advance of critical decision points** to allow motorists to modify their route prior to traveling through the corridor and better anticipate the level of congestion and travel conditions. The PCMSs should be activated at least two weeks prior to the beginning of construction and should remain in place for the duration of active construction. The following PCMS locations are proposed (Figure 14:):

1. North of Exit 17 for SB I-89 motorists.
2. North of Exit 16 for SB I-89 motorists.
3. West of Mallets Bay Avenue along Blakely Road.
4. South of Exit 14 for NB I-89 motorists.
5. East of Exit 15 along VT-15 for westbound motorists.
6. Entering Winooski from Burlington, along Riverside Avenue or Colchester Avenue.
7. Along US-2/7, north of project area for SB travelers at critical decision points: north of VT-2A, north of Severance Corners, and prior to the work zone.

FIGURE 14: PROPOSED PCMS LOCATIONS



The contractor may also reserve PCMSs to be used within the work zone to communicate with drivers already inside the construction area.

All PCMSs should be connected into the SWZ. The sign messages should be able to be modified in real time to reflect actual conditions. Connectivity and coordination of signs and monitoring devices should be addressed prior to deployment in a SWZ Deployment Plan to be prepared by the contractor.

VTrans is likely to install and activate a Roadway Weather Information System (RWIS) along I-89 near Exit 16. The RWIS will likely include permanent changeable message signs for SB travelers north of Exit 16 and for NB travelers south of Exit 15. These signs may be integrated into the PCMS deployment plan.

PCMS messages are preferred to be two phases, or screens of text. Each phase should consist of no more than three lines of text and eight characters per line. Guidance on phase timing and cycles can be found in Chapter 2L of the MUTCD.[11] The PCMS board should provide current information that reflects changing condition of the work being performed. Messages should be revised regularly.

CORRIDOR/NETWORK MANAGEMENT

Corridor management techniques encourage optimization of the existing road network and facilities to maximize traffic efficiency through the construction project area.

- **During active construction** in the nighttime hours (8:00 p.m.–6:00 a.m.) the work zone will be in effect. The work zone may consist of reduced lanes and modified intersection controls (all-way stop control, UTO, temporary signals) that may increase delay to motorists to an allowable level as defined in Section 8.0. This increased delay is unavoidable and intended to be managed to within reasonable levels as set forth in this TMP.
- **Outside of active construction** the work zone should be taken down for daytime hours (6:00 a.m.–8:00 p.m.); this should allow the entire existing road network to operate in the fully open condition during the peak hours. Some additional delay may be expected due to changes in the environment and road surface, but these delays should be minimized and monitored as set forth in Section 8.0, including signal timing modifications and queue detection.
- **During the traffic crossover** when the traffic pattern switches from traditional to DDI traffic flow, PCMSs and a UTO are recommended in advance of the transition to inform motorists of the new traffic pattern, slow motorists, and direct traffic to the new traffic pattern, as needed. These should be preceded by an information and educational campaign.

[11] US Department of Transportation, Federal Highway Administration. Manual of Uniform Traffic Control Devices (MUTCD), 2009 Edition Chapter 2L. Changeable Message Signs, https://mutcd.fhwa.dot.gov/htm/2009/part2/part2l.htm.

WORK ZONE SAFETY MANAGEMENT

Work zone safety management seeks to reduce conflicts between traveling vehicles and construction activities within the construction project area. The applicable management strategies include the following:

- Speed limit reduction in advance of and through the construction site.
- Temporary traffic signals, as appropriate.
- Temporary traffic barrier, as appropriate.
- Visual barriers to daytime construction activity to minimize rubbernecking, if needed.
- Warning lights/bright nighttime lighting. Work zone lighting should meet prescribed foot-candle levels based on work activity and prevent glare to motorists entering and exiting the work area; refer to NCHRP Report 476.
- TMP monitoring and inspection.
- Identifying a construction safety supervisor.
- Project on-site safety trainings for all construction workers, engineers, and visitors.

INCIDENT MANAGEMENT

Incident management strategies detect and respond to incidents to minimize impacts to the construction project area. The applicable management strategies include the following:

- Implementation of SWZ and intelligent transportation system strategies, including the following:
  - Real-time queue detectors on the off-ramps to prevent queue spillback onto I-89.
  - Bluetooth or other real-time travel time monitoring to collect travel time performance measurement data.

  The data collected through these systems should be continuously monitored with automatic alerts notifying the contractor, RE, and PIO of unacceptable levels of congestion that may increase the likelihood of a crash. The Operations and Safety Bureau within VTrans should be given access to the data for research and/or monitoring. Refer to Section 8.1 and Section 8.2 for additional requirements of the SWZ and traffic data collection system.
- Coordination with media organizations, social media, and other emergency alerts.
- Identifying an incident/emergency management coordinator.
- Maintaining a current incident/emergency response plan.
- Increased penalties for work zone violations; advance work zone warning regulatory signs must be used, and an approved temporary speed limit certificate must be obtained prior to installation of such signs.
- Communicating with the VTrans Maintenance District to coordinate traffic diversions, if needed.
- Increased police presence and enforcement.

