VT 2A - VT 289 Interchange Scoping Study

Essex, Vermont

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Final Scoping Report

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This study is the result of the support and strong interest of the Project Committee Members. Much of the background, history, local input, existing conditions, and consensus documented in the study is attributed to the Committee member's involvement. The study's quality and success is due to their contributions.

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1.0 Introduction

The Town of Essex has obtained transportation planning assistance from the Chittenden County Regional Planning Commission (CCRPC) to complete a scoping process for alternatives to improve the area around the existing VT 2A/VT 289 partial interchange. This interchange is the northwestern termination of VT 289, also known as the "Chittenden County Circumferential Highway" (CCCH). The scoping process includes working with a project committee, soliciting public input, establishing the project purpose and needs, evaluating alternatives, and seeking endorsement of a preferred alternative. The project committee consists of:

Dennis Lutz – Town of Essex
Jason Charest – Chittenden County Regional Planning Commission
Christine Forde – Chittenden County Regional Planning Commission
Joshua Shultz – Vermont Agency of Transportation
Richard Hosking – Vermont Agency of Transportation
Thad Luther – Stantec Consulting Services Inc.
Greg Edwards – Stantec Consulting Services Inc.
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The project area is approximately a 2,000 foot long section of VT Route 2A, beginning south of Susie Wilson Bypass and extending northward past the VT 289 off-ramp. Sections of Susie Wilson Bypass and the on and off-ramps are also included in the project area. See Figure 1 for the approximate project area boundary.

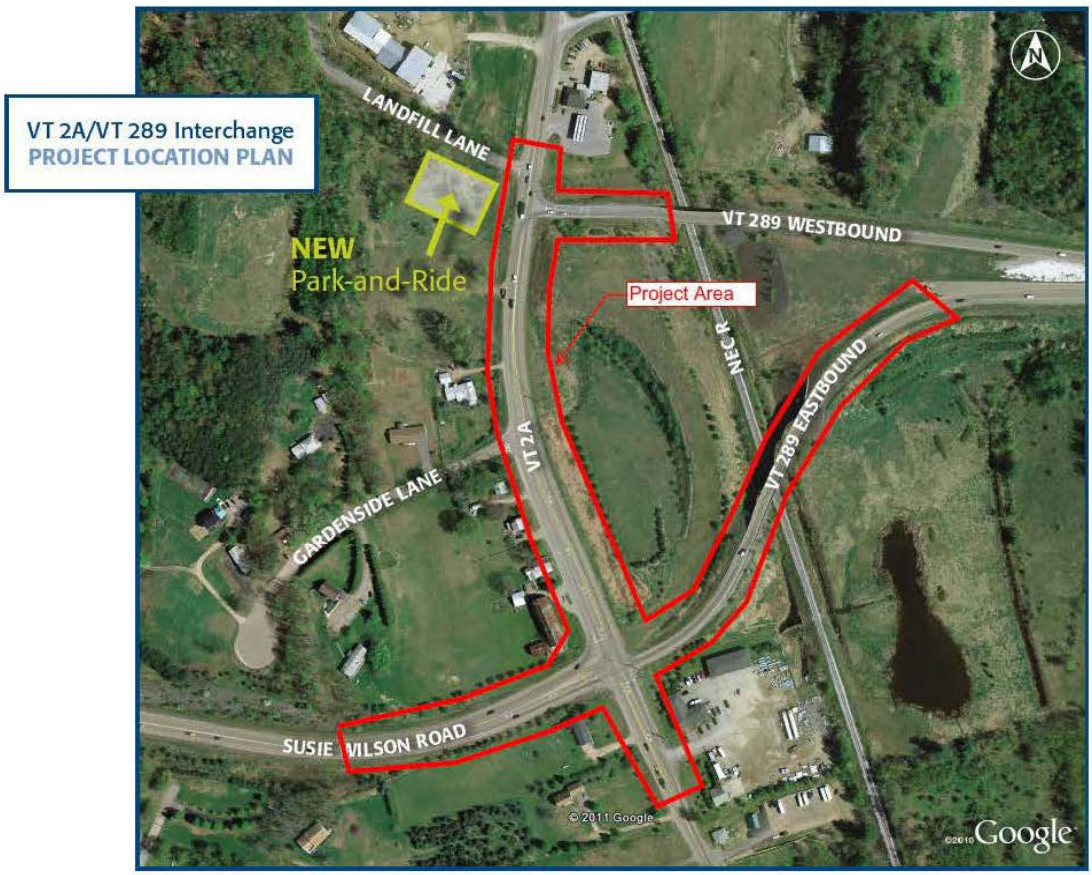


Figure 1: Project Area Boundary

2.0 Project Background

Previous studies on this area have largely focused on the complete CCCH, which would have extended VT 289 westward to Interstate 89. This leg of the CCCH was never built, and the VT 289/VT 2A interchange has not been studied extensively. The following two studies are of note and have been reviewed for this scoping study:

- VT 2A/ VT 289 Interchange Traffic Analysis, March 5, 2012, written by Stantec Consulting Services Inc. on behalf of the CCRPC and the Town of Essex
- The CCCH Environmental Impact Statement (2003)

2.1 Existing Plan and Study Review

The Interchange Traffic Analysis (2012) was the launching point for this study. It examined existing conditions, including lane configuration, signalization, traffic operation, and safety concerns, and made the following conclusions:

1. The two signals are uncoordinated and no detection is provided for the VT 2A through lanes and the VT 2A southbound right turn lane onto Susie Wilson Bypass. It appears that the signal system has not been modified since construction.
2. Due to the absence of detection on VT 2A through movements, the phases serving those movements are set to a maximum green that occurs during each cycle even when no vehicles are present on those approaches.
3. Extensive queues are present on the VT 289 off-ramp during the AM peak and at the eastbound approach on Susie Wilson Bypass during the PM peak.
4. The un-signalized intersection at Gardenside Lane experiences an above average crash rate compared to similar intersections statewide. No intersection sight distance issues were noted. However, at peak times, drivers exiting onto VT 2A may become impatient and accept a shorter gap between vehicles.
5. Using information provided by the Towns of Essex, Essex Junction Village, and Colchester about trip generation and proposed developments, Stantec estimated a total traffic growth of 5% over 20 years. AM and PM Design Hour Volumes were calculated for the intersections.
6. Stantec presented a number of signal and geometric improvement alternatives for the intersections. It was recommended that this scoping study be conducted to arrive at the preferred improvements and to investigate their cost.
7. Part of the 2012 traffic analysis also examined making all approaches to the existing traffic signals fully actuated and implementing adaptive traffic control as the first phase of a two phase process. This improvement has been referred to as Phase I and has already been approved by the CCRPC and the Town of Essex. It is expected to be completed by the end of 2012. Given Phase I's imminent

completion, this report assumes that the fully actuated signals are operational in any modeling or analyses conducted. The Phase II improvements were geometric improvements, which are evaluated as part of this scoping report.

8. The CCCH Environmental Impact Statement (2003), provided by VTrans, found the potential for archeological finds and the presence of wetlands in the project area. These concerns are addressed in this report.

3.0 Existing Conditions

3.1 Roadway Characteristics

The project study area is located in the vicinity of the VT 289 on and off-ramps, which are separated by approximately 1,100 feet along VT Route 2A. Intersections with the other roads in the area: Susie Wilson Bypass, Gardenside Lane, and Landfill Lane are also considered in this study. The project study area is shown in Figure 1. Existing roadway conditions in the study area are described below and shown in detail in Appendix A. As-built plans are shown in Appendix B.

No formal bicycle or pedestrian accommodations, including shared lanes or crosswalks, are present within the project area. However, the existing shoulders are wide enough to accommodate on road bicycle use. In addition, Susie Wilson Bypass is signed as a designated bicycle route. Utilities present include underground electric, aerial electric and telephone, gas, and water.

3.1.1 VT Route 2A

VT Route 2A, also named Colchester Road, is a state-maintained minor arterial. It connects Essex to Essex Junction, Williston and US I-89 to the south, and Colchester and VT Route 7 to the north. It intersects with, from north to south within the project area, Landfill Lane, the VT 289 Westbound Off-Ramp, Gardenside Lane and the four-way intersection of the VT 289 Eastbound On-Ramp and Susie Wilson Bypass. Pavement width is about 30 feet north and south of the project area but varies within it. Dedicated left turn lanes are provided for turns onto Gardenside Lane, the on-ramp, and Susie Wilson Bypass. Travel lane widths are mostly 12 feet and the shoulders are generally six to eight feet wide. The posted speed limit is 40 miles per hour. There are no formal accommodations for pedestrians or bicyclists (e.g. sidewalks, crosswalks or bike lanes), but the wide shoulders along VT 2A are adequate for bicycle use. The horizontal and vertical alignment of VT 2A is relatively straight and level, although a slight curve is present in the horizontal alignment.

3.1.2 Landfill Lane

Landfill Lane is a 24-foot wide road under 2,000 feet long leading to the Essex Drop Off Center of the Chittenden Solid Waste District and the landfill. The only other improvement on the street is the recently constructed 19-spot park-and-ride facility on the corner of Landfill Lane and VT 2A. No improvements to Landfill Lane are being considered.

3.1.3 VT 289 Off-Ramp

The VT 289 off-ramp is classified as a principle arterial – freeway and is the terminus of VT 289 Westbound. VT 289 runs north and east of Essex Junction. It connects

drivers on VT 2A to VT 15 and VT 117 while circumnavigating Essex Junction. It was originally part of the CCCH, but the highway was never built in its entirety. Because of its speed and limited access, the road is popular with commuters during the morning and evening peak hours. The off-ramp runs over a rail line with a 170-foot long and 28-foot wide bridge. Then the roadway drops at about a 6% decline as it approaches VT 2A. The travel way is about 16 feet wide leaving the bridge; then the road widens to accommodate both left and right-hand turn lanes at the T-intersection with VT 2A. Pavement width is about 28 feet along the length of the ramp. A speed limit is not posted for this road.

3.1.4 Gardenside Lane

Gardenside Lane tees into VT 2A from the west about 500 feet south of the off-ramp. It is a 700-foot long local town road serving less than 10 houses and ending in a cul-de-sac. The pavement width is about 20 feet. No improvements are proposed for the road and traffic volumes are minimal. However, a development is proposed on Gardenside Lane that may alter the existing traffic patterns. This study assumes that the roads undergo no improvements in relation to the Gardenside development and that the intersection remains unsignalized. The traffic modeling performed for this study does account for the additional traffic volume that the development may generate.

3.1.5 Susie Wilson Bypass

Susie Wilson Bypass is a town maintained limited access major collector that intersects with VT 2A from the west about 600 feet south of Gardenside Lane. Along with Susie Wilson Road, it connects VT 15 with VT 2A and allows drivers to bypass the Five Corners intersection in Essex Junction. It runs in a general northeast-southwest direction and connects to VT 2A running due west. The two-lane road has 12-foot-wide travel lanes and a 40-foot pavement width. Its wide travel lanes and limited access allow traffic to move quickly and freely. It has a posted speed limit of 40 miles per hour. Since the full CCCH was not built, Susie Wilson Bypass has become a de facto extension of the Highway, and the road receives a great deal of traffic from VT 289. Eastbound PM peak traffic from Susie Wilson Bypass inundates the intersection with VT 2A and the VT 289 on-ramp, and drivers typically experience significant delays during this time.

3.1.6 VT 289 On-Ramp

The VT 289 On-Ramp is a principal arterial – freeway that serves as the beginning of VT 289 Eastbound. As traffic leaves the intersection with VT 2A and Susie Wilson Bypass, it curves north on a single lane, 16-foot wide ramp at a 6 percent incline. It travels over a rail line on a 330-foot long and 28-foot wide bridge, and then the alignment curves east so that it is running almost parallel with the bearing at which traffic left the intersection.

3.1.7 Intersections

The four intersections in the study area are described below.

VT 2A / Landfill Lane - Landfill Lane enters VT 2A from the west at a 90-degree angle and is under STOP-sign control. VT 2A is uncontrolled. All intersection approaches consist of a single lane each.

VT 2A / VT 289 Off-Ramp - The off-ramp approaches VT 2A from the east with dedicated left and right-turn lanes and no through lane. Both lanes are 12 feet wide and contain 100 feet of storage. VT 2A approaches to the intersection are single lane approaches and given the off-ramp is one way coming into the intersection, only through movements are allowed. The intersection is signalized but only the off-ramp approach is actuated.

VT 2A / Gardenside Lane - Gardenside Lane enters VT 2A from the west at a 90-degree angle and is under STOP-sign control. VT 2A is uncontrolled. The Gardenside and VT 2A southbound approaches have one lane, while the VT 2A northbound approach has a dedicated-left turn lane in addition to the through lane. Two receiving lanes accept traffic from the single southbound through lane.

VT 2A / Susie Wilson Bypass / VT 289 On-Ramp - Susie Wilson Bypass approaches VT 2A from the west, and the on-ramp intersects opposite Susie Wilson Bypass. The VT 2A southbound approach contains dedicated right-turn, left-turn, and through lanes, each 12 feet wide. The left lane is 230 feet long. The through and right lanes extend back to the intersection with Gardenside. The northbound approach contains a shared through/right-turn lane and a dedicated left-turn lane with 150 feet of storage. The Susie Wilson Bypass approach also has a dedicated left-turn lane with about 250 feet of storage and a shared through/right-turn lane. All lanes are 12 feet in width except the on-ramp, which is 16 feet wide, and the westbound lane of Susie Wilson Bypass, which is 24 feet wide.

3.2 Traffic Volumes

Vehicle turning movement and classification counts were taken by the CCRPC on August 2, 2011 at the off-ramp and Susie Wilson intersections. Origin-destination information was also collected to determine how many westbound left turns from the VT 289 off-ramp also turned right onto Susie Wilson Bypass. The collected traffic data are included in Appendix C. Stantec adjusted the traffic counts to derive the AM and PM Design Hour Volumes (DHV) for 2011 in accordance with VTrans guidelines.

Next, Stantec contacted the Town of Essex, the Town of Colchester and Essex Junction Village Planning Departments and solicited trip generation information for any approved but not yet built developments whose traffic may influence these intersections. This information as well as historic traffic count data from an adjacent continuous count station on VT 289 was considered when developing the projected future volumes at each intersection, but the resulting growth rate was deemed too small to have a significant effect. Instead, a total growth rate of 5% over the next 20 years was assumed to be a conservative estimate of overall traffic growth. This growth rate calculation was summarized and provided to CCRPC and the Town of Essex for review and was approved for use in this study.

These DHV's were projected to 2012 and 2032 (the assumed design year). Additionally, the projected trips from the Gardenside development were added to the 2012 and 2032 DHV's to produce the volume used in this study. See Appendix D for growth rate and DHV calculations. Although the Gardenside development will not

be fully built and inhabited in 2012, its volumes were included to create a more equal comparison between current (2012) and design year (2032) conditions.

Figure 2: 2012 AM DHV

Figures 2 and 3 show the 2012 DHV traffic flow networks for AM and PM commuter peak hours. The peaks occurred between 7:00 to 9:30 AM and from 3:00 to 6:00 PM. The major AM peak hour traffic flow is from the VT 289 off-ramp to Susie Wilson Bypass. The origin-destination information showed that about 95% of left turns off VT 289 in the AM peak turned onto Susie Wilson Bypass. The PM peak hour is more balanced between trips entering and exiting the CCCH and motorists entering or exiting the Susie Wilson Bypass. Southbound and northbound traffic on VT 2A north of the off ramp is also substantial albeit smaller than the traffic associated with Susie Wilson Bypass and the CCCH.

Figure 3: 2012 PM DHV

In general, truck traffic from the 2011 traffic count was observed to be between zero and six percent. However, over 20 percent of the movements turning left off VT 2A northbound onto Susie Wilson Bypass and turning right off Susie Wilson Bypass onto VT 2A southbound were trucks. This pattern indicates that Susie Wilson Bypass serves as a major route for trucks traveling to and from the Essex Junction area.

Pedestrian and bicycle volumes were also recorded as part of the 2011 traffic count program and are included in the traffic count data. Although pedestrians and bicyclists were observed, they were not common.

Table 1 summarizes the daily traffic volumes that each road experiences. The volumes were provided by VTrans.

Location	Daily Traffic Volume	Count Years
VT Route 2A	16,200	2011
VT 289 WB Off-Ramp	7,700	2011
VT 289 EB On-Ramp	8,300	2011
Susie Wilson Bypass	15,000	2011

Table 1: Existing AADT Volumes

3.3 Intersection Operations

Intersection and roadway operating levels of service (LOS) are calculated for the study area intersections based on the traffic volume, geometry and traffic control data provided above.

3.3.1 Level of Service Criteria and V/C Ratio

Intersection operating Levels of Service (LOS) are calculated by following procedures defined in the *Highway Capacity Manual*, published by the Transportation Research Board. LOS is a term used to describe the quality of the traffic flow on a roadway facility at a particular point in time. It is a qualitative measure of traffic conditions comprised of measures such as travel time and speed, congestion, driver discomfort, and convenience based on ranges of average delay per vehicle. The ranges of delay per vehicle are reported on a scale of A to F, where A represents the best operating conditions with little or no delay to motorists, and F represents the worst operating conditions with long delays and traffic demands sometimes exceeding roadway capacity. Drivers are more accepting of longer delays at signalized intersections and therefore the ranges of LOS differ when compared to unsignalized intersections. Delays are calculated as a function of many characteristics such as traffic volume, peaking characteristic of traffic flow, percentage of heavy vehicles in the traffic stream, type of traffic control, number of travel lanes and lane use, intersection approach grades, and pedestrian activity. The delay ranges utilized as per the *2000 Highway Capacity Manual* to determine operating levels of service are displayed in Table 2.

	Average Delay per Vehicle (Seconds)	
Level of Service	Signalized Intersections	Unsignalized Intersections
A	≤10.0	≤10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F	>80.0	>50.0

Table 2: Intersection Level of Service Criteria, Source: HCM 2010 Highway Capacity Manual, Transportation Research Board, National Academy of Sciences, Washington, DC, 2010.

For two-way stop controlled intersections, the through movements on the major approaches have the right-of-way and are not delayed by side street traffic. Major approaches may be exposed to delays from traffic turning left onto side streets unless there is a dedicated left turn lane provided. Generally, the longest delays at unsignalized intersections are experienced on the side streets by traffic waiting to enter or cross the main street.

Volume-to-capacity (V/C) ratios were also calculated as part of this study. V/C ratios are ratios of vehicular demand and theoretical capacity. They can be calculated for individual movements (lane groups) or intersections as a whole. A V/C ratio of 1.0 indicates that a movement or intersection is operating at its theoretical capacity. Anything over 1.0 indicates the intersection is operating over capacity. In other words the infrastructure does not provide the capacity required by the traveling public.

For this study, Synchro, a software produced by Trafficware, was used to calculate LOS and V/C. The software utilizes the aforementioned design hour volumes and roadway geometry as inputs among many others. All analyses assume the previously discussed Phase I signal improvements. However, Synchro is not capable of analyzing adaptive traffic control, so they were conservatively modeled as fully-actuated signals instead. Although effort was made to model the traffic system as accurately as possible, there is a chance that the performances observed in the field will be better than what is reported here since adaptive signals are expected to perform as well as or better than fully-actuated signals.

3.3.2 Calculated Operating Levels of Service

Capacity analysis results for the study area intersections are presented below. Tables 3 and 4 summarize the existing conditions capacity of the off-ramp and on-ramp intersection in 2012 and again assume the Phase I signal upgrades.

Existing Geometry, Full Actuated Signal Timing, and 2012 Volumes

		VT 2A Southbound			VT 2A Northbound			Eastbound			VT 289 Westbound			Overall
		Rt	Thru ↓	Left	Left	Thru ↑	Right	Rt	Thru	Left	Rt ↑	Thru	Left ↓	LOS V/C
Weekday AM	Volume		**599**			**226**					**136**		**836**	
	V/C Ratio		1.04			0.38					0.18		1.04	
	HCM LOS		F			C					A		E	**E**
	95% Queue (ft)		#773			215					58		#974	**1.04**
Weekday PM	Volume		**514**			**575**					**203**		**451**	
	V/C Ratio		0.71			0.77					0.32		0.76	
	HCM LOS		B			C					A		C	**B**
	95% Queue (ft)		246			281					46		#278	**0.76**

95% queue volume exceeds capacity, queue may be longer

Table 3: 2012 Off-Ramp Intersection Capacity Analysis Results, existing conditions 2012

Existing Geometry, Full Actuated Signal Timing, and 2012 Volumes														
		VT 2A Southbound			VT 2A Northbound			Susie Wilson Bypass Eastbound			Westbound			Overall
		Rt	Thru	Left	Left	Thru	Right	Rt	Thru	Left	Rt	Thru	Left	LOS V/C
Weekday AM	Volume	940	275	156	55	165	22	30	252	93				
	V/C Ratio	0.71	0.51	0.35	0.17	0.40			0.59	0.20				
	HCM LOS	A	C	B	B	B			C	B				B
	95% Queue (ft)	53	161	63	27	106			162	58				0.59
Weekday PM	Volume	693	205	191	57	309	74	29	835	217				
	V/C Ratio	0.54	0.45	1.00	0.18	0.95			1.04	0.28				
	HCM LOS	A	C	F	C	E			E	B				D
	95% Queue (ft)	19	194	#234	53	#442			#893	136				1.06

95% queue volume exceeds capacity, queue may be longer

Table 4: 2012 On-Ramp Intersection Capacity Analysis Results, existing conditions 2012

As shown, under 2012 design hour conditions, the off-ramp intersection is operating at LOS E in the AM and B in the PM. Conversely, the on-ramp intersection operates at LOS B in the AM and D in the PM. This traffic pattern results from the majority of commuters traveling westbound on VT 289 and Susie Wilson Bypass towards the greater Burlington area in the morning and then returning in the opposite direction in the evening. AM traffic volumes at the off-ramp intersection and PM traffic volumes at the on-ramp intersection have exceeded the theoretical carrying capacity of the intersection since the calculated V/C ratio exceeds 1.

Given the high traffic volumes turning right onto Susie Wilson Bypass from VT 2A in the AM, LOS A seems better than expected. However, since this traffic is turning right and since the on-ramp is one way, the only time this traffic experiences a red light is when the VT 2A northbound lane receives a protected left turn. With the new actuated Phase I signals, a protected left turn phase will only occur if a car is actually in the left turn lane. This large amount of green time allows the queue to empty with minimal delay. Furthermore, traffic leaving the CCCH cannot flow freely to Susie Wilson Bypass since the off-ramp is oversaturated (V/C ratio > 1.0) in the AM.

As stated earlier, these analyses assume the completion of the Phase I improvements, which should significantly improve the performance compared to historical levels of service. Although these analyses still show some approaches failing, the overall picture is an improvement over what the public has come to expect.

3.4 Land Use and Zoning

The 2011 Official Zoning Map of the Town of Essex shows three zoning designations present within the project area. Figure 4 shows an excerpt of this map along with its legend. On the west side of VT 2A, a boundary exists about halfway between Gardenside Lane and Landfill Lane where land to the north is zoned industrial and land to the south is zoned medium density residential. Additionally, the area bounded by Susie Wilson Bypass and Gardenside Lane is zoned retail-business. Land within the project area east of VT 2A is also zoned industrial.

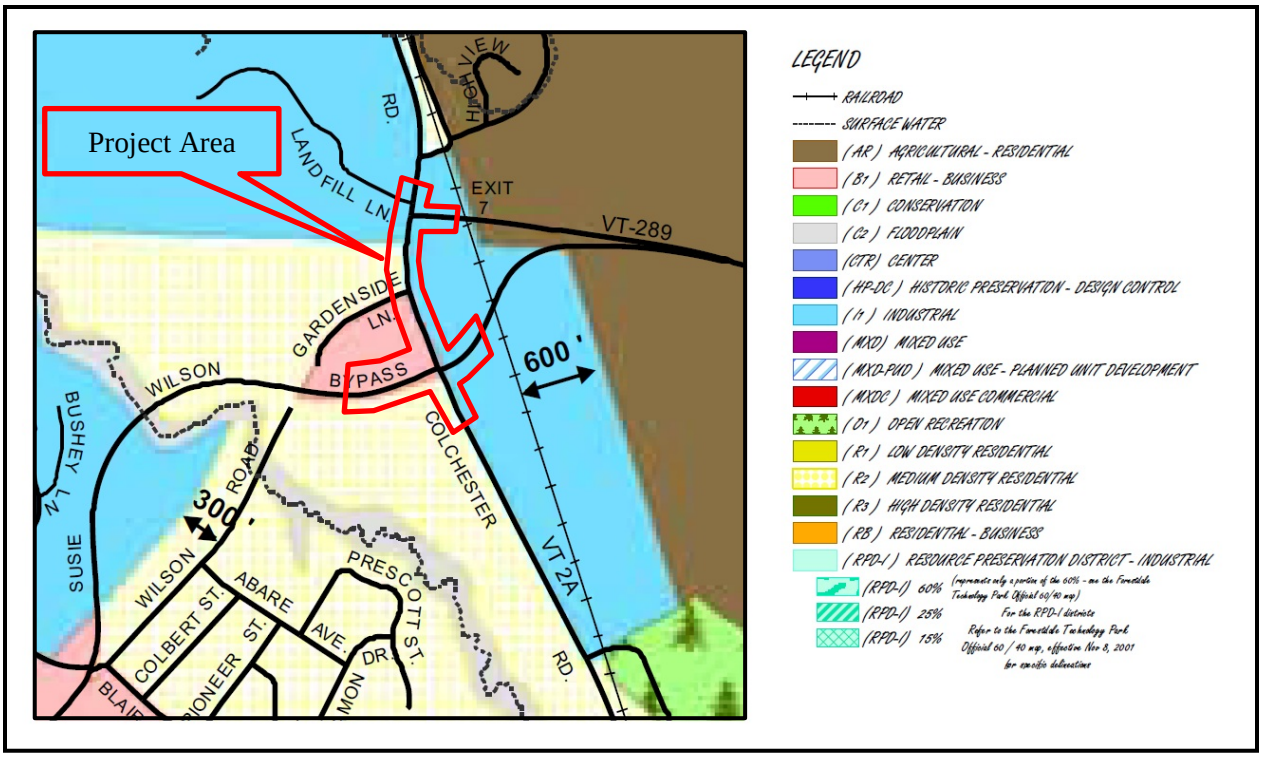


Figure 4: Excerpt of 2011 Official Zoning Map of the Town of Essex with legend and project area

The project area contains a variety of existing land uses including commercial, retail, industrial, and residential. The land is not very densely populated.

3.5 Pedestrian and Bicycle Facilities

No formal pedestrian or bicycle facilities are present within the project area. However, the wide shoulders may accommodate some bike and pedestrian traffic. Additionally, at the intersection with VT 2A, there are bike route signs indicating that Susie Wilson Bypass is a bike route. According to the traffic counts described in 3.2, this section of road is not heavily traveled by bicycles and pedestrians.

3.6 Transit Service

Chittenden Country Transportation Authority (CCTA) does not operate a bus in this area. The low density of housing and few nearby points of interest to pedestrians makes this site ill-suited as a transit stop. Furthermore, the Village of Essex Junction, located less than 2 miles south, has access to both bus and rail, has a higher populaiton density, and is better connected to other urban areas than the project area. Although CCTA is planning a new bus line that will run through the project area, stops along Susie Wilson Bypass and this section of VT 2A are not planned.

3.7 Crash History

The crash history for the study area was investigated using the VTrans crash database. VTrans keeps records of reported crashes by milepost along State and Federal Aid highways in Vermont. General Yearly Summaries can be requested from VTrans for given roadway segments. For this study, five years of crashes for the project area were investigated. The crashes have been grouped by intersection and summarized in Appendix E.

As noted in the Interchange Traffic Analysis (2012), the un-signalized intersection at Gardenside Lane experiences a significant number of vehicle crashes for its volume. No intersection sight distance issues were noted. The likely cause is drivers choosing inadequate gaps in traffic as a result of becoming impatient due to congestion on VT 2A. This intersection has the highest crash rate in the project area.

On VT Route 2A in the project area, VTrans reports the ratio of actual to critical crash rates (a/c ratio) as 1.079. This ratio places the segment at 559th on a list of 653 segments with a/c ratios greater than 1.0 (ranked in descending order).

3.8 Natural Resources

On June 11, 2012, Stantec evaluated the natural resources present within the project area up to 50 feet from the road edge. Specifically, as part of this investigation, Stantec identified and characterized observable rare, threatened or endangered (RTE) species, wetlands, streams, wildlife habitat, agricultural land, and conservation zones. Wetland boundaries under state and federal jurisdiction were determined using the technical criteria described in the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0). Following is a summary of our findings.

3.8.1 General Site Description

The study area includes existing roads, utility lines, residential, commercial, and retail development. Vegetation within the study area includes ornamental plantings near buildings, as well as maintained lawns and a variety of roadside vegetation (see Photos 1 – 4 in Appendix F).

3.8.2 Natural Resource Review Summary

Review of Existing Materials

According to the Natural Resource Conservation Service (NRCS) Web Soil Survey[1] for Chittenden County, Vermont, soils are mapped as Adams and Windsor loamy sands, 0-5% slopes, 5-12% slopes, and 12-30% slopes; Au Gres fine sandy loam; Belgrade and Eldridge soils, 3-8% slopes; Enosburg and Whately soils, 0-3% slopes; Munson and Raynham silt loams, 2-6% slopes; and Scantic silt loam, 0-2% slopes. All of the soil types, with the exception of the Adams and Windsor loamy sands, 12-30% slopes, are considered farmland soils of statewide importance. Note that these mapped soil types do not reflect the fill soils present due to road construction.

[1] Natural Resource Conservation Service Web Soil Survey: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Refer to map for Chittenden County, Vermont. Accessed on June 12, 2012.

Stantec used the Vermont Agency of Natural Resources (ANR) Environmental Interest Locator program to assess the likelihood of the presence or absence of mapped Vermont Significant Wetland Inventory (VSWI) wetlands and rare, threatened, and endangered (RTE) plant and animal species. According to this program,[2] there are no VSWI wetlands, RTE species, or significant natural communities mapped within the study area. A wetland mitigation site is mapped as a Class 2 wetland to the southeast of the study area. The entire project area is in the Indian Brook stormwater impaired watershed (see ANR Map in Appendix F).

Wetlands and Streams

One wetland was identified in the study area. It is located to the east of VT 2A between the on-ramp and off-ramp to VT 289. This is a palustrine emergent wetland dominated by common reed (Phragmites australis) (see Photo 4 in Appendix F).

Although there are no streams in the study area, the study area is located within the Indian Brook watershed, an area identified as a stormwater impaired watershed by ANR. Total Maximum Daily Loads (TMDLs) have been established for this stream, and any required stormwater permit will take this into consideration.

RTE Species

Stantec identified no RTE species during the June 11, 2012 site visit. Because the majority of the area has been disturbed by road construction and roadside maintenance, it is unlikely that any RTE plant species occur within the study area.

Wildlife and Wildlife Habitat

The project area includes narrow corridors along existing roads. These areas have some wildlife habitat value, and likely support occasional use by songbirds and transient wildlife species.

Agricultural Land

As described above, according to the NRCS Web Soil Survey for Chittenden County, Vermont, the majority of soils within the study area are mapped as farmland soils of statewide importance. Any impact to these soils would require submittal of a Farmland Conversion Impact Rating Form 1006 to USDA for their authorization. They would likely consider the soils to be already in "urban use."

Conservation Zones

No designated state or town conservation or recreation zones are present within the study area. According to a review of Land & Water Conservation Fund (LWCF) Projects from 1965-2011, no areas within the study area were purchased with LWCF funds. Therefore, there are no "Section 4(f)" or "Section 6(f)" public lands present.

Federal and State Wetland Regulations

The Corps regulates the wetlands identified within the project area. Under the provisions of Section 404 of the Clean Water Act, the Corps regulates activities within waters of the United States, which include navigable waters and all their tributaries, as well as adjacent wetlands. The Corps has issued a Programmatic

[2] http://maps.vermont.gov/imf/sites/ANR_NATRESViewer/jsp/launch.jsp

General Permit for the State of Vermont. Typically, wetland impacts of less than one acre may be covered by a Programmatic General Permit.

The Vermont Wetland Rules were recently revised (Aug. 1, 2010) such that more wetlands are regulated, and a Vermont Wetland Permit or Vermont General Permit is required for impacts to these wetlands and their 50-foot buffers.

If widening is proposed on the east side of 2A, the wetlands identified within the study area must be delineated. Any direct impacts to the wetlands would require authorization from the Corps via a VT General Permit. It is likely that the wetlands would be considered VT Class 2 wetlands, even though the area is not shown on the ANR map. If so, any impact to the wetland or its 50-foot buffer would require authorization from ANR via a VT Wetlands Permit.

3.8.3 Summary

Stantec conducted a natural resource review of the study area. In summary, one wetland was identified to the east of VT 2A, between the on-ramp and off-ramp. A formal wetland delineation should be conducted to identify the boundaries. The majority of the soils within the study area are considered farmlands of statewide importance. Finally, the entire project area is located within a stormwater impaired watershed. Stantec recommends that any impacts to these resources be minimized.

3.9 Hazard Material Sites

The Vermont ANR Environmental Interest Locator was accessed on August 27, 2012 to identify potential hazardous material sites. Bob's Auto Center, about 200 feet north of the off-ramp on the east side of VT 2A, was the only hazardous material sites found within the project area. It is suspected that this property has a history of contaminated soils that are addressed or monitored. If widening is planned in this area, some contaminated soil testing may be needed to determine the scope of contamination if any, and to account for handling it.

3.10 Historic Sites and Structures

Suzanne Jamele, Historic Preservation Consultant developed a report which identifies historic resources within the proposed project's Area of Potential Effect. The report identifies a number of historic structures and cautions that encroachment onto these structures front lawns could produce a detrimental effect. It also notes the presence of mature shrubs and trees and front lawn space, which provides a buffer from the road. These resources should be preserved as much as possible. With these considerations, it is unlikely that the project will have an adverse effect on the surrounding properties since the proposed widening is minor and the impacts of a major road have already been felt. The full report is included in Appendix G.

3.11 Archaeological Sites

Hartgen Archeological Associates, Inc., investigated the project area and surrounding locations for archeological sensitivity and found indications that

parts of the project area will need additional investigation if they are disturbed. Specifically, flat, grassy areas that have not been disturbed by previous construction should be considered sensitive. Widening along the western edge of the road is likely to require additional investigation. The full report is included in Appendix H and areas of archeological sensitivity are shown on the existing plan in Appendix A.

4.0 Local Concerns Meeting

A Local Concerns Meeting was held on June 21, 2012 to receive input about concerns from the public. The meeting was sparsely attended, possibly because most people connected to the interchange agree with altering it to make it more efficient.

Two issues were raised:

1. Motorists attempting a left turn off of VT 2A Northbound onto Susie Wilson Bypass will cross the double yellow line to avoid the through queue. This behavior will conflict with people turning left out of the Steven's Energy driveway.

2. On the VT 289 off-ramp, drivers will use the right-hand shoulder to get around cars waiting to make a left turn.

The Minutes from the meeting are included in Appendix I. These local concerns have been incorporated into the evaluation of alternatives.

5.0 Project Purpose and Need

Purpose: The purpose of the VT 2A/VT 289 Interchange Project is to improve the operation of the interchange by reducing traffic delays and queues to increase the overall safety and mobility of the traveling public.

Needs:

1. **Increase intersection capacity:** The existing signalized intersections regularly experience congestion and queues during the AM peak hour on the westbound off ramp and in the PM peak hour on Susie Wilson Bypass. Phase I upgrades will provide a measure of increased capacity, however geometric improvements are required to bring the intersections to under-saturated conditions (V/C < 1.0).

2. **Reduce delays and queues:** Over capacity conditions lead to queues and excessive delay. Additional lanes for queue storage are needed to reduce cycle lengths and reduce delay to acceptable levels.

3. **Improve safety:** This interchange has a deserved reputation of frustration and delay. Making the interchange run more smoothly and minimizing delay will calm drivers and reduce the perceived need to take risks to get through the interchange.