In addition to the daily TCP, the contractor should prepare a contingency plan relevant to the implemented TCP to manage incidents that may occur during active construction periods. The contingency plan should receive updates, as necessary, to remain relevant to the TCP. The plan should identify ways to minimize traffic impacts when unexpected events occur. The contractor's contingency plan should identify immediate steps to accomplish the following:

1. Redirect traffic away from the incident.
2. Avoid queue spillback onto I-89.
3. Provide current information on PCMSs.
4. Work toward reopening the roadway to traffic as soon as safe to do so.

At project inception, the contractor and RE should identify and discuss key project risks and effects on traffic operations, safety, mobility, and response strategies. The contingency plan, developed by the contractor, should identify traffic management strategies based on specific traffic control layout, locations of PCMSs, and work zone arrangements. Central to contingency planning and risk management are redundancies in the system to enable a multifaceted response to incidents and unlikely but significant issues.

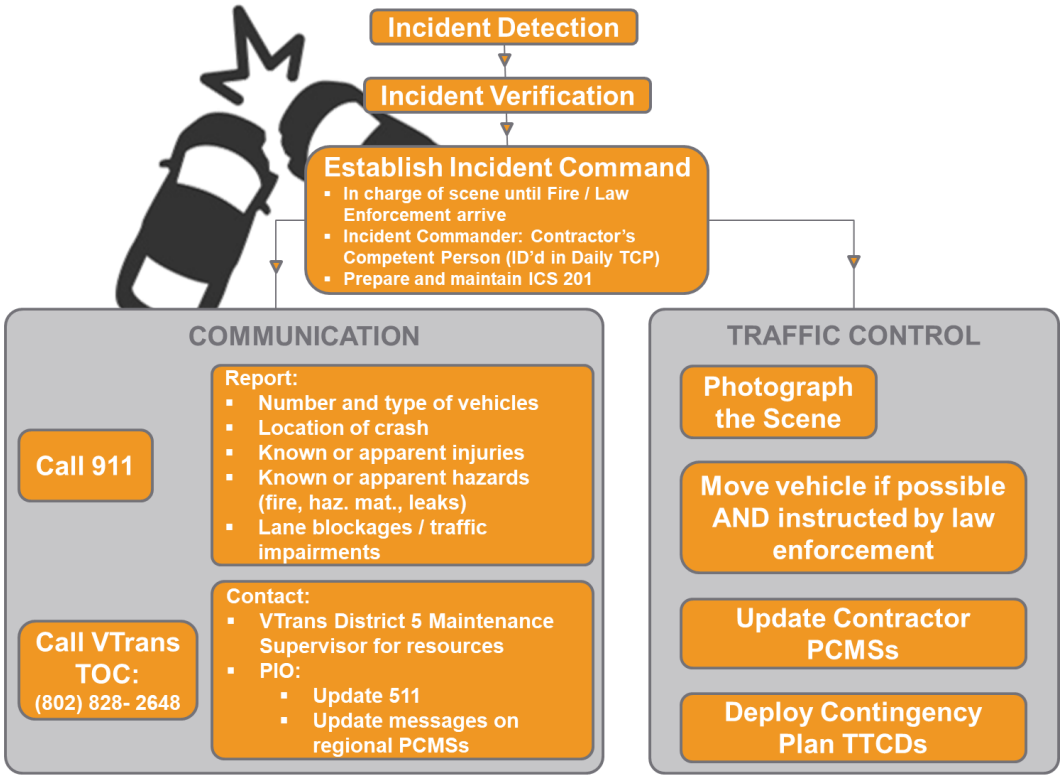
Incident detection should occur through construction zone observation, TMP monitoring and SWZ alerts, or through official channels like the state or local police departments, DTA, or another representative. Any detected incident should be addressed immediately. The first step should be to verify the incident, identify the cause of the incident, and classify the incident as minor or major.

FEMA Incident Briefing form ICS 201 should be completed by the Incident Commander to document the incident situation and response. The contractor's Safety Officer and Competent person should both be trained to act as the Incident Commander and prepare and maintain ICS 201. According to the ICS 201:

> The Incident Briefing (ICS 201) provides the Incident Commander (and the Command and General Staffs) with basic information regarding the incident situation and the resources allocated to the incident. In addition to a briefing document, the ICS 201 also serves as an initial action worksheet. It serves as a permanent record of the initial response to the incident.[12]

[12] Federal Emergency Management Agency, Incident Briefing (ICS 201), p. 5, https://www.fema.gov/media-library-data/20130726-1922-25045-4125/ics_forms_201.pdf.