6.0 Design Criteria

Based on pertinent standards and references, applicable design criteria are tabulated below in Table 5. These references include:

- Vermont State Standard for the Design of Transportation Construction, Reconstruction and Rehabilitation on Freeways, Roads and Streets (VSS)
- A Policy on Geometric Design of Highways and Streets (AASHTO)

Parameter	VT 2A	VT 289 On/ Off Ramps	Susie Wilson Bypass	Reference
Functional Classification	Urban Minor Arterial	Urban Principal Arterial – Freeway	Urban Major Collector	2011 VTrans Functional Classification Map
AADT (2012)	16,200 vpd	8,300/7,700 vpd	15,000 vpd	
Design Vehicle	WB-67	WB-67	WB-67	
Posted Speed	40 mph	30 mph	40 mph	
Design Speed	40 mph	30 mph	40 mph	
Stopping Sight Distance	300 ft.	200 ft.	275 ft.	VSS 4.4.1; 5.4.1; AASHTO Table 3-1
Corner Sight Distance	440 ft.	330 ft.	440 ft.	VSS 3.4.2; 4.4.2; 5.4.2
Travel Lane Width				
Minimum	10 ft.	9 ft.	9 ft.	VSS 4.5; 5.5; AASHTO 4.3
Existing	12 ft.	16 ft.	12 ft.	
Proposed	11 ft.	12 ft.	12 ft.	
Shoulder Width (Shared use)				
Existing	2-4 ft.	2-4 ft.	2-4 ft.	
Minimum w/ Bicycles	4 ft.	4 ft.	3 ft.	VSS 4.14; 5.1.4; AASHTO 4.4.2
Proposed	4 ft.	4 ft.	3 ft.	
Clear Zone				
With Vertical Curb	1.5 ft.	1.5 ft.	1.5 ft.	VSS Sect. 3.9; 4.9; 5.9
Without Vertical Curb	14-16 ft.	14-16 ft.	12-14 ft.	VSS Sect. 3.9; 4.9; 5.9
Horizontal Alignment				
@ emax = 0.04	533 ft.	250 ft.	533 ft.	AASHTO, Table 3-8
@ sensitive resources (DS-10 mph)	250 ft.	86 ft.	250 ft.	AASHTO, Table 3-8
@ intersection approach (DS-15 mph)	154 ft.	42 ft.	154 ft.	AASHTO, Table 3-8 & 3-7
@ reverse crown	3,220 ft.	1,880 ft.	3,220 ft.	AASHTO, Table 3-8 & 3-7
@ normal crown	4,770 ft.	2,830 ft.	4,770 ft.	AASHTO, Table 3-8 & 3-7

Table 5: Design criteria and their sources

7.0 Intersection Alternatives

Two improvement scenarios for the intersections were analyzed for the design year 2032 traffic volumes. The first scenario, Alternative 1, assumes that the Phase I signal improvements are complete, that traffic volumes have increased to the projected 2032 levels, and that no geometric improvements are made. Alternative 2 assumes that Phase II geometric improvements are constructed in addition to the Phase I signal improvements. The Phase II geometric improvements are explained below, followed by capacity analyses of both Alternatives. The overall Alternative 2 plan view and intersection plan views are provided in Appendix J, and plan view and cross-sections of typical existing and proposed conditions are presented below. Note that all work can be done within the existing right of way, but small amounts of widening are required for some of the alternatives.

Complete Streets practices and principles were considered and implemented where appropriate in accordance with Complete Streets Legislation (Act 34) which became effective on July 1, 2011. See Appendix M for CCRPC's Complete Streets Project Reporting Form.

7.1 VT 2A/VT289 Off-Ramp

7.1.1 Considered Alternatives

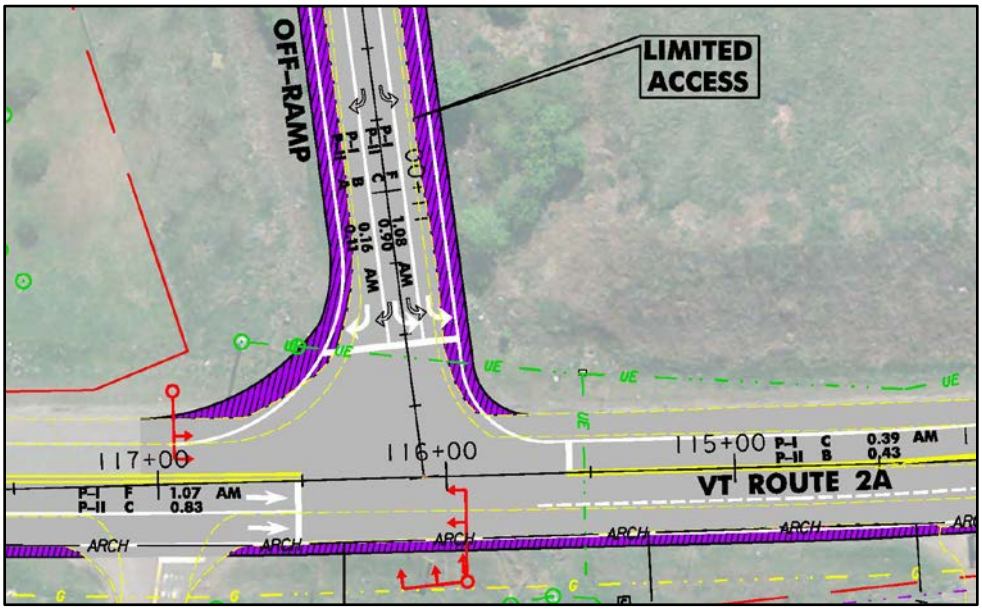


Figure 5: Plan view of proposed improvements at off-ramp

Second Westbound Left-Turn Lane

- Widen the VT 289 off-ramp to add a second left turn lane
- Add a receiving southbound lane on VT 2A.
- Minor widening along both sides of the off-ramp and along the west side of VT 2A (see Figures 6 and 7)

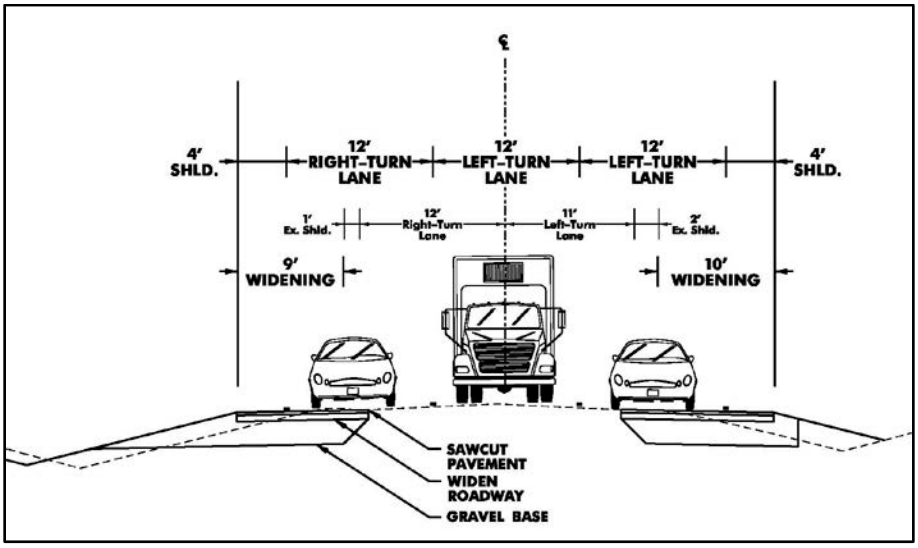


Figure 6:Cross-section of off-ramp showing existing and proposed conditions, looking east

Additional Through Lane on VT 2A Southbound

- Widen the southbound VT 2A approach to add a second through lane
- Add a receiving southbound lane on VT 2A
- About 5 feet of widening along 325 feet of the road (see Figure 6)

Although the second lane would complicate left turns out of Landfill Lane onto VT 2A northbound, traffic to Landfill Lane is not heavy at the intersection's peak flow times since the Drop-Off Center's operating hours are 8:00 am to 3:30 pm with the greatest activity on Saturdays.

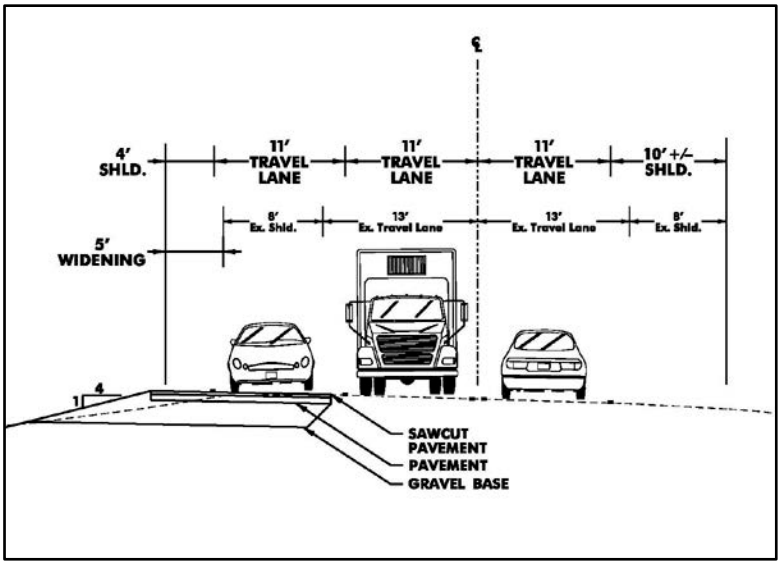


Figure 7:Cross-section of VT 2A showing existing and proposed conditions, looking north

Both of the options require a VT 2A southbound receiving lane to be added. This lane should extend to the intersection with Gardenside Lane and tie into the existing two southbound receiving lanes there. North of Gardenside Lane, the southbound right-hand lane would be a shared right/through lane, and the southbound left-hand lane would be a through lane as seen in figure 6.

7.1.2 Reviewed and Discarded Improvements

Combined Left/Right on Westbound VT 289 Off-Ramp

- Convert existing westbound right turn lane on VT 289 off-ramp to combined left/right
- Add receiving southbound lane on VT 2A.

This Alternative was discarded for the following reasons:

- Left turns outnumber right turns by about 6 to 1 during the AM peak, likely blocking a right on red.
- Would encourage right turners to use the shoulder as a right turn lane and create a safety hazard.
- The cycle length would not be shortened significantly, so the delay on the other approaches would not be reduced.

Second Lane on Bridge, Westbound 289 Off-Ramp

- Extend the second left turn lane off the ramp across the bridge

This Alternative was discarded for the following reasons:

- Capacity modeling showed that additional storage should not be needed.
- The 26'-3" curb to curb width on the existing structure does not provide adequate room for dual lanes with shoulders across the bridge.
- Widening the bridge would have a significant cost.

7.2 VT 2A/VT289 On-Ramp/Susie Wilson Bypass

7.2.1 Considered Alternatives

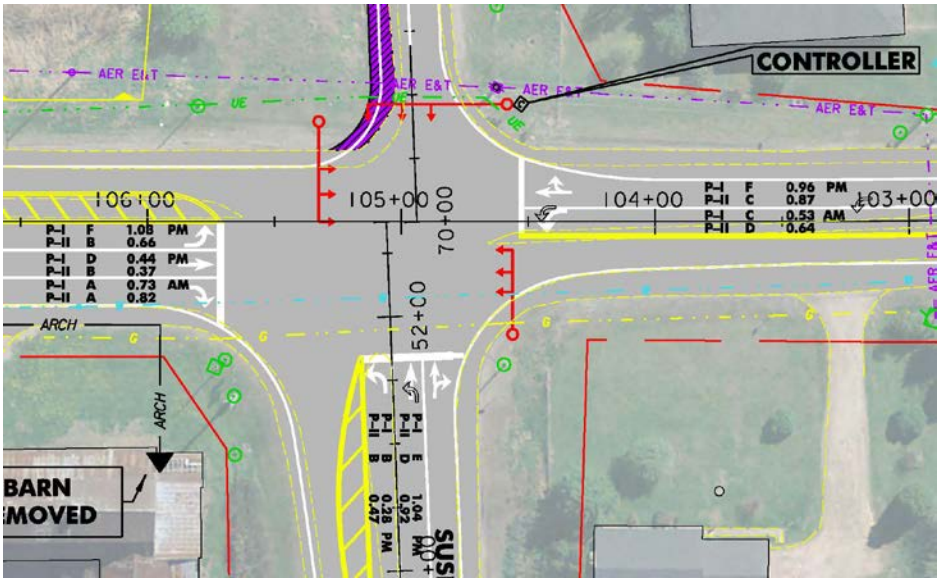


Figure 8: Plan view of proposed improvements at on-ramp

Additional Eastbound Through Lane

- Add a through lane at the Susie Wilson Bypass eastbound approach allowing more through traffic to cross the intersection during one cycle
- Lanes will merge on the on-ramp prior to the bridge
- Minor widening on the north side of the ramp will be required (see Figure 9)

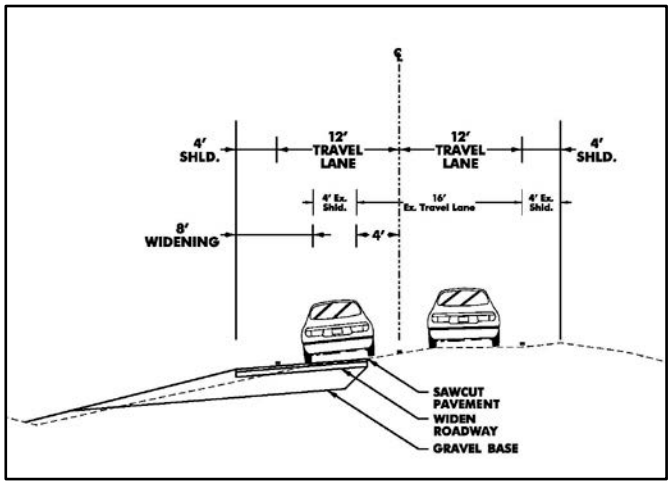


Figure 9:Cross-section of on-ramp showing existing and proposed conditions, looking east

Queue calculations from Synchro and SimTraffic indicate that the additional through lane should be 250-300 feet long for storage. These two through lanes merge to one lane prior to the on ramp bridge over the railroad. The merge begins 360 feet from the Susie Wilson Bypass stop-bar. This 360 feet of two full lanes past the Susie

Wilson Bypass stop-bar provides adequate area for drivers to merge to one lane prior to the one lane bridge on the ramp.

Extend Northbound Left-Turn Storage Lane

- Extend the existing left-turn storage lane on VT 2A northbound past the first driveway on the east side of the road
- Reduce occurrences of left turners crossing yellow line
- Make presence of left turners explicit

The current storage lane is, in theory, long enough to accommodate the current number of left-turners. However, a resident at the Local Concerns Meeting stated that when a left turning motorist is stuck in the through queue, he/she will sometimes advance to the left-turn storage lane by crossing the yellow line and driving over the hatching. Drivers turning left out of the Steven's Energy driveway onto 2A southbound do not expect a car in the hatching nor will the drivers see each since the through/right queue is in between them. This creates a conflicting condition of one motorist driving faster than those nearby and neither motorist expecting the other nor able to see the other until they have almost collided. Extending the storage lane would make left turners out of the driveway better able to anticipate the oncoming left turner since they would expect someone in the second lane. It would also mean that VT 2A left turners would be stuck in the through lane less often.

7.2.2 Reviewed and Discarded Improvements

Second Lane on Bridge

- Extend dual receiving lanes on ramp across the bridge to VT 289 dual lanes
- Avoid lane drop on the ramp

This Alternative was discarded for the following reasons:

- Capacity modeling showed that additional storage should not be needed.
- The tight radius on the ramp and the 26'-8" curb to curb width on the existing structure do not provide adequate room for dual lanes across the structure. (See Appendix K)
- Widening the bridge would have a significant cost.

VT2A Second Northbound Through Lane

- Add second through northbound lane that would merge after intersection
- Existing northbound through lane experiences significant queues, LOS F and the additional eastbound lane allows a shorter overall signal length which raises the northbound approach to LOS to D.

This Alternative was discarded for the following reasons:

- An added lane would require widening, possibly impacting wetlands.
- The northbound merge after the intersection would be difficult to accommodate safely given location of Gardenside Lane.
- Left turns from Gardenside Lane would either be crossing an additional lane or entering at a merge, both of which would decrease safety.
- An additional lane could be added in the future if needed

Second Southbound Right/Through Lane

- Add second southbound right/through lane

The southbound right lane experiences shortened queues due to metering from the inadequate off-ramp upstream. With the additional left lane off the off-ramp, it was anticipated that the southbound right here would be inundated and an additional right/through lane would be needed to maintain LOS A.

This Alternative was discarded for the following reasons:

- Synchro analysis indicates that the single right lane approach maintains LOS A as is
- The southbound right has a green for most of the cycle.
- An additional phase would be required for the right/through lane, increasing overall delay.
- The extra lane would require widening on VT 2A and Susie Wilson Bypass.

7.3 Alternative 1: Capacity Analysis of Phase I Only, No Build

The interchange capacity was analyzed for the projected 2032 traffic volumes with no geometric improvements in place. This scenario is the no build option with only Phase I improvements, and is referred to as "Alternative 1" in the Alternatives Matrix, section 7.6. Movements on four out of the six approaches are at LOS F when they see their peak traffic volumes, i.e. off-ramp AM peak and on-ramp PM peak. In addition, during these respective peak times, both intersections are at capacity. Tables 6 and 7 summarize the 2032, no build capacity of the off-ramp and on-ramp intersection respectively.

		VT 2A Southbound			VT 2A Northbound			Eastbound			VT 289 Westbound			Overall
		Rt	Thru ↓	Left	Left	Thru ↑	Right	Rt	Thru	Left	Rt ↑└	Thru	Left ↓┌	LOS V/C
Weekday AM	Volume		**629**			**237**					**143**		**877**	
	V/C Ratio		1.07			0.39					0.16		1.08	
	HCM LOS		F			C					B		F	**E**
	95% Queue (ft)		#930			255					74		#1183	**1.07**
Weekday PM	Volume		**539**			**603**					**213**		**473**	
	V/C Ratio		0.74			0.79					0.21		0.79	
	HCM LOS		B			B					B		C	**B**
	95% Queue (ft)		263			#320					55		#298	**0.79**

95% queue volume exceeds capacity, queue may be longer

Table 6: 2032 Off-Ramp Intersection Capacity Analysis Results (Alternative 1)

Existing Geometry, Full Actuated Signal Timing, and 2032 Volumes														
		VT 2A Southbound			VT 2A Northbound			Susie Wilson Bypass Eastbound			Westbound			Overall
		Rt	Thru	Left	Left	Thru	Right	Rt	Thru	Left	Rt	Thru	Left	LOS V/C
Weekday AM	Volume	986	288	164	58	173	23	32	265	98				
	V/C Ratio	0.73	0.62	0.37	0.53	0.47			0.63	0.21				
	HCM LOS	A	C	B	B	C			C	B				B
	95% Queue (ft)	#458	#223	69	51	123			167	59				0.81
Weekday PM	Volume	727	215	200	60	324	78	30	877	227				
	V/C Ratio	0.58	0.47	1.03	0.65	0.96			1.04	0.28				
	HCM LOS	A	D	F	C	F			E	B				D
	95% Queue (ft)	23	243	#308	67	#578			#1151	171				1.06

95% queue volume exceeds capacity, queue may be longer

Table 7: 2032 On-Ramp Intersection Capacity Analysis Results (Alternative 1)

7.4 Alternative 2: Capacity Analysis of Phase II, Full Build Out

The full build out of Phase II was analyzed for capacity using Synchro and is presented below. Overall, the Considered Alternatives from 7.1 and 7.2, when used together, alleviate the major strains on the intersection.

7.4.1 VT 2A/VT289 Off-Ramp

The off-ramp intersection was analyzed assuming that an additional left turn lane was added to the off-ramp, an additional through lane was added to the southbound approach, and an additional receiving lane was added to the southbound lane just after the intersection. As shown in Table 8, the AM southbound through and AM westbound left lanes have both changed from LOS F to LOS C, and the queues have been reduced proportionally. The other movements have either improved or remained the same.

		VT 2A Southbound			VT 2A Northbound			Eastbound			VT 289 Westbound			Overall
		Rt	Thru	Left	Left	Thru	Right	Rt	Thru	Left	Rt	Thru	Left	LOS V/C
Weekday AM	Volume		629			237					143		877	
	V/C Ratio		0.83			0.43					0.11		0.90	
	HCM LOS		C			B					A		C	C
	95 % Queue (ft)		#203			127					22		#261	0.87
Weekday PM	Volume		539			603					213		473	
	V/C Ratio		0.50			0.75					0.17		0.65	
	HCM LOS		B			B					B		B	B
	95 % Queue (ft)		91			244					46		118	0.70

95% queue volume exceeds capacity, queue may be longer

Table 8: 2032 Off-Ramp Intersection with Full Build Out Capacity Analysis Results

7.4.2 VT 2A/VT289 On-Ramp/Susie Wilson Bypass

The on-ramp intersection was analyzed assuming that an additional through lane was added to the eastbound approach, an additional receiving lane was added to the on-ramp, and the storage on the northbound approach was increased. Improving the intersection's ability to handle the PM peak traffic was given priority, and the considered alternatives increase the intersection's performance. As shown in Table 9, the queues have been substantially reduced, and the LOS E and F movements have been improved to LOS B, C, and D. The northbound left and eastbound through movements are the only LOS D. Since these two movements cross paths and do not move concurrently, increasing the green time for one would increase the delay for the other.

It should be noted that the AM intersection LOS stays the same at B before and after the geometric improvements, but that the V/C ratio increases by 0.08. This increase is due to the freer flow of traffic from the off-ramp upstream and is mostly seen in the southbound right approach. Although the queue more than doubles at this approach, it maintains LOS A due to the long green time it enjoys.

		VT 2A Southbound			VT 2A Northbound			Susie Wilson Bypass Eastbound			Westbound			Overall
		Rt	Thru	Left	Left	Thru	Right	Rt	Thru	Left	Rt	Thru	Left	LOS V/C
Weekday AM	Volume	**986**	**288**	**164**	**58**	**173**	**23**	**32**	**265**	**98**				
	V/C Ratio	0.79	0.61	0.36	0.50	0.46			0.36	0.24				
	HCM LOS	A	C	B	C	B			B	B				**B**
	95% Queue (ft)	#424	#203	60	47	114			69	59				**0.89**
Weekday PM	Volume	**727**	**215**	**200**	**60**	**324**	**78**	**30**	**877**	**227**				
	V/C Ratio	0.61	0.38	0.65	0.79	0.67			0.96	0.49				
	HCM LOS	A	B	B	D	C			D	B				**C**
	95% Queue (ft)	94	125	#100	56	#289			#295	131				**0.84**

95% queue volume exceeds capacity, queue may be longer

Table 9: 2032 On-Ramp Intersection with Full Build Out Capacity Analysis Results

7.4.3 VT 2A/Gardenside Lane

The unsignalized intersection of Gardenside lane and VT 2A was not analyzed for capacity, but the improvements at the other intersections may partially address the safety concerns here. The increased capacity from the additional lanes results in shorter cycle lengths and less overall delay. Shorter cycles create more gaps for turns out of Gardenside Lane. As the surrounding intersections operate more efficiently, motorists turning out of Gardenside Lane may also feel less sense of urgency and therefore wait longer to make their turn.

7.5 Public Concerns Meeting/Alternative Presentation

The two alternatives were presented at the Essex Select Board Meeting on October 15, 2012, and both the Select Board and members of the public commented on the proposal. The Select Board voted to approve a draft copy of this report and selected

Alternative 2 as the preferred alternative at their November 19, 2012 meeting. Minutes from both meetings are included in Appendix L. A letter from the Essex Public Works Director to the Select Board recommending Alternative 2 is also included in Appendix L.

7.6 Alternatives Matrix

Table 10 compares the various alternatives by their cost, safety, impacts, permit requirements, and their effectiveness at meeting the needs described in 5.0.

	Evaluation Matrix		
ITEM		**Alt 1-Phase I Only**	**Alt 2-Geometric Improvements**
Project Costs			
Construction Costs (estimated)		$0 (under construction 2012)	$950,000
Preliminary Engineering (15%)		$0	$142,500
ROW Costs (assume None)		$0	$0
Construction Engineering (10%)		$0	$95,000
TOTAL PROJECT COSTS		$0	$1,187,500
Safety			
Reduce Delay at Intersections		Least	Most
Increase Awareness on VT 2A NB @ On-Ramp		No	Yes
Reduce Wait at Gardenside Lane		No	Possibly
Hinders Landfill Lane		Least	Most
Reduce Queuing?		Least	Most
Impacts			
Environmental		None	None
Right of Way		0	0
Temporary Construction Easement		0	0
Utility Easement		0	Possible
Archaeological		None	Minor
Permits			
ACT 250		No	No
NEPA		Categorical Exclusion	Categorical Exclusion
404 COE Wetlands		No	No
WD – ANR Wetlands		No	No
Stream alteration		No	No
Stormwater Discharge		No	No
Archaeology – Phase IB		No	Yes
Section 106 / Historic		No	No
NEPDES		No	CGP
VTrans Access Permit		Yes	Yes
Utilities – Potential for Impacts			
Utility Poles		0	0
Underground Electric		None	Minor
Underground Communications		None	Minor
Water		None	Minor

		Evaluation Matrix	
ITEM		**Alt 1-Phase I Only**	**Alt 2-Geometric Improvements**
Gas		None	Minor
Purpose and Need			
Improves Intersection Capacity		Least	Most
Reduce Overall Delay		Least	Most
Improves Intersection Safety		Least	Most

Table 10: Alternatives Matrix

7.7 Preferred Alternative

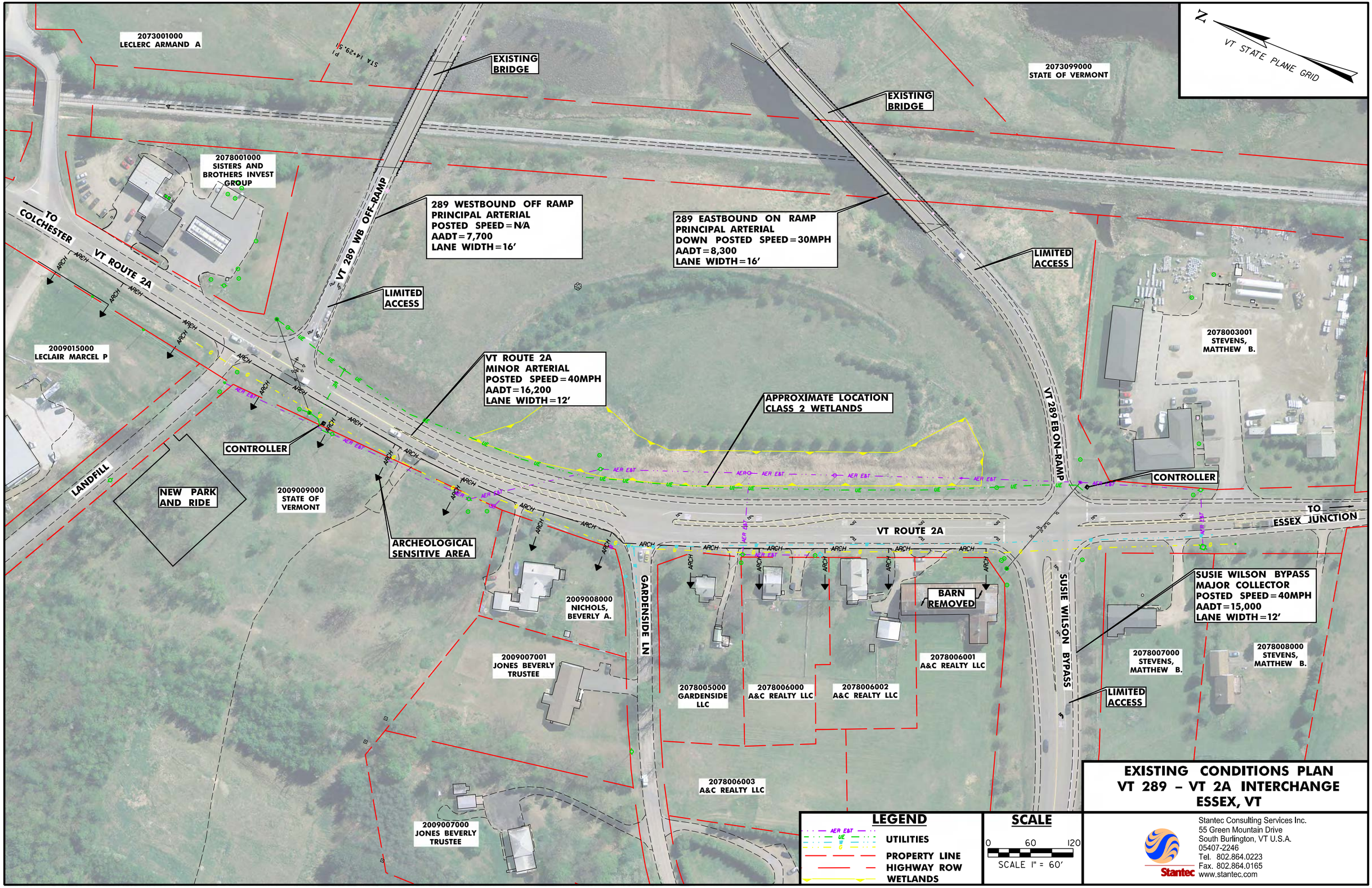
Based on public input, the alternative evaluation, stakeholder consensus, and the need to balance benefits, impacts, and costs, the preferred alternative is Alternative 2 – Geometric Improvements.

Alternative 2 is preferred for the following reasons:

- Intersection capacity is improved with Alternative 2.
  - No approaches are below LOS D with Alternative 2.
  - Failing Approaches are seen with Alternative 1.
  - Intersections are below capacity in Alternative 2 and not in Alternative 1.
- Public comment favors alternative 2.
- The impacts of Alternative 2 are minimal.
- Costs of Alternative 2 are minimal compared to the large gains of improving the interchange.
  - No Right-Of-Way impacts are anticipated
  - Widening is minimal.
  - Utility impacts are minimal.
  - Maintaining the failing approaches is detrimental to the surrounding area.

APPENDIX A

Existing Lane Configurations


N
VT STATE PLANE GRID
2073001000
LECLERC ARMAND A
EXISTING BRIDGE
2073099000
STATE OF VERMONT
EXISTING BRIDGE
2078001000
SISTERS AND BROTHERS INVEST GROUP
TO COLCHESTER
VT ROUTE 2A
VT 289 WB OFF-RAMP
289 WESTBOUND OFF RAMP
PRINCIPAL ARTERIAL
POSTED SPEED = N/A
AADT = 7,700
LANE WIDTH = 16'
289 EASTBOUND ON RAMP
PRINCIPAL ARTERIAL
DOWN POSTED SPEED = 30MPH
AADT = 8,300
LANE WIDTH = 16'
LIMITED ACCESS
LIMITED ACCESS
2009015000
LECLAIR MARCEL P
VT ROUTE 2A
MINOR ARTERIAL
POSTED SPEED = 40MPH
AADT = 16,200
LANE WIDTH = 12'
APPROXIMATE LOCATION
CLASS 2 WETLANDS
2078003001
STEVENS, MATTHEW B.
VT 289 EB ON-RAMP
CONTROLLER
CONTROLLER
LANDFILL
NEW PARK AND RIDE
2009009000
STATE OF VERMONT
ARCHEOLOGICAL SENSITIVE AREA
TO ESSEX JUNCTION
VT ROUTE 2A
GARDENSIDE LN
2009008000
NICHOLS, BEVERLY A.
BARN REMOVED
SUSIE WILSON BYPASS
SUSIE WILSON BYPASS
MAJOR COLLECTOR
POSTED SPEED = 40MPH
AADT = 15,000
LANE WIDTH = 12'
2009007001
JONES BEVERLY TRUSTEE
2078006001
A&C REALTY LLC
2078007000
STEVENS, MATTHEW B.
2078008000
STEVENS, MATTHEW B.
2078005000
GARDENSIDE LLC
2078006000
A&C REALTY LLC
2078006002
A&C REALTY LLC
LIMITED ACCESS
2078006003
A&C REALTY LLC
2009007000
JONES BEVERLY TRUSTEE
LEGEND
UTILITIES
PROPERTY LINE
HIGHWAY ROW
WETLANDS
SCALE
0 60 120
SCALE 1" = 60'
EXISTING CONDITIONS PLAN
VT 289 – VT 2A INTERCHANGE
ESSEX, VT
Stantec Consulting Services Inc.
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com
Stantec

N

VT STATE PLANE GRID

VT 279 EB ON-RAMP

16'

AER E&T

UE

5'

12'

STORAGE LENGTH = 228'

VT ROUTE 2A

W

G

VT ROUTE 2A

STORAGE LENGTH = 148'

24'

12'

SUSIE WILSON BYPASS

STORAGE LENGTH = 244'

0 40 80

SCALE 1" = 40'

VT 279 EB ON RAMP
VT ROUTE 2A
EXISTING PLAN

Stantec Consulting Services Inc
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com

VT 279 WB OFF RAMP
VT ROUTE 2A
EXISTING PLAN

Stantec Consulting Services Inc
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com

APPENDIX B

As Built Plans

4" WHITE LINE

					PAY LENGTH
SUSIE WILSON RD.	57+00	TO	57+50,	12' RT. (SOLID)	50 L.F.
	57+00	TO	57+50,	12' LT. (SOLID)	50 L.F.
	57+50, 12' RT.	TO	61+50,	24' RT. (SOLID)	400 L.F.
	61+50,	TO	63+75,	24' RT. (SOLID)	225 L.F.
	57+50, 12' LT.	TO	63+75,	38' LT. (SOLID)	625 L.F.
	61+50	TO	63+85,	12' RT. (SOLID)	235 L.F.
	62+15, 12' LT.	TO	63+90,	28' LT. (DASHED)	44 L.F.
VT. RTE. 2A	101+00, 15' RT.	TO	104+40,	20' RT. (SOLID)	340 L.F.
	101+00, 12' LT.	TO	104+30,	20' LT. (SOLID)	330 L.F.
	103+60, 8' RT.	TO	104+60,	8' RT. (SOLID)	100 L.F.
	106+05, 20' RT.	TO	110+00,	20' RT. (SOLID)	395 L.F.
	105+63, 8' LT.	TO	106+60,	8' LT. (SOLID)	97 L.F.
	105+63,	TO	107+35,	21' LT. (SOLID)	172 L.F.
	107+35, 21' LT.	TO	110+00,	20' LT. (DASHED)	66 L.F.
	105+87, 32' LT.	TO	110+00,	32' LT. (SOLID)	413 L.F.
	109+45	TO	110+00,	8' RT. (SOLID)	55 L.F.
	104+40, 20' RT.	TO	104+82,	65' RT. (50' RADIUS)	80 L.F.
	104+30, 20' LT.	TO	104+78,	70' LT. (50' RADIUS)	80 L.F.
	105+41, 72' LT.	TO	105+87,	32' LT. (50' RADIUS)	80 L.F.
	105+64, 78' RT.	TO	106+05,	20' RT. (50' RADIUS)	80 L.F.

DURABLE 4" YELLOW LINE

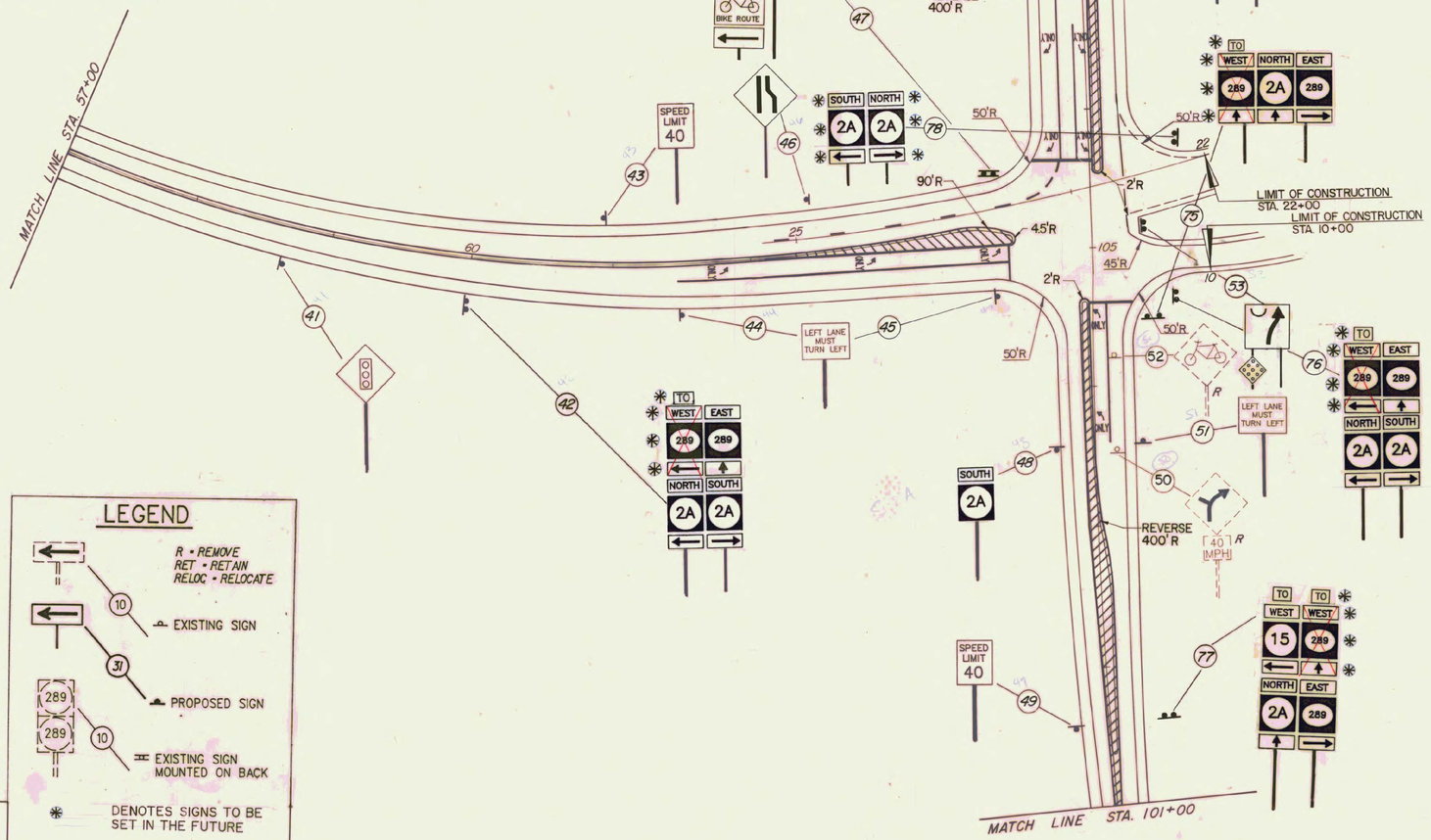
					PAY LENGTH
SUSIE WILSON RD.	62+02	TO	63+86,	℄ (DOUBLE)	368 L.F.
	62+02, ℄	TO	63+60,	12' LT. (DOUBLE)	298 L.F.
	63+60, 12' LT.	TO	63+86,	9' LT. (DOUBLE, 90° RADIUS)	60 L.F.
	63+86, 9' LT.	TO	63+86,	℄ (DOUBLE, 4.5' RADIUS)	28 L.F.
VT. RTE. 2A	101+00, 2' RT.	TO	102+60,	6' RT. (DOUBLE)	320 L.F.
	101+00, ℄	TO	104+60,	8' LT. (DOUBLE)	720 L.F.
	102+60, 6' RT.	TO	103+15,	℄ (DOUBLE)	110 L.F.
	103+15, ℄	TO	104+60,	4' LT. (DOUBLE)	290 L.F.
	104+60, 8' LT.	TO	104+60,	4' LT. (DOUBLE, 2' RADIUS)	13 L.F.
	105+00, 54' RT.	TO	105+10,	25' RT. (45° RADIUS)	30 L.F.
	105+10	TO	105+21,	25' RT. (SOLID)	11 L.F.
	105+21, 25' RT.	TO	105+25,	30' RT. (2' RADIUS)	3 L.F.
	105+55, 4' RT.	TO	105+55,	8' RT. (DOUBLE, 2' RADIUS)	13 L.F.
	105+55, 8' RT.	TO	108+45,	8' RT. (DOUBLE)	580 L.F.
	108+45, 8' RT.	TO	109+50,	4' LT. (DOUBLE)	210 L.F.
	105+55	TO	106+80,	4' RT. (DOUBLE)	250 L.F.
	106+80, 4' RT.	TO	107+80,	8' LT. (DOUBLE)	200 L.F.
	107+80	TO	110+00,	8' LT. (DOUBLE)	440 L.F.
	109+50	TO	110+00,	4' LT. (DOUBLE)	100 L.F.