FIGURE 15: INCIDENT/EMERGENCY RESPONSE FLOWCHART

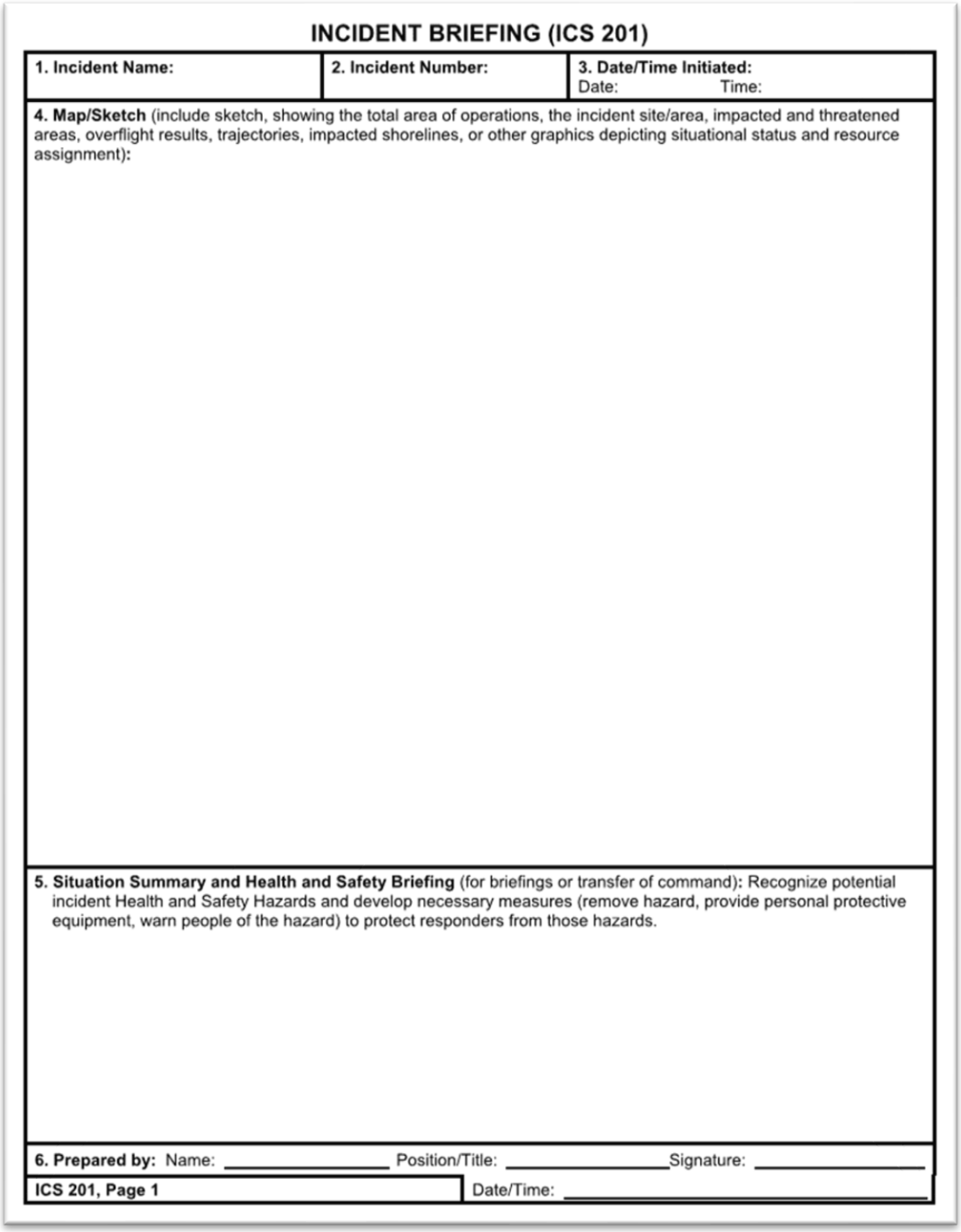


If the incident is a result of unexpected traffic demand, the contractor should modify the TTCDs to alleviate the congestion, as documented by the TMP monitoring strategies. If the incident is the result of a crash within or adjacent to the construction site, the contractor shall contact emergency personnel (911) immediately. The contractor should not remove disabled vehicles unless directed by emergency service responders. The contractor should maintain a contact list of standard-duty and heavy-duty towing companies to remove disabled vehicles when authorized by emergency service responders.

In the event of an emergency or traffic crash, state police and local emergency service personnel shall have the authority to direct traffic management operations. The contractor should serve a support role to first responders providing additional traffic control devices or labor, as needed.

The contractor, the RE, VTrans Operations and Safety Bureau, and other relevant parties should meet within 24 hours of the incident to debrief on the incident. The meeting should discuss the application of the TMP, review the SWZ traffic data preceding the crash, the procedures of the contingency plan, and discuss any changes necessary to reduce the likelihood of future incidents and improve the contingency plan and incident response.

FIGURE 16: EXCERPT OF ICS 201



INCIDENT BRIEFING (ICS 201)

1. Incident Name:	2. Incident Number:	3. Date/Time Initiated: Date: Time:

4. Map/Sketch (include sketch, showing the total area of operations, the incident site/area, impacted and threatened areas, overflight results, trajectories, impacted shorelines, or other graphics depicting situational status and resource assignment):

5. Situation Summary and Health and Safety Briefing (for briefings or transfer of command): Recognize potential incident Health and Safety Hazards and develop necessary measures (remove hazard, provide personal protective equipment, warn people of the hazard) to protect responders from those hazards.

6. Prepared by: Name: _____ Position/Title: _____ Signature: _____

ICS 201, Page 1 Date/Time: _____

The contractor's contingency plan should include preparation and maintenance of ICS 201 through the duration of the incident.

8.0 TMP MONITORING

This TMP provides guidance for acceptable traffic performance measures. This section documents existing traffic performance levels and sets out minimum performance levels during active construction activity (8:00 p.m.–6:00 a.m.) and outside of the active construction period (6:00 a.m.–8:00 p.m.). This section also identifies the recommended monitoring programs to evaluate the effectiveness of this TMP.