DURABLE 8" YELLOW LINE

					PAY LENGTH
SUSIE WILSON RD.	62+12	TO	63+86	(DIAGONALS ON ISLAND)	238 L.F.
VT. RTE. 2A	1+00	TO	104+60	(DIAGONALS ON ISLAND)	396 L.F.
	105+55	TO	110+00	(DIAGONALS ON ISLAND)	766 L.F.

DURABLE 4" WHITE LINE

					PAY LENGTH
VT. RTE. 2A	105+30, 58' LT.	TO	105+63, 20' LT.	(DOTTED, 37.5' RADIUS)	60 L.F.



LEGEND

R - REMOVE
RET - RETAIN
RELOC - RELOCATE

10 — EXISTING SIGN

31 — PROPOSED SIGN

289 289 10 — EXISTING SIGN MOUNTED ON BACK

✱ DENOTES SIGNS TO BE SET IN THE FUTURE

DATUM

VERTICAL _____

HORIZONTAL _____

4" YELLOW LINE

					PAY LENGTH
SUSIE WILSON RD.	57+00	TO	62+02,	℄ (DOUBLE)	1004 L.F.

DURABLE LETTER IN WORD MARKING

SUSIE WILSON RD.	61+70, RT.	- O,N,L,Y
	62+80, RT.	- O,N,L,Y
	63+71, RT.	- O,N,L,Y
VT. RTE. 2A	103+67, RT.	- O,N,L,Y
	104+40, RT.	- O,N,L,Y
	105+80, 5' LT.	- O,N,L,Y
	105+80, 25' LT.	- O,N,L,Y
	106+52, 5' LT.	- O,N,L,Y
	106+52, 25' LT.	- O,N,L,Y
	107+25, LT.	- O,N,L,Y

DURABLE ARROW MARKING

SUSIE WILSON RD.	61+82, RT.	(LEFT POINT)
	62+90, RT.	(LEFT POINT)
	63+83, RT.	(LEFT POINT)
VT. RTE. 2A	103+79, RT.	(LEFT POINT)
	104+52, RT.	(LEFT POINT)
	105+71, LT.	(LEFT POINT)
	105+71, 25' LT.	(RIGHT POINT)
	106+40, LT.	(LEFT POINT)
	106+40, 25' LT.	(RIGHT POINT)
	107+13, LT.	(RIGHT POINT)

DURABLE 24" STOP BARS

				PAY LENGTH
SUSIE WILSON RD.	63+85, ℄	TO	25' RT.	25 L.F.
E.B. OFF-RAMP	22+41, 18' RT.	TO	22+51, 24' LT.	42 L.F.
VT. RTE. 2A	104+60, 4' LT.	TO	29' RT.	25 L.F.
	105+63, 4' RT.	TO	42' LT.	36 L.F.

4" WHITE LINE

					PAY LENGTH
VT. RTE. 2A	100+00, 12' RT.	TO	101+00, 15' RT.		100 L.F.
	100+00,	TO	101+00, 12' LT.		100 L.F.

4" YELLOW LINE

					PAY LENGTH
VT. RTE. 2A	100+00	TO	100+90, ℄	(DOUBLE)	180 L.F.

DURABLE 4" YELLOW LINE

					PAY LENGTH
VT. RTE. 2A	100+90	TO	101+00, ℄	(DOUBLE)	20 L.F.

SEE TRAFFIC SUMMARY SHEETS

AS BUILT 4/13/94 RB

SURVEYED BY _____ DATE _____

DRAWN BY T. KARIS DATE _____

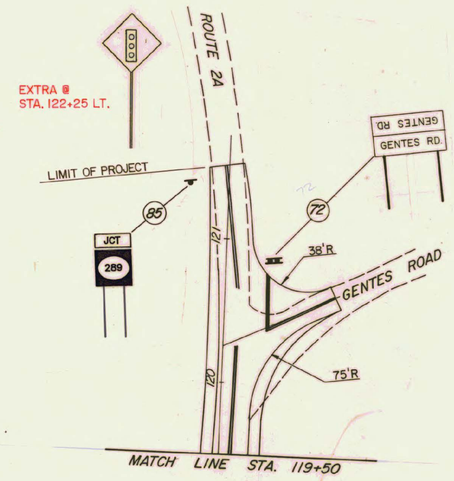
TRACED BY J. LUKOVITS DATE 2/89

VERMONT ROUTE 289 (F.A.P.)
TOWN OF ESSEX

PROJ. ESSEX NO. PB 033-1(3)

SHEET 61 OF 193

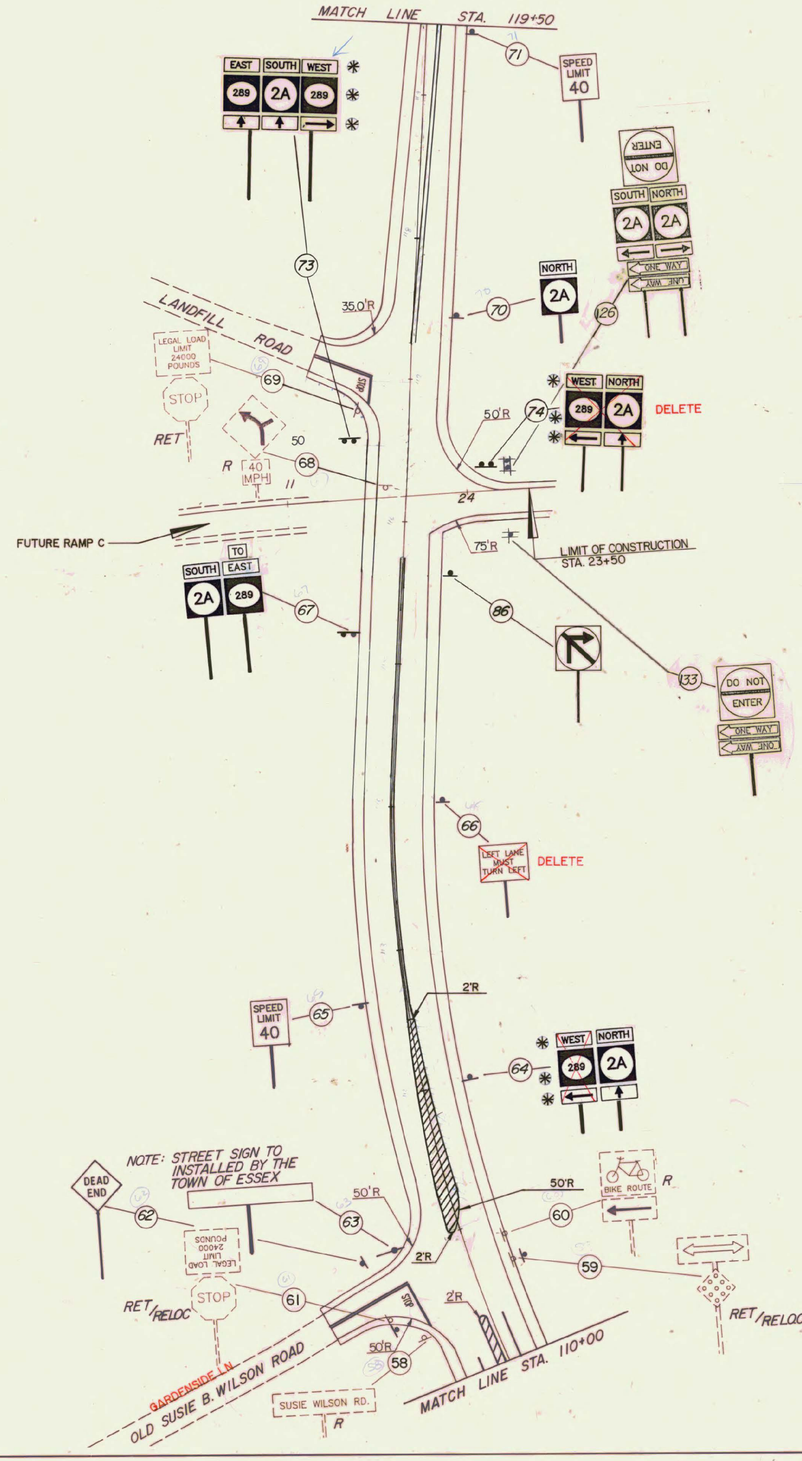
SWR SP-5



4" WHITE LINE			PAY LENGTH
VT. RTE. 2A	119+50, 20' RT. TO 119+70, 20' RT.	(SOLID)	20 L.F.
	119+50, 4' LT. TO 120+24, 3' LT.	(SOLID)	74 L.F.
	120+24, 3' LT. TO 121+50, 13' LT.	(SOLID)	126 L.F.
	121+00, 18' RT. TO 121+50, 9' RT.	(SOLID)	50 L.F.
	119+70, 20' RT. TO 120+53, 80' RT.	(75' RADIUS)	118 L.F.
	120+70, 72' RT. TO 121+00, 18' RT.	(38' RADIUS)	60 L.F.

4" YELLOW LINE			PAY LENGTH
VT. RTE. 2A	119+50, 8' RT. TO 120+25, 9' RT.	(DOUBLE)	150 L.F.
	120+64, 8' RT. TO 121+50, 3' LT.	(DOUBLE)	172 L.F.
GENTES RD.	50 L.F. TO MATCH EXISTING		100 L.F.

DURABLE 24" STOP BAR		PAY LENGTH
VT. RTE. 2A	120+38, 30' RT. TO 120+77, 29' RT.	39 L.F.



4" WHITE LINE			PAY LENGTH
VT. RTE. 2A	110+00,	TO 115+90, 20' RT. (SOLID)	590 L.F.
	116+85	TO 119+50, 20' RT. (SOLID)	265 L.F.
	110+00	TO 110+35, 8' RT. (SOLID)	35 L.F.
	110+88, 65' LT. TO 110+76, 110' LT. (OLD SUSIE WILSON RD.)		100 L.F.
	110+00	TO 110+35, 20' LT. (DASHED)	9 L.F.
	110+00	TO 110+20, 32' LT. (SOLID)	20 L.F.
	111+30	TO 116+50 20' LT. (SOLID)	520 L.F.
	117+60, 14' LT. TO 119+50, 5' LT.	(SOLID)	190 L.F.
	110+20, 32' LT. TO 110+60, 85' LT.	(50' RADIUS)	80 L.F.
	110+88, 65' LT. TO 111+30 20' LT.	(50' RADIUS)	50 L.F.
	115+90, 20' RT. TO 116+08, 55' RT.	(80' RADIUS)	42 L.F.
	116+50, 20'LT. TO 116+95 70'LT.	(35' RADIUS)	70 L.F.
	117+22, 60' LT. TO 117+60, 14' LT.	(35' RADIUS)	60 L.F.
	116+25, 69' RT. TO 116+85, 20' RT.	(50' RADIUS)	70 L.F.
	110+60, 85' LT. TO 110+55, 107' LT. (OLD SUSIE WILSON RD.)		25 L.F.

DURABLE 24" STOP BARS		PAY LENGTH
VT. RTE. 2A	110+40, 40' LT. TO 110+76, 46' LT. (OLD SUSIE WILSON RD.)	35 L.F.
	116+80, 29' LT. TO 117+00, 27' LT. (LANDFILL RD.)	20 L.F.

DURABLE 8" YELLOW LINE		PAY LENGTH
VT. RTE. 2A	110+00 TO 110+35 (DIAGONALS ON ISLAND)	28 L.F.
	111+00 TO 112+50 (DIAGONALS ON ISLAND)	330 L.F.

4" YELLOW LINE			PAY LENGTH
VT. RTE. 2A	110+65, 109' LT. TO 110+76, 46' LT. (OLD SUSIE WILSON RD.)	(DOUBLE)	124 L.F.
	117+00, 27' LT. TO 117+13, 68' LT. (LANDFILL RD.)	(DOUBLE)	84 L.F.
	112+50, CL. TO 115+75 CL.	(DOUBLE)	650 L.F.
	117+25, CL. TO 119+50, 8'RT.	(DOUBLE)	450 L.F.

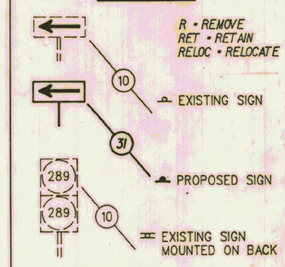
DURABLE 4" YELLOW LINE			PAY LENGTH
VT. RTE. 2A	110+00	TO 110+35, 4' LT. (DOUBLE)	70 L.F.
	110+00	TO 110+35, 8' LT. (DOUBLE)	70 L.F.
	110+35, 8' LT. TO 110+35, 4' LT.	(DOUBLE, 2' RADIUS)	12 L.F.
	111+02, 8'LT. TO 111+01, 4'LT.	(DOUBLE, 2' RADIUS)	12 L.F.
	111+02, 8'LT. TO 112+48, 1'LT.	(DOUBLE)	292 L.F.
	111+01, 4'LT. TO 111+25, 6'RT.	(DOUBLE, 50' RADIUS)	28 L.F.
	111+25, 6'RT. TO 112+48, 3'RT.	(DOUBLE)	246 L.F.
	112+48, 1'LT. TO 112+48, 3'RT.	(DOUBLE, 2' RADIUS)	12 L.F.

DURABLE LETTER IN WORD MARKING	
OLD SUSIE WILSON RD.	S, T, O, P
LANDFILL RD.	S, T, O, P

SEE TRAFFIC SUMMARY SHEETS

REVISED 06/91

LEGEND



* DENOTES SIGNS TO BE SET IN THE FUTURE

AS BUILT 4/13/94 RB

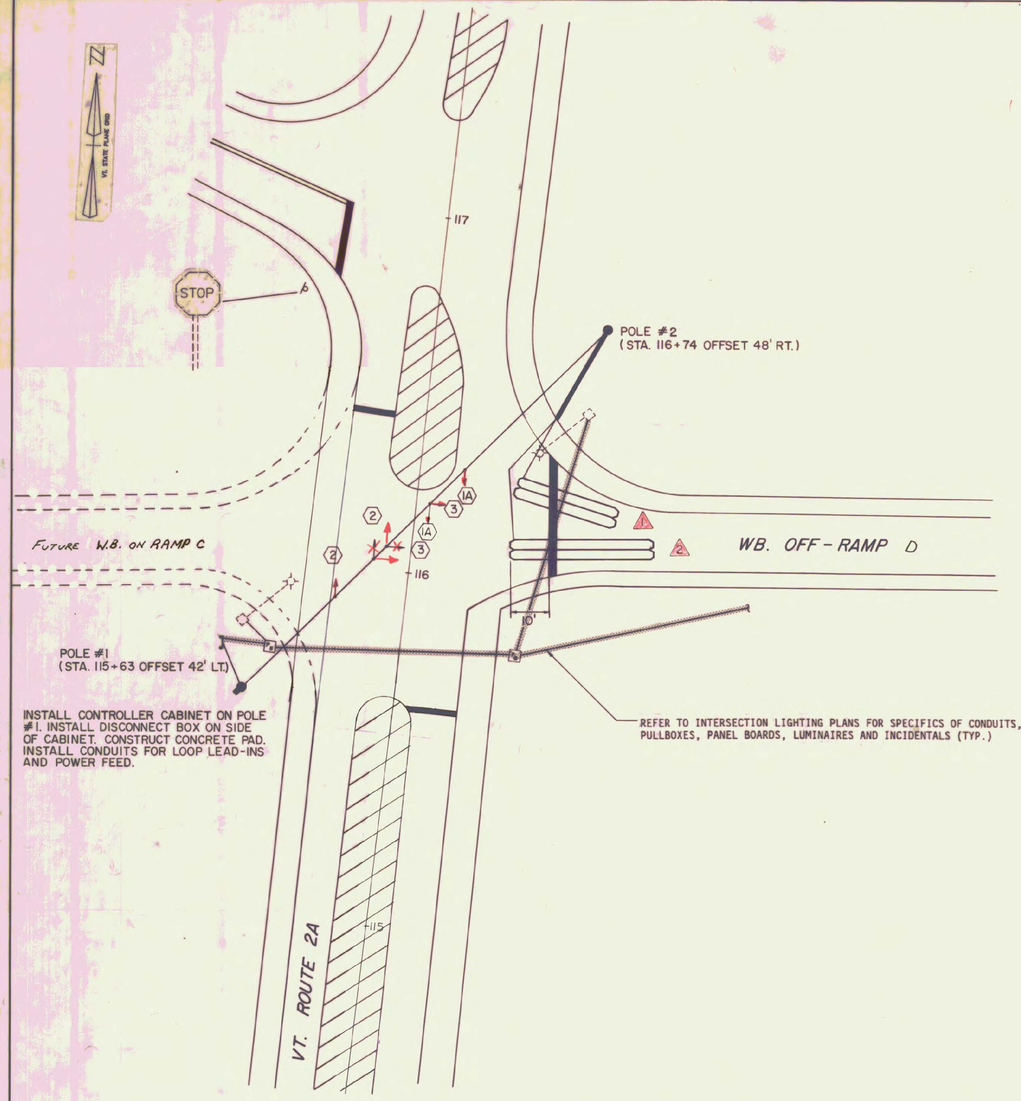
DATUM
VERTICAL _____
HORIZONTAL _____

SURVEYED BY _____ DATE _____
DRAWN BY T. KARIS DATE _____
TRACED BY J. LUKOVITS DATE 2/89

VERMONT ROUTE 289 (F.A.P.)
TOWN OF ESSEX
PROJ. ESSEX NO. PB 033-1(3)

SHEET 62 OF 193

SWR SP-6



VEHICLE LOOP DETECTORS

	LANE	LOOP NO.	SIZE	TYPE	NO. TURNS	CALL #	MODE	AMP
138'	WB RIGHT	1	6'x30'	QUAD	2	ø B	PRESENCE	DELAY
154'	WB LEFT	2	6'x40'	QUAD	2	ø B	PRESENCE	NON-DELAY

TEST RESULTS

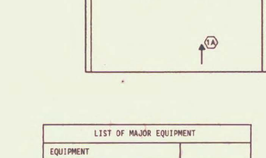
INDUCTANCE (uh)		RESISTANCE Ω @ 77° F		(meg Ω)
CALCULATED	MEASURED	CALCULATED	MEASURED	LEAKAGE TO GROUND
320				
406				

ALL CALCULATED VALUES ARE AT THE CONTROLLER. MEASURED VALUES MUST BE FILLED IN PRIOR TO TEST PERIOD.

TIMING AND PHASING

		PHASE A (DWELL) R/W	PHASE A (DWELL) CLEAR TO ø B	PHASE B R/W	PHASE B CLEAR TO ø C	PHASE B CLEAR TO ø A	PHASE C (FUTURE) R/W	PHASE C (FUTURE) CLEAR TO ø A
A.M. PEAK	INITIAL							
	VEHICLE							
	MINIMUM							
	MAX 1							
	MAX 2							
OFF PEAK REST OF DAY	INITIAL							
	VEHICLE							
	MINIMUM							
	MAX 1							
	MAX 2							
P.M. PEAK	INITIAL	-			7			
	VEHICLE	-			1			
	MINIMUM	35 4 2			8 4 2	4 2		
	MAX 1	35 4 2			45 4 2	4 2		
	MAX 2							
	FACE 1A	G Y R			R R R	R R		
	FACE 2	G Y R			R R R	R R		
	FACE 3	R R R			G Y R	Y R		

FLASHING OPERATION



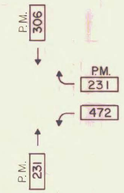
LIST OF MAJOR EQUIPMENT		
EQUIPMENT		
STRAIN POLES		2
NEW 12" TRAFFIC SIGNAL HEADS W/TUNNEL VISORS, DISCONNECT HANGARS & MOUNTING HARDWARE		
3-SECTION		6
ONE-WAY HANGAR TWO-WAY HANGAR THREE-WAY HANGAR		4 1 0
CONTROLLER/CABINET		1
LUMINAIRES		0
PULLBOX		0
CONDUIT	2"	30'
VEHICLE LOOP DETECTORS*		390'

THE QUANTITIES LISTED ABOVE ARE APPROXIMATE AND ARE FURNISHED FOR INFORMATION ONLY. MISCELLANEOUS (UNLISTED) WIRE, CABLE, HARDWARE, ETC. ARE REQUIRED TO PROVIDE FOR A FUNCTIONING TRAFFIC SIGNAL SYSTEM.

*THE QUANTITY LISTED IS FOR SAWCUT ONLY. LEAD-IN WIRES AND/OR SHIELDED CABLE QUANTITIES FROM THE EDGE OF PAVEMENT OR CURB TO THE CONTROLLER ARE NOT INCLUDED IN THE TOTAL.

SIGNAL FACE ARRANGEMENT

FACES 1A, 2, 3



2004 P.M. PEAK HOUR VOLUMES

TRAFFIC CONTROL NOTES

1. DURING CONSTRUCTION, A MINIMUM OF ONE-WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. TWO-WAY TRAFFIC SHALL BE MAINTAINED AT NIGHT, ON WEEKENDS AND HOLIDAYS. DURING PEAK TRAFFIC AND WHENEVER POSSIBLE DURING CONSTRUCTION. AT THE DISCRETION OF THE DISTRICT TRANSPORTATION ADMINISTRATOR (OR OTHER DESIGNATED AGENCY REPRESENTATIVE), A UNIFORMED TRAFFIC CONTROL OFFICER SHALL DIRECT TRAFFIC, WHENEVER REQUIRED.

2. TRAFFIC CONTROL SIGNING AND CHANNELIZING DEVICES SHALL BE IN ACCORDANCE WITH THE APPROPRIATE STANDARD DRAWINGS (E-100 THROUGH E-110, E-10, OTHERS AS REQUIRED). THE DESIGNER SHALL SPECIFY AND INCLUDE ONLY THOSE THAT APPLY.

3. AFTER SIGNAL INSTALLATION, ALL HEADS MUST BE COVERED (TURNING SHALL NOT BE ALLOWED) UNTIL TURN ON. THE METHOD OF COVERING SHALL BE AS FOLLOWS: ALL NEW TRAFFIC AND PEDESTRIAN SIGNAL HEADS WHICH HAVE BEEN INSTALLED BUT NOT PLACED IN EITHER FLASHING OR FULL OPERATION SHALL BE COVERED. EXISTING SIGNAL HEADS WHICH ARE PLACED OUT OF SERVICE IN ORDER TO PERFORM WORK ON THE SIGNAL SYSTEM SHALL ALSO BE COVERED, EXCEPT WHEN SUCH WORK CAN BE COMPLETED IN A RELATIVELY SHORT PERIOD OF TIME (SEVERAL HOURS) AND APPROVED TRAFFIC CONTROL HAS BEEN PROVIDED.

   THE SIGNAL COVERS SHALL CONSIST OF A ONE-PIECE PLASTIC BAG HAVING A MINIMUM THICKNESS OF 4 MIL. THE BAG SHALL BE OPAQUE. THE COVER SHALL SLIP OVER THE ENTIRE SIGNAL HEAD AND SHALL BE SECURELY TIED AT THE OPENING WITH A ROPE OF SUFFICIENT SIZE AND STRENGTH TO SECURE THE COVER. AN INTERMEDIATE ROPE OF THE SAME MATERIAL SHALL BE DRAWN AROUND THE CENTER OF THE COVER TO PREVENT EXCESS FLAPPING IN THE WIND.

   A DRAIN HOLE SHALL BE MADE AT THE BOTTOM OF THE BAG TO ALLOW THE ESCAPE OF MOISTURE. NO TAPE OR ADHESIVE WILL BE ALLOWED TO BE ATTACHED TO ANY SURFACE OF THE SIGNAL HOUSING OR LENSES. ALL COVERS SHALL BE PLACED IN A NEAT WORKMANLIKE MANNER. ANY COVER WHICH IS TORN OR MISSING SHALL BE IMMEDIATELY REPLACED. PAYMENT FOR THE COVERS, THEIR PLACEMENT, AND REMOVAL AND ALL INCIDENTALS FOR COMPLETION OF THE WORK SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL.

4. WHERE TWO-WAY TRAFFIC IS MAINTAINED DURING CONSTRUCTION, THE SIGN PACKAGE SHOWN ON STD. E-10 SHOULD BE USED. FOR ONE-WAY TRAFFIC, E-110 APPLIES. APPROACH CONSTRUCTION SIGNING SHALL REMAIN IN PLACE DURING THE ENTIRE CONSTRUCTION PERIOD. OTHER SIGNING SHALL BE REMOVED OR COVERED WHEN NOT APPLICABLE.

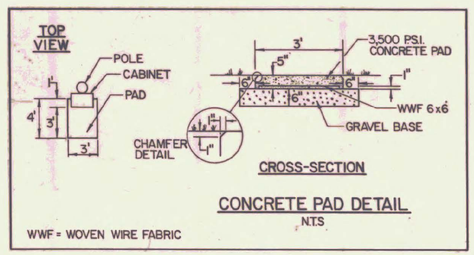
5. VARIATIONS IN THE SIGNING PACKAGES MAY BE DICTATED BY UNIQUE GEOMETRY AND/OR TRAFFIC CONDITIONS.

6. THE CONTRACTOR SHALL NOT WORK WITHIN THE HIGHWAY ROW WITHOUT THE APPROPRIATE CONSTRUCTION SIGNING IN PLACE.

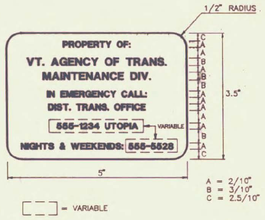
7. THE DEVELOPMENT ROADWAY, IF OPEN TO TRAFFIC, SHALL BE STOP SIGN CONTROLLED UNTIL THE SIGNAL IS OPERATIONAL. THE STOP SIGN(S) SHALL BE REMOVED AT SIGNAL TURN ON.

NOTES:

ALL EXCAVATION FOR INSTALLATION OF SLEEVES, ITEM 625.10, SHALL BE INCLUDED IN ITEM 678.21, ELECTRICAL CONDUIT. NO SEPARATE PAYMENT SHALL BE MADE FOR SLEEVE TRENCH EXCAVATION.



CONTROLLER IDENTIFICATION PLAQUE



LEGEND: – BLACK (NON-REFL.) – STAMPED PRIOR TO PAINTING BACKGROUND: NATURAL ALUMINUM OR BRASS SURFACE.

NOTES:

1.) THE PLAQUE SHALL BE MOUNTED ON ALL TRAFFIC SIGNAL CONTROLLER CABINETS. IT SHALL BE FASTENED TO THE CONTROLLER CABINET IN SUCH A MANNER AS TO BE NOT EASILY REMOVED, SUCH AS WELDED, RIVITED OR BOLTED WITH VANDAL PROOF BOLTS.

2.) THE LETTERS SHALL BE PUNCHED, STAMPED OR ENGRAVED. SUCH STAMPING SHALL PENETRATE AT LEAST 1/2 THE BASE MATERIAL THICKNESS, EXCEPT AS NOTED BELOW.

3.) THE BASE MATERIAL FOR THE PLAQUE SHALL BE BRASS OR ALUMINUM WITH A MINIMUM THICKNESS OF 0.100 INCHES.

4.) THE VARIABLE PORTION OF THE LETTERING SHALL BE "STICK-ON" WITH THE SAME LETTER SIZE AS THE REST OF THE PLAQUE.

DATUM	
VERTICAL	N.G.V.D. 1929
HORIZONTAL	N.A.D. 1927

AS BUILT 4/13/94 RB

REVISED 2/28/91

SURVEYED BY		DATE
DRAWN BY	T. JOHNSON	DATE 8/90
TRACED BY	N. GIBSON	DATE 8/90

VERMONT ROUTE 289 (F.A.P.)
TOWN OF ESSEX
PROJ. ESSEX NO. PB 033-1(3)

SHEET 74A OF 193

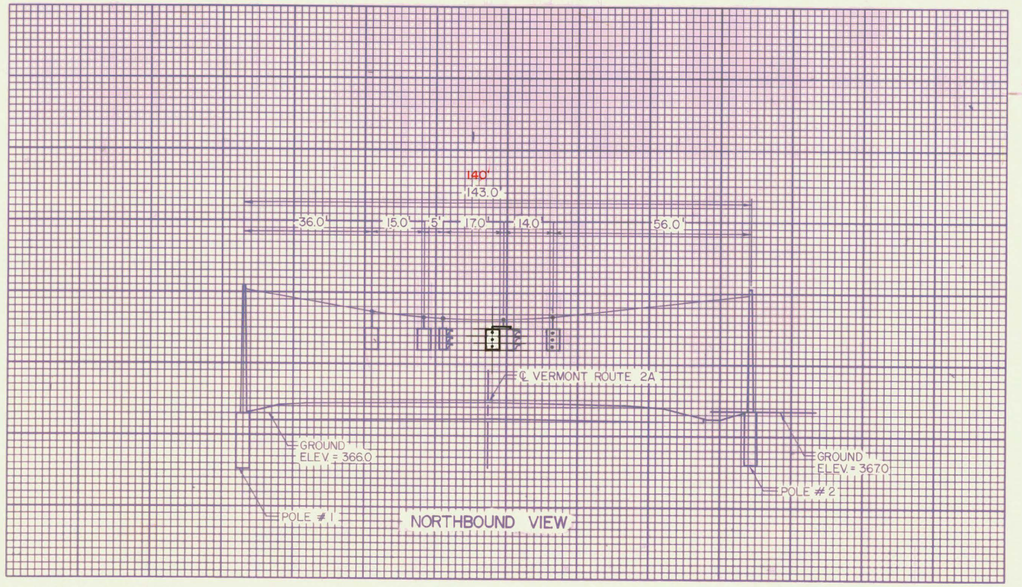
RTE 289

POLE NO.	POLE LENGTH GAGE & DIAMETER	B.C.	S	T	BASE DEPTH	BASE DIA.	ANCHOR BOLTS	POLE BKRK
# 1	36', 0 GA, 14"	18-1/2"	19-1/2"	1-3/4"	15.5'	30"	1-3/4"x90"	
# 2	34', 0 GA, 14"	18-1/2"	19-1/2"	1-3/4"	15'	30"	1-3/4"x90"	

NOTE: ANCHOR BOLTS, BASE PLATE, AND FOOTING DIMENSIONS ARE BASED ON DESIGN POLE DIMENSIONS AND YIELD STRENGTH SHOWN. POLES SUPPLIED OF DIFFERENT SIZE OR STRENGTH MAY REQUIRE CHANGES IN THE DIMENSIONS.
BACKRAKE (BKRK) SHOWN IS AS MEASURED AT THE TOP OF THE POLE.

DESIGN CRITERIA USED:
POLE FY = 48,000 p.s.i.
BASE PLATE FY = 36,000 p.s.i.
ANCHOR BOLTS FY = 55,000 p.s.i.

STRAIN POLE



IF MORE THAN ONE LOCATION SEE SHEET(S) FOR ADDITIONAL DETAILS.

(SEE SHEET(S) FOR LOCATION PLAN)

DEAD LOAD SPAN WIRE TENSION= 1497 lb
LIVE LOAD SPAN WIRE TENSION= 4506 lb
SCALE 1" = 20'

SPAN WIRE CROSS SECTION

GENERAL NOTES

1) ALL MATERIAL AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND AASHTO'S STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGN, LUMINAIRES AND TRAFFIC SIGNALS, 1985. SEE SPECIFICATION BOOK FOR REVISED ALLOWABLE BENDING STRESS.

2) TRAFFIC CONTROL SIGNAL STRAIN POLES SHALL CONFORM TO THE REQUIREMENTS OF SUBSECTION 752.02, STRAIN POLES AND SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH SECTION 678 - TRAFFIC CONTROL SIGNALS.

3) STEEL POLE CAPS SHALL BE PROVIDED WITH A 2-INCH BUSHED (BLIND) ELECTRICAL ENTRANCE WHEN APPLICABLE. STRAIN POLES SHALL BE PROVIDED WITH A 2-INCH (BLIND) HALF COUPLING FOR SIGNAL CABLE, LOCATED 6 INCHES BELOW THE SPANWIRE ATTACHMENT HEIGHT.

4) FOUR STAINLESS STEEL ANCHOR BOLTS WITH TWO HEXAGON NUTS PER BOLT SHALL BE FURNISHED WITH EACH POLE. ANCHOR BOLTS AND WASHERS SHALL BE AN AUSTENITIC GRADE OF STAINLESS STEEL CONFORMING TO THE CHEMISTRY OF ASTM A276 TYPE 304 WITH THE FOLLOWING PHYSICAL PROPERTIES:

(A) TENSILE STRENGTH, MINIMUM	80,000 psi
(B) YIELD STRENGTH, MINIMUM	55,000 psi
(C) ELONGATION IN 2 INCHES, MINIMUM	25%
(D) ROCKWELL B HARDNESS, MINIMUM	86
OR CHARPY V-NOTCH (AASHTO T243 USING H FREQUENCY OF TESTING).	15 ft.-lbs. @ 40° F

NUTS FOR THE ANCHOR BOLTS SHALL BE THE HEAVY HEX TYPE CONFORMING TO THE REQUIREMENTS OF ASTM A-194 GRADE 8

5) BOLTS AND BASES SHALL BE OF ADEQUATE SIZE TO RESIST THE FULL BENDING MOMENT OF THE POLE AT YIELD STRENGTH STRESS.

6) ADDITIONAL DESIGN CRITERIA:
CONCRETE - f'c = 1,400 P.S.I. f'c = 3,500 P.S.I.
WIND LOAD - 25 LBS PER SQUARE FOOT (MIN.) ON THE EXPOSED POLE SURFACE.
REINFORCING STEEL = 24,000 psi (GRADE 60)

7) CONCRETE FOR FOOTINGS SHALL CONFORM TO REQUIREMENTS OF CONCRETE CLASS 'B' SECTION 501. STRUCTURAL CONCRETE.

8) BACKFILL MATERIAL PLACED ADJACENT TO THE FOOTINGS SHALL MEET THE REQUIREMENTS FOR GRANULAR BACKFILL FOR STRUCTURES. SUBSECTION 704.08.

9) WHEN THE DESIGN DEPTH OF A FOOTING CANNOT BE OBTAINED DUE TO UNFORESEEN FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND OBTAIN A REVISED FOOTING DETAIL FROM THE ENGINEER.

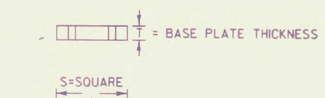
10) EACH METAL POLE SUPPORTING EITHER VEHICLE OR PEDESTRIAN TRAFFIC SIGNAL SHALL BE GROUNDED. RESISTANCE OF MADE ELECTRODES. A SINGLE ELECTRODE CONSISTING OF A GROUND ROD WHICH DOES NOT HAVE A RESISTANCE TO GROUND OF 25 OHMS OR LESS SHALL BE AUGMENTED BY AT LEAST ONE ADDITIONAL ELECTRODE. THEY SHALL BE AT LEAST 6 FEET APART.

11) STRAIN POLE BASE PLATES SHALL BE STAMPED WITH POLE DIAMETER, HEIGHT, YIELD STRENGTH, AND GAGE. ALTERNATELY, THE INFORMATION MAY BE STAMPED ON A METAL TAG ATTACHED TO THE POLE NEAR THE HANDHOLE.

12) ALL DESIGN DETAILS, WORKMANSHIP, PROCEDURES AND INSPECTION OF WELDING SHALL CONFORM TO THE REQUIREMENTS OF THE AWS D.1.1.- 80 AS MODIFIED BY THE LATEST EDITION OF AASHTO STANDARD STEEL SPECIFICATIONS FOR WELDING OF STRUCTURAL HIGHWAY BRIDGES. THE SHEILDED METAL ARC WELDING (SMAW) OR SUBMERGED ARC WELDING (SAW) PROCESSES SHALL BE USED FOR ALL WELDING UNLESS OTHER PROCESSES ARE APPROVED, ON A PROJECT BY PROJECT BASIS, FROM ACCEPTABLE RESULTS OF PROCEDURE QUALIFICATION TESTS. WHERE WELDMENTS ARE TO BE GALVANIZED AFTER WELDING, A TYPE OF FILLER METAL WHICH WILL DEPOSIT WELD METAL WITH A SILICON CONTENT LESS THAN 0.4 PERCENT SHALL BE USED. ALL WELDS SHALL BE AT LEAST AS STRONG AS THE MATERIAL(S) BEING WELDED.

13) IN ACCORDANCE WITH SUBSECTION 105.03, SHOP DRAWINGS (6 COPIES OF EACH; 1 - TRAFFIC & SAFETY, 1 - PRIME CONTR., 1 - SUB CONTR., 3 - CONST.) SHALL BE SUBMITTED TO THE VERMONT AGENCY OF TRANSPORTATION FOR APPROVAL PRIOR TO FABRICATION. THE SUBMITTAL SHALL INCLUDE THE FOLLOWING INFORMATION:
A) DETAILED DRAWING OF EACH COMPONENT OF THE STRAIN POLE.
B) MATERIAL SPECIFICATIONS FOR EACH COMPONENT OF THE STRAIN POLE BY COMPLETE SPECIFICATIONS OR BY REFERENCE TO APPLICABLE ASTM STANDARDS.
C) NOTATION OF PROJECT NAME, PROJECT NUMBER, ROUTE NUMBER, AND STRAIN POLE STATIONING. (TO BE INCLUDED ON EACH SHEET INCLUDING STANDARD SHEETS AND SPECIFICATION SHEETS).
D) DETAILS FOR LOCATION OF LUMINAIRE ARM(S) ON STRAIN POLE(S).
E) ALL ELEVATIONS AND DIMENSIONS NECESSARY TO PROVIDE A COMPLETE SET OF RECORD PLANS. (POLE HEIGHT, SPAN WIRE ATTACHMENT HEIGHT, POLE DIAMETER (TOP AND BOTTOM), POLE GAGE, HANDHOLE (SIZE AND LOCATION), BASE PLATE, BOLT CIRCLE, ANCHOR BOLT SIZE)
F) POLE BASE STAMPING DETAIL.
G) DEAD LOAD DEFLECTION INFORMATION.
H) WELDING DETAILS AND PROCEDURES ARE REQUIRED FOR ALL WELDS. PROCEDURES SHALL BE SUBMITTED FOR APPROVAL WITH REFERENCE TO EACH WELD IDENTIFIED ON THE SHOP DRAWINGS. (SEE SUBSECTION 506.10) THE FOLLOWING INFORMATION WILL BE REQUIRED FOR ALL WELDED JOINTS (ALUMINUM OR STEEL):
(a) PROCEDURE SPECIFICATIONS PER AWS D1.1 APPENDIX E FORM E1
(b) PROCESS AND PROCEDURE QUALIFICATION TESTS PER AWS D1.1 APPENDIX E FORM E2
(c) CERTIFICATE OF CONFORMANCE TO SPECIFICATIONS FOR FILLER MATERIAL.
WHEN USING ANY GMAW OR FCAW WELDING PROCESS (WITH PRIOR APPROVAL AS NOTED ABOVE), THE FOLLOWING WILL ALSO BE REQUIRED:
A MANUFACTURER'S CERTIFICATE THAT THE GAS OR GAS MIXTURE IS SUITABLE FOR THE INTENDED APPLICATION AND MEETS THE DEW POINT REQUIREMENTS.
REFERENCE-ASSHTO MODIFICATION OF AWS D1.1 SEC. 4.18

AS BUILT 4/14/94 RS
REVISED 2/28/91

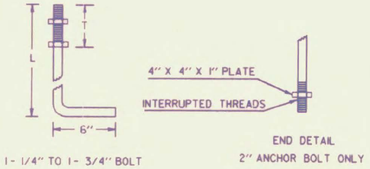


USED FOR CONDUIT LOCATION, SEE AT RIGHT "SECTION" DETAIL.

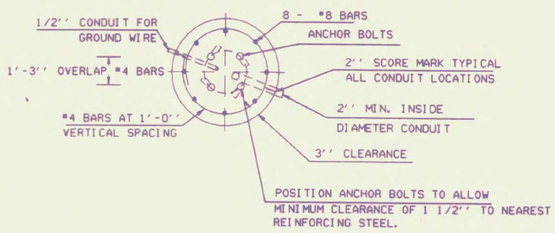
2" SCORE MARK DETAIL

BASE PLATE DETAIL

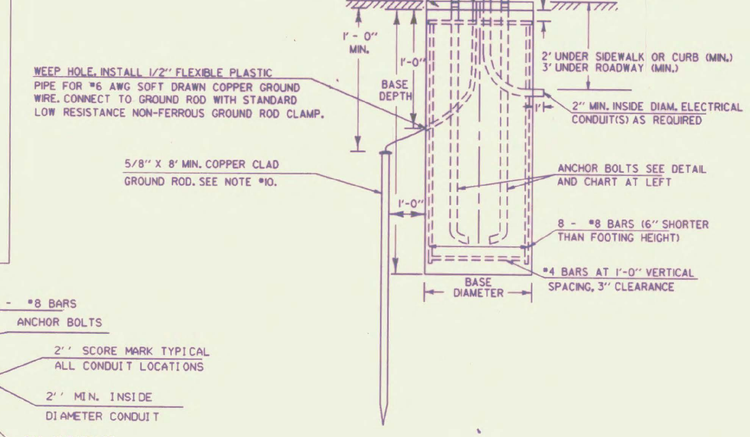
ANCHOR BOLT DETAIL		
SIZE	L	T
1-1/4" X 48"	42	8
1-1/2" X 60"	54	9
1-3/4" X 90"	84	9
2" X 96"	96	9



ANCHOR BOLT DETAIL



SECTION



ELEVATION

STRAIN POLE FOOTING

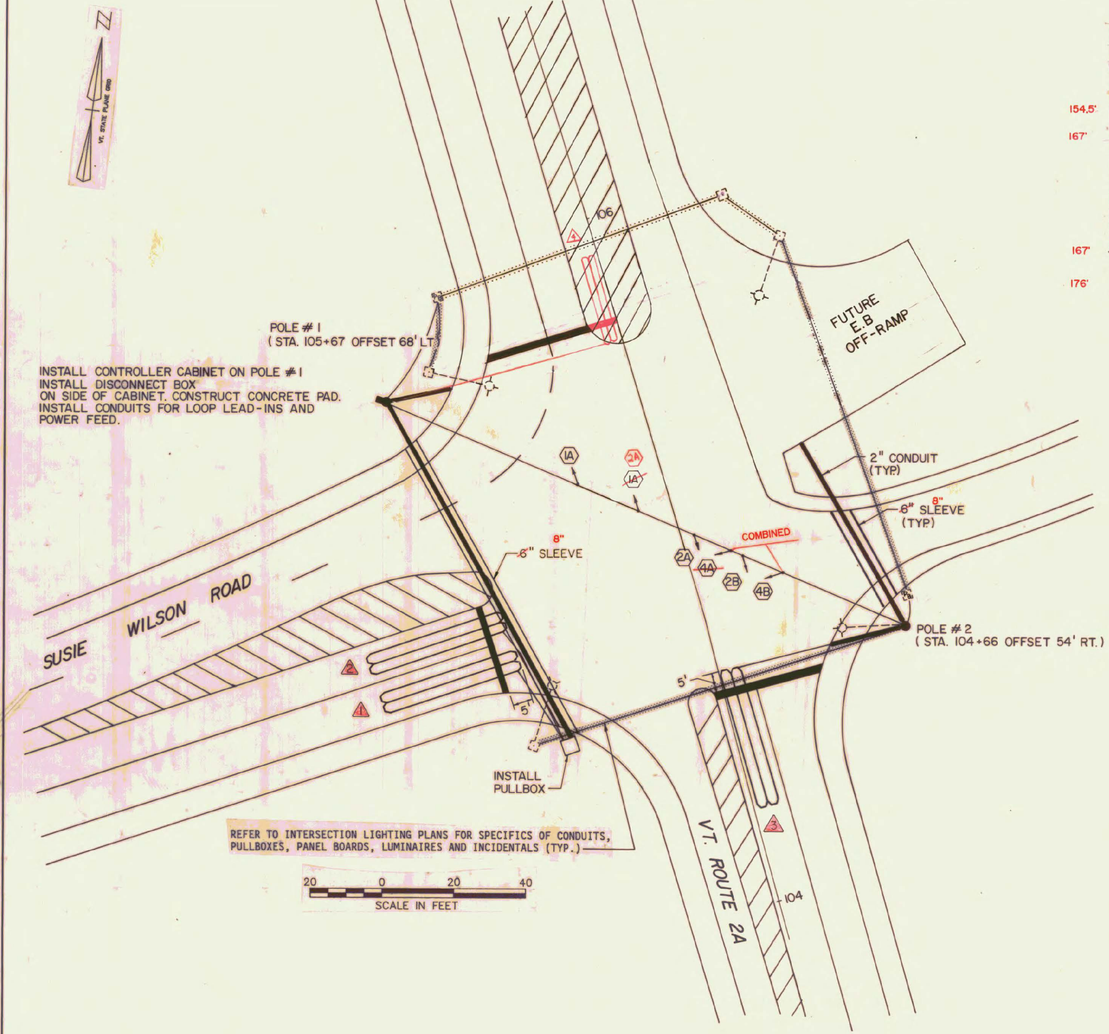
STRAIN POLE/FOOTING DETAIL SHEET

SIGNAL # 2

INTERSECTION OF RAMP C (W.B. ON-RAMP)/ RAMP D (W.B. OFF-RAMP)/ VERMONT RTE. 2A

PREPARED BY Y.S. DATE 9/90
CHECKED BY T.M. DATE 9/90
DESIGN SUPERVISOR M.W.O. DATE 9/90
PROJ. ESSEX NO. PB 033-1(3)
VT. RTE. 289 F.A.P. TOWN OF ESSEX
TRAFFIC SHEET NO. ____ OF ____
SHEET 74B OF 193 SHEETS

TD112



VEHICLE LOOP DETECTORS

	LANE	LOOP NO.	SIZE	TYPE	NO. TURNS	CALL ø	MODE	AMP
154.5'	EB THRU/RT	1	6'x40'	QUAD	2	ø B	PRESENCE	NON-DELAY
167'	EB LEFT	2	6'x40'	QUAD	2	ø D	PRESENCE	DELAY
167'	NB LEFT	3	6'x40'	QUAD	2	ø C	PRESENCE	DELAY
176'	SB-THRU, RT, & LT.	4	6'x40'	QUAD	2			

TEST RESULTS

INDUCTANCE (uh)		RESISTANCE Ω @ 77° F		(meg Ω)
CALCULATED	MEASURED	CALCULATED	MEASURED	LEAKAGE TO GROUND
374				
377				
408				

ALL CALCULATED VALUES ARE AT THE CONTROLLER. MEASURED VALUES MUST BE FILLED IN PRIOR TO TEST PERIOD.

TIMING AND PHASING

		PHASE A (DWELL) R/W	PHASE A (DWELL) CLEAR TO ø B	PHASE A (DWELL) CLEAR TO ø D	PHASE B R/W	PHASE B CLEAR TO ø C	PHASE B CLEAR TO ø A	PHASE C (ADVANCE) R/W	PHASE C (ADVANCE) CLEAR TO ø A	PHASE D (ADVANCE) R/W	PHASE D (ADVANCE) CLEAR TO ø B	FLASHING OPERATION
A.M. PEAK	INITIAL											
	VEHICLE											
	MINIMUM											
	MAX 1											
	MAX 2											
OFF PEAK REST OF DAY	INITIAL											
	VEHICLE											
	MINIMUM											
	MAX 1											
	MAX 2											
P.M. PEAK	INITIAL	–			7							
	VEHICLE	–			1							
	MINIMUM	35	4 2	4 2	8	4 2	4 2	10	4 1	10	4 1	
	MAX 1	35	4 2	4 2	45	4 2	4 2	10	4 1	10	4 1	
	MAX 2											
	FACE 1A	G	Y R	Y R	R	R R	R R	R	R R	R	R R	FY
	FACE 2A	G	Y R	Y R	R	R R	R R	R	R R	G	R R	FY
	FACE 2B	G	Y R	Y R	R	R R	R R	R	R R		R R	FY
	FACE 4A	R	R R	R R	G	Y R	Y R	R	R R		R R	FR
	FACE 4B	R	R R	R R	G	Y R	Y R	R	R R	G	R R	FR

SIGNAL FACE ARRANGEMENT

FACES 2B, 4B — FACES 2A, 4A — FACE 1A

2004 P.M. PEAK HOUR VOLUMES

P.M. 523 155
P.M. 30 474 56
P.M. 26 340 5

LIST OF MAJOR EQUIPMENT

EQUIPMENT	
STRAIN POLES	2
NEW 12" TRAFFIC SIGNAL HEADS W/TUNNEL VISORS, DISCONNECT HANGARS & MOUNTING HARDWARE	
3-SECTION	2
5-SECTION	4
ONE-WAY HANGAR	6
TWO-WAY HANGAR	0
THREE-WAY HANGAR	0
CONTROLLER/CABINET	1
LUMINAIRES	1
PULLBOX	1
CONDUIT 2"	200'
VEHICLE LOOP DETECTORS*	460'

THE QUANTITIES LISTED ABOVE ARE APPROXIMATE AND ARE FURNISHED FOR INFORMATION ONLY. MISCELLANEOUS (UNLISTED) WIRE, CABLE, HARDWARE, ETC. ARE REQUIRED TO PROVIDE FOR A FUNCTIONING TRAFFIC SIGNAL SYSTEM.

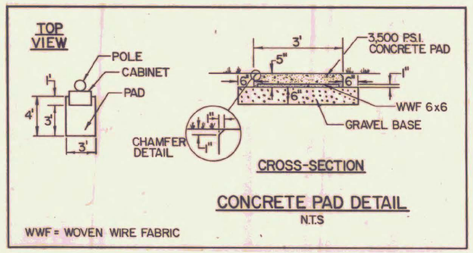
*THE QUANTITY LISTED IS FOR SAWCUT ONLY. LEAD-IN WIRES AND/OR SHIELDED CABLE QUANTITIES FROM THE EDGE OF PAVEMENT OR CURB TO THE CONTROLLER ARE NOT INCLUDED IN THE TOTAL.

NOTE:

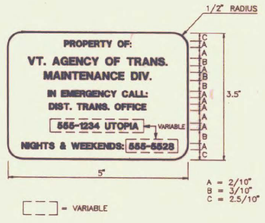
ELECTRIC SERVICE TO THIS SIGNAL CONTROLLER IS 240 VOLTS SINGLE PHASE. THE TRAFFIC SIGNAL CONTROLLER MANUFACTURER SHALL PROVIDE THE APPROPRIATE SIZE TRANSFORMER TO PROVIDE THE OPERATING VOLTAGE OF 120.

NOTES:

ALL EXCAVATION FOR INSTALLATION OF SLEEVES, ITEM 625.10, SHALL BE INCLUDED IN ITEM 678.21, ELECTRICAL CONDUIT. NO SEPARATE PAYMENT SHALL BE MADE FOR SLEEVE TRENCH EXCAVATION.



CONTROLLER IDENTIFICATION PLAQUE



LEGEND: – BLACK (NON-REFL.) – STAMPED PRIOR TO PAINTING BACKGROUND: NATURAL ALUMINUM OR BRASS SURFACE.

NOTES:

1.) THE PLAQUE SHALL BE MOUNTED ON ALL TRAFFIC SIGNAL CONTROLLER CABINETS. IT SHALL BE FASTENED TO THE CONTROLLER CABINET IN SUCH A MANNER AS TO BE NOT EASILY REMOVED, SUCH AS WELDED, RIVITED OR BOLTED WITH VANDAL PROOF BOLTS.

2.) THE LETTERS SHALL BE PUNCHED, STAMPED OR ENGRAVED. SUCH STAMPING SHALL PENETRATE AT LEAST 1/2 THE BASE MATERIAL THICKNESS, EXCEPT AS NOTED BELOW.

3.) THE BASE MATERIAL FOR THE PLAQUE SHALL BE BRASS OR ALUMINUM WITH A MINIMUM THICKNESS OF 0.100 INCHES.

4.) THE VARIABLE PORTION OF THE LETTERING SHALL BE "STICK-ON" WITH THE SAME LETTER SIZE AS THE REST OF THE PLAQUE.

TRAFFIC CONTROL NOTES

1. DURING CONSTRUCTION, A MINIMUM OF ONE-WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES. TWO-WAY TRAFFIC SHALL BE MAINTAINED AT NIGHT, ON WEEKENDS AND HOLIDAYS, DURING PEAK TRAFFIC AND WHENEVER POSSIBLE DURING CONSTRUCTION. AT THE DISCRETION OF THE DISTRICT TRANSPORTATION ADMINISTRATOR (OR OTHER DESIGNATED AGENCY REPRESENTATIVE), A UNIFORMED TRAFFIC CONTROL OFFICER SHALL DIRECT TRAFFIC, WHENEVER REQUIRED.

2. TRAFFIC CONTROL SIGNING AND CHANNELIZING DEVICES SHALL BE IN ACCORDANCE WITH THE APPROPRIATE STANDARD DRAWINGS (E-100 THROUGH E-110, E-10, OTHERS AS REQUIRED). THE DESIGNER SHALL SPECIFY AND INCLUDE ONLY THOSE THAT APPLY.

3. AFTER SIGNAL INSTALLATION, ALL HEADS MUST BE COVERED (TURNING SHALL NOT BE ALLOWED) UNTIL TURN ON. THE METHOD OF COVERING SHALL BE AS FOLLOWS: ALL NEW TRAFFIC AND PEDESTRIAN SIGNAL HEADS WHICH HAVE BEEN INSTALLED BUT NOT PLACED IN EITHER FLASHING OR FULL OPERATION SHALL BE COVERED. EXISTING SIGNAL HEADS WHICH ARE PLACED OUT OF SERVICE IN ORDER TO PERFORM WORK ON THE SIGNAL SYSTEM SHALL ALSO BE COVERED, EXCEPT WHEN SUCH WORK CAN BE COMPLETED IN A RELATIVELY SHORT PERIOD OF TIME (SEVERAL HOURS) AND APPROVED TRAFFIC CONTROL HAS BEEN PROVIDED.

   THE SIGNAL COVERS SHALL CONSIST OF A ONE-PIECE PLASTIC BAG HAVING A MINIMUM THICKNESS OF 4 MIL. THE BAG SHALL BE OPAQUE. THE COVER SHALL SLIP OVER THE ENTIRE SIGNAL HEAD AND SHALL BE SECURELY TIED AT THE OPENING WITH A ROPE OF SUFFICIENT SIZE AND STRENGTH TO SECURE THE COVER. AN INTERMEDIATE ROPE OF THE SAME MATERIAL SHALL BE DRAWN AROUND THE CENTER OF THE COVER TO PREVENT EXCESS FLAPPING IN THE WIND.

   A DRAIN HOLE SHALL BE MADE AT THE BOTTOM OF THE BAG TO ALLOW THE ESCAPE OF MOISTURE. NO TAPE OR ADHESIVE WILL BE ALLOWED TO BE ATTACHED TO ANY SURFACE OF THE SIGNAL HOUSING OR LENSES. ALL COVERS SHALL BE PLACED IN A NEAT WORKMANLIKE MANNER. ANY COVER WHICH IS TORN OR MISSING SHALL BE IMMEDIATELY REPLACED. PAYMENT FOR THE COVERS, THEIR PLACEMENT, AND REMOVAL AND ALL INCIDENTALS FOR COMPLETION OF THE WORK SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL.

4. WHERE TWO-WAY TRAFFIC IS MAINTAINED DURING CONSTRUCTION, THE SIGN PACKAGE SHOWN ON STD. E-10 SHOULD BE USED. FOR ONE-WAY TRAFFIC, E-110 APPLIES. APPROACH CONSTRUCTION SIGNING SHALL REMAIN IN PLACE DURING THE ENTIRE CONSTRUCTION PERIOD. OTHER SIGNING SHALL BE REMOVED OR COVERED WHEN NOT APPLICABLE.

5. VARIATIONS IN THE SIGNING PACKAGES MAY BE DICTATED BY UNIQUE GEOMETRY AND/OR TRAFFIC CONDITIONS.

6. THE CONTRACTOR SHALL NOT WORK WITHIN THE HIGHWAY ROW WITHOUT THE APPROPRIATE CONSTRUCTION SIGNING IN PLACE.

7. THE DEVELOPMENT ROADWAY, IF OPEN TO TRAFFIC, SHALL BE STOP SIGN CONTROLLED UNTIL THE SIGNAL IS OPERATIONAL. THE STOP SIGN(S) SHALL BE REMOVED AT SIGNAL TURN ON.

DATUM
VERTICAL N.G.V.D. 1929
HORIZONTAL N.A.D. 1927

AS BUILT 4/14/94 RB
REVISED 2/28/91

SURVEYED BY _____ DATE _____
DRAWN BY T. JOHNSON DATE 8/90
TRACED BY N. GIBSON DATE 8/90

VERMONT ROUTE 289 (F.A.P.)
TOWN OF ESSEX
PROJ. ESSEX NO. PB 033-1(3)

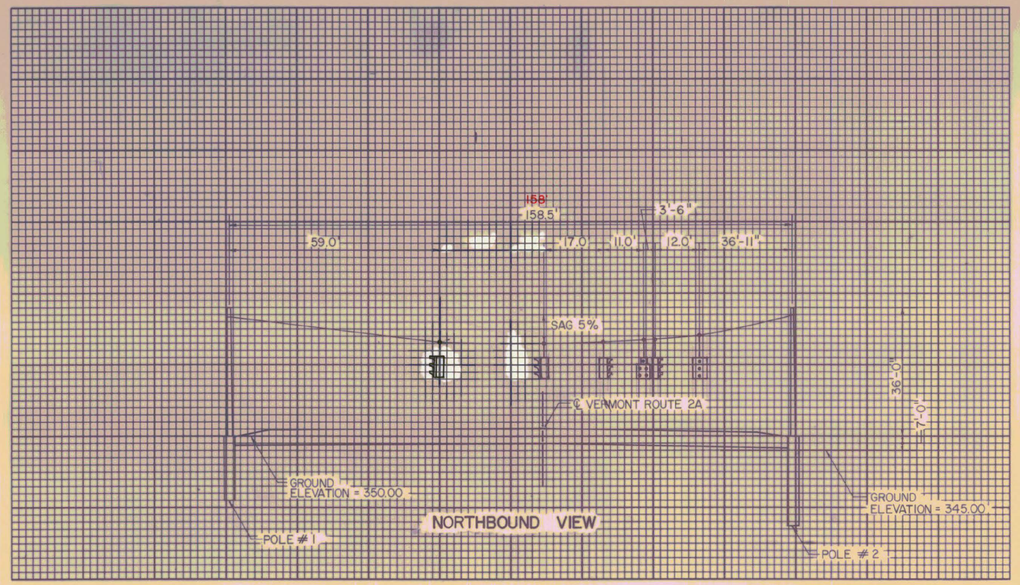
SHEET 74C OF 193

POLE NO.	POLE LENGTH GAGE & DIAMETER	B.C.	S	T	BASE DEPTH	BASE DIA.	ANCHOR BOLTS	POLE BKRK
#1	36', 0 GA, 18"	22"	23-1/2"	2"	18'	36"	1-3/4"x90"	
#2	36', 0 GA, 18"	22"	23-1/2"	2"	24'	36"	1-3/4"x90"	

NOTE: ANCHOR BOLTS, BASE PLATE, AND FOOTING DIMENSIONS ARE BASED ON DESIGN POLE DIMENSIONS AND YIELD STRENGTH SHOWN. POLES SUPPLIED OF DIFFERENT SIZE OR STRENGTH MAY REQUIRE CHANGES IN THE DIMENSIONS. BACKRAKE (BKRK) SHOWN IS AS MEASURED AT THE TOP OF THE POLE.

DESIGN CRITERIA USED:
POLE FY = 48,000 p.s.i.
BASE PLATE FY = 36,000 p.s.i.
ANCHOR BOLTS FY = 55,000 p.s.i.

STRAIN POLE



IF MORE THAN ONE LOCATION SEE SHEET(S) FOR ADDITIONAL DETAILS.

(SEE SHEET(S) FOR LOCATION PLAN)

DEAD LOAD SPAN WIRE TENSION = 2034 lb
LIVE LOAD SPAN WIRE TENSION = 7297 lb
SCALE 1" = 20'

SPAN WIRE CROSS SECTION

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(B) YIELD STRENGTH, MINIMUM	55,000 psi
(C) ELONGATION IN 2 INCHES, MINIMUM	25%
(D) ROCKWELL B HARDNESS, MINIMUM	86
OR CHARPY V-NOTCH (AASHTO T243 USING H FREQUENCY OF TESTING),	15 ft.-lbs. @ 40° F

NUTS FOR THE ANCHOR BOLTS SHALL BE THE HEAVY HEX TYPE CONFORMING TO THE REQUIREMENTS OF ASTM A-194 GRADE 8

5) BOLTS AND BASES SHALL BE OF ADEQUATE SIZE TO RESIST THE FULL BENDING MOMENT OF THE POLE AT YIELD STRENGTH STRESS.

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13) IN ACCORDANCE WITH SUBSECTION 105.03, SHOP DRAWINGS (6 COPIES OF EACH; 1 - TRAFFIC & SAFETY, 1 - PRIME CONTR., 1 - SUB CONTR., 3 - CONST.) SHALL BE SUBMITTED TO THE VERMONT AGENCY OF TRANSPORTATION FOR APPROVAL PRIOR TO FABRICATION. THE SUBMITTAL SHALL INCLUDE THE FOLLOWING INFORMATION:
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C) NOTATION OF PROJECT NAME, PROJECT NUMBER, ROUTE NUMBER, AND STRAIN POLE STATIONING. (TO BE INCLUDED ON EACH SHEET INCLUDING STANDARD SHEETS AND SPECIFICATION SHEETS).
D) DETAILS FOR LOCATION OF LUMINAIRE ARM(S) ON STRAIN POLE(S).
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F) POLE BASE STAMPING DETAIL.
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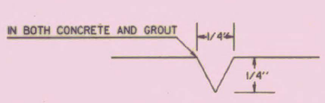
(a) PROCEDURE SPECIFICATIONS PER AWS D1.1 APPENDIX E FORM E1
(b) PROCESS AND PROCEDURE QUALIFICATION TESTS PER AWS D1.1 APPENDIX E FORM E2
(c) CERTIFICATE OF CONFORMANCE TO SPECIFICATIONS FOR FILLER MATERIAL. WHEN USING ANY GMAW OR FCAW WELDING PROCESS (WITH PRIOR APPROVAL AS NOTED ABOVE), THE FOLLOWING WILL ALSO BE REQUIRED: A MANUFACTURER'S CERTIFICATE THAT THE GAS OR GAS MIXTURE IS SUITABLE FOR THE INTENDED APPLICATION AND MEETS THE DEW POINT REQUIREMENTS. REFERENCE-ASSHTO MODIFICATION OF AWS D1.1 SEC. 4.18

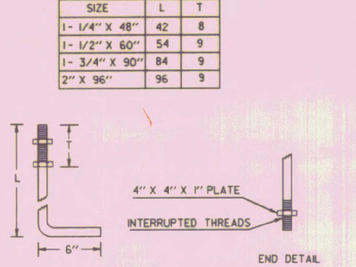
AS BUILT 4/14/94 RB
REVISED 2/28/91



USED FOR CONDUIT LOCATION, SEE AT RIGHT 'SECTION' DETAIL.

2" SCORE MARK DETAIL

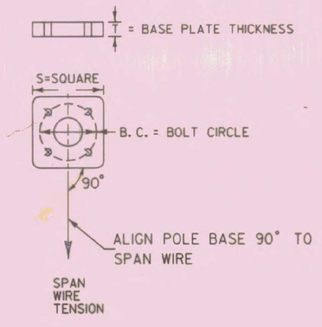
ANCHOR BOLT DETAIL		
SIZE	L	T
1- 1/4" X 48"	42	8
1- 1/2" X 60"	54	9
1- 3/4" X 90"	84	9
2" X 96"	96	9



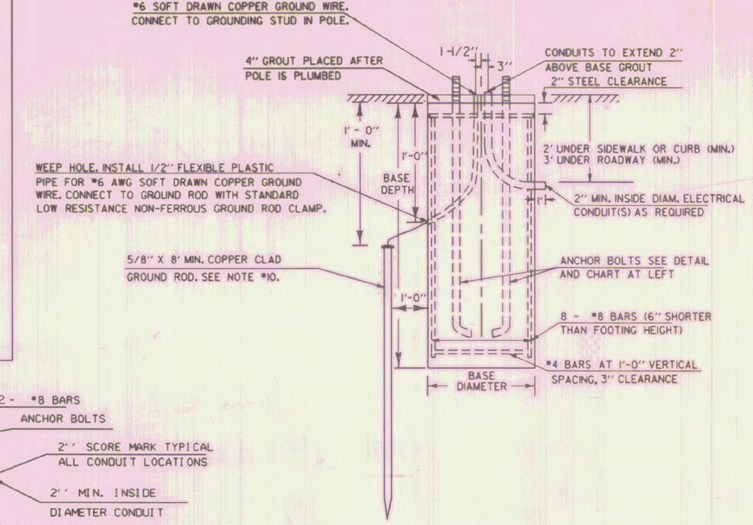
1- 1/4" TO 1- 3/4" BOLT

END DETAIL 2" ANCHOR BOLT ONLY

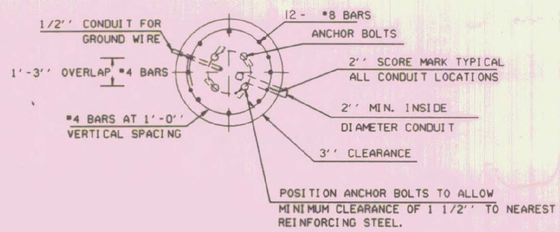
ANCHOR BOLT DETAIL



BASE PLATE DETAIL



ELEVATION



SECTION

STRAIN POLE FOOTING

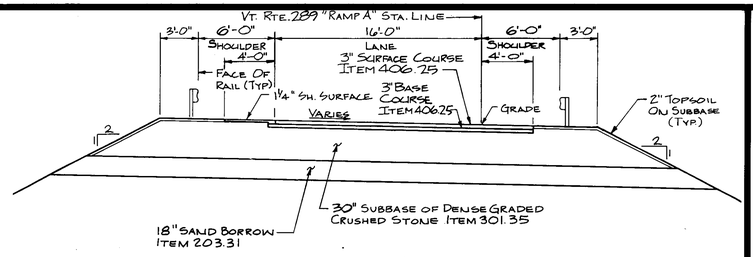
STRAIN POLE/FOOTING DETAIL SHEET

SIGNAL # 3

INTERSECTION OF RAMP A (E.B. ON-RAMP)/ RAMP B (E.B. OFF-RAMP)/SUSIE WILSON RD. /VERMONT RTE. 2A

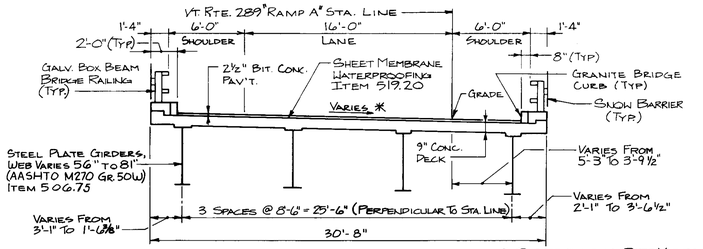
PREPARED BY Y.S. DATE 9/90
CHECKED BY T.M. DATE 9/90
DESIGN SUPERVISOR M.W.O. DATE 9/90
PROJ. ESSEX NO. PB 033-1(3)
VT. RTE. 289 F.A.P. TOWN OF ESSEX
TRAFFIC SHEET NO. ____ OF ____
SHEET 74D OF 193 SHEETS

TD112



NEW HIGHWAY SECTION — BRIDGE APPROACHES

3/16"=1'-0"



BRIDGE TYPICAL SECTION

3/16"=1'-0"

* SUPERELEVATION RATE VARIES FROM 0.0079 FT/FT AT BEG. OF BRIDGE STA. 13+83.92 TO 0.0756 FT/FT AT END OF BRIDGE STA. 17+18.67

NEW STRUCTURE

STRUCTURE GEOMETRY:

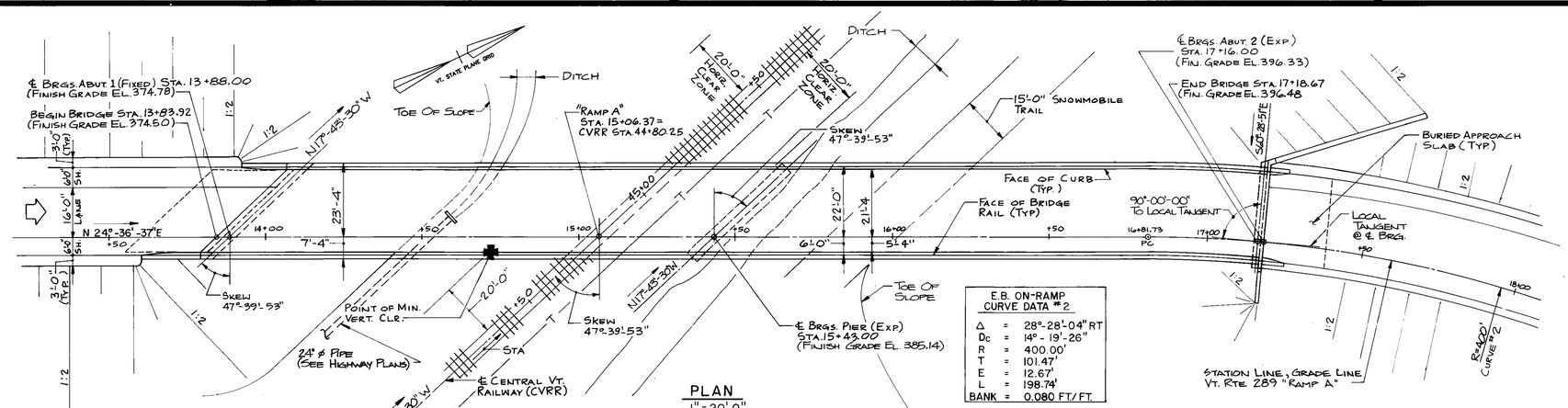
1. STRUCTURE TYPE: TWO SPAN STEEL MULTI-GIRDER — OVERALL LENGTH: 334'-9" ALONG STATION LINE
2. SPAN LENGTH(S) CENTER TO CENTER OF BEARINGS: 155'-0", 173'-0" ALONG STATION LINE
3. VERTICAL CLEARANCE ABOVE STREAMBED OR ROAD UNDER: – 23'-6" TO CVRR RAILWAY
4. CLEAR SPAN LENGTH(S) NORMAL TO STREAM: –
5. WATERWAY AREA OF FULL OPENING (NORMAL TO STREAM): –
6. ARE PROVISIONS TO BE MADE FOR PUBLIC UTILITIES? N.A.