The TMP is intended to be implemented, monitored, and updated throughout construction. It is important that the contractor's TMP Implementation Manager has sufficient authority to implement the TMP, as approved, and to adjust the traffic control and traffic operations to maintain the mobility through the work zone in accordance with the performance standards established. The TMP implementation should be reported on at each project meeting throughout the construction phase.

Both the contractor and the Agency have a role in the monitoring of the TMP. The TMP Monitoring Task Leaders should work together to monitor and consider adjustments to improve the effectiveness of the TMP. The contractor's TMP Monitoring Task Leader has the primary responsibility to maintain the elements of the TMP throughout construction. The Agency's TMP Monitoring Task Leader should be providing independent verification of the TMP implementation. The Agency's TMP Implementation Manager should have sufficient authority to review and approve changes to the TMP throughout construction, as needed.

Monitoring the TMP is comprised of two parts: 1) verification that the approved TMP is being followed; and 2) review of the effects of the TMP on travel behavior and operations. An approved TMP that is not being followed is a liability to both the contractor and the Agency. Similarly, an approved TMP that is creating unusual or unsafe travel behaviors or violates a driver's expectations has the potential to cause driver confusion and may lead to work zone crashes that should be avoided.

The measurement of a working TMP should be based on performance standards that are agreed to by the contractor and the Agency prior to the start of construction. This section provides some performance standards to be considered and evaluation methods to measure the TMP performance against those standards.

8.1 CONSTRUCTION ZONE PERFORMANCE MEASURES

Several performance measures have been identified for monitoring through the construction process. Background documentation on the development of these performance measures is provided in Appendix 4. These measures include the following:

- Average travel time.
- Queue lengths.
- Crashes.
- Roadway surface condition.

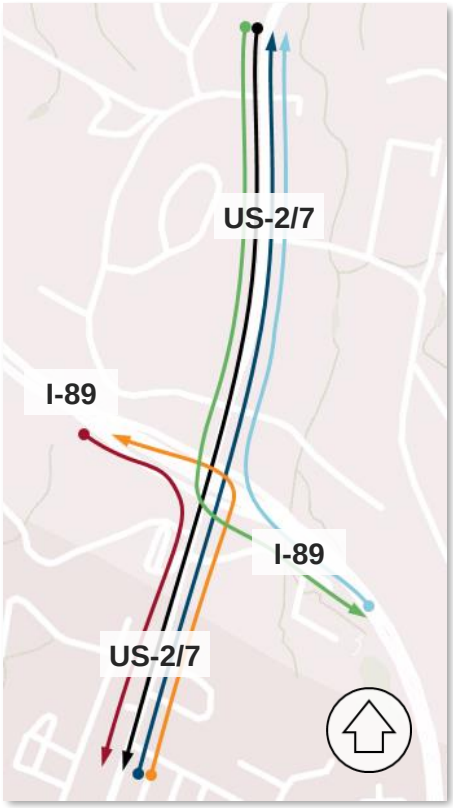
AVERAGE TRAVEL TIME

The average travel time through the corridor is recommended to be monitored in real time throughout construction. The acceptable travel time through the corridor was decided as the existing peak travel time through the corridor with an additional delay added associated with a 10% reduction in roadway capacity. This travel time has been determined to be an acceptable threshold during active construction periods and was estimated through detailed microsimulation traffic modeling. (This threshold is significantly more stringent than the maximum delay of 10 minutes specified in VTrans Standard Specification 104.04(b).) The average travel times through the corridor are documented in Figure 17.

Performance Measure Target

- Increases in travel times 10% greater than the values listed in Figure 17.

FIGURE 17: MAXIMUM ACCEPTABLE CORRIDOR TRAVEL TIMES



Movement			Travel Time (s)	Travel Time + 10%
US-2/7	NB US-2/7 → I-89 NB on-ramp	●	130	143
	NB US-2/7 Thru	●	162	178
	SB US-2/7 → I-89 SB on-ramp	●	143	157
	SB US-2/7 Thru	●	176	194
I-89	NB I-89 → Exit NB on US-2/7	●	119	131
	SB I-89 → Exit SB on US-2/7	●	142	156

QUEUE LENGTH

The queue (standing vehicle) length is recommended to be monitored in real time throughout construction. The two queue approaches recommended for monitoring include the I-89 NB and SB off-ramps, with the intention that neither ramp impedes free-flowing I-89 traffic conditions.

Currently, the NB off-ramp queue length does occasionally exceed this threshold in the existing PM peak hour. The efforts to eliminate queuing on the ramps may negatively impact the travel time for some approaches during these peak hours outside of active construction periods. This impact should be addressed as it is identified and quantified in the field.

If queue spillback continually impacts I-89, end-of-queue protection should be provided in advance of the off-ramp entrance on I-89. Temporary end-of-queue protection may include a UTO in the peak periods or installation of a "RAMP TRAFFIC STOPPED AHEAD" sign with "WHEN FLASHING" supplementary plaque and beacons connected to the queue detection system to flash whenever the queue exceeds the identified target (Figure 18).

FIGURE 18: END OF QUEUE WARNING DEVICE IN ADVANCE OF EXIT 12 SB OFF-RAMP

Performance Measure Target

- Vehicle queues affect mainline I-89 operations.
- Vehicle queues affect Winooski Circulator or Spring Street intersection operation.[13]
- Vehicle queues affect Severance Corners (US-2/7/Blakely/Severance).