ALLOWABLE STRESSES:

1. DESIGN LIVE LOAD AASHTO: HS-25-44
2. ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL: – ON LEDGE: –
3. ALLOWABLE LOAD FOR PILING: 70 TONS TYPE: HP12 x 74 ESTIMATED LENGTH: *
4. ALLOWABLE STRESS FOR STRUCTURAL STEEL AASHTO M270 GR. 50W TENSION: 27,000 PSI
5. ALLOWABLE STRESS FOR REINFORCING STEEL GRADE 60 TENSION: 24,000 PSI COMPRESSION: 20,000 PSI
6. ALLOWABLE STRESS FOR CONCRETE CLASS A f'_c: 3,500 PSI ** f_c: 1,400 PSI
   CLASS B f'_c: 3,500 PSI f_c: 1,400 PSI

* ABUT. 1 - 100', ABUT. 2 - VARIES 100' - 110', & PIER - 70'

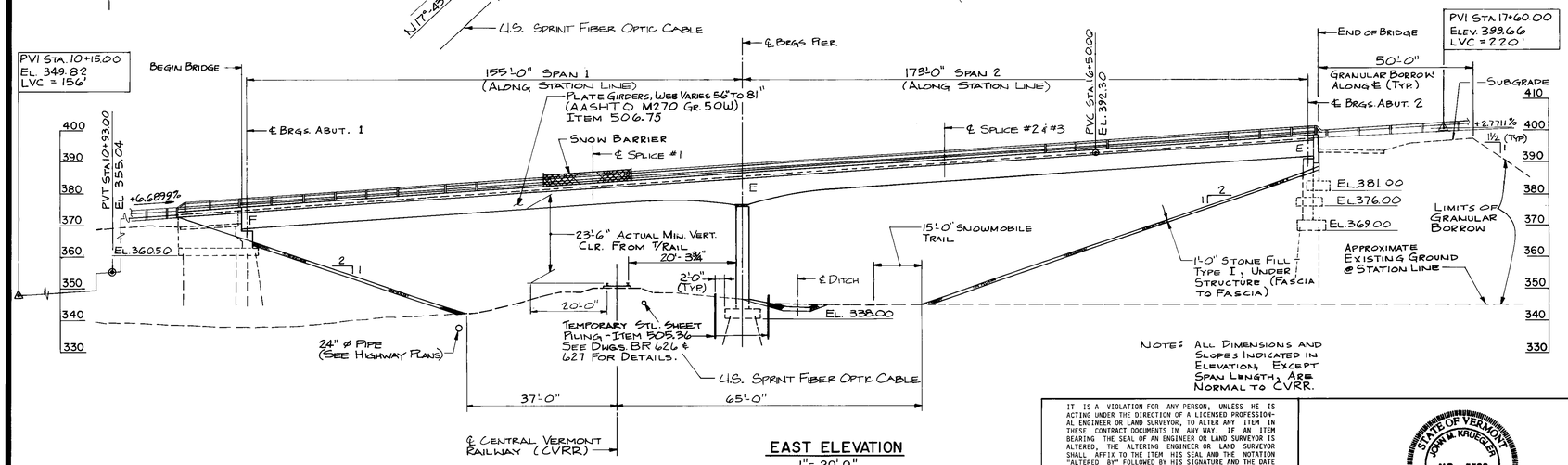
** SEE GENERAL NOTE 15, SHEET BR602



PLAN

1" = 20'-0"

E.B. ON-RAMP CURVE DATA #2		
Δ	=	28°-28'-04" RT
D_C	=	14° - 19'-26"
R	=	400.00'
T	=	101.47'
E	=	12.67'
L	=	198.74'
BANK	=	0.080 FT/FT.



EAST ELEVATION

1" = 20'-0"

NOTE: ALL DIMENSIONS AND SLOPES INDICATED IN ELEVATION, EXCEPT SPAN LENGTH, ARE NORMAL TO CVRR.

CLOUGH, HARBOUR & ASSOCIATES
ENGINEERS & PLANNERS

STATE OF VERMONT — JOHN M. KRUEGER — NO. 8599 — REGISTERED PROFESSIONAL ENGINEER

RECOMMENDED FOR APPROVAL: John M. Krueger 10/12/90 DATE

VAOT STANDARD SHEETS

SB-R4A-82	9-18-89R
SB-R4B-82	3-30-88R

INDEX OF DRAWINGS

* LANE LOADING CONTROLS ** TRUCK LOADING CONTROLS

STRESS LEVELS	LOAD RATING (TONS) TRUCK						
	H *	HS **	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
INVENTORY 0.55 Fy = 27 KSI	25	45	X	X	X	X	X
POSTED 0.67 Fy = 33.5 KSI	45	70	77	X	67	68	74
OPERATING 0.75 Fy = 37.5 KSI	X	86	94	102	83	83	X

RECOMMENDED FOR APPROVAL _____ STRUCTURES ENGINEER DATE

RECOMMENDED FOR APPROVAL _____ CHIEF OF DESIGN DATE

APPROVED BY _____ DIRECTOR OF ENGINEERING & CONSTRUCTION DATE

REVISIONS

NO.	DESCRIPTION	BY & DATE
	BUILT [illegible] 90	

STATE OF VERMONT
AGENCY OF TRANSPORTATION

TOWN OF ESSEX	Bridge No. 14
	Log Sta.
HIGHWAY NO. VT. RTE. 289	Surv. Sta. RAMP 15+00

VT. RTE. 289 "RAMP A" OVER CVRR

PLAN, ELEVATION AND SECTIONS

Designed by KRH	Drawn by BW
Checked by RB date 10/12/90	Bridge Design Supervisor MWO date 10/12/90
PROJECT: WILLISTON – COLCHESTER	PROJECT NO. PB 033-1(2)
Bridge Sheet No. BR601	Sheet 190 of 400

APPENDIX C

Traffic Counts

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX_22.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 & 2A
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, JH, JM, TS and RD

	2A (SB)		289 (WB)			2A (NB)	
Start Time	Thru	Peds	Right	Left	Peds	Thru	Peds
07:00 AM	137	0	23	193	0	80	0
07:15 AM	160	0	34	208	0	61	0
07:30 AM	162	0	49	232	2	33	0
07:45 AM	133	0	30	192	0	46	0
08:00 AM	135	0	30	176	0	28	0
08:15 AM	160	0	23	156	1	39	0
08:30 AM	131	0	12	186	0	41	0
08:45 AM	114	0	17	115	0	40	0
09:00 AM	88	0	19	129	0	51	0
09:15 AM	106	0	31	114	7	45	0
09:30 AM	103	0	28	102	0	71	0
09:45 AM	91	0	38	80	3	45	0
10:00 AM	91	0	33	86	0	52	0
10:15 AM	94	0	29	81	0	42	0
10:30 AM	80	0	26	98	0	44	0
10:45 AM	88	0	22	101	0	49	0
11:00 AM	129	0	25	72	0	40	0
11:15 AM	92	0	28	95	2	52	0
11:30 AM	115	0	8	94	0	49	0
11:45 AM	106	0	3	77	0	64	0
12:00 PM	91	0	3	97	0	61	0
12:15 PM	107	0	3	99	0	64	0
12:30 PM	114	0	14	89	0	72	0
12:45 PM	92	0	25	77	0	54	0
01:00 PM	94	0	15	82	0	71	0
01:15 PM	107	0	10	90	0	56	0
01:30 PM	87	0	18	112	0	44	0
01:45 PM	97	0	31	91	0	69	0
02:00 PM	86	0	34	100	0	87	0
02:15 PM	89	0	41	99	0	82	0
02:30 PM	113	0	41	102	0	71	0
02:45 PM	102	0	25	73	0	92	0
03:00 PM	90	0	47	102	0	94	0
03:15 PM	97	0	43	94	1	136	0
03:30 PM	111	0	54	124	0	138	0
03:45 PM	108	0	71	107	0	132	0
04:00 PM	112	0	52	112	1	139	0
04:15 PM	108	0	53	89	0	112	0
04:30 PM	110	0	54	114	0	138	0
04:45 PM	135	0	57	114	0	135	0
05:00 PM	124	0	49	112	0	153	0
05:15 PM	132	0	43	105	0	132	0
05:30 PM	99	0	3	86	0	102	0
05:45 PM	77	0	38	98	0	100	0
06:00 PM	96	0	0	91	0	76	0
06:15 PM	112	0	29	98	1	74	0
06:30 PM	82	0	6	81	0	68	0
06:45 PM	74	0	17	57	0	67	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX_22.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 & 2A
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, JH, JM, TS and RD

	2A (SB) From North		289 (WB) From East			2A (NB) From South	
Start Time	Thru	Peds	Right	Left	Peds	Thru	Peds
07:00 AM	128	0	21	189	0	74	0
07:15 AM	151	0	31	204	0	61	0
07:30 AM	157	0	49	227	2	33	0
07:45 AM	122	0	27	186	0	46	0
08:00 AM	126	0	26	169	0	28	0
08:15 AM	150	0	20	149	1	39	0
08:30 AM	122	0	10	184	0	41	0
08:45 AM	105	0	15	108	0	40	0
09:00 AM	75	0	17	124	0	51	0
09:15 AM	97	0	31	106	7	45	0
09:30 AM	99	0	26	97	0	71	0
09:45 AM	87	0	35	78	0	45	0
10:00 AM	85	0	30	84	0	52	0
10:15 AM	84	0	27	76	0	42	0
10:30 AM	73	0	23	95	0	44	0
10:45 AM	80	0	17	98	0	49	0
11:00 AM	118	0	22	67	0	40	0
11:15 AM	88	0	27	90	0	52	0
11:30 AM	110	0	6	86	0	49	0
11:45 AM	100	0	3	73	0	64	0
12:00 PM	86	0	2	89	0	61	0
12:15 PM	97	0	3	93	0	64	0
12:30 PM	106	0	13	84	0	72	0
12:45 PM	87	0	22	74	0	54	0
01:00 PM	86	0	13	79	0	71	0
01:15 PM	94	0	9	83	0	56	0
01:30 PM	76	0	18	108	0	44	0
01:45 PM	87	0	29	86	0	69	0
02:00 PM	76	0	32	95	0	87	0
02:15 PM	80	0	39	96	0	82	0
02:30 PM	102	0	40	98	0	71	0
02:45 PM	94	0	24	68	0	92	0
03:00 PM	79	0	44	98	0	94	0
03:15 PM	93	0	43	90	1	136	0
03:30 PM	106	0	52	119	0	138	0
03:45 PM	105	0	67	106	0	132	0
04:00 PM	104	0	51	110	0	139	0
04:15 PM	103	0	53	83	0	112	0
04:30 PM	104	0	51	112	0	138	0
04:45 PM	128	0	54	110	0	135	0
05:00 PM	120	0	48	110	0	153	0
05:15 PM	127	0	41	99	0	132	0
05:30 PM	98	0	3	85	0	102	0
05:45 PM	74	0	37	96	0	100	0
06:00 PM	95	0	0	90	0	76	0
06:15 PM	112	0	28	94	0	74	0
06:30 PM	82	0	6	80	0	68	0
06:45 PM	73	0	17	56	0	67	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX_22.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 & 2A
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, JH, JM, TS and RD

	2A (SB) From North		289 (WB) From East			2A (NB) From South	
Start Time	Thru	Bikes on CW	Right	Left	Bikes on CW	Thru	Bikes on CW
07:00 AM	6	0	2	4	0	6	0
07:15 AM	8	0	2	4	0	0	0
07:30 AM	5	0	0	5	0	0	0
07:45 AM	10	0	3	6	0	0	0
08:00 AM	6	0	4	7	0	0	0
08:15 AM	6	0	3	5	0	0	0
08:30 AM	8	0	2	2	0	0	0
08:45 AM	7	0	2	7	0	0	0
09:00 AM	11	0	2	5	0	0	0
09:15 AM	9	0	0	8	0	0	0
09:30 AM	4	0	2	5	0	0	0
09:45 AM	3	0	3	1	0	0	0
10:00 AM	5	0	3	2	0	0	0
10:15 AM	10	0	2	5	0	0	0
10:30 AM	6	0	3	3	0	0	0
10:45 AM	7	0	5	3	0	0	0
11:00 AM	11	0	3	5	0	0	0
11:15 AM	4	0	1	5	0	0	0
11:30 AM	5	0	2	8	0	0	0
11:45 AM	6	0	0	4	0	0	0
12:00 PM	5	0	1	8	0	0	0
12:15 PM	9	0	0	5	0	0	0
12:30 PM	8	0	0	5	0	0	0
12:45 PM	4	0	3	3	0	0	0
01:00 PM	8	0	2	3	0	0	0
01:15 PM	13	0	1	6	0	0	0
01:30 PM	11	0	0	4	0	0	0
01:45 PM	8	0	2	4	0	0	0
02:00 PM	10	0	2	5	0	0	0
02:15 PM	9	0	2	3	0	0	0
02:30 PM	10	0	1	3	0	0	0
02:45 PM	7	0	1	5	0	0	0
03:00 PM	11	0	3	4	0	0	0
03:15 PM	4	0	0	4	0	0	0
03:30 PM	5	0	2	4	0	0	0
03:45 PM	2	0	4	1	0	0	0
04:00 PM	8	0	1	2	0	0	0
04:15 PM	5	0	0	6	0	0	0
04:30 PM	6	0	1	2	0	0	0
04:45 PM	5	0	3	4	0	0	0
05:00 PM	4	0	1	2	0	0	0
05:15 PM	4	0	1	4	0	0	0
05:30 PM	1	0	0	1	0	0	0
05:45 PM	3	0	1	2	0	0	0
06:00 PM	1	0	0	1	0	0	0
06:15 PM	0	0	1	4	0	0	0
06:30 PM	0	0	0	1	0	0	0
06:45 PM	1	0	0	1	0	0	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX_22.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 & 2A
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, JH, JM, TS and RD

	2A (SB) From North		289 (WB) From East			2A (NB) From South	
Start Time	Thru	Bikes on RD	Right	Left	Bikes on RD	Thru	Bikes on RD
07:00 AM	3	0	0	0	0	0	0
07:15 AM	1	0	1	0	0	0	0
07:30 AM	0	0	0	0	0	0	0
07:45 AM	1	0	0	0	0	0	0
08:00 AM	3	0	0	0	0	0	0
08:15 AM	4	0	0	2	0	0	0
08:30 AM	1	0	0	0	0	0	0
08:45 AM	2	0	0	0	0	0	0
09:00 AM	2	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0
09:45 AM	1	0	0	1	3	0	0
10:00 AM	1	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0
10:30 AM	1	0	0	0	0	0	0
10:45 AM	1	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	2	0	0
11:30 AM	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0
12:15 PM	1	0	0	1	0	0	0
12:30 PM	0	0	1	0	0	0	0
12:45 PM	1	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0
01:15 PM	0	0	0	1	0	0	0
01:30 PM	0	0	0	0	0	0	0
01:45 PM	2	0	0	1	0	0	0
02:00 PM	0	0	0	0	0	0	0
02:15 PM	0	0	0	0	0	0	0
02:30 PM	1	0	0	1	0	0	0
02:45 PM	1	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0
03:30 PM	0	0	0	1	0	0	0
03:45 PM	1	0	0	0	0	0	0
04:00 PM	0	0	0	0	1	0	0
04:15 PM	0	0	0	0	0	0	0
04:30 PM	0	0	2	0	0	0	0
04:45 PM	2	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0
05:15 PM	1	0	1	2	0	0	0
05:30 PM	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0
06:15 PM	0	0	0	0	1	0	0
06:30 PM	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX22_2ASB.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 on 2A SB
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, TS, RD, JM and JH

	289 WB to 2A SB Lane Destination From North		
Start Time	Right	Thru	Left
07:00 AM	194	5	2
07:15 AM	199	8	0
07:30 AM	219	4	0
07:45 AM	165	6	0
08:00 AM	171	3	1
08:15 AM	161	4	0
08:30 AM	170	7	0
08:45 AM	100	6	1
09:00 AM	113	7	0
09:15 AM	104	8	0
09:30 AM	96	4	0
09:45 AM	73	6	0
10:00 AM	84	4	0
10:15 AM	80	8	0
10:30 AM	88	9	1
10:45 AM	93	4	0
11:00 AM	69	7	0
11:15 AM	83	5	0
11:30 AM	92	7	1
11:45 AM	80	4	1
12:00 PM	93	7	0
12:15 PM	92	5	1
12:30 PM	102	6	0
12:45 PM	73	12	0
01:00 PM	72	6	1
01:15 PM	90	5	0
01:30 PM	102	6	1
01:45 PM	89	4	0
02:00 PM	82	9	0
02:15 PM	92	5	0
02:30 PM	99	8	0
02:45 PM	74	7	0
03:00 PM	96	3	1
03:15 PM	83	10	0
03:30 PM	120	7	0
03:45 PM	102	10	0
04:00 PM	98	9	0
04:15 PM	76	12	4
04:30 PM	102	12	1
04:45 PM	106	18	1
05:00 PM	103	8	1
05:15 PM	96	5	0
05:30 PM	80	7	0
05:45 PM	72	23	1
06:00 PM	79	18	0
06:15 PM	79	13	0
06:30 PM	63	10	0
06:45 PM	46	12	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX22_2ASB.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 on 2A SB
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, TS, RD, JM and JH

	289 WB to 2A SB Lane Destination From North		
Start Time	Right	Thru	Left
07:00 AM	190	5	2
07:15 AM	195	8	0
07:30 AM	217	4	0
07:45 AM	160	5	0
08:00 AM	164	2	1
08:15 AM	155	4	0
08:30 AM	168	7	0
08:45 AM	95	5	1
09:00 AM	108	7	0
09:15 AM	100	6	0
09:30 AM	85	4	0
09:45 AM	71	6	0
10:00 AM	82	4	0
10:15 AM	75	8	0
10:30 AM	86	9	1
10:45 AM	90	4	0
11:00 AM	65	6	0
11:15 AM	77	5	0
11:30 AM	86	6	1
11:45 AM	76	3	1
12:00 PM	85	7	0
12:15 PM	87	4	1
12:30 PM	97	5	0
12:45 PM	69	12	0
01:00 PM	68	6	1
01:15 PM	84	5	0
01:30 PM	99	5	1
01:45 PM	85	3	0
02:00 PM	77	9	0
02:15 PM	89	5	0
02:30 PM	95	7	0
02:45 PM	67	7	0
03:00 PM	93	3	1
03:15 PM	80	9	0
03:30 PM	116	6	0
03:45 PM	101	10	0
04:00 PM	96	9	0
04:15 PM	74	12	4
04:30 PM	100	12	1
04:45 PM	105	18	1
05:00 PM	102	8	1
05:15 PM	89	5	0
05:30 PM	78	7	0
05:45 PM	71	23	1
06:00 PM	77	18	0
06:15 PM	76	13	0
06:30 PM	61	10	0
06:45 PM	45	12	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX22_2ASB.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 on 2A SB
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, TS, RD, JM and JH

	289 WB to 2A SB Lane Destination From North		
Start Time	Right	Thru	Left
07:00 AM	4	0	0
07:15 AM	4	0	0
07:30 AM	2	0	0
07:45 AM	5	1	0
08:00 AM	7	1	0
08:15 AM	4	0	0
08:30 AM	2	0	0
08:45 AM	5	1	0
09:00 AM	4	0	0
09:15 AM	4	2	0
09:30 AM	11	0	0
09:45 AM	2	0	0
10:00 AM	2	0	0
10:15 AM	5	0	0
10:30 AM	2	0	0
10:45 AM	3	0	0
11:00 AM	4	1	0
11:15 AM	6	0	0
11:30 AM	5	1	0
11:45 AM	4	1	0
12:00 PM	8	0	0
12:15 PM	4	1	0
12:30 PM	5	1	0
12:45 PM	4	0	0
01:00 PM	4	0	0
01:15 PM	5	0	0
01:30 PM	3	1	0
01:45 PM	3	1	0
02:00 PM	5	0	0
02:15 PM	3	0	0
02:30 PM	3	1	0
02:45 PM	7	0	0
03:00 PM	3	0	0
03:15 PM	3	1	0
03:30 PM	4	0	0
03:45 PM	1	0	0
04:00 PM	2	0	0
04:15 PM	2	0	0
04:30 PM	2	0	0
04:45 PM	1	0	0
05:00 PM	1	0	0
05:15 PM	5	0	0
05:30 PM	2	0	0
05:45 PM	1	0	0
06:00 PM	2	0	0
06:15 PM	3	0	0
06:30 PM	2	0	0
06:45 PM	1	0	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-22\ESSX22_2ASB.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: 22
Comment 1: ID : ESSX-22
Comment 2: LOC : 289 on 2A SB
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: MG, MK, TS, RD, JM and JH

	289 WB to 2A SB Lane Destination From North		
Start Time	Right	Thru	Left
07:00 AM	0	0	0
07:15 AM	0	0	0
07:30 AM	0	0	0
07:45 AM	0	0	0
08:00 AM	0	0	0
08:15 AM	2	0	0
08:30 AM	0	0	0
08:45 AM	0	0	0
09:00 AM	1	0	0
09:15 AM	0	0	0
09:30 AM	0	0	0
09:45 AM	0	0	0
10:00 AM	0	0	0
10:15 AM	0	0	0
10:30 AM	0	0	0
10:45 AM	0	0	0
11:00 AM	0	0	0
11:15 AM	0	0	0
11:30 AM	1	0	0
11:45 AM	0	0	0
12:00 PM	0	0	0
12:15 PM	1	0	0
12:30 PM	0	0	0
12:45 PM	0	0	0
01:00 PM	0	0	0
01:15 PM	1	0	0
01:30 PM	0	0	0
01:45 PM	1	0	0
02:00 PM	0	0	0
02:15 PM	0	0	0
02:30 PM	1	0	0
02:45 PM	0	0	0
03:00 PM	0	0	0
03:15 PM	0	0	0
03:30 PM	0	1	0
03:45 PM	0	0	0
04:00 PM	0	0	0
04:15 PM	0	0	0
04:30 PM	0	0	0
04:45 PM	0	0	0
05:00 PM	0	0	0
05:15 PM	2	0	0
05:30 PM	0	0	0
05:45 PM	0	0	0
06:00 PM	0	0	0
06:15 PM	0	0	0
06:30 PM	0	0	0
06:45 PM	0	0	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-S03\ESSXS03.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: S03
Comment 1: ID : ESSX-S03
Comment 2: LOC : VT 2A & SUSIE WILSON/ VT 289
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: JH, MG, TS, RD, MK and JM

	VT 2A (SB) From North				289 From East	VT 2A (NB) From South				Susie Wilson From West			
Start Time	Right	Thru	Left	Peds/ Bikes	Peds/ Bikes	Right	Thru	Left	Peds/ Bikes	Right	Thru	Left	Peds/ Bikes
07:00 AM	188	54	27	1	0	2	57	13	0	8	52	17	0
07:15 AM	242	78	39	0	0	6	52	9	0	13	56	19	0
07:30 AM	244	65	45	0	0	5	26	21	0	2	76	22	0
07:45 AM	248	71	41	0	1	9	25	12	0	7	68	33	0
08:00 AM	174	54	38	0	0	3	21	21	0	6	82	18	0
08:15 AM	207	61	29	0	0	7	19	19	0	7	66	15	1
08:30 AM	220	66	41	0	0	5	23	19	0	8	71	25	0
08:45 AM	166	50	42	0	0	5	21	14	0	12	49	19	9
09:00 AM	126	47	24	0	0	4	12	14	0	14	73	31	0
09:15 AM	141	39	30	0	0	1	15	5	0	3	54	30	0
09:30 AM	113	45	25	0	7	2	33	6	0	10	54	36	0
09:45 AM	118	50	24	0	2	5	21	5	0	6	67	27	0
10:00 AM	106	35	26	0	1	5	23	5	0	10	76	21	0
10:15 AM	105	46	30	0	0	1	18	16	0	10	70	30	0
10:30 AM	110	38	20	0	0	6	22	12	0	9	73	27	0
10:45 AM	114	31	10	0	0	2	22	6	0	6	68	24	0
11:00 AM	117	47	28	0	0	11	24	9	0	10	73	19	0
11:15 AM	102	44	34	0	0	2	35	10	0	10	99	36	0
11:30 AM	127	50	25	0	0	4	28	8	0	6	76	30	0
11:45 AM	129	52	30	0	2	6	33	15	0	9	76	22	0
12:00 PM	105	50	26	0	0	8	38	9	0	14	89	33	0
12:15 PM	125	35	25	1	0	1	46	10	0	9	83	28	0
12:30 PM	124	54	37	0	0	4	38	16	0	12	93	28	0
12:45 PM	100	48	29	0	0	5	38	10	0	14	80	37	1
01:00 PM	106	48	16	0	0	4	43	9	0	12	86	34	0
01:15 PM	116	40	30	3	0	4	39	16	0	17	83	29	0
01:30 PM	127	49	28	0	0	6	37	18	0	13	88	19	0
01:45 PM	115	44	30	0	0	12	30	7	0	3	97	33	0
02:00 PM	108	42	31	0	0	6	38	13	0	9	87	43	0
02:15 PM	116	29	37	0	0	5	45	6	0	8	109	46	0
02:30 PM	116	56	32	0	4	14	57	13	0	16	105	29	0
02:45 PM	102	47	39	1	0	4	47	6	0	11	121	37	0
03:00 PM	99	36	29	0	0	6	55	13	0	10	121	51	0
03:15 PM	123	35	32	0	0	8	54	14	0	8	141	46	1
03:30 PM	118	36	37	0	0	8	77	18	0	10	178	60	0
03:45 PM	115	34	35	0	0	9	53	21	0	9	176	62	1
04:00 PM	121	42	38	0	1	23	75	15	0	6	179	62	0
04:15 PM	95	40	53	0	0	9	62	7	0	4	168	46	0
04:30 PM	96	50	34	0	0	17	79	13	0	8	212	45	0
04:45 PM	93	49	33	0	0	16	82	5	0	9	202	35	0
05:00 PM	142	52	54	0	0	12	87	18	0	7	217	49	0
05:15 PM	122	50	54	0	0	27	74	23	0	3	201	54	0
05:30 PM	122	48	38	0	0	19	58	11	0	10	215	67	0
05:45 PM	98	43	38	0	0	13	61	10	0	14	182	46	0
06:00 PM	110	59	39	2	0	9	54	4	0	14	139	35	2
06:15 PM	101	72	37	0	0	7	44	9	0	9	128	33	0
06:30 PM	103	58	32	0	0	9	45	10	0	11	112	22	0
06:45 PM	72	48	30	0	0	9	29	10	0	6	98	21	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-S03\ESSXS03.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: S03
Comment 1: ID : ESSX-S03
Comment 2: LOC : VT 2A & SUSIE WILSON/ VT 289
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: JH, MG, TS, RD, MK and JM

	VT 2A (SB) From North				289 From East	VT 2A (NB) From South				Susie Wilson From West			
Start Time	Right	Thru	Left	Peds	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	181	49	26	1	0	2	52	11	0	4	38	15	0
07:15 AM	237	74	37	0	0	6	51	6	0	8	51	17	0
07:30 AM	236	61	42	0	0	5	23	14	0	1	68	20	0
07:45 AM	241	67	39	0	0	7	23	9	0	4	66	28	0
08:00 AM	167	53	32	0	0	3	16	19	0	2	72	13	0
08:15 AM	199	56	28	0	0	6	16	16	0	5	59	14	0
08:30 AM	210	61	37	0	0	5	22	14	0	7	66	22	0
08:45 AM	156	50	42	0	0	5	19	14	0	9	46	15	8
09:00 AM	114	42	22	0	0	4	12	10	0	12	66	29	0
09:15 AM	135	36	26	0	0	0	12	3	0	3	51	28	0
09:30 AM	108	39	24	0	7	2	26	4	0	3	54	33	0
09:45 AM	117	48	23	0	0	5	13	2	0	4	64	24	0
10:00 AM	101	34	25	0	0	5	19	4	0	7	67	20	0
10:15 AM	98	46	27	0	0	1	16	10	0	8	67	30	0
10:30 AM	107	37	16	0	0	5	22	9	0	7	73	25	0
10:45 AM	111	28	10	0	0	1	22	4	0	5	60	23	0
11:00 AM	107	43	22	0	0	11	20	5	0	7	69	17	0
11:15 AM	95	43	33	0	0	2	27	8	0	8	96	33	0
11:30 AM	122	48	24	0	0	4	28	7	0	3	75	25	0
11:45 AM	123	46	29	0	0	5	29	10	0	7	70	19	0
12:00 PM	98	46	25	0	0	8	36	8	0	13	86	32	0
12:15 PM	119	29	23	0	0	1	41	8	0	8	78	26	0
12:30 PM	115	49	32	0	0	3	35	13	0	11	89	25	0
12:45 PM	92	46	28	0	0	4	34	6	0	9	77	34	0
01:00 PM	96	45	15	0	0	3	41	7	0	9	82	31	0
01:15 PM	109	36	30	3	0	4	36	15	0	13	79	26	0
01:30 PM	117	42	26	0	0	6	29	13	0	10	87	16	0
01:45 PM	112	39	25	0	0	12	27	6	0	3	92	32	0
02:00 PM	100	39	28	0	0	6	37	8	0	3	82	39	0
02:15 PM	111	28	31	0	0	5	38	2	0	7	104	42	0
02:30 PM	114	51	29	0	4	14	50	8	0	12	104	28	0
02:45 PM	95	40	37	1	0	4	43	4	0	8	118	33	0
03:00 PM	88	35	26	0	0	6	51	8	0	7	118	47	0
03:15 PM	117	33	30	0	0	6	52	12	0	5	140	45	0
03:30 PM	115	35	36	0	0	8	76	13	0	6	173	58	0
03:45 PM	110	33	34	0	0	9	48	18	0	9	172	60	1
04:00 PM	117	40	37	0	0	21	74	15	0	5	175	60	0
04:15 PM	93	39	53	0	0	9	62	4	0	4	168	43	0
04:30 PM	94	47	31	0	0	17	77	13	0	7	207	43	0
04:45 PM	91	45	32	0	0	16	81	5	0	8	197	31	0
05:00 PM	137	50	53	0	0	12	86	18	0	6	215	47	0
05:15 PM	117	47	54	0	0	26	73	22	0	3	195	52	0
05:30 PM	119	43	38	0	0	18	55	11	0	9	212	64	0
05:45 PM	97	42	38	0	0	13	60	6	0	14	179	43	0
06:00 PM	107	58	37	2	0	9	53	4	0	14	135	34	0
06:15 PM	101	71	37	0	0	7	44	9	0	7	128	32	0
06:30 PM	99	58	32	0	0	9	41	10	0	9	110	21	0
06:45 PM	71	47	30	0	0	9	29	10	0	5	95	19	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-S03\ESSXS03.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: S03
Comment 1: ID : ESSX-S03
Comment 2: LOC : VT 2A & SUSIE WILSON/ VT 289
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: JH, MG, TS, RD, MK and JM

	VT 2A (SB) From North				289 From East	VT 2A (NB) From South				Susie Wilson From West			
Start Time	Right	Thru	Left	Bikes on CW	Bikes on CW	Right	Thru	Left	Bikes on CW	Right	Thru	Left	Bikes on CW
07:00 AM	7	3	1	0	0	0	5	2	0	4	14	2	0
07:15 AM	4	2	2	0	0	0	1	3	0	5	5	2	0
07:30 AM	8	4	3	0	0	0	3	7	0	1	7	2	0
07:45 AM	7	4	2	0	0	2	1	3	0	3	2	5	0
08:00 AM	6	1	5	0	0	0	5	2	0	4	10	5	0
08:15 AM	7	3	1	0	0	1	3	3	0	2	7	1	1
08:30 AM	5	4	4	0	0	0	1	3	0	1	5	3	0
08:45 AM	9	0	0	0	0	0	2	0	0	3	3	3	0
09:00 AM	11	4	2	0	0	0	0	3	0	2	6	1	0
09:15 AM	5	3	4	0	0	1	3	2	0	0	2	2	0
09:30 AM	5	6	1	0	0	0	7	2	0	7	0	3	0
09:45 AM	1	2	1	0	2	0	8	3	0	2	3	3	0
10:00 AM	2	1	1	0	0	0	4	1	0	3	9	1	0
10:15 AM	7	0	3	0	0	0	2	5	0	2	2	0	0
10:30 AM	2	1	4	0	0	1	0	3	0	2	0	1	0
10:45 AM	3	3	0	0	0	1	0	2	0	1	7	1	0
11:00 AM	9	4	6	0	0	0	4	4	0	3	4	2	0
11:15 AM	7	1	1	0	0	0	8	2	0	2	3	3	0
11:30 AM	5	2	1	0	0	0	0	1	0	3	1	5	0
11:45 AM	5	6	1	0	0	1	4	5	0	2	6	3	0
12:00 PM	7	4	1	0	0	0	2	1	0	0	3	1	0
12:15 PM	6	6	2	1	0	0	5	2	0	1	5	2	0
12:30 PM	7	4	5	0	0	1	1	3	0	1	4	2	0
12:45 PM	8	2	1	0	0	1	4	4	0	5	3	3	0
01:00 PM	8	3	1	0	0	1	2	2	0	3	4	3	0
01:15 PM	7	4	0	0	0	0	3	1	0	4	3	2	0
01:30 PM	10	7	2	0	0	0	8	5	0	3	1	3	0
01:45 PM	3	5	5	0	0	0	3	1	0	0	5	1	0
02:00 PM	7	3	2	0	0	0	1	5	0	6	4	3	0
02:15 PM	5	1	6	0	0	0	6	4	0	1	4	4	0
02:30 PM	1	5	3	0	0	0	7	5	0	4	1	1	0
02:45 PM	6	7	2	0	0	0	4	2	0	3	3	4	0
03:00 PM	10	1	3	0	0	0	4	5	0	3	3	4	0
03:15 PM	6	2	2	0	0	2	2	2	0	3	1	1	1
03:30 PM	3	1	1	0	0	0	1	5	0	4	5	2	0
03:45 PM	4	0	1	0	0	0	4	3	0	0	4	2	0
04:00 PM	4	2	1	0	0	2	1	0	0	1	2	2	0
04:15 PM	2	1	0	0	0	0	0	3	0	0	0	1	0
04:30 PM	2	3	2	0	0	0	2	0	0	1	5	0	0
04:45 PM	2	4	1	0	0	0	1	0	0	1	5	3	0
05:00 PM	5	2	1	0	0	0	1	0	0	1	2	1	0
05:15 PM	5	3	0	0	0	1	0	1	0	0	6	2	0
05:30 PM	1	4	0	0	0	1	2	0	0	1	3	0	0
05:45 PM	1	1	0	0	0	0	1	4	0	0	3	2	0
06:00 PM	3	1	2	0	0	0	1	0	0	0	4	0	0
06:15 PM	0	1	0	0	0	0	0	0	0	2	0	0	0
06:30 PM	4	0	0	0	0	0	4	0	0	2	2	1	0
06:45 PM	1	1	0	0	0	0	0	0	0	1	3	1	0

File Name: P:\2011_DATA\Turning_Movements\ESSX-S03\ESSXS03.ppd
Start Date: 8/2/2011
Start Time: 7:00:00 AM
Site Code: S03
Comment 1: ID : ESSX-S03
Comment 2: LOC : VT 2A & SUSIE WILSON/ VT 289
Comment 3: Essex, VT / Sunny / Sunny
Comment 4: JH, MG, TS, RD, MK and JM

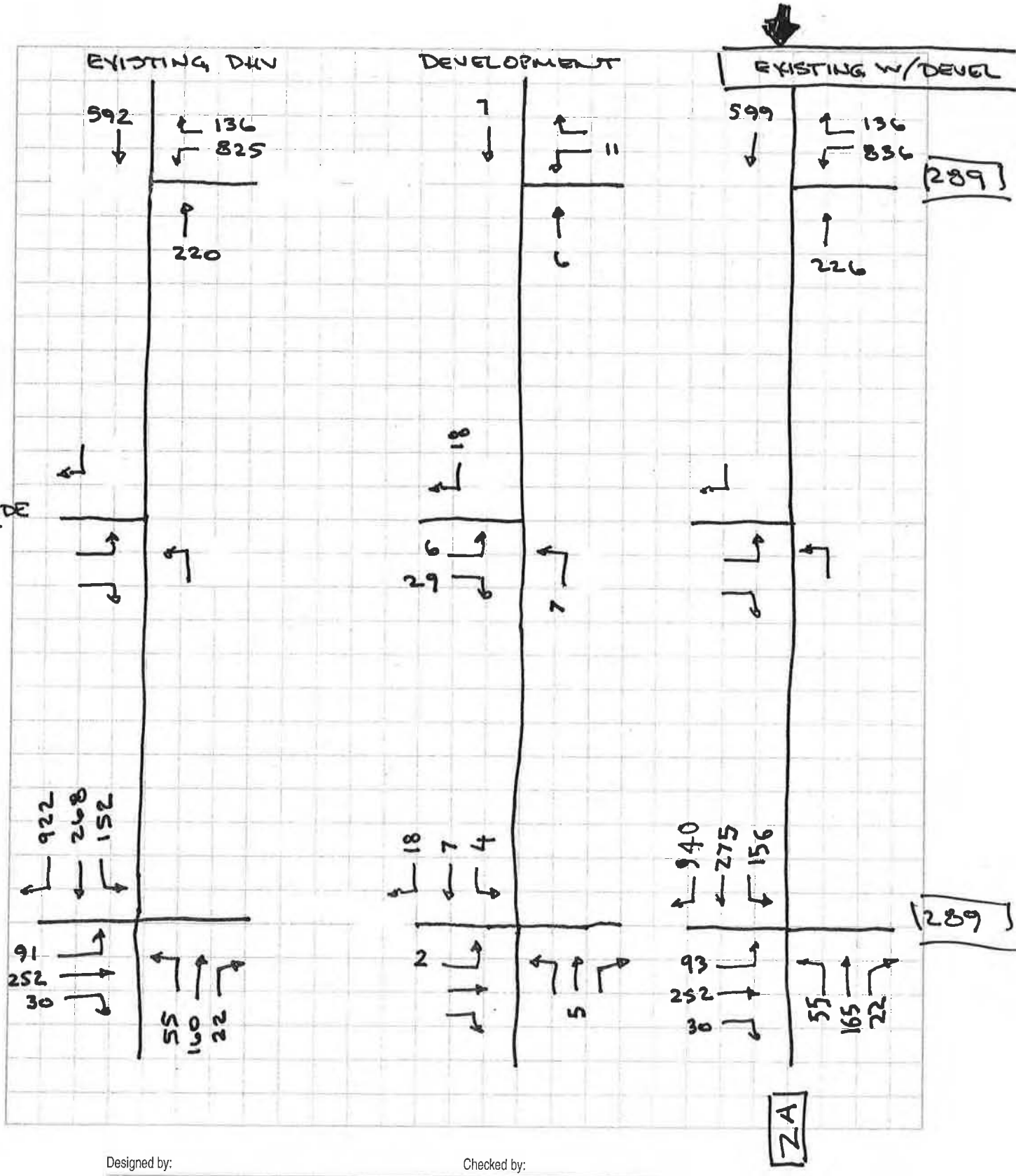
	VT 2A (SB) From North				289 From East	VT 2A (NB) From South				Susie Wilson From West			
Start Time	Right	Thru	Left	Bikes on RD	Bikes on RD	Right	Thru	Left	Bikes on RD	Right	Thru	Left	Bikes on RD
07:00 AM	0	2	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	1	2	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	0
07:45 AM	0	0	0	0	1	0	1	0	0	0	0	0	0
08:00 AM	1	0	1	0	0	0	0	0	0	0	0	0	0
08:15 AM	1	2	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	5	1	0	0	0	0	0	2	0	0	0	0	0
08:45 AM	1	0	0	0	0	0	0	0	0	0	0	1	1
09:00 AM	1	1	0	0	0	0	0	1	0	0	1	1	0
09:15 AM	1	0	0	0	0	0	0	0	0	0	1	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	3	0	0	0	1	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	1	0	0	1	0	0
10:30 AM	1	0	0	0	0	0	0	0	0	0	0	1	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0
11:00 AM	1	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	1	0	0	0	2	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	2	1	0	0	0	0	2	0	0	0	0	1	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1
01:00 PM	2	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	1	0	1	0	0	0	0	0	0	0	1	1	0
02:15 PM	0	0	0	0	0	0	1	0	0	0	1	0	0
02:30 PM	1	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	1	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	1	1	0	0	0	0	1	0	0	0	0	0	0
04:00 PM	0	0	0	0	1	0	0	0	0	0	2	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0
04:30 PM	0	0	1	0	0	0	0	0	0	0	0	2	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0
05:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0
05:30 PM	2	1	0	0	0	0	1	0	0	0	0	3	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	2
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0
06:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0

APPENDIX D

DHV Calculations

Stantec

VT 2A / VT 289 SCOPING STUDY
DESIGN VOLUMES WITH DEVELOPMENT
2012 AM DHV

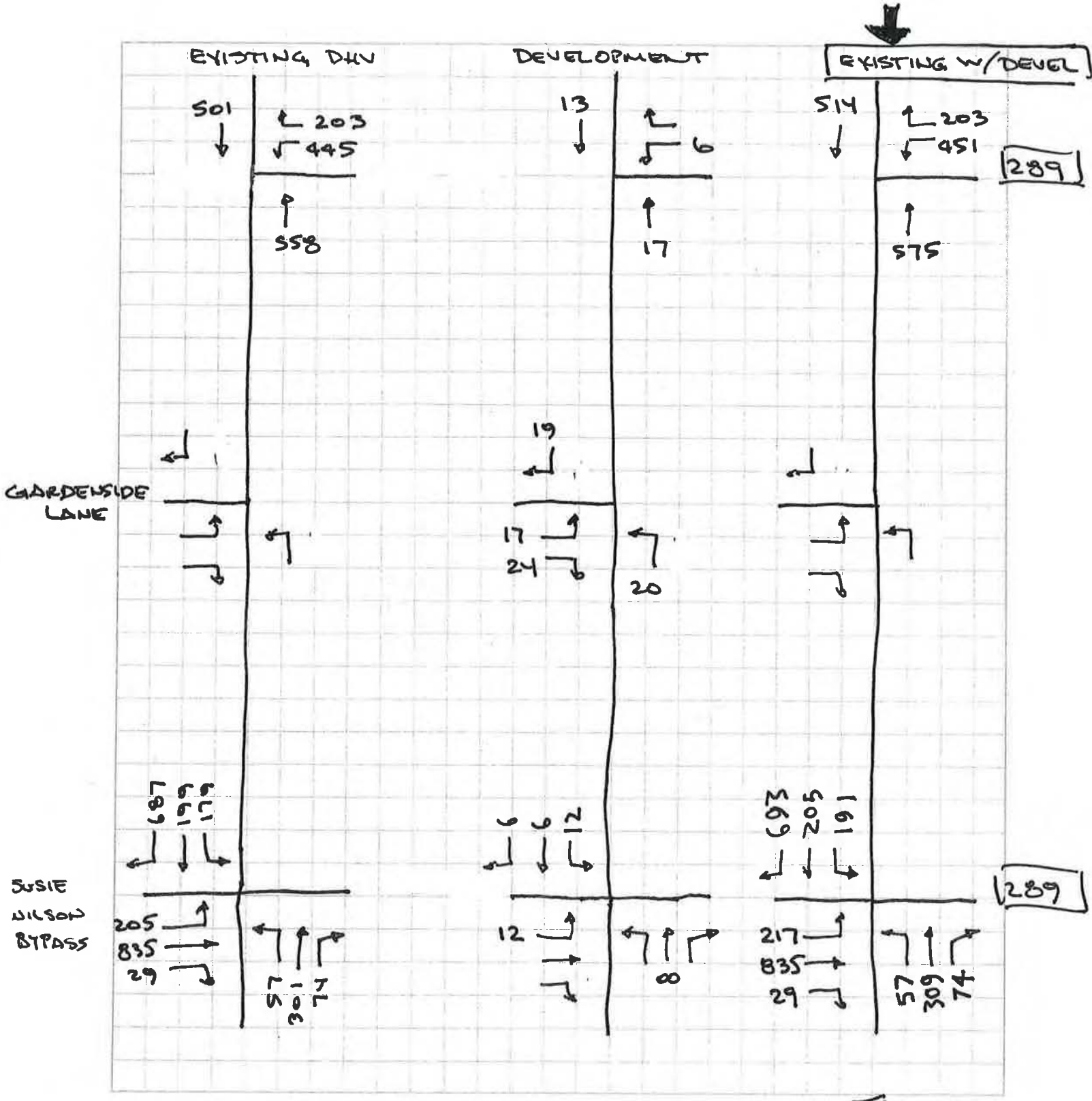


Designed by:

Checked by:

Stantec

VT 2A / VT 289 SCOPING STUDY
DESIGN VOLUMES WITH DEVELOPMENT
2012 PM DHV

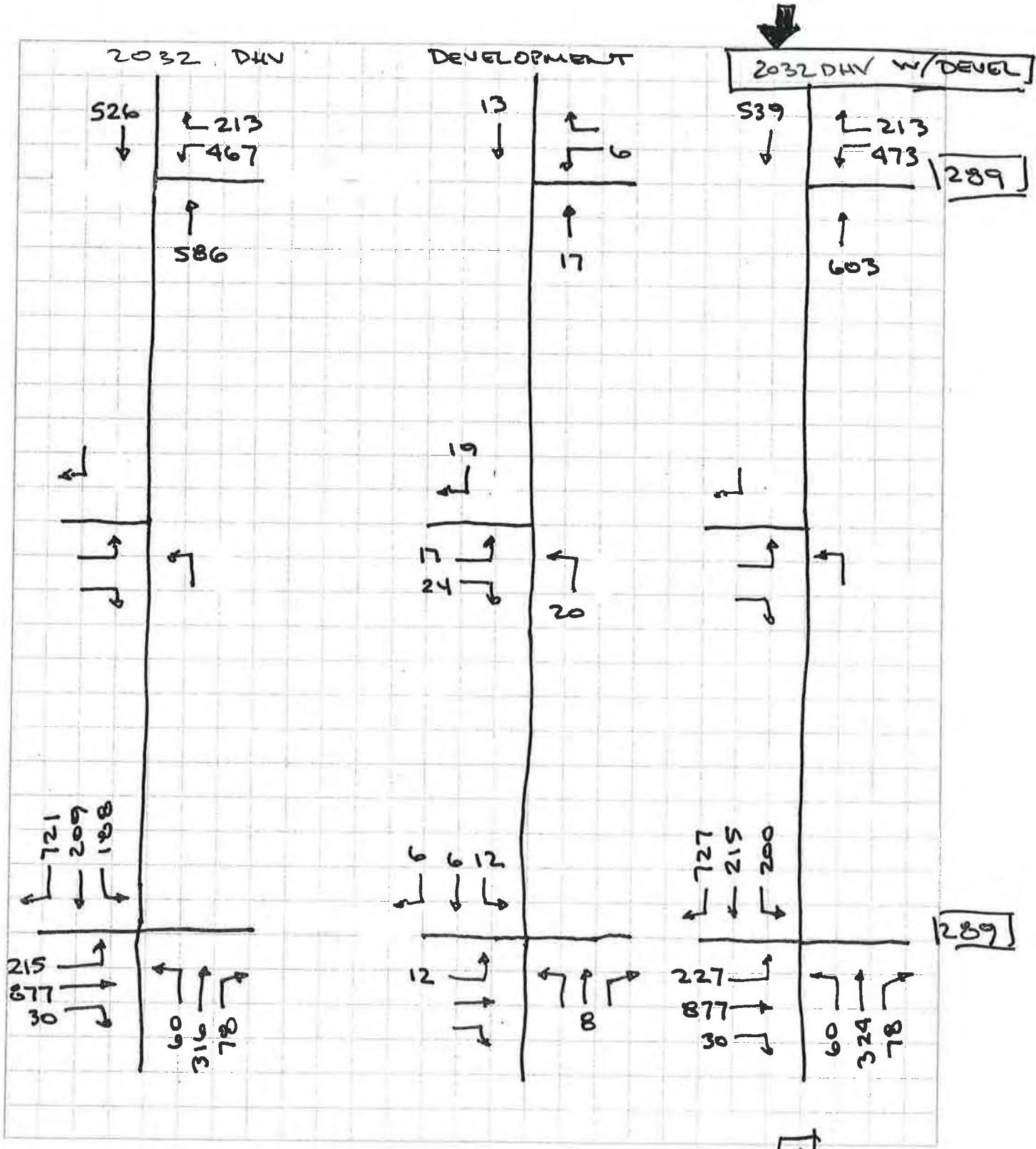


Designed by: Checked by:

2A

Stantec

VT 2A / VT 289 SCOPING STUDY
DESIGN VOLUMES WITH DEVELOPMENT
2032 PM DHV

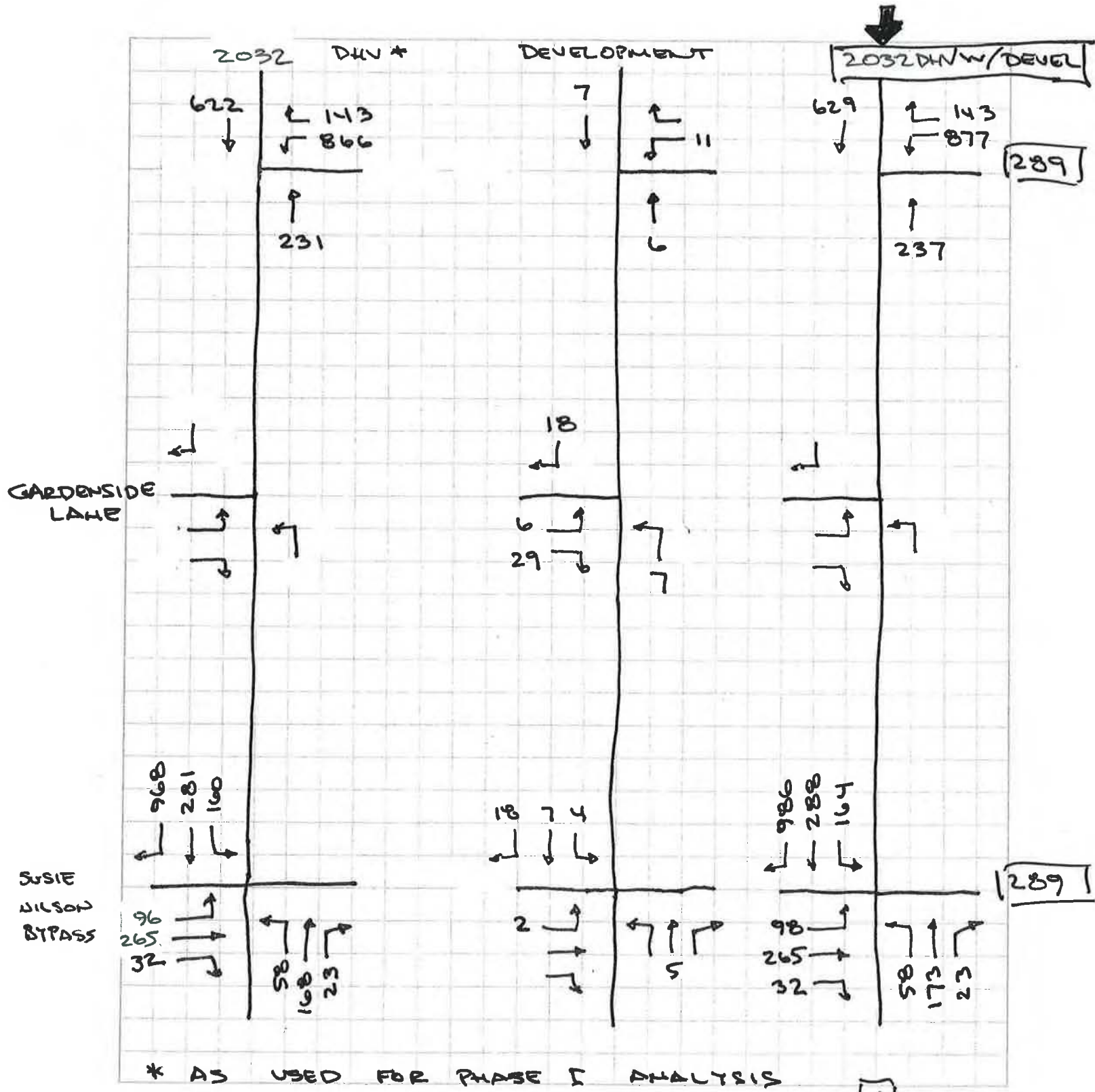


Designed by:

Checked by:

Stantec

VT 2A / VT 289 SCOPING STUDY
DESIGN VOLUMES WITH DEVELOPMENT
2032 AM DHV



* AS USED FOR PHASE I ANALYSIS

Designed by: Checked by:

2A

DHV METHOD | VALIDATION | CALCULATION

a. DHV from CTC

Recorded DHV Available ?

Nearest CTC						DHV =
CTC	Route	Town	Location	20 Yr Growth*	Annual growth	
P6D530	VT 289	Essex	0.6 mi W of VT 15	1.01	1.005	1,713
P6D531	VT 289	Essex	1.3 mi W of VT 117	NA	NA	NA
				* 2010 to 2030		**USED**
				Group B: Urban		

b. % K from a CTC [% K (AADT)]

Nearest CTC				CTC along	Actual	2010		
CTC	Route	Town	Location	Route ?	AADT ?	% K =	AADT =	DHV =

NOT USED

c. Alternate DHV determination [% K (AADT)]

by Poll Group	K Factor
1. Rural Interstate	0.1243
2. Rural Non - Interstate	0.1127
3. Urban	0.104
4. Summer Recreational	0.1326
5. Summer / Winter Recreational (US & VT)	0.1436

Roadway Type	Roadway Number	Town	Available AADT Beginning Reference	End Reference	ATR Station	Year	AADT	Actual

Applicable Poll Group / AADT

K Factor	AADT	DHV

NOT USED

d. CTC Method using Red Book Report

Is CTC along Route? NO
Is TMC along Route? YES

Step 1. CTC near w/o traffic breaks
Step 2. DHV for CTC that year
Step 3. PHV at CTC for date of TMC count
Step 4. Calc DHV Factor
Step 5. Apply DHV factor to TMC

CTC:
DHV ctc =
PHV ctc =
DHV ctc / PHV ctc =
PHV tmc =
DHV tmc =

NOT USED

e. DHV based on AADT and Highway Class

NOT USED

FUTURE YEAR INTERSECTION DHV's

VT 2A / VT 2A / VT 289		VT 2A / VT 289 / Susie WB		**VT 289**
PM PH Count Data 4:30 - 530 PM 8/2/2011		PM PH Count Data 4:45 - 5:45 PM 8/2/2011		PM PH Composite 8/2/2011
WB	0	WB	744	
EB Left	0	EB Left	205	
EB Thru	0	EB Thru	835	835
EB Right	0	EB Right	29	
Total	0	Total	1813	
WB right	203	WB right	0	203
WB Thru	0	WB Thru	0	
WB Left	445	WB Left	0	445
EB	0	EB		
Total	648	Total		
NB Left	0	NB Left	57	
NB Thru	558	NB Thru	301	
NB Right	0	NB Right	74	74
SB	946	SB	404	
Total	1504	Total	836	
NB	761	NB	506	
SB Right	0	SB Right	687	
SB Thru	501	SB Thru	199	
SB Left	0	SB Left	179	179
Total	1262	Total	1571	1736*

*1736 > DHV (1713) : USE

VT 2A / VT 2A / VT 289		VT 2A / VT 289 / Susie WB		**VT 289**
Year 2032 (Growth Factor of 1.05 Applied)				
WB	0	WB	781	
EB Left	0	EB Left	215	
EB Thru	0	EB Thru	877	877
EB Right	0	EB Right	30	
Total	0	Total	1904	
WB right	213	WB right	0	213
WB Thru	0	WB Thru	0	
WB Left	467	WB Left	0	467
EB	0	EB		
Total	680	Total		
NB Left	0	NB Left	60	
NB Thru	586	NB Thru	316	
NB Right	0	NB Right	78	78
SB	993	SB	424	
Total	1579	Total	878	
NB	799	NB	531	
SB Right	0	SB Right	721	
SB Thru	526	SB Thru	209	
SB Left	0	SB Left	188	188
Total	1325	Total	1650	1823

Essex Vermont

VT 2A / VT 289
Traffic Analysis

195310689 2/14/2012

DHV Calculation - Existing and 2032 (PM)

Stantec Consulting Services Inc.
55 Green Mountain Drive.
South Burlington, VT U.S.A.
05403
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com

DHV METHOD	VALIDATION	CALCULATION

a. DHV from CTC

Recorded DHV Available ?

Nearest CTC						DHV =
CTC	Route	Town	Location	20 Yr Growth*	Annual growth	
P6D530	VT 289	Essex	0.6 mi W of VT 15	1.01	1.005	1,713
P6D531	VT 289	Essex	1.3 mi W of VT 117	NA	NA	NA
				* 2010 to 2030		**USED**
				Group B: Urban		

b. % K from a CTC [% K (AADT)]

Nearest CTC				CTC along	Actual	2010		
CTC	Route	Town	Location	Route ?	AADT ?	% K =	AADT =	DHV =

NOT USED

c. Alternate DHV determination [% K (AADT)]

by Poll Group	K Factor
1. Rural Interstate	0.1243
2. Rural Non - Interstate	0.1127
3. Urban	0.104
4. Summer Recreational	0.1326
5. Summer / Winter Recreational (US & VT)	0.1436

Roadway Type	Roadway Number	Town	Available AADT Beginning Reference	End Reference	ATR Station	Year	AADT	Actual

Applicable Poll Group / AADT

K Factor	AADT	DHV

NOT USED

d. CTC Method using Red Book Report

Is CTC along Route? NO

Is TMC along Route? YES

Step 1. CTC near w/o traffic breaks
Step 2. DHV for CTC that year
Step 3. PHV at CTC for date of TMC count
Step 4. Calc DHV Factor
Step 5. Apply DHV factor to TMC

CTC:
DHV ctc =
PHV ctc =
DHV ctc / PHV ctc =
PHV tmc =
DHV tmc =

NOT USED

e. DHV based on AADT and Highway Class

NOT USED

FUTURE YEAR INTERSECTION DHV's

VT 2A / VT 2A / VT 289		VT 2A / VT 289 / Susie WB		**VT 289**
AM PH Count Data 7:00 - 8:00 AM 8/2/2011		AM PH Count Data 7:00 - 8:00 AM 8/2/2011		AM PH 8/2/2011
WB	0	WB	977	
EB Left	0	EB Left	91	
EB Thru	0	EB Thru	252	252
EB Right	0	EB Right	30	
Total	0	Total	1350	
WB right	136	WB right	0	136
WB Thru	0	WB Thru	0	
WB Left	825	WB Left	0	825
EB	0	EB		
Total	961	Total		
NB Left	0	NB Left	55	
NB Thru	220	NB Thru	160	
NB Right	0	NB Right	22	22
SB	1417	SB	359	
Total	1637	Total	596	
NB	356	NB	251	
SB Right	0	SB Right	922	
SB Thru	592	SB Thru	268	
SB Left	0	SB Left	152	152
Total	948	Total	1593	1387

PM 1736 > DHV (1713) : USE (No DHV Factor Required)

VT 2A / VT 289		VT 2A / VT 2A / VT 289 / Susie WB		**VT 289**
Year 2032 (Growth Factor of 1.05 Applied)				
WB	0	WB	1026	
EB Left	0	EB Left	96	
EB Thru	0	EB Thru	265	265
EB Right	0	EB Right	32	
Total	0	Total	1418	
WB right	143	WB right	0	143
WB Thru	0	WB Thru	0	
WB Left	866	WB Left	0	866
EB	0	EB		
Total	1009	Total		
NB Left	0	NB Left	58	
NB Thru	231	NB Thru	168	
NB Right	0	NB Right	23	23
SB	1488	SB	377	
Total	1719	Total	612	
NB	374	NB	264	
SB Right	0	SB Right	968	
SB Thru	622	SB Thru	281	
SB Left	0	SB Left	160	160
Total	995	Total	1673	1456

Essex Vermont

VT 2A / VT 289
Traffic Analysis

195310689 2/14/2012

DHV Calculation - Existing and 2032 (AM)

Stantec Consulting Services Inc.
55 Green Mountain Drive.
South Burlington, VT U.S.A.
05403
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com

Memo

Stantec

To:	File	From:	David DeBaie
File:	195310709	Date:	June 7, 2012

Reference: VT 2A / VT 289 – Adjacent Private Development Trip Generation

An estimate of the trips generated by a potential development (AC Realty) adjacent to the subject project corridor prepared by Trudell Consulting Engineers and dated 04/05/2012 has been provided to Stantec. This estimate was accompanied by a sketch plan dated 8/22/2011. The review of this material is provided in this memo.

Development Program:

- 65 residential condominiums including 113 parking spaces;
- 9,800 sf medical office with 50 spaces

Trip Generation:

The provided estimate is consistent with the *ITE Trip Generation* rates for Land Use Code (LUC) 230 (Residential Condominium / Townhome) and LUC 720 (Medical / dental Office).

Table 1 Trip Generation

	Enter	Exit	Total
AM Peak Hour	25	35	60
PM Peak Hour	39	41	80

Notes:

1. For the land use types and their combination, passby and internal trip adjustments are not applicable.

Trip Distribution:

1. The trip distribution estimate indicates all trips from the Gardenside Lane access egress. This would be a worse case condition if the driveways indicated on the plan, a right turn in and right turn out driveways, are not part of the final plan.

2. Trip distribution estimates provided by Trudell indicate mostly right turns rather than left turns to/from Gardenside Lane, and Susie Wilson Bypass, and significantly fewer left turns onto VT 289 is estimated to be just 50 % of that coming from VT 289 Westbound.

To present a more conservative analysis two gross adjustments are recommended for the PM peak hour:

1. 6 right turns from VT 2A to Susie Wilson will be modeled as left turns from VT 2A onto VT 289.

2. 6 entering left turn vehicles from VT 289 will be modeled as left turns from Susie Wilson Bypass.

Hourly Distribution

An hourly distribution would be needed if the projected traffic volumes met the traffic signal warrant threshold during the peak hours. As noted below the development as proposed will not meet traffic signal warrant thresholds during the peak hours and therefore an estimate of other hours is not required.

Traffic Signal Warrant Review

If all site generated traffic were to use Gardenside Lane the resulting peak hour volume on Gardenside lane would be 35 + during the AM peak hour and 41 + during the PM peak hour assuming a few additional vehicle trips generated by the seven existing residences that would remain after the development. These hourly volumes do not meet the minor street thresholds for the Warrant 1 Eight Hour Warrants A or B or the reduced A and B combination. Similarly, the Warrant 7 Crash experience criteria of 5 crashes per year are not met. On the basis of this review a traffic signal will not be warranted with the proposed A C Realty development.

Table 2 Hourly Warrant Thresholds

1 major and minor street lane on each approach	Vehicles on major street	Vehicles on higher volume minor street
Warrant 1 Condition A	500	150
Warrant 1 Condition B	750	75
Warrant 1 Combined* or Warrant 7 if 5 crashes per year	400 and 600	120 and 60

Reference: VT 2A / VT 289

Potentially Applicable Approved Developments

TOWN	Development	Location	Type	Size	AM Trips In	AM Trips Out	AM Trips Tot	PM Trips In	PM Trips Out	PM Trips Tot
	One approved development project identified (1/5/12) by theTown of Essex Community Devel Office.									
	Green Mountain	New England Dr	Manufacturing	374 /weekday						
	Coffee Roasters			(multiple shifts)	0	0	0	0	152	152
	Per Traffic Impact Assessment by Lamoureux & Dickinson June 14, 2011									
Essex	New Peak Hour Trips to /from VT 2A / VT 289 project area.				0	0	0	0	38	38
Colchester	Development projects identified (1/5/12) by Department of Planning and Zoning as approved but not built; however, no development project is suffciently near the project to have direct traffic impact.									
	Three approved but not built development projects identified (1/4/11) Essex Junction Planning Department.									
	Estimated as ITE LUC 231 Low rise residential condominiums with 20 % thru project area.									
		Lincoln Street	Residential	36 units	6	18	24	17	13	30
		Trips to/from project area								
		Park Street	Residential	60 units	10	30	40	29	21	50
		Trips to/from project area								
		Maple Street	Residential	48 units	8	24	32	23	17	40
		Trips to/from project area								
				Total	24	72	96	69	51	120
Essex Junction				20%	5	14	19	14	10	24
TOTAL					5	14	19	14	48	62

Regional Background Growth

At CTC P6D530 VT 289 in Essex 0.6 miles west of VT 15 the Vtrans calculated 20 year growth (2010-2030) is 1 percent.
This projected growth reflects an annual growth rate of 0.0005 (effectively no annual growth)
On VT 289, the 2011 DHV is 1736 vph on VT 289. 20 year growth @ 1 percent is 17 vehicles per hour.

Overall Growth Rate

If 50% of Approved Developments use VT 289 then 31 vph PM peak hour growth would result. 17< 31 (adjust annual growth)
Assume 0.25 percent annual growth (5 percent growth over 20 years) resulting in 87 peak hour trips on VT 289. 89 > 31 (OK)

Conclusion

Use overall annual growth rate of 0.25 percent resulting in 20 year growth factor of 1.05 to account for local development and regional growth.

Essex Vermont Vt 2A / Vt 289 195310689 2/14/2012	Overall 20 year Growth Rate	Stantec **Stantec Consulting Services Inc.** 55 Green Mountain Drive. South Burlington, VT U.S.A. 05403 Tel. 802.864.0223 Fax. 802.864.0165 www.stantec.com

APPENDIX E

Crash History

CRASH RATE WORKSHEET

CITY/TOWN : Essex COUNT DATE : 8/2/2011

UNSIGNALIZED : [ ] SIGNALIZED : [X]

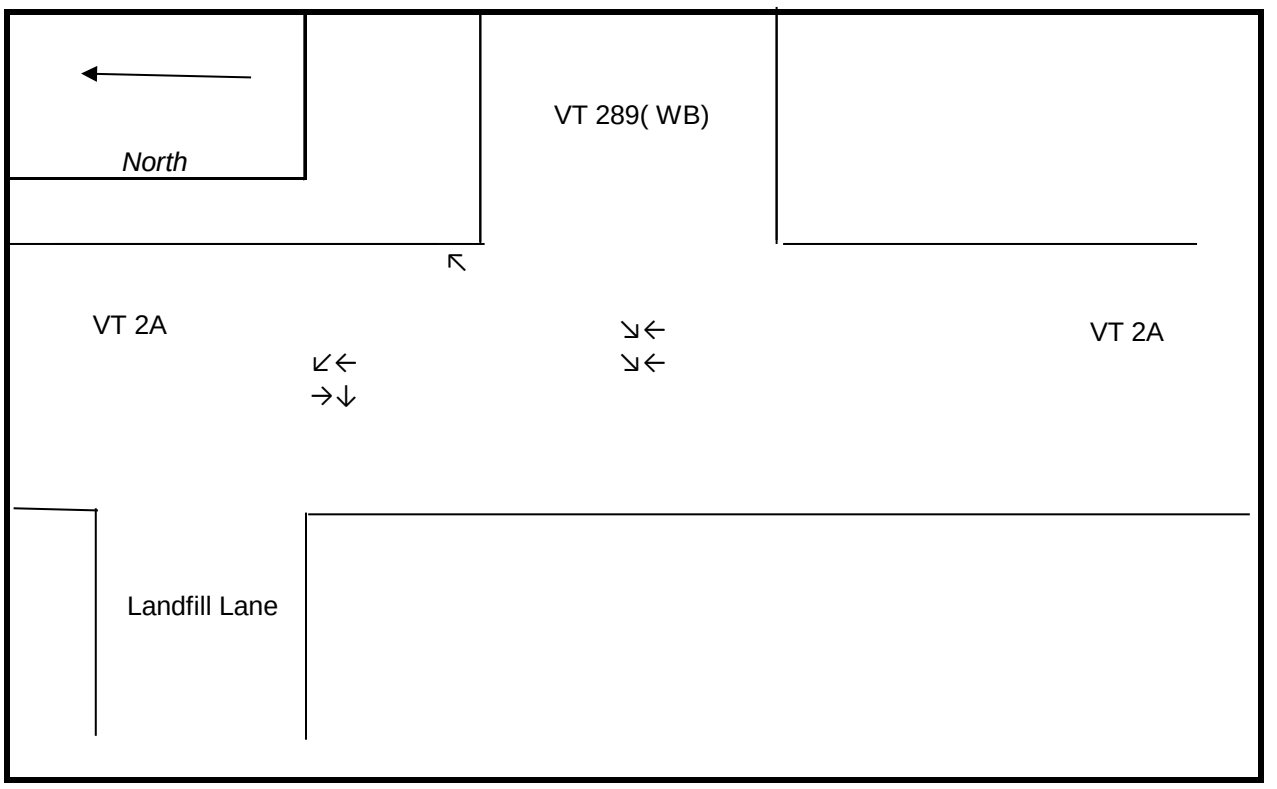
~ INTERSECTION DATA ~

MAJOR STREET : VT 2A

MINOR STREET(S) : VT 289 (WB)

LEGEND
CRASH TYPE
RE - Rear End ←←
A - Angle →↑
SS - Sideswipe →↖
HO - Head On →←

COLLISION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	558	501	0	648		**1,707**

" K " FACTOR : **0.106** APPROACH ADT : **16,104** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 5 # OF YEARS : 5 AVERAGE # OF CRASHES (**A**) : **1.00**

CRASH RATE CALCULATION : **0.170** RATE = (A * 1,000,000) / (ADT * 365)

Comments : The Crash Rate is less than the Statewide Average for the intersection of an Expressway and an Urban Minor Arterial at 0.703.

Essex Vermont VT 2A / VT 289 Traffic Analysis 195310689 10/25/2012	Crash Diagram VT 2A / VT 289 (WB)	Stantec **Stantec Consulting Services Inc.** 55 Green Mountain Drive. South Burlington, VT U.S.A. 05403 Tel. 802.864.0223 Fax. 802.864.0165 www.stantec.com

CRASH RATE WORKSHEET

CITY/TOWN : Essex COUNT DATE : 8/2/2011

UNSIGNALIZED : X SIGNALIZED :

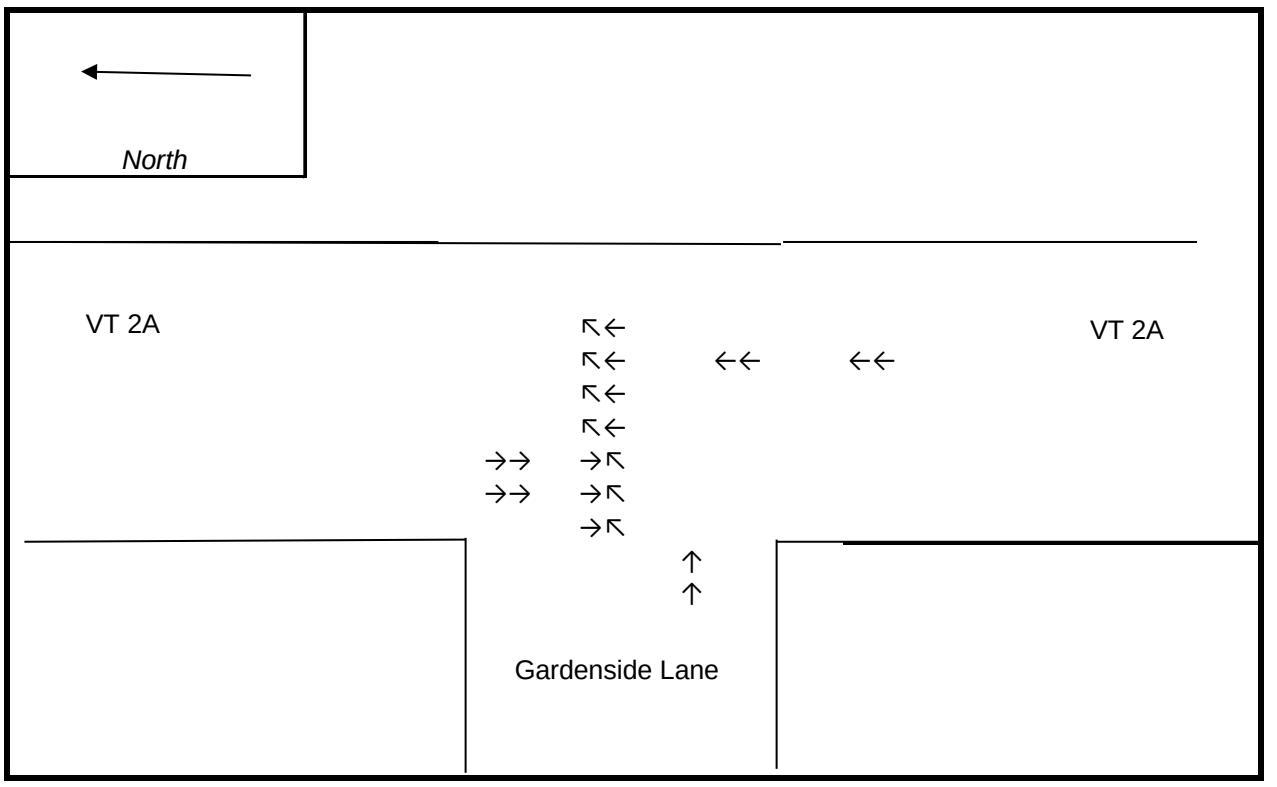
~ INTERSECTION DATA ~

MAJOR STREET : VT 2A

MINOR STREET(S) : Gardenside Lane

LEGEND
CRASH TYPE
RE - Rear End ←←
A - Angle →↑
SS - Sideswipe →↖
HO - Head On →←

COLLISION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	432	1,065		0		**1,497**

" K " FACTOR : **0.106** APPROACH ADT : **14,123** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 13 # OF YEARS : 5 AVERAGE # OF CRASHES (**A**) : **2.60**

CRASH RATE CALCULATION : **0.504** RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : The Crash Rate is slightly greater than the Statewide Average for Urban Minor Arterials at 0.495

Essex Vermont VT 2A Traffic Analysis 195310689 10/25/2012	Crash Diagram VT 2A (mm 2.58-2.60)	Stantec **Stantec Consulting Services Inc.** 55 Green Mountain Drive. South Burlington, VT U.S.A. 05403 Tel. 802.864.0223 Fax. 802.864.0165 www.stantec.com

CRASH RATE WORKSHEET

CITY/TOWN : Essex COUNT DATE : 8/2/2011

UNSIGNALIZED : [ ] SIGNALIZED : [X]

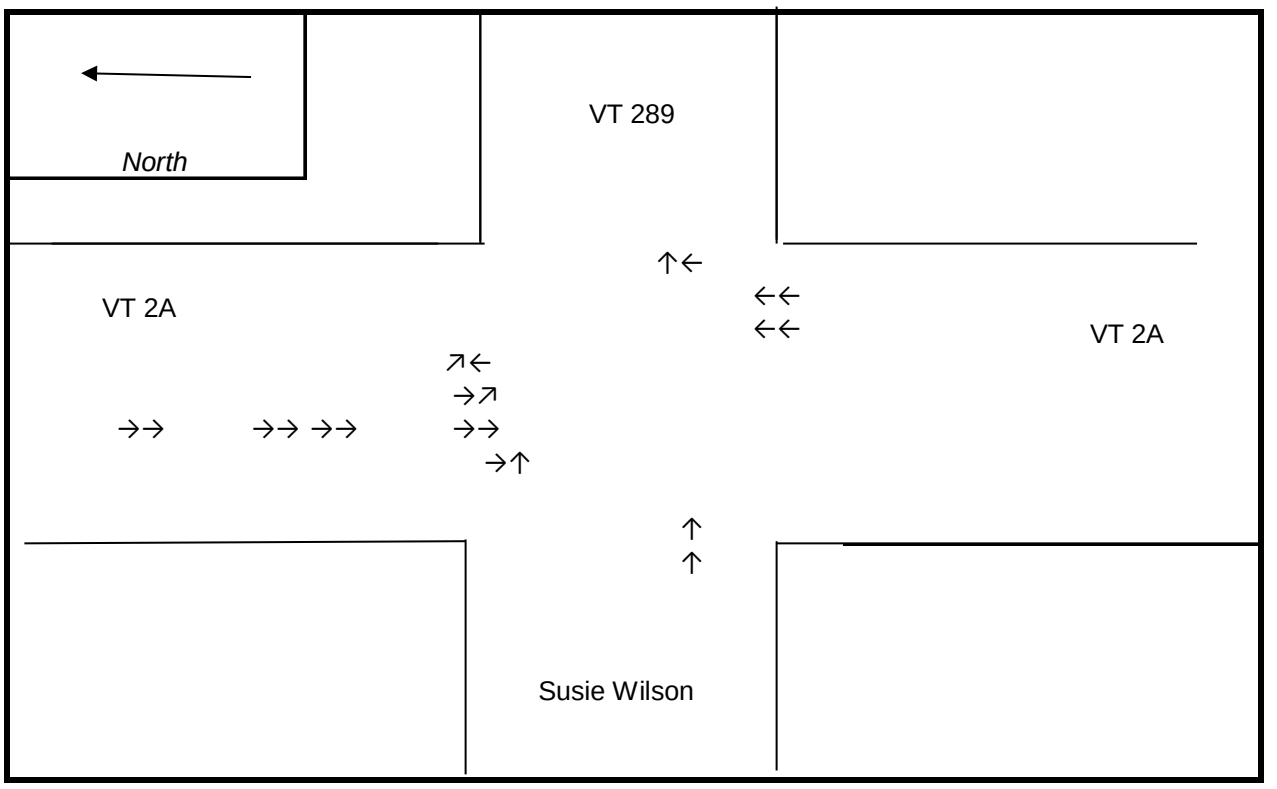
~ INTERSECTION DATA ~

MAJOR STREET : VT 2A

MINOR STREET(S) : Susie Wilson Bypass and VT 289

LEGEND
CRASH TYPE
RE - Rear End ←←
A - Angle →↑
SS - Sideswipe →↖
HO - Head On →←

COLLISION DIAGRAM
(Label Approaches)



Peak Hour Volumes

APPROACH :	1	2	3	4	5	Total Entering Vehicles
DIRECTION :	NB	SB	EB	WB		
VOLUMES (PM) :	432	1,065	1,069	0		**2,566**

" K " FACTOR : **0.106** APPROACH ADT : **24,208** **ADT** = TOTAL VOL/"K" FACT.