CRASHES

The US-2/7 corridor experienced 201 reported crashes between Tigan Street and Hercules Drive from January 1, 2011 to January 1, 2016, or approximately 40 crashes per year, or 3–4 crashes per month. During the 18 months of construction, a slightly higher rate of crashes can be expected. It is estimated that the crash rate may increase 10% associated with the additional congestion in the project area. Although the overall number of crashes may increase, with an overall reduction in traffic speeds it is anticipated that the severity of these crashes should remain the same or lessen.

The RE, contractor, and VTrans Construction Occupation Safety Technician should review the circumstances of all crashes with law enforcement and emergency services. If there are any crashes resulting in death or significant injury, all work should stop immediately until any contributing factors to the crash relating to the construction zone can be determined with

[13] Winooski Main Street Reconstruction Project may impact reliability of queue development along Main Street in Winooski as a reasonable performance measure.

necessary mitigating actions completed. Traffic control layout and practices, including flagger and UTO positions, should be documented daily to assist in this review.

Specific safety measures associated with nonmotorized crash protection should be evaluated at the start of each day. Crossing locations, visibility, and normal everyday precautions in the TTC should be reviewed in terms of safety and travel operations.

Performance Measure Target

- Crash rate should not exceed 110% of the pre-project monthly average.

ROADWAY SURFACE CONDITION

The roadway surface condition is expected to deteriorate during construction. However, unacceptably poor surface conditions may affect travel times outside of the construction activity periods and may result in higher likelihood of crashes. Unacceptable surface conditions include the following:

- Unpaved (gravel) surface condition for more than 24 hours without continuing/adjacent work planned during the following construction period. When work is completed in a logical paving region, the unpaved surface should be paved with a temporary wearing course and temporary striping. The intention of this condition is to limit the extent of unpaved surfaces at any time within the work zone while also minimizing the number of paving crew mobilizations necessary to install temporary wearing courses.
- Cold planed/grooved asphalt without lane markings for any period of time.
- Unpaved (gravel) surfaces spanning more than two lanes along the length of the roadway open to traffic for any period of time without clear lane designations. The intention of this condition is to ensure drivers understand the number of lanes, lane boundaries, and turn-lane designations when open to traffic.
- Temporary or permanent surfaces spanning lanes without lane markings for any period of time.
- Unpaved (gravel) surfaces over a weekend or holiday.
- Excessive aggregate tracking onto paved surfaces.
- Stormwater impacting the levelness of unpaved (gravel) surfaces.

Performance Measure Target

- Presence of the above conditions at the end of daily construction.

8.2 MONITORING REQUIREMENTS

The following monitoring requirements should be incorporated into the construction contract and bid documents. The monitoring efforts, equipment, installation, maintenance, signal modification and programming, data processing, server hardware, professional services and software support for the items below should be considered incidental to SWZ contract pay items:

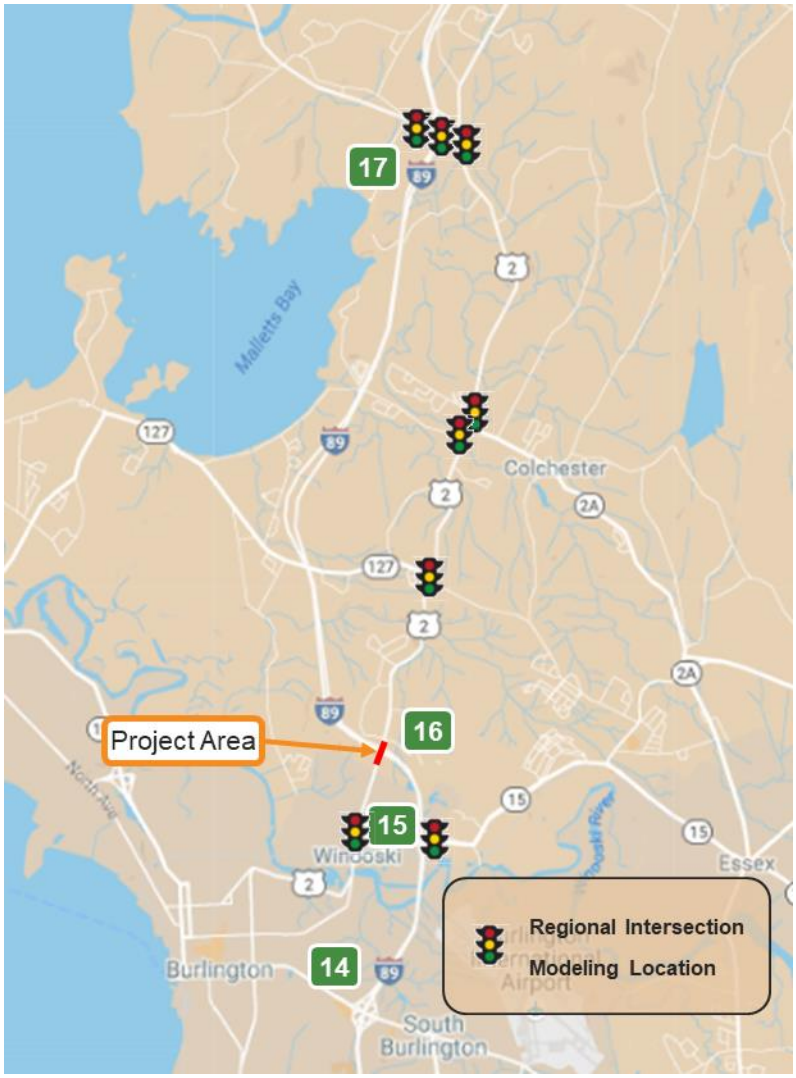
- **Real-Time Travel Time Monitoring**. Travel time monitoring through the corridor for the six identified routes below should be conducted using integrated Bluetooth detectors. The Bluetooth detectors should automatically upload the collected data to an online encrypted server, and the data should be available for monitoring, analyzing, and visualizing on a web-based platform, available to the contractor, RE, PIO, VTrans Operations and Safety Bureau, and other parties as needed 24 hours a day, 7 days a week throughout construction.