TOTAL # OF CRASHES : 12 # OF YEARS : 5 AVERAGE # OF CRASHES (**A**) : **2.40**

CRASH RATE CALCULATION : **0.272** RATE = $\frac{(A * 1{,}000{,}000)}{(ADT * 365)}$

Comments : The Crash Rate is less than the Statewide Average for the intersection of a Minor Arterial (u) and an urban collector at 0.572

Essex Vermont VT 2A / VT 289 Traffic Analysis 195310689 10/25/2012	Crash Diagram VT 2A / VT 289 / Susie Wilson Bypass	**Stantec Consulting Services Inc.** 55 Green Mountain Drive. South Burlington, VT U.S.A. 05403 Tel. 802.864.0223 Fax. 802.864.0165 www.stantec.com

APPENDIX F

Natural Resource Figures

Photo 1. The VT 2A/VT 289 Interchange study area includes existing roadways, signage, and utility ROWs. The vegetation immediately adjacent to the roads is maintained by periodic mowing. 6/11/12

Photo 2. Roadsides include utility lines and primarily herbaceous vegetation. 6/11/12

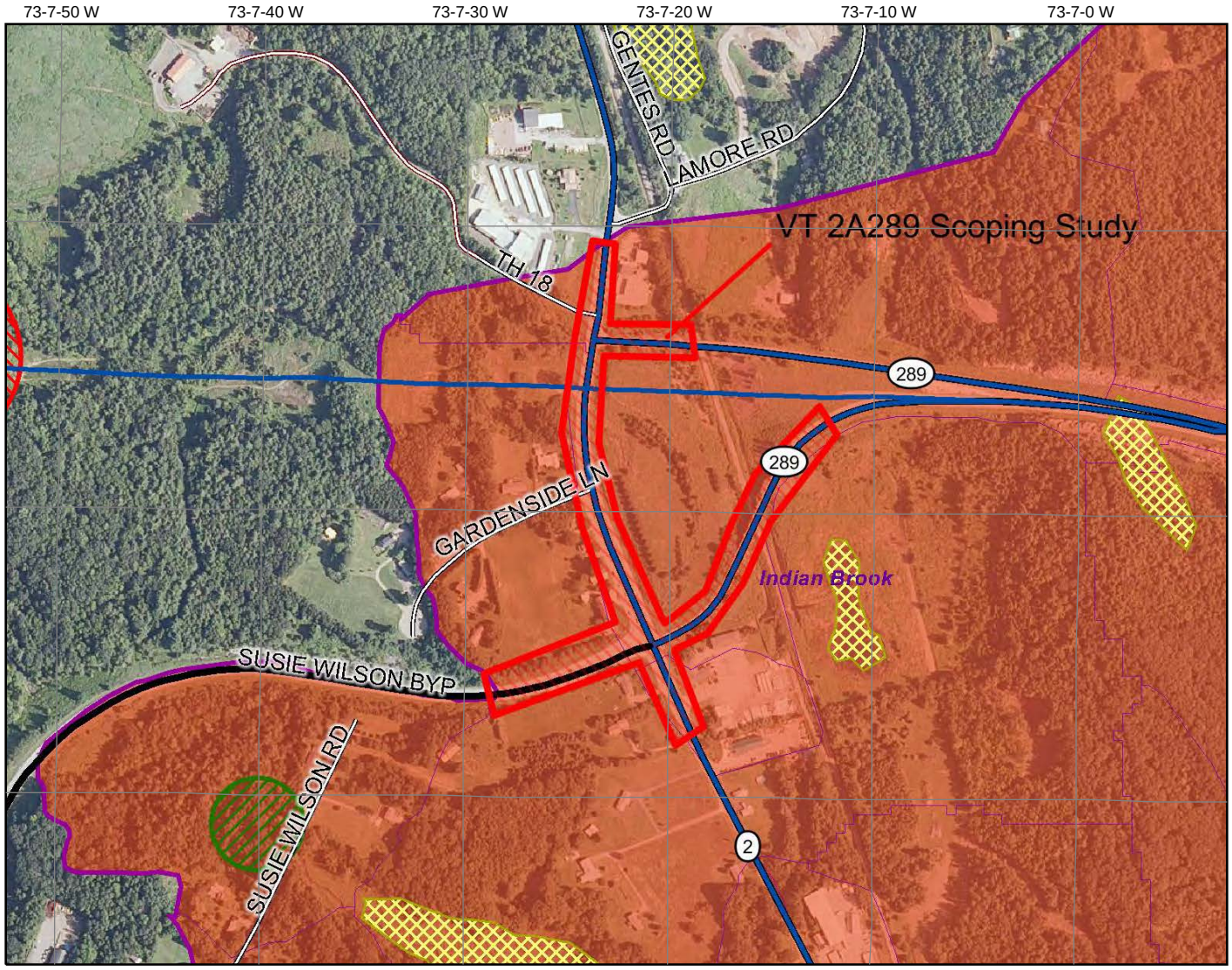
Photo 3. The on-ramp and roadside vegetation are shown above. 6/11/12

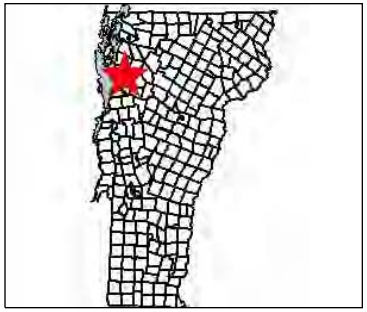
Photo 4. A wetland dominated by common reed is visible in the distance. 6/11/12

ANR Environmental Interest Locator

Vermont Agency of Natural Resources (ANR)

VT 2A/VT 289 Scoping Study ANR Map





Legend

Roads
- US Highway
- Vermont State Highway
- Class One
- Class Two
- Legal Trail
- Emergency U-Turn Area
- Proposed Class Two
- Proposed Class Three
- Proposed Vermont State Highway
- Proposed US Highway
- Proposed Interstate
- Discontinued
- Interstate
- Class Three
- Class Four
- State/National Forest Highway
- Military Road (No Public Access)
- Private Road

VSWI
- Class 1 Wetland
- Class 2 Wetland

Rare, Threatened, and Endangered Species
- Threatened or Endangered
- Rare (Not T or E)

- Stormwater Impaired SubWatershed
- Stormwater Impaired Watershed
- Hydrography Lakes and Ponds (VHD 5k)
- Hydrography (VHD 5k)
- VT County Boundary
- VT Town Boundaries (No Fill)
- NAIP Color Orthophotos 2009
- VT State Boundary (Fill)

VT State Plane Meters (NAD83)

N

Scale: 1:7,122

0 700 1400 2100 ft.

Map center: 450473, 224257

URL: http://maps.vermont.gov/imf/sites/ANR_NATRESViewer/jsp/launch.jsp

6/12/12

APPENDIX G

Historic Resources

Historic Structures Assessment for the Vermont Route2A-VT 289 Interchange Scoping Study
Essex Junction, Vermont

Prepared for:
Stantec
55 Green Mountain Drive
South Burlington, VT 05407

Prepared by:
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Plainfield, Vermont 05667

June 2012

Introduction

This report will provide comments on the above-referenced project pursuant to 36 CFR 800.4, regulations established by the Advisory Council on Historic Preservation to implement Section 106 of the National Historic Preservation Act. Project review consists of evaluating the project's potential impacts to historic buildings and structures, historic districts, historic landscapes and settings, and known or potential archeological resources.

This report identifies historic resources within the proposed project's Area of Potential Effect (APE), "the geographic area within which the project may cause changes to the character or use of the historic properties" [36CFR 800.2(c)] that are listed on or appear to be eligible for listing on the National Register of Historic Places. The report also provides a preliminary assessment of effect based on the preliminary project description. A site visit was conducted by the consultant on June 12, 2012, at which time photographs were taken. File review to identify sites in the project area was undertaken on June 12, 2012 at the Vermont Division for Historic Preservation in Montpelier, VT. Research was conducted at the Vermont Historical Society Library in Barre.

Project Description

The proposed project is being planned by the Town of Essex and the Chittenden County Regional Planning Commission. The proposed undertaking involves geometric changes and traffic signal system upgrades to enhance performance of the VT 2A/VT 289 partial interchange. This interchange is the northwestern termination of VT 289 also known as the "Chittenden County Circumferential Highway". Currently Susie Wilson Road serves as the western extension of VT 289 connecting to VT Route 15 to the west. The geometric improvements will require minor widening and the installation of mast arms. All work will occur within the right-of-way.

The project will begin just north of Landfill Lane and extend southward to a point just north of the CCR Sales and Services building at 183 Colchester Road. It extends approximately 639 feet west on Susie Wilson Road, approximately 1,140 feet on the VT 289 eastbound ramp, and approximately 345 feet on the VT 289 westbound ramp.

The actual construction area has not yet been defined and until it is, the proposed project's Area of Potential Effect (APE) is along both sides of the above named roads. The APE corresponds to the area within, and immediately adjacent to, the red line labeled "Project Area" on the attached VT2A/VT289 Interchange Project Location Plan.

The project area includes a former two lane, two way, state highway (VT 2A) that has been upgraded to accommodate intersections with highways that bypass busy areas of Chittenden County. These large intersections have substantially altered the character of the former residential and agrarian settlement in southwestern Essex.

Vermont Route 2A, also known as Colchester Road, is a heavily traveled two-lane road with paved breakdown lanes. Heading south. at its intersection with Gardenside Lane, the west side of VT 2A becomes two lanes and a breakdown lane. In front of the house at 200 Colchester Road (VT 2A) the road becomes a travel lane, two turning lanes, and a breakdown lane. In the southeast quadrant of the project area, VT 2A has a breakdown lane, travel lane and turning lane onto the VT 289 eastbound ramp. There are overhead traffic lights at both intersections of VT 2A and the VT 289 access ramps. The VT 289 east and west bound access ramps are part of a limited access highway built in the late 20th century. Susie Wilson Road was relocated and widened in the late 20th century. At its intersection with VT 2A, both sides of the road have paved breakdown lanes, a travel lane and a turning lane. Landfill Lane and Gardenside Lane are small dead end streets that extend west from VT 2A, intersecting in the project area.

Much of the development in the project area is a mix of modern residential and commercial construction. There are no structures near the project area along either of the VT 289 access ramps, along the portion of Susie Wilson Road, or along the west side of VT 2A between the two access ramps. Buildings to the south of the Susie Wilson Road/VT 2A/VT 289 Westbound ramp are all late 20th century structures. The southwest quadrant contains modern homes, the southeast quadrant contains the Stevens Energy complex at 189 Colchester Road and the CCR Sales and Services building at 183 Colchester Road. The northern end of the project area, beyond a building at the intersection of Gardenside Lane, contains no structures. A gas station and convenience store are located just outside the northeastern end of the project area and commercial storage units are located just beyond the northwestern end.

Historic Properties

The western side of VT 2A, from just north of Gardenside Lane to Susie Wilson Road contains four residential structures (208, 204, 202, 200 Colchester Road). These buildings are set in a flat field, close to the road with shallow front yards and some mature trees and shrubs serving as a bit of buffer from the heavy traffic. They do not appear to comprise an historic district due to changes to their setting. All four of these buildings are more than 50 years old and appear individually eligible for the State and National Registers. The house at 200 Colchester Road was included in the 1976 Vermont Historic Sites and Structures Survey (VHSSS) for the Town of Essex and is listed on the State Register of Historic Places. The other three properties were not included in the VHSSS. The house at 202 Colchester Road was determined eligible for the State Register by the Vermont Division for Historic Preservation as part of a project review conducted in 2011.

Historic maps, including the 1857 Walling map, the 1869 Beers map, and the 1908 and 1915 United States Geological Survey (USGS) topographic maps, all indicate that the area was a lightly settled farming community with properties spread out along Colchester Road and Susie Wilson Road. The number and location of the properties and streets remained constant during these years. The 1948 USGS map documents a period of growth in this part of Essex during the

intervening years after 1915. By 1948, the schoolhouse at 208 Colchester Road had been relocated to its present location across Susie Wilson Road. A number of new buildings had been built along Colchester Road, including the two houses on the former schoolhouse site, #'s 202 and 204 Colchester Road. The former farming neighborhood was evolving into a more developed residential and commercial area.

200 Colchester Road, VHSSS #0405-53

This farmhouse has deteriorated significantly since it was surveyed in 1976 and its barn, which was collapsing, was demolished in 2011. The house sits at the corner of a large and busy intersection and is no longer occupied. The c. 1840, 5x2 bay,1 ½ story, south-facing side gabled house, with ell on the west end, has a central gable wall dormer on the front elevation above a c. 1900 Queen Anne style porch with turned posts, sawn brackets, and a square railing whose end posts have ball finials. The porch shelters a simple Federal style entry with rectangular transom. Entries retain their historic glass and panel doors. The building has vinyl siding, asphalt shingle roof, stone foundation and a mix of window types including 2/2 double hung.

Historic maps and town histories indicate that in 1869 the property was owned by Harrison Griffin, in 1857 by P. White, and prior to that by David Day, Jr. The building is listed on the State Register of Historic Places and is eligible for the National Register, with local significance, under Criteria A and C as an example of a farmhouse from the first half of the 19th century with a distinctive gable wall dormer and Federal entry that continues to convey the early settlement history of this corner Essex.

202 Colchester Road

This c. 1930, 1 ½ story, eaves-front, gable roofed Bungalow style house has a 5 bay wide and 1 bay deep screened-in porch spanning its front façade. Shed roof dormers rest on the front and back roof slopes. The porch and dormers have exposed rafter tails. On the back of the house is a single-story shed roofed addition and an open, shed roofed porch. Both front and back porches have battered posts. The front porch has a wood railing with square balusters and a lattice skirt. The left, sidehall front entry has two double hung windows to its right. There are two windows in the front dormer. All windows are original, wood, 3/1 double hung sash. The house rests on a foundation composed of rock-faced concrete blocks and has an asphalt shingle roof. There is a wide water table and corner boards. Walls are clapboarded on the first floor, with wood shingles above a belt course that runs above the first floor windows. There is a mature tree on the front lawn.

The building is eligible for the State and National Registers under Criteria C as a good local example of a Bungalow style house dating from the first third of the 20th century. The full-length front porch and smaller back porch-both with battered posts, shed roof dormers, exposed rafter tails, 3/1 double hung wood windows, mixed clapboard and wood shingle siding, and rock-faced concrete foundation blocks are all distinctive elements of the Bungalow style. It is also locally eligible under Criteria A as it represents early 20th century residential growth on former farmland in this once agrarian section of Essex.

204 Colchester Road

This c. 1930, two-story, eaves-front, gambrel roofed, Dutch Colonial house has full-length shed roofed dormers on the front and back roof slopes. Each dormer has two windows. The centered front entry is sheltered by a gable roofed door hood supported by square posts with capitals and bases. It has brick steps and landing. The front door is flanked by a pair of 4/4 replacement double hung windows on the left and a single 4/4 window on the right Windows on the building are largely 4/4 replacement sash. A single-story, shed roofed addition is centered on the back of the building with an open, shed-roofed entry porch supported by square posts with capitals and bases. On the north side of the house is an open, shed roofed porch spanning the eastern half of the elevation and sheltering a window and centered side door. The entry contains an original storm door with a long eight light window over a recessed panel, and an inner door with a long Craftsman-style window with a large central pane surrounded by small panes, all above a recessed panel. Both doors are natural finish. There are semi-circular gable vents. The building has wide clapboard siding, and an asphalt shingle roof with a molded cornice. There is a mature tree on the front lawn.

To the south of the house, is a small, c. 1930, single-story, gable front garage with a metal roof and exposed rafter tails, narrow clapboards, and wide corner boards. The north wall has a 6/6 double hung window and the rear wall has a fixed sash single pane window in the gable.

Although slightly altered, the building is eligible for the State and National Registers under Criterion C as a local example of a Dutch Colonial style house, with associated early garage, dating from the first third of the 20th century. Its gambrel roof form, shed roof dormers, semi-circular gable vents, multiple open porches, and Craftsman style doors all are typical features of the Dutch Colonial style. The garage represents the early garage form with its diminutive size, exposed rafter tails, and fenestration. The property is locally significant under Criterion A as it represents early 20th century residential growth on former farmland in this once agrarian section of Essex.

This house, along with its neighbor at 202 Colchester Road, appear to have been built after the schoolhouse (208 Colchester Road) that once stood on the south side of what is now Gardenside Lane, was moved to its present lot on the north side of Gardenside in 1929.

208 Colchester Road

This c. 1840, 1 ½ story, gable front building is one of Essex's early District schools. The building has a central entry on the south gable end which is now sheltered by an enclosed porch. The simple building has a shed roofed, single-story addition spanning the west side that may once have been a wood shed. Two 8/8 double hung windows light the north gable end and four similar windows light the east side. On this side, the central two windows are paired. Attached to the west side of the building is a modern ell with an attached garage. The building has an asphalt shingle roof, clapboard siding, wide corner boards, water table and fascia. Framing timbers are reported to be unpeeled logs with the bark remaining. The building is set behind a line of evergreen and deciduous trees and hedges that shield it from the busy road.

This school, the District 2 school, is one of seven remaining schoolhouses out of the original fourteen District schools that existed in Essex at the time of the Beers map in 1869. It has long been known as the Griffin School, named after Harrison and Phoebe S. Griffin who owned a neighboring farm (at 200 Colchester Road) and the land the school originally sat on, and who sold the land to the Town in 1853. The Walling map of 1857 and the 1869 Beers map, as well as the 1908 and 1915 USGS topographic maps all indicate the building once stood on the south side of what is now Gardenside Lane. This road was the original alignment of Susie Wilson Road, before it was relocated. In 1929 the school was moved to its present location, providing better playground space, and upgrades were made to meet the standards established for Standard School rating. The school was the last-operating one-room school in Essex and closed after the 1958 school year, in which it served grades 1-3. The following year, 1959, it was purchased and converted to a private residence.

Although the building has had some change and multiple additions, the original schoolhouse form is still evident. The building is eligible for the State and National Registers under Criterion A as it is locally significant as an example of early education in Essex. The property appears to meet the Registration Requirements for one room schoolhouses as outlined in the Multiple Property Listing for "Educational Resources of Vermont".

Assessment of Effect

Project plans are preliminary. Formal findings of effect for Section 106 should be based on final project plans when they become available. This project is anticipated to include minor road widening and the installation of mast arms for traffic signals inside the exiting right of way. It may also include minor slope impacts outside the right of way. It is anticipated that the proposed project will have no adverse effect on any historic structures since there will be no direct impact to the buildings. Since the setting of the buildings has already been compromised by the introduction of multiple lanes and large intersections with overhead traffic lights, some lane widening and the addition of masthead traffic signals should not substantially change the character of the area.

Care should be taken to preserve as many of the mature trees and shrubs, and front lawn space, as possible, to provide a continuing buffer from traffic for the residents of the historic buildings. Closer encroachment of a road of this scale and traffic volume could render the buildings largely uninhabitable, and could lead to them becoming vacant and deteriorated.

Bibliography

Allen, Richard & Lucille. *Images of America-Essex and Essex Junction*. Portsmouth, NH: Arcadia Publishing, 2004.

Beers, F.W. *Atlas of Chittenden County, Vermont*. New York: F.W. Beers, 1869. Reprint. Rutland, VT: Charles E. Tuttle, 1969.

Bent, Frank R., editor. *The History of Essex, VT*. Essex, VT: Essex Publishing Company, Inc., 1963.

Carlisle, Lilian Baker, editor. *Look Around Essex and Williston*, *Vermont*. Burlington, VT: George Little Press, 1973.

Essex Centennial 1783-1883. Montpelier, Vermont: Argus and Patriot and Job Printing House, 1883.

Fonda, Christine, Vermont Historic Sites and Structures Survey: Town of Essex, recorded for Vermont Division for Historic Preservation, Montpelier, VT: 1976.

O'Neil, Mary. *Standing Still, Surviving One Room Schoolhouses in Essex Junction.* Unpublished manuscript, 2001.

Powell, Harriet Farnsworth. *Yesterday in Essex.* Essex Junction, Vermont: Essex Publishing Co., Inc., undated.

United States Geological Survey, *Topographical Maps, Milton Quadrangle, 1908, 1915, 1948.*

Walling, H.F., *Map of Chittenden County, Vermont.* New York: Baker, Tilden & Co., 1857.

Attachments

1. Location of Historic Buildings
2. Photographs
3. Conceptual Location Map/APE
4. 200 Colchester Road, Vermont Historic Sites and Structures Survey Form #0405-2

Historic Building Location Map

Numbers represent street addresses and correspond with headings in the report text.

1. Looking northwest at 200 Colchester Road, edge of road on right.

2. Detail of front façade of 200 Colchester Road with wall dormer, Federal style transom, Queen Anne porch.

3. Looking northwest at 202 Colchester Road with front and back porches and dormers.

4. Front elevation of 202 Colchester Road with rafter tails, battered porch posts, front yard and trees.

5. Looking southwest at 204 Colchester Road with front and side porches, dormer, semi-circular gable vent, and front yard.

6. Looking southeast at 204 Colchester Road with rear dormer and original side entry doors.

7. Looking southeast at garage with exposed rafter tails at 204 Colchester Road.

8. Looking northeast at 208 Colchester Road-schoolhouse is portion at far right.

9. Looking northerly at front of former schoolhouse at 208 Colchester Road.

10. Looking northerly at Route 2A and front yards of 200-204 Colchester Road.

11. Looking southerly at Route 2A/Susie Wilson Road/VT 289 eastbound intersection and front yards of 200-204 Colchester RD.

12. Looking southeast at primary building of Stevens energy at 189 Colchester Road.

13. Looking southeast at single story, gable roofed subsidiary building at 189 Colchester Road. Located to the south of the main structure.

14. Looking east at 183 Colchester Road, CCR Sales and Service.

15. Looking west at 190 Colchester Avenue, on corner with Susie Wilson Road..

16. Looking south from VT 289 eastbound/VT 2A/Susie Wilson Road intersection.

17. Looking southwest at VT 289 westbound/ VT 2A/Landfill Lane intersection.

18. Looking northerly immediately north of the end of the project area.

19. Looking northeasterly at area on northwest corner of project area.

20. Looking northerly at building just outside northeast corner of project area.

Area of Potential Effect (APE) Map

STATE OF VERMONT
Division for Historic Preservation
Montpelier, VT 05602

HISTORIC SITES & STRUCTURES SURVEY
Individual Structure Survey Form

SURVEY NUMBER: 0405-2

NEGATIVE FILE NUMBER: 76-A-116

UTM REFERENCES: Zone/Easting/Northing
18 / 649110E / 4930690N

U.S.G.S. QUAD. MAP: Essex Center Quad., 7.5' Series

PRESENT FORMAL NAME:

ORIGINAL FORMAL NAME:

COUNTY: Chittenden

TOWN: Essex

LOCATION: West side of Route 2A, just south of Susie Wilson Road

PRESENT USE: Farmhouse

ORIGINAL USE: Farmhouse

ARCHITECT/ENGINEER:

COMMON NAME: R.A. Parizo House

BUILDER/CONTRACTOR:

FUNCTIONAL TYPE: Farmhouse

OWNER: R.A. Parizo
ADDRESS: Essex, Vermont

PHYSICAL CONDITION OF STRUCTURE:
Excellent ■ Good ☐
Fair ☐ Poor ☐

ACCESSIBILITY TO PUBLIC:
Yes ☐ No ■ Restricted ☐

THEME:

STYLE:

LEVEL OF SIGNIFICANCE:
Local ☐ State ■ National ☐

DATE BUILT: c.1840/c.1900

GENERAL DESCRIPTION:
Structural System
1. Foundation: Stone ■ Brick ☐ Concrete ☐ Concrete Block ☐
2. Wall Structure
   a. Wood Frame: Post & Beam ☐ Balloon ☐
   b. Load Bearing Masonry: Brick ☐ Stone ☐ Concrete ☐ Concrete Block ☐
   c. Iron ☐ d. Steel ☐ e. Other:
3. Wall Covering: Clapboard ☐ Board & Batten ☐ Wood Shingle ☐ Shiplap ☐ Novelty ☐ Stucco ☐ Sheet Metal ☐ Aluminum ☐ Asphalt Shingle ☐ Brick Veneer ☐ Stone Veneer ☐
   Bonding Pattern: Other: Vinyl
4. Roof Structure
   a. Truss: Wood ☐ Iron ☐ Steel ☐ Concrete ☐
   b. Other: Wood Rafter
5. Roof Covering: Slate ■ Wood Shingle ☐ Asphalt Shingle ☐ Sheet Metal ■ Built Up ☐ Rolled ☐ Tile ☐ Other:
6. Engineering Structure:
7. Other:

Appendages: Porches ■ Towers ☐ Cupolas ☐ Dormers ■ Chimneys ☐ Sheds ☐ Ells ■ Wings ☐ Other: Central Gable

Roof Style: Gable ☐ Hip ☐ Shed ☐ Flat ☐ Mansard ☐ Gambrel ☐ Jerkinhead ☐ Saw Tooth ☐ With Monitor ☐ With Bellcast ☐ With Parapet ☐ With False Front ☐ Other:

Number of Stories: 1½
Number of Bays: 5 x 2
Approximate Dimensions: 36' x 28'
Entrance Location: Center

THREAT TO STRUCTURE:
No Threat ☐ Zoning ☐ Roads ☐
Development ■ Deterioration ☐
Alteration ☐ Other:

LOCAL ATTITUDES:
Positive ☐ Negative ☐
Mixed Other:

ADDITIONAL ARCHITECTURAL OR STRUCTURAL DESCRIPTION:

A central gable wall dormer dominates the main block. The one-story front porch supported by turned posts and sawn brackets shelters the front door and its rectangular transom light. An ell extends to the west.

RELATED STRUCTURES: (Describe)

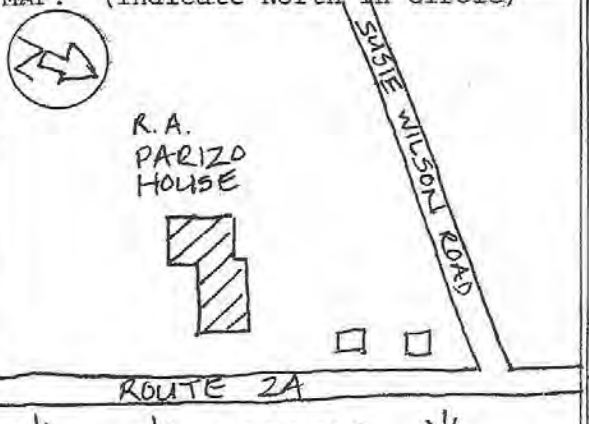
1. Shiplap-sided barn with gambrel roof.
2. Shiplap garage.
3. Shiplap chicken coop.

STATEMENT OF SIGNIFICANCE:

The Parizo farmhouse serves as a reminder of the life style of this section of Essex and is a pleasing contrast to nearby development housing.

REFERENCES:

MAP: (Indicate North In Circle)



SURROUNDING ENVIRONMENT:
Open Land ■ Woodland □
Scattered Buildings □
Moderately Built Up ■
Densely Built Up □
Residential ■ Commercial □
Agricultural ■ Industrial □
Roadside Strip Development □
Other:

RECORDED BY:
Christine Fonda

ORGANIZATION:
Vt. Division for Historic Preservation

DATE RECORDED:
7/25/76

0405-2

APPENDIX H

Archaeological Resources

ARCHEOLOGICAL RESOURCE ASSESSMENT

VT 2A/VT 289 Interchange Scoping Study

Town of Essex
Chittenden County, Vermont

HAA # 4546.11

Submitted to:

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An ACRA Member Firm
www.acra-crm.org

August 2012

ARCHEOLOGICAL RESOURCE ASSESSMENT

INTRODUCTION

Hartgen Archeological Associates, Inc. (HAA, Inc.) was retained by Stantec to conduct an Archaeological Resource Assessment (ARA) for the VT 2A/VT 289 Interchange Scoping Study in the Town of Essex, Chittenden County, Vermont (Map 1). This is a planning project for geometric and signal system upgrades at the interchange of VT 2A with the northwestern termination of VT 289, also known as the Chittenden County Circumferential Highway (Map 2). Currently Susie Wilson Road serves as the western extension of VT 289 connecting to VT Route 15 to the west. This connection allows vehicles to bypass the Essex Junction Five Corners.

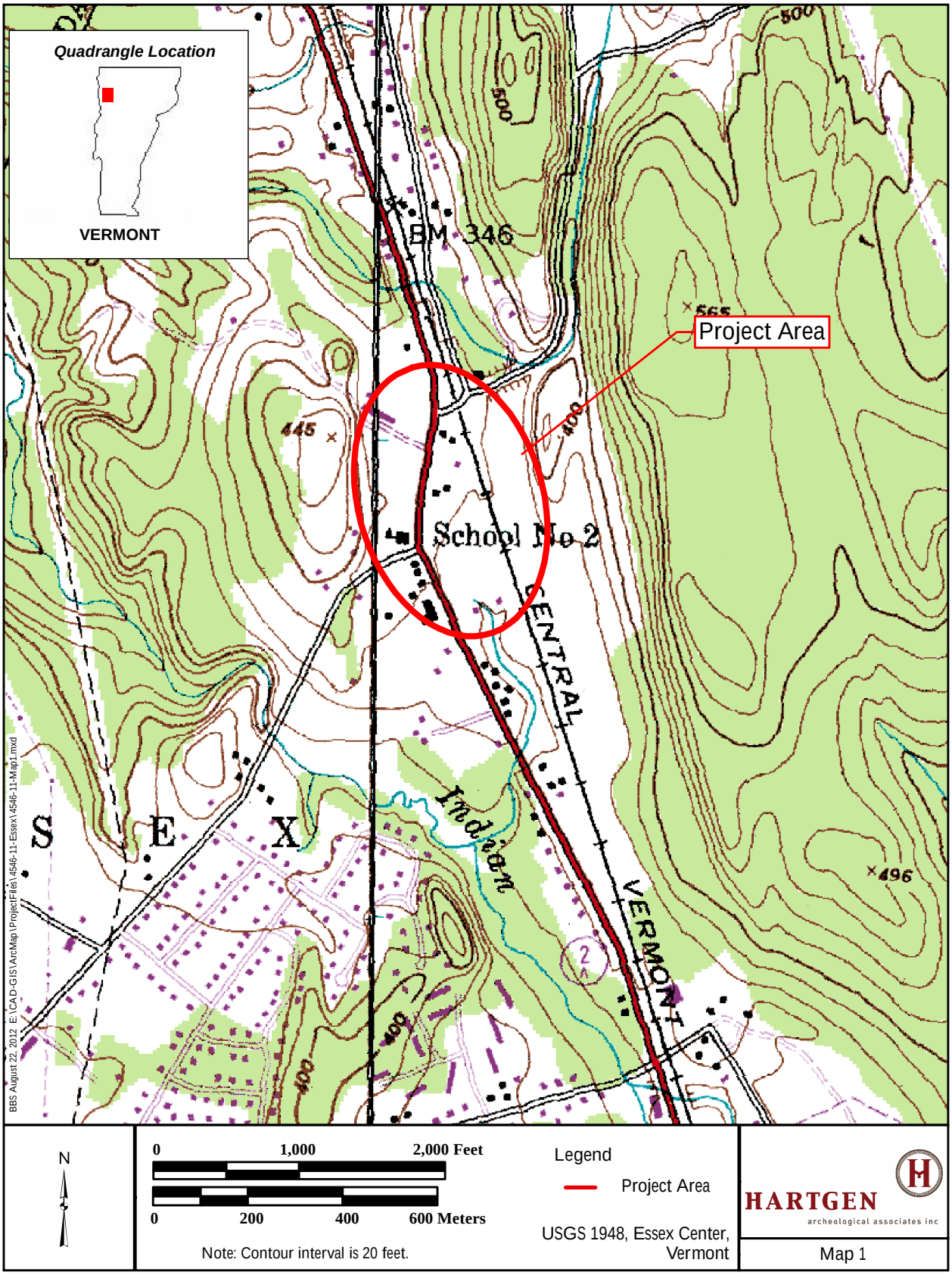
The Vermont Agency of Transportaion (VTrans) is currently designing a Phase 1 for this area that is limited to signal system upgrades. Phase 1 does not include any geometric improvements and therefore does not require any roadway widening. The Chittenden County Regional Planning Commission (CCRPC) and the Town of Essex are continuing with this scoping report to look at various geometric improvements to further enhance the performance of these intersections. As determined in the traffic analysis, the geometric improvements will likely require minor widening and the installation of mast arms. The project is contracted by the CCRPC and financially supported with Federal, State and Local funding. The project will be reviewed by VTrans.

The primary objective of the ARA is to identify areas of archeological sensitivity based on environmental factors, known site information and historical information for the project Area of Potential Effects (APE). Reference to the general project vicinity is provided as appropriate to understanding the local cultural and historical context. Background research was conducted at the Vermont Division for Historic Preservation (VDHP) where archeological site files, National Register (NR), State Register (SR) and town information were reviewed. A site visit was conducted by Elise Manning Sterling on August 2, 2012 to observe and photograph existing conditions within the project area.

Environmental Overview and Current Conditions

Environmental characteristics of an area are significant for determining the sensitivity for archeological resources. Precontact and historic groups often favored level, well-drained locations near wetlands and waterways. Therefore, topography, proximity to wetlands, and soils are examined to determine if there are landforms in the project area that are more likely to contain archeological resources. In addition, bedrock formations or other lithic sources may contain resources that may have been quarried by precontact groups. Other locations can also be special purpose sacred and traditional use sites. Soil conditions can provide a clue to past climatic conditions, as well as changes in local hydrology.

The Town of Essex is located in the Vermont Lowlands physiographic region. The project area is situated at an approximate elevation of 380 feet above mean sea level, on a plateau situated above the Winooski River Valley (100 feet amsl), approximately 1.5 miles (2.4 km) to its south, and Lake Champlain (100 feet amsl), located approximately 4.5 miles (7.2 km) to the west. The northern end of the project area is situated approximately 300 feet (90 m) south of a tributary of Indian Brook. The southern end of the project area is situated approximately 500 feet (152 m) north of another tributary of Indian Brook, and 1,600 feet (487 m) north of its confluence with another stream. There are wetlands located on the east side of VT 2A in the central portion of the APE, between VT 289 westbound and eastbound roadway ramps. It is likely that this wetland was created as part of wetland replacement during the construction of the CCCH (Photo 1). A large sloped earthwork north of the wetland and south of the VT 289 westbound off ramp was also likely created at this time (Photos 1 and 2). The Central Vermont Railroad is located approximately 150 feet (45 meters) east of the northern end of the project area.