  The CCRPC may be able to provide regional travel time information through the project area based on several existing Bluetooth detectors. VTrans owns several iCone-brand smart TTCDs. The contractor and the provider of travel time traffic data analysis are advised to coordinate with the CCRPC regional Advanced Traffic Modeling System (ATMS) and VTrans to coordinate and incorporate traffic data collection techniques, as appropriate.

  The real-time travel time monitoring should be used to determine if the construction work zones are unacceptably delaying traffic. Thirty-minute rolling averages of the instantaneous reports should be used to adjust the work zone, as needed, to achieve the required travel time.
- **Real-Time Queue Detection**. Queue monitoring cameras should be installed on the NB and SB off-ramps. The cameras should be positioned to monitor queues backing up the ramps. When acceptable queue lengths are exceeded, the maximum green on the ramp legs should be extended for the next cycle to ensure the queue clears. The signal timing necessary for this extension should be coordinated with the DTA, RE, VTrans Operations and Safety Bureau, and VTrans Traffic Signal Unit. In addition to signal timing changes, the contractor and RE should monitor on-site conditions and continue to modify the TCP if queues persist.
- **Crash Evaluation**. Crash reports shall be prepared and reviewed following every crash incident within or approaching the construction zone as outlined in the Incident Management Section. A 30-day running monthly crash total should be recorded. The Vermont State Police shall be engaged prior to the project inception to outline a responsible party for collecting and maintaining these data.
- **Daily Surface Condition Reporting**. At the end of every active construction period, the contractor should prepare a schematic of the surface condition that notes lane markings, exposed aggregate sections, and pavement condition, as appropriate. The RE should review the reports and note unacceptable conditions for the contractor to correct.
- **Regional Intersection Monitoring**. VTrans signal staff should observe and adjust regional traffic signals periodically throughout construction to mitigate changes to regional traffic patterns as motorists divert through other signals to avoid the Exit 16 construction site. These regional intersections include the following:
  - US-2 and I-89 Exit 17 in Colchester.
  - US-2 and US-2/7 (Chimney Corner) in Colchester.
  - US-2/7 and VT-2A (Main Street) in Colchester.

- US-2/7 and Blakely Road/Severance Road in Colchester.
- US-2/7 (Main Street) and Spring Street in Winooski[14]
- VT-15 and I-89 Exit 15 in Winooski.

FIGURE 19: REGIONAL INTERSECTION MONITORING LOCATIONS



Additional intersections may warrant monitoring based on changes in traffic demand associated with the construction project.

8.3 EVALUATION REPORT

The RE should prepare a daily TCP evaluation report that documents the application of the contractor's daily TCP and notes the achievement of the performance measures above. The contractor and RE should discuss unmet performance measures and develop a plan to meet the performance measures or adjust the targets to a reasonable measure.

[14] To be coordinated with the Main Street Reconstruction Project in Winooski, if applicable.

The daily TCP evaluation report, to be prepared by the RE, is intended to be a short supplemental form to the contractor's daily TCP. The TCP evaluation report is intended to document the implementation of the TCP and installation of the associated TTCDs as planned, and periodically record the performance measures. The evaluation report template should have an opportunity for the RE to document approval of the daily TCP and record observed data related performance measures such as travel time, queue length, and roadway surface condition. Figure 20 and Figure 21 present an example TCP evaluation report form.

FIGURE 20: EXAMPLE OF A DAILY TCP EVALUATION REPORT (PART 1)

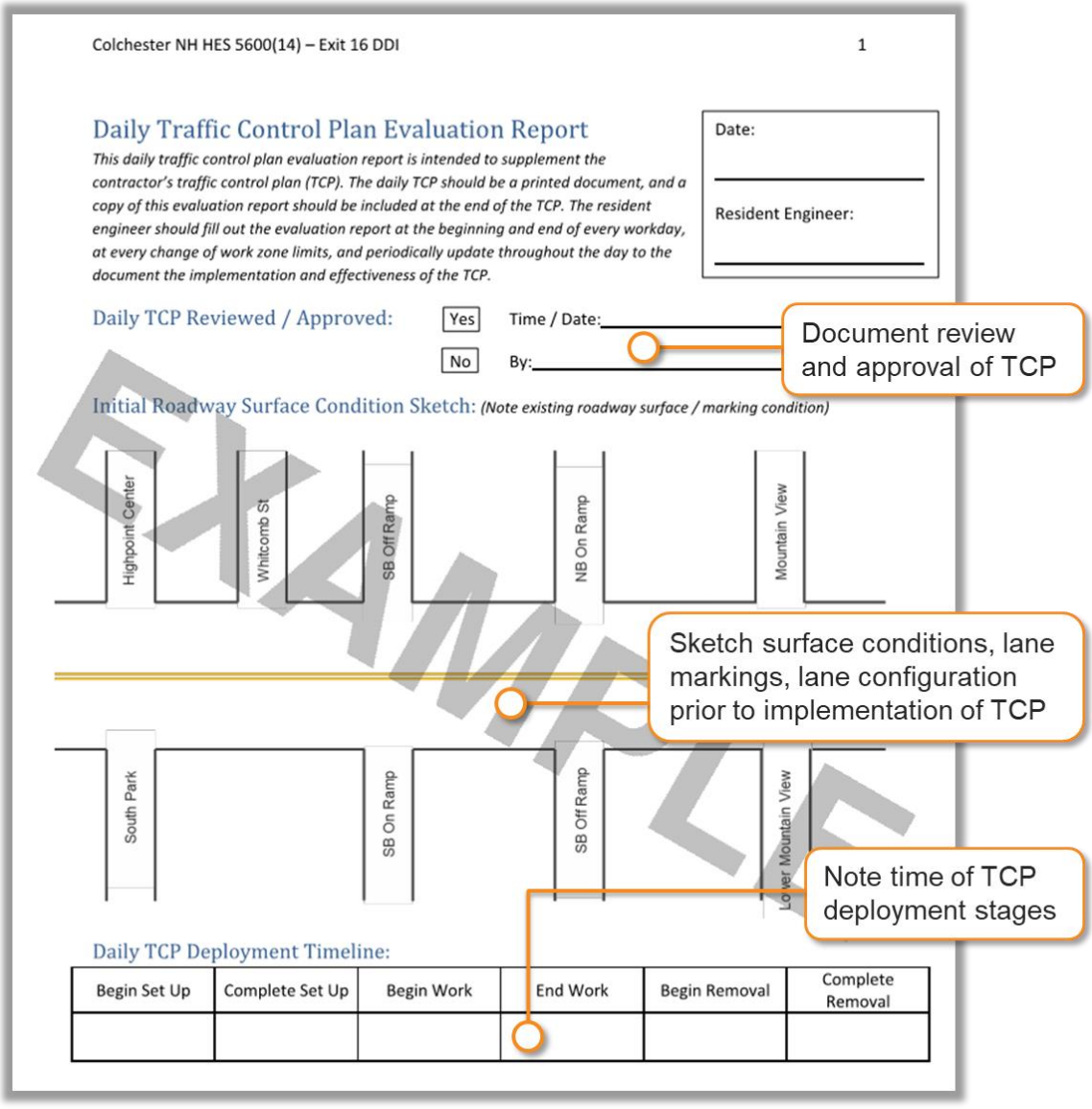
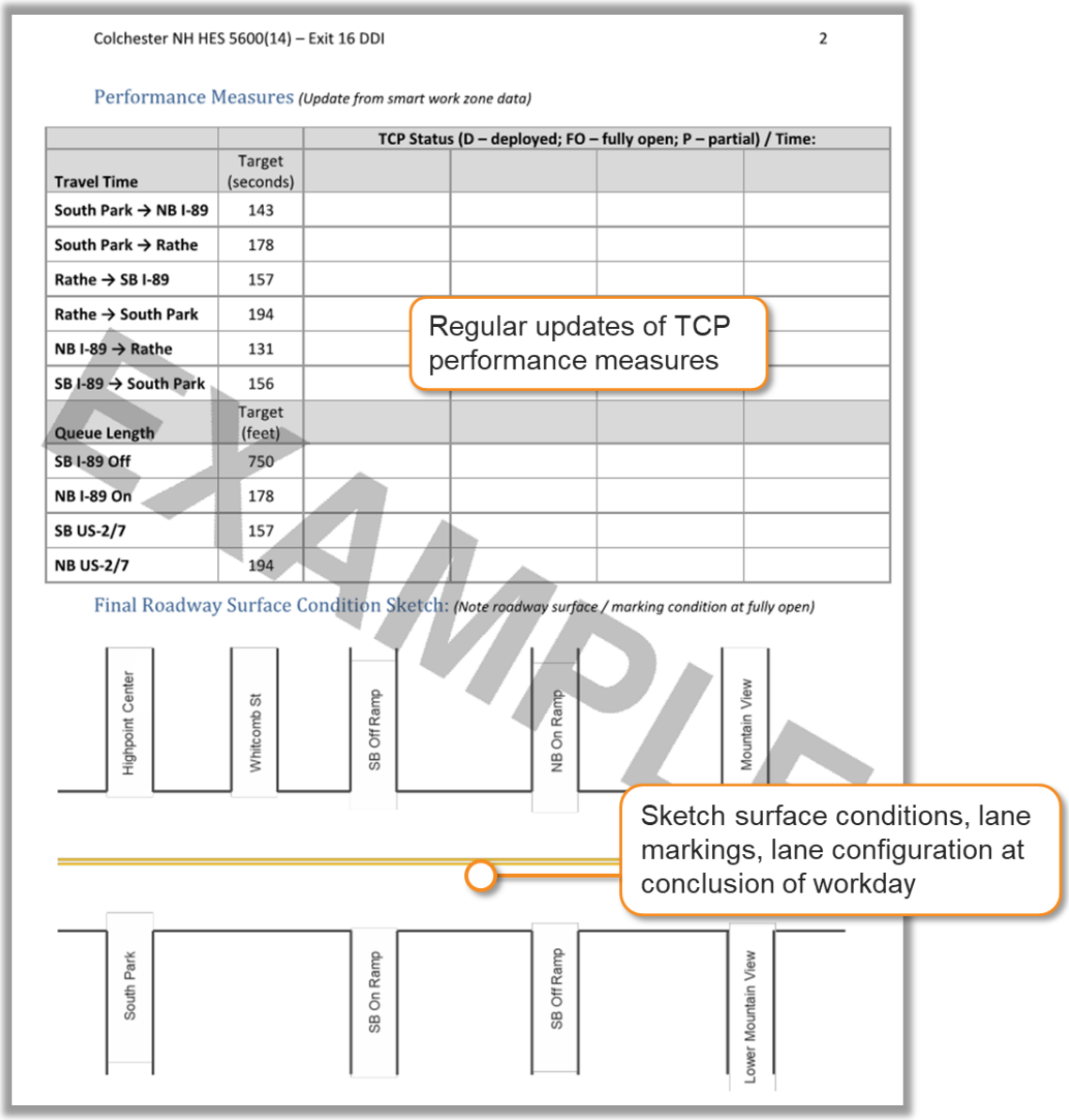


FIGURE 21: EXAMPLE OF A DAILY TCP EVALUATION REPORT (PART 2)



Colchester NH HES 5600(14) – Exit 16 DDI 2

Performance Measures *(Update from smart work zone data)*

		TCP Status (D – deployed; FO – fully open; P – partial) / Time:			
Travel Time	Target (seconds)				
South Park → NB I-89	143				
South Park → Rathe	178				
Rathe → SB I-89	157				
Rathe → South Park	194				
NB I-89 → Rathe	131				
SB I-89 → South Park	156				
Queue Length	Target (feet)				
SB I-89 Off	750				
NB I-89 On	178				
SB US-2/7	157				
NB US-2/7	194				

Regular updates of TCP performance measures

Final Roadway Surface Condition Sketch: *(Note roadway surface / marking condition at fully open)*

Sketch surface conditions, lane markings, lane configuration at conclusion of workday

9.0 ESTIMATED IMPLEMENTATION QUANTITIES

Table 10 estimates the major elements and equipment required to implement the described work zone. These items and quantities do not represent bid items or quantities. Actual items and quantities will depend on the traffic control strategies employed by the contractor; the methods of measurement and payment will be documented in the project plans and specifications.

TABLE 10: ESTIMATES OF THE MAJOR ELEMENTS AND EQUIPMENT REQUIRED TO IMPLEMENT THE DESCRIBED WORK ZONE

DESCRIPTION	UNIT	ESTIMATED VTRANS QUANTITY	ESTIMATED CONTRACTOR QUANTITY
PCMS: Static	Week	--	585
PCMS: Movable	Week	--	8
Temporary Bridge-Mounted LED Lane-Use Control Signals	Each	--	12
Queue Detection—System	Lump Unit	--	1
Queue Detection—Devices	Each	--	2
BT Travel Time—System	Lump Unit	--	1
BT Travel Time—Devices	Each	--	6
End-of-Queue Warning	Each	--	2
SWZ Maintenance	Lump Unit	--	1
UTO—Advance	Hour	--	6,500
UTO—Enforcement	Hour	--	325
Flaggers	Hour	--	19,500
Daily Mob/Demob of Work Zone	Day	--	325
Traffic Control Equipment	Lump Unit	--	1
Daily TCP Development	Hour	--	325
Traffic Engineer	Hour	--	325
Daily TMP Monitoring Worksheet	Hour	325	--

10.0 TMP APPROVAL AND CHANGE PROCESS

The Regional Construction Engineer and Traffic Operations Engineer have the primary authority to review and approve the TMP. It is anticipated that the TMP should be formally reviewed at the completion of the Final Design phase and Contract Plan submission in consultation with a constructability expert. Once approved in writing by the Agency, any changes to the TMP must follow the TMP Change Process indicated below.

Two types of changes may be required to the TMP throughout construction: minor modifications and major modifications. An example of a minor modification could be modifying the location of a traffic control device or the adjustment of a SWZ unit. Any minor modification should be discussed between the TMP Monitoring Task Leaders and approved by the RE. The RE should determine if the TMP change requires notifying the PIO. Any approved minor modification should be documented in the next project meeting notes and in the contractor's biweekly TMP reports. An example of a major modification could be changes to the sequence of construction, traffic control phasing, or allowable times for lane closures. Major modifications should be prepared in writing and submitted to the TMP Implementation Managers for review and discussion. Upon the Agency's written approval, the TMP should be updated with the next Revision number and the modification should be implemented.

Approvals:

Regional Construction Engineer

Signature Date

Name

Traffic Operations Engineer

Signature Date

Name

Revision#	Initials	Date	Revision#	Initials	Date
1			1		
2			2		
3			3		

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