Quadrangle Location
VERMONT
BM 346
Project Area
School No 2
CENTRAL VERMONT
Indian
S E X
500
445
400
496
BBS August 22, 2012 E:\CAD-GIS\ArcMap\ProjectFiles\4546-11-Essex\4546-11-Map1.mxd
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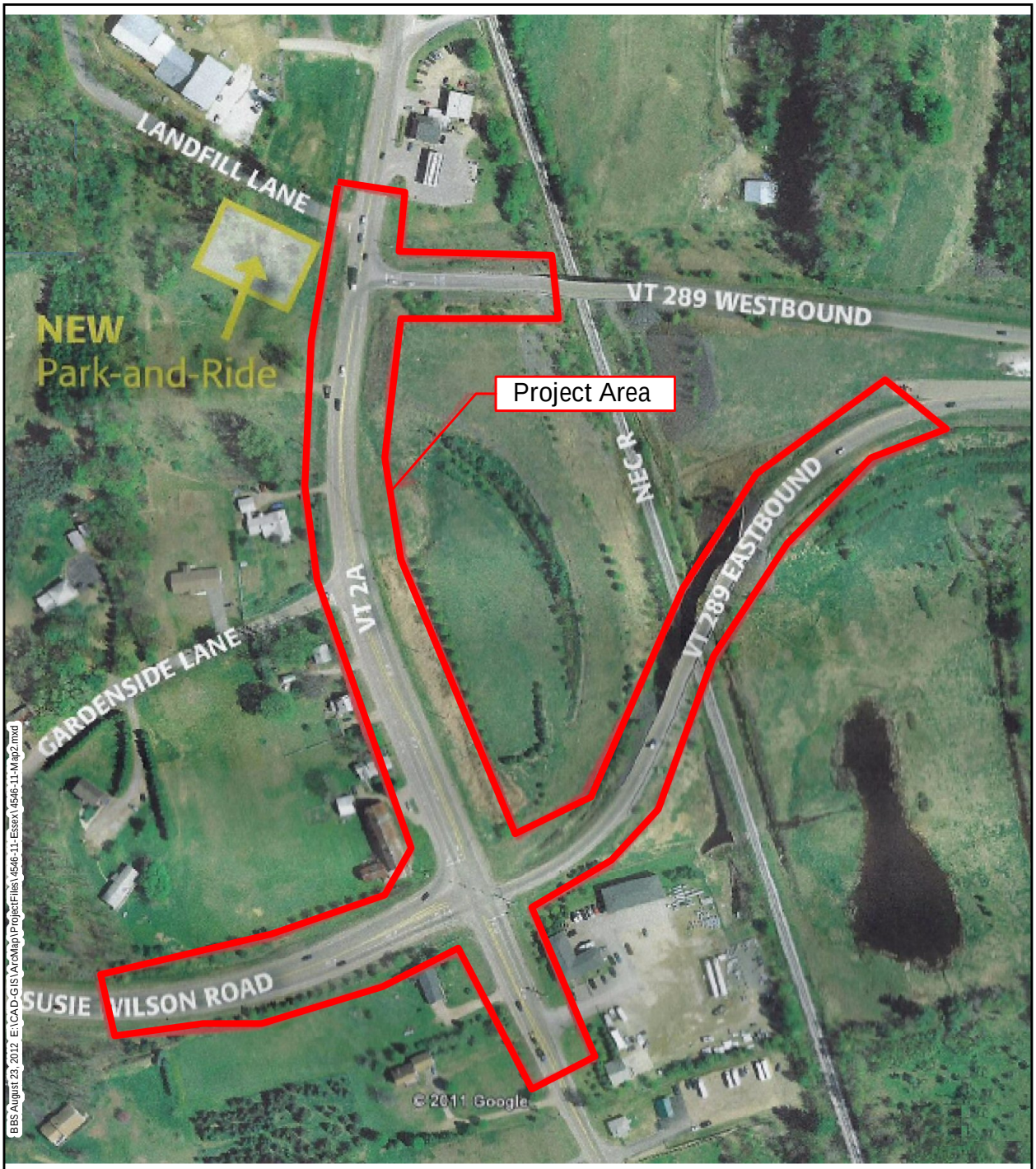
Note: Contour interval is 20 feet.
Legend
Project Area
USGS 1948, Essex Center, Vermont
HARTGEN
archeological associates inc
Map 1



N

0 1,000 2,000 Feet

0 200 400 600 Meters

Note: Contour interval is 20 feet.

Legend

Project Area

(Ortho-Image Basemap Provided by Stantec 2012)

HARTGEN archeological associates inc

Map 1

Photo 1. Photo shows wetland on east side of VT 2 and sloped embankment south of the VT 289 westbound off ramp. View is to the northeast.

Photo 2. Photo shows VT 2 roadway and sloped embankment south of the VT 289 westbound off ramp. View is to the southwest.

There are several soils types located within the project area. The primary soil types represented in the central portion of the project including Adams and Winsor loamy sands, 0 to 5 percent slopes, Au Gres fine sandy loam, Munson and Raynham silt loams, 2 to 6 percent slopes, and Scantic silt loam, 0 to 2 percent slope. These soil types are located on the areas of level terrain, and are somewhat excessively drained soils are derived from sandy glaciofluvial deposits, and are encountered on terrace formations between 90 to 1,200 feet amsl (USDA 2012). Soils on the western end of the project alignment on Susie Wilson Bypass are comprised of Belgrade and Eldridge soils, 3 to 8 percent slopes. At the eastern end of the APE, the Lyman-Marlow very rocky loams, 5 to 30 percent slopes, are present (USDA 2012).

DOCUMENTARY RESEARCH

Precontact Site File Research and Archeological Sensitivity

Examination of VDHP site files indicates that within several miles of the project area, there are several hundred precontact sites situated adjacent to Lake Champlain, the Winooski River, and their numerous tributaries and associated wetlands. There are thirteen precontact sites located within a one mile (1.6 km) radius of the APE, all identified during testing for the Chittenden County Circumferential Highway (Dillon 1985, Knight 2001, Sheehan & Thomas 1993, Thomas & Florentin 2002 and Wilson 1990). While there is great variation displayed in the site types and amount and type of precontact cultural material identified at these 13 sites, the majority are associated near or adjacent to Indian Brook or one of its tributaries. There are isolated find sites as well as sites which have dense concentrations of lithics, pottery, and buried features, and which date from the Early Archaic through to the Late Woodland Periods. There are two sites which date to the Late Archaic period (VT-CH-493 and VT-CH-502), and eight precontact sites of indeterminate temporal affiliation (VT-CH 237, VT-CH-238, VT-CH-243, VT-CH-492, VT-CH-500, VT-CH-501, VT-CH-612, VT-CH-613). There were also several large multi-component sites identified, including VT-CH-494 (Early Archaic, Middle Woodland and Late Woodland components), VT-CH-495 (Late Archaic, Early Woodland and Late Woodland components) and VT-CH-497 (Middle Woodland and Late Woodland components).

The Vermont Division for Historic Preservation Internet Mapping Site was accessed and used to formulate the archeological sensitivity of the proposed project area (VDHP 2009). The mapping site evaluates the precontact potential of all areas of Vermont, based on 11 environmental factors, such as the presence of specific terrain, soils, or proximity to streams or wetlands. If an area possesses just one of these environmental characteristics, it is considered by the Vermont Division for Historic Preservation (VDHP) / State Historic Preservation Officer (SHPO) to be archeologically sensitive. Based on the Vermont ArcheoMap Information System (VAMIS), the project area possesses four sensitivity factors, including its proximity to a waterbody, proximity to the head of a drainage, its location on a glacial outwash terrace and the presence of level terrain (Map 3).

The VDHP Environmental Predictive Model was completed for the project area which produced an overall rating of 76 (Appendix 1), with a rating of 32 or above indicating precontact sensitivity. The project area received points based on its location on level terrain within a travel corridor, situated near streams, as well as being situated in an area with a high density of recorded sites.

The general project area is considered to be an area of precontact sensitivity. However, there has also been previous disturbance from modern development and road construction, as evidenced by wide roadway and shoulders, and high embankments for VT 289 ramps (Photo 2). Undisturbed grassy areas adjacent to the roadways are considered to be archaeologically sensitive (Photos 3 and 4). If the proposed project plans involve impacts beyond the limits of the roadway and road shoulder onto level grass areas, then further archeological investigation is recommended.

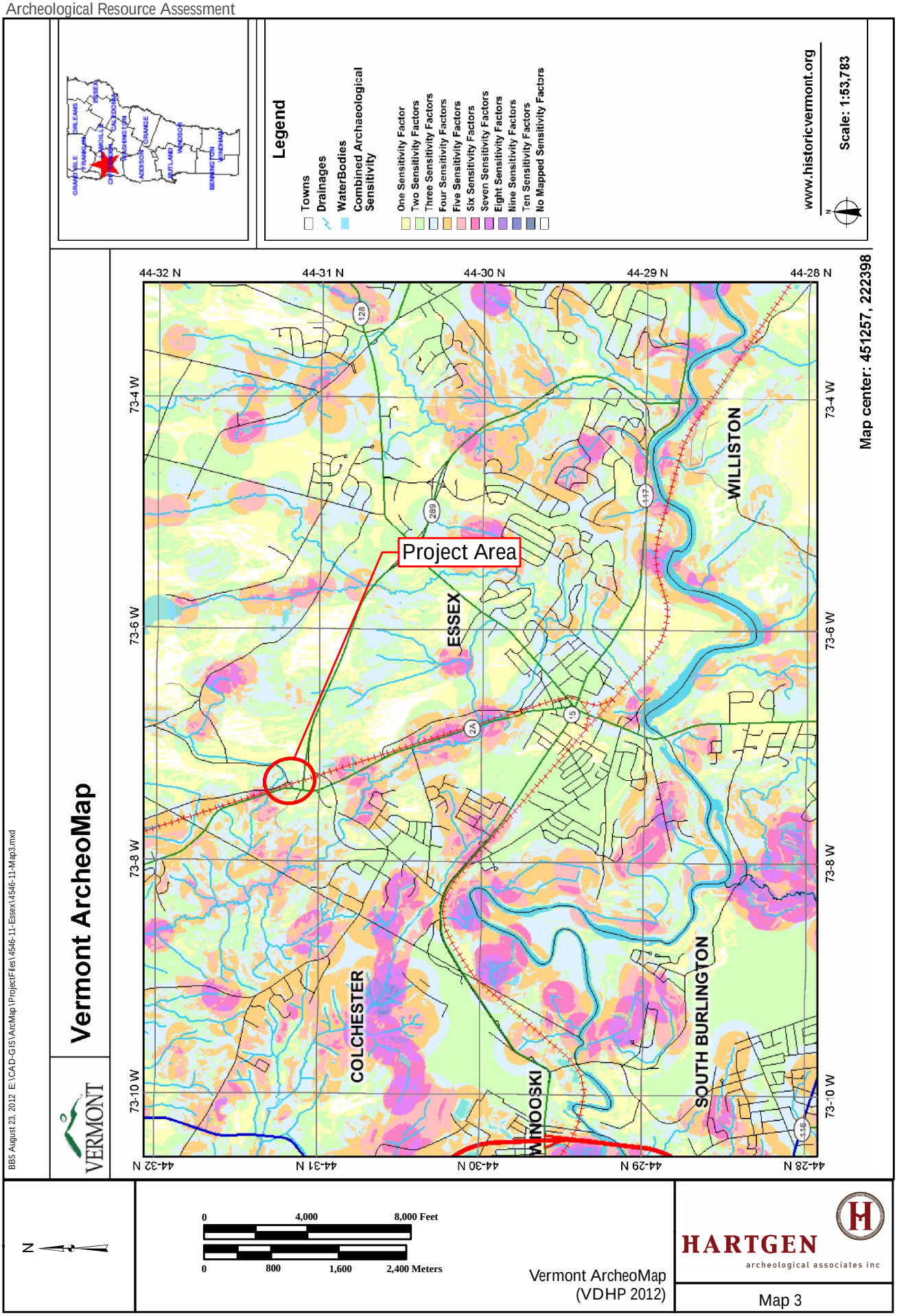

Legend
Towns
Drainages
WaterBodies
Combined Archaeological Sensitivity
One Sensitivity Factor
Two Sensitivity Factors
Three Sensitivity Factors
Four Sensitivity Factors
Five Sensitivity Factors
Six Sensitivity Factors
Seven Sensitivity Factors
Eight Sensitivity Factors
Nine Sensitivity Factors
Ten Sensitivity Factors
No Mapped Sensitivity Factors
www.historicvermont.org
Scale: 1:53,783
Vermont ArcheoMap
VERMONT
Project Area
ESSEX
WILLISTON
COLCHESTER
WINOOSKI
SOUTH BURLINGTON
Map center: 451257, 222398
44-32 N
44-31 N
44-30 N
44-29 N
44-28 N
73-4 W
73-6 W
73-8 W
73-10 W
0 4,000 8,000 Feet
0 800 1,600 2,400 Meters
Vermont ArcheoMap
(VDHP 2012)
HARTGEN
archeological associates inc
Map 3
BBS August 23, 2012 E:\CAD-GIS\ArcMap\ProjectFiles\4546-11-Essex\4546-11-Map3.mxd

Photo 3. Photo shows a grassy field located on the west side of VT 2 south of Landfill Lane and east of the new park and ride. View is to the west

Photo 4. Photo shows the grass lawns on the west side of VT 2 at the southern end of the project alignment. View is to the north.

Historic Site File Search and Archeological Sensitivity

National and State Register

There are no historic structures listed on the State Register (VHSSS) located within the project APE.

There are no National Register sites located within or adjacent to the project APE.

Cemeteries

There are no known cemeteries located within or adjacent to the project area (Hyde and Hyde 1991).

Historic Sites

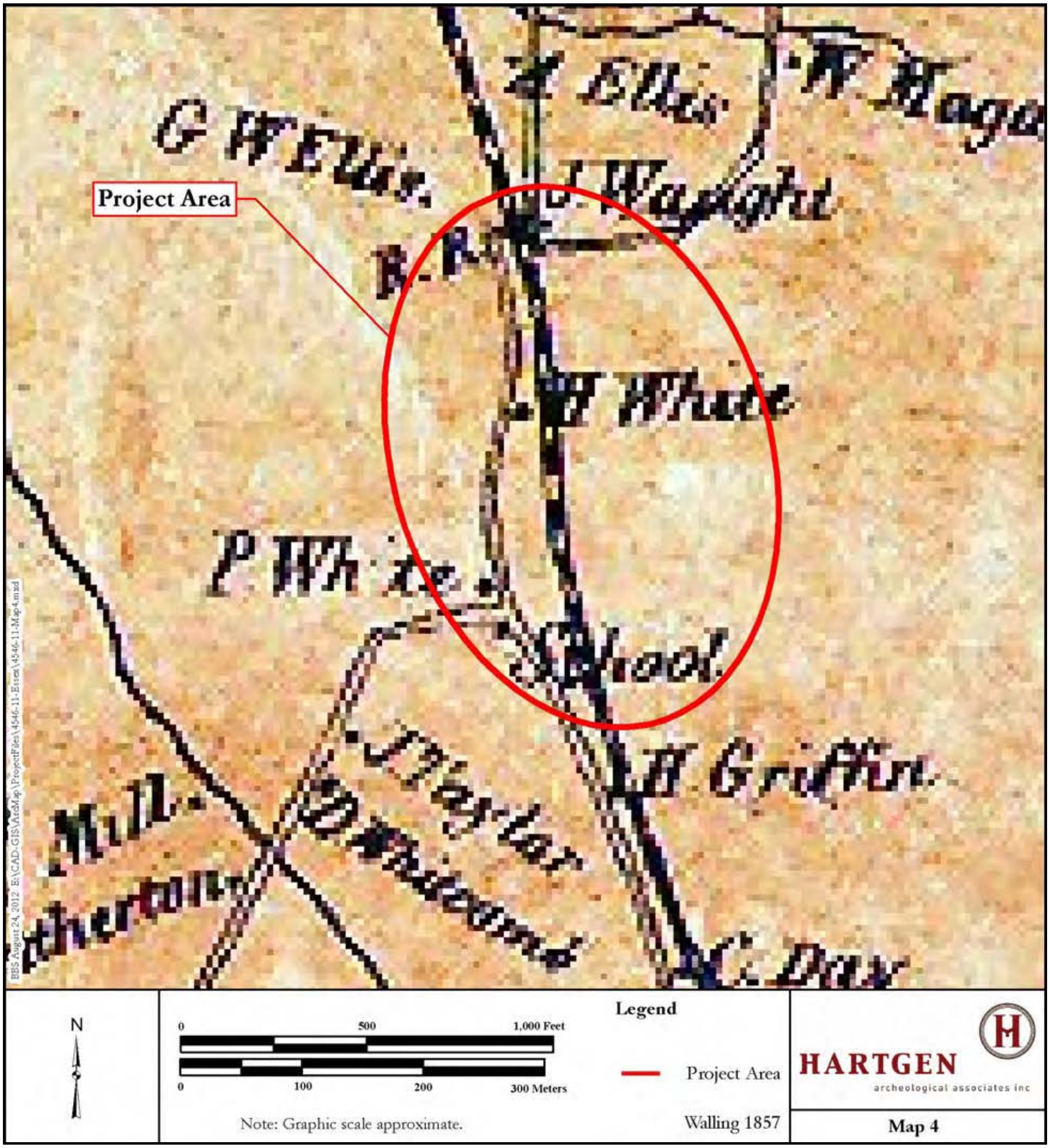
An examination of the VDHP archeological site files indicated that there are four historic archeological sites located within one mile of the project area, all of which were identified during CCCH testing. There are three sites west of the APE, located between 750 feet (230 m) and 1225 feet distant. These sites include a late 18th century mill complex (VT-CH-491), a multi-component precontact and 19th-20th century domestic site (VT-CH-492), and a multi-component Late Archaic precontact site, and a late 18th to early 19th century farm complex (VT-CH-493). A 19th century grist mill site (VT-CH-498) is located approximately 4,400 (1.3 km) east of the project area. The presence of these sites, several of which date to the early settlement of this area, suggest that the project area has archaeological sensitivity for the presence of historic sites.

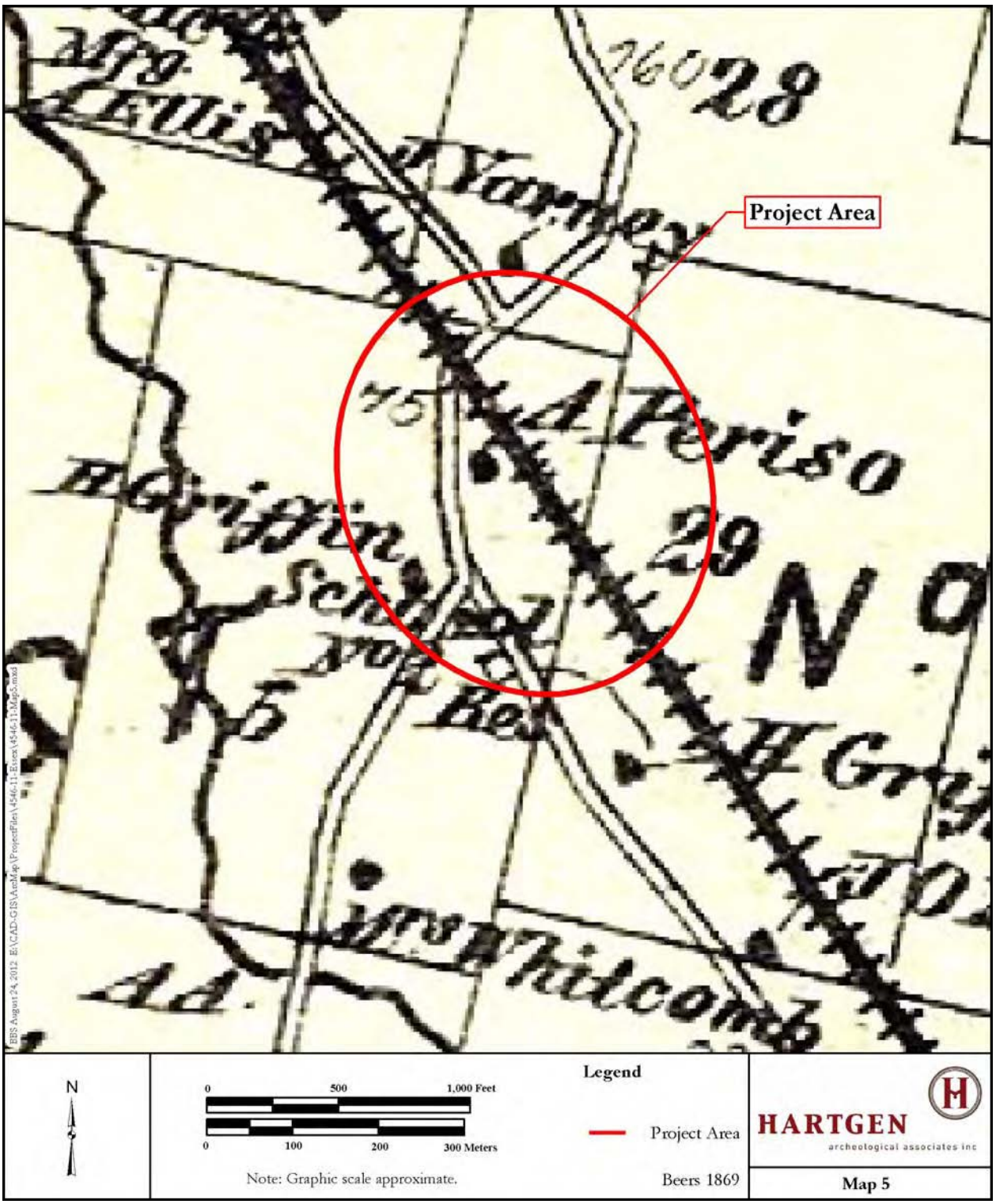
Historic Maps

A review of historic maps of the project area was conducted to attain an overview of the changing historical and environmental landscape within the project area. This review includes the study of historic structures that may be or may no longer be extant, alterations to road and rail systems, and changes in stream and river courses. Two 19th-century maps, the 1857 Walling map and the 1869 Beers map, depict the roadways and river and stream courses in the project area, as well as the names of the residents who lived there in those years (Maps 4 & 5).

The 1857 Walling map shows three structures located within the project area, including the residence of H. White on the east side of present day VT 2A (Map 4). Located on the west side of the road are a school and the residence of P. White. By this date, the railroad had already been built through the town of Essex. The 1869 Beers map depicts the same three structures as the Walling map, labeled as the No 2 School, and the residences of A. Periso and H. Griffin (Map 5).

The study of historic USGS maps indicates that the area has undergone many changes in the 20th century. The 1915 USGS shows two structures located on the east side of VT 2A, and only the school on the west (Map 6). Most notable is the relative level topography located between VT 2A and the railroad. The 1948 USGS also shows level terrain is this location, along with six structures (Map 7). Today, this area, situated between the eastbound and westbound lanes of VT 289, contains a wetland bordered to the north by the sloped earthen berm, most likely created during the construction of the CCCH. No structures are presently located in this location. The 1948 topographic map is the only historic map to show the school located on the north side of the road leading west to Fort Ethan Allen. It is unclear whether the road was altered, or if there was a cartographic mistake. The schoolhouse, which still stands on the west side of VT 2A, has been converted into a residence.


G W Ellis.
Project Area
R. R.
J Waught
H White
P White
School
H Griffin
J Taylor
Mill.
C. Day
N
0
500
1,000 Feet
0
100
200
300 Meters
Note: Graphic scale approximate.
Legend
Project Area
Walling 1857
HARTGEN
archeological associates inc
Map 4


Project Area
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500
1,000 Feet
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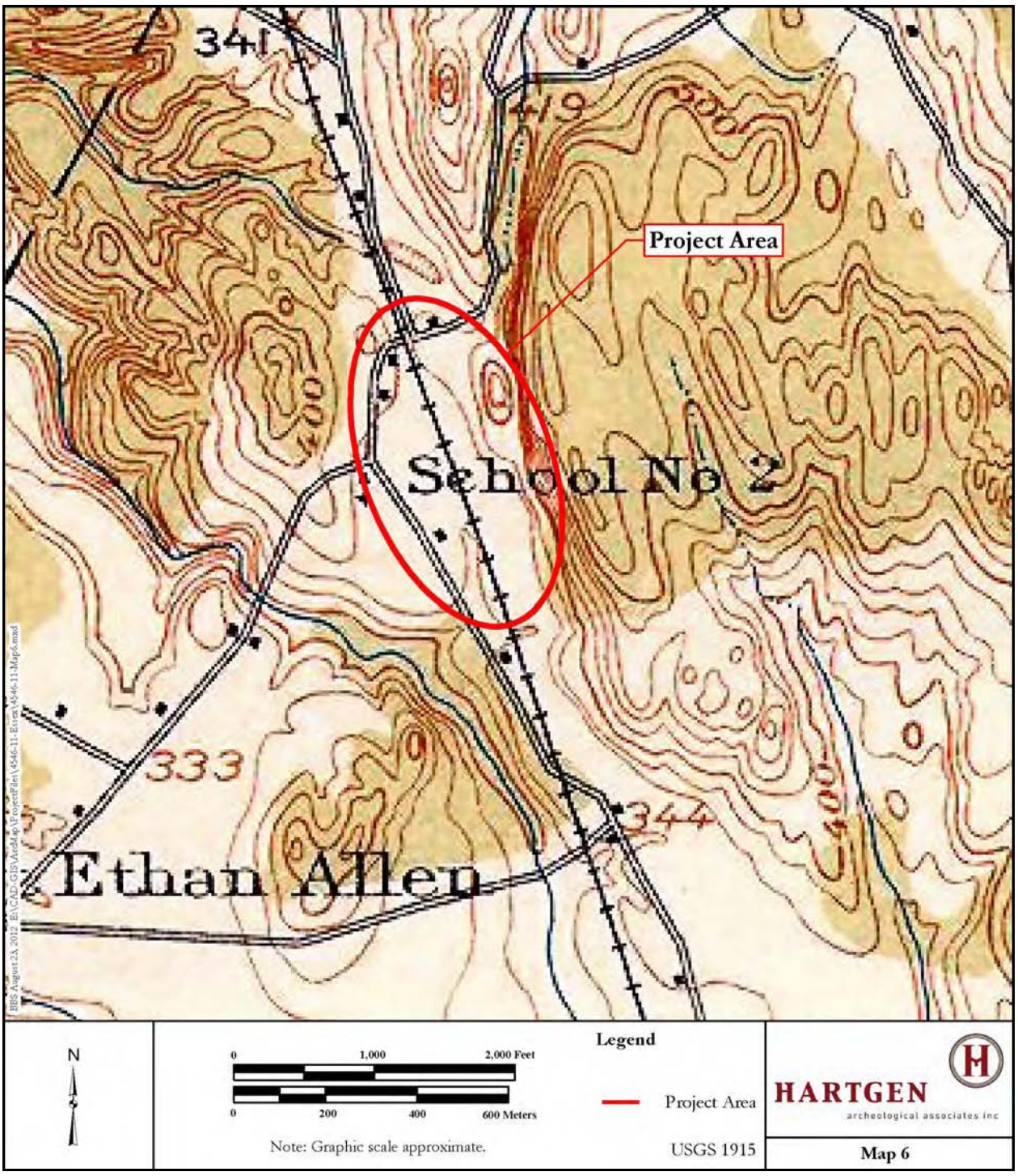
Note: Graphic scale approximate.
Legend
Project Area
Beers 1869
HARTGEN
archeological associates inc
Map 5


341
419
Project Area
School No 2
333
344
Ethan Allen
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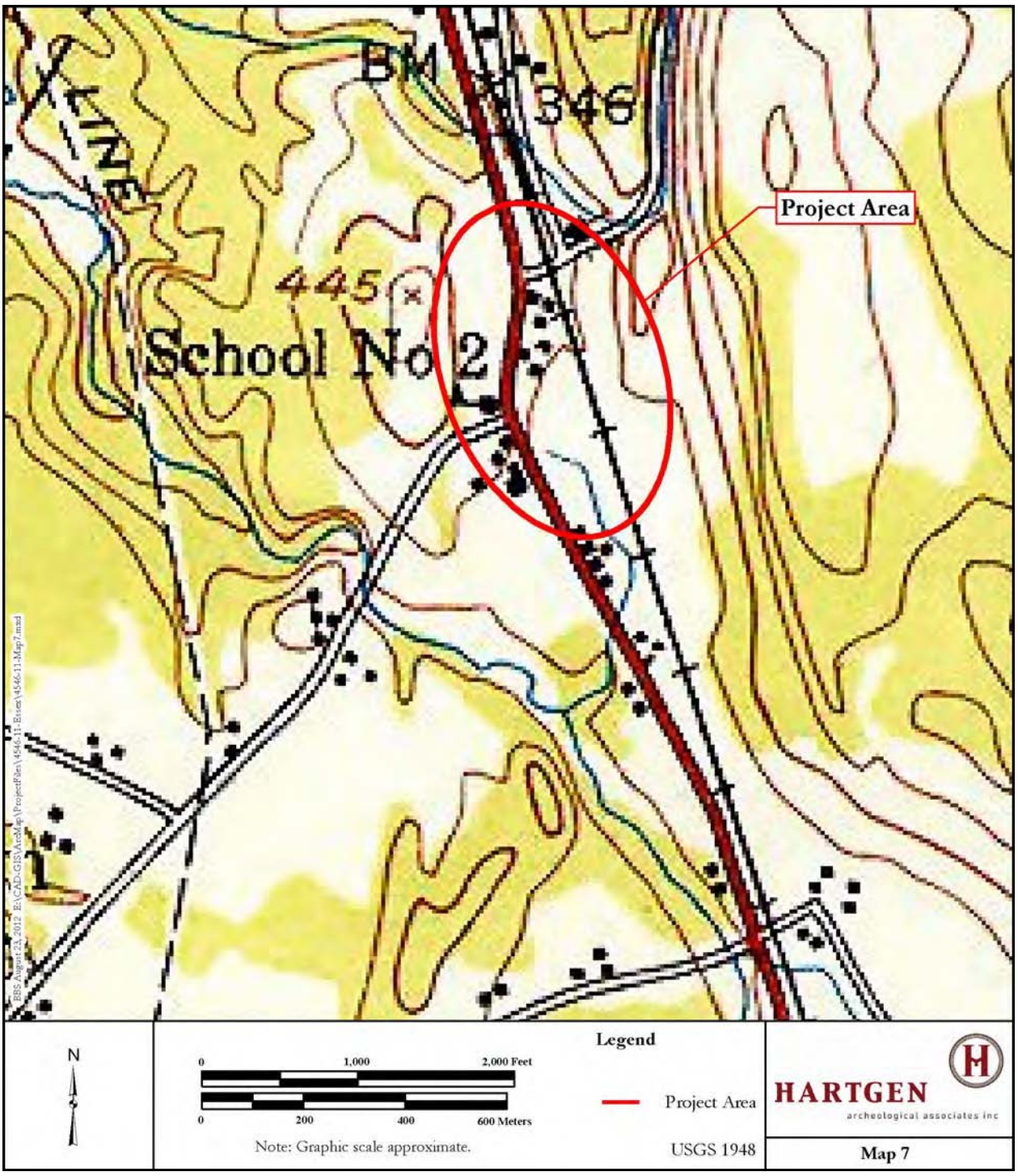
2,000 Feet
0
200
400
600 Meters
Note: Graphic scale approximate.
Legend
Project Area
USGS 1915
HARTGEN
archeological associates inc
Map 6


BM
346
LINE
445
School No 2
Project Area
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1,000
2,000 Feet
0
200
400
600 Meters
Note: Graphic scale approximate.
Legend
Project Area
USGS 1948
HARTGEN
archeological associates inc
Map 7

ARCHEOLOGICAL POTENTIAL AND RECOMMENDATIONS

A site visit was made to the VT 2A/ VT289 interchange project area on August 3, 2012 under sunny and warm conditions. The primary development within the project area has been with the construction of roads and associated earthworks for the VT 289 exit and entrance ramps. There are several historic homes located at the southern end of the alignment, on the west side of VT 2A.

As discussed in the precontact section of this report, the areas which are considered archeologically sensitive are undisturbed areas of level terrain. Within the project area, these sensitivity areas include grass parcels located beyond the limits of the road shoulder, primarily on the west side of VT 2A. If the project plans entail ground disturbance beyond the limits of the roadway onto level lawns and green spaces, then further archeological investigation is recommended

BIBLIOGRAPHY

Beers, F.W.
1869 *Atlas of Chittenden County, Vermont*. F.W. Beers & Co., New York.

Dillon, Scott, Peter Thomas, and Prudence Doherty
1985 *Archaeological Reconnaissance Survey and Site Evaluation Study for the Yello-Blue-Yellow Alignment, Chittenden County Circumferential Highway, 1985-1985, Volume V: Tecnhical Data for Sampling Areas and Archaeological Sites*. Department of Anthropology, University of Vermont.

Doll, Charles G., Wallace M. Cady, James B. Thompson, Jr. and Marland P. Billings
1961 *Centennial Geologic Map of Vermont*. State of Vermont Geological Survey, Waterbury, Vermont.

Hyde, Arthur L. and Frances P. Hyde, editors
1991 *Burial Grounds of Vermont*. Published by The Vermont Old Cemetery Association, Bradford, VT.

Knight, Charles
2001 *CCCH Site Relocation adnd Site Datum Placment for Ten Prehistoric Native American Sites in Chittenden County, Vermont*. Consulting Archaeology Program, University of Vermont. Report No. 329.

Sheehan, Nora and Peter Thomas
1993 *Phase I Archaeological Site Identification Survey for the Revised Alignment, Western Section, Chittenden County Circumferential Highway*. Consulting Archaeology Program, University of Vermont Report No. 123.

Thomas, Peter A. and Robert Florentin
2002 *Selected Phase I Survey, Phase 2 Site Evaluations and Phase 3 Data Recovery for Prehistoric Archaeological Sites within the Revised Section F (Routes 15-2A) Alignment, Central Vermont Railroad Wetland Replacment Area, and the Susie Wilson Road Bypass, Chittenden County Circumferential Highway, Essex, Vermont.* Consulting Archaeology Program, University of Vermont.

United States Department of Agriculture (USDA)
2010 Web Soil Survey 2.0, National Cooperative Soil Survey, accessed on June 27, 2012 at http://websoilsurvey.nrcs.usda.gov/app/United States Geological Survey (USGS)

United States Geological Survey (USGS)
1948/87 *Essex Center, Vermont 7.5' Topographic Quadrangle.*. Surveyed 1954. U.S. Government Printing Office, Washington, D.C.
1915 *Milton, Vermont 7.5' Topographic Quadrangle.*. Surveyed 1954. U.S. Government Printing Office, Washington, D.C.

1948 *Milton, Vermont 7.5' Topographic Quadrangle.*. Surveyed 1954. U.S. Government Printing Office, Washington, D.C.

Vermont Division for Historic Preservation (VDHP)
1989 *Vermont Historic Preservation Plan*. State of Vermont Agency of Development and Community Affairs. Montpelier, VT.

1991 *Vermont's Prehistoric Cultural Heritage*. Vermont Historic Preservation Plan. State of Vermont Agency of Development and Community Affairs. Montpelier, VT.

2002 *Guidelines for Conducting Archeology in Vermont.* The Vermont State Historic Preservation Office, Montpelier, VT.

2009 The Vermont Division for Historic Preservation Internet Mapping Site. http://maps.vermont.gov/imf/imf.jsp?site=ACCD_VermontArcheoMapPubExpert. Accessed April 12, 2010.

Walling, H.E.
1857 *Map of Washington County, Vermont from Actual Surveys.* Published by Baker, Tilden and Co., NY.

Wilson, Jack H., Jr.
1990 *Summary Report Chittenden County Circumferential Highway, Route 289, Archaeological Reconnaissance for Build Sections Between Routes 2A and 15, The Sussie Wilson Bypass, and a Proposed Welands Replacement Area.* Consluting Archaeology Program, Department of Anthropology, The University of Vermont.

APPENDIX 1: VDHP Archaeological Resources Assessment Form

Vermont Division for Historic Preservation
Archeological Resources Assessment Form
VT 2A/VT 289 Interchange

DHP# _____
Organization & Recorder: **HAA. INC./ E. Manning**
Date: 8/20/2012

Envronmental Predictive Model				ArcheoMapTool GIS Model	Field Inspection Comments
Variable	Proximity	Value	Assigned Score	Variable	
A. Rivers and Streams (Existing or relict)					
1) Proximity to Rivers and Permanent Streams	0–90 m	12	**12**	Layer 1: Proximity to Rivers and Permanent Streams (0-180 m)	
	90-180 m	6			
2) Proximity to Intermittent Streams	0–90 m	12		-	
	90-180 m	6			
3) Proximity to Permanent River/Stream Confluences	0–90 m	8		Layer 6: Proximity to River/Stream Confluences (0-180 m)	
	90-180 m	4			
4) Proximity to Intermittent Stream Confluences	0–90 m	12		-	
	90-180 m	6			
5) Proximity to Waterfalls	0–90 m	8		Layer 7: Proximity to Waterfalls (0-180 m)	
	90-180 m	4			
6) Proximity to Heads of Drainages	0–90 m	8	**8**	Layer 5: Proximity to Heads of Permanent Drainages (0-300 m)	
	90-180 m	4			
7) Major Floodplain - Alluvial Terrace	0–90 m	8		Layer 10: Floodplain Soils Presence	
	90-180 m	4			
8) Knoll or Swamp Island		32		Layer 1: Proximity to Rivers and Permanent Streams (0-180 m)	
9) Stable Riverine Island		32		Layer 2: Proximity to Waterbodies (0-180 m)	
B. Lakes and Ponds					
10) Proximity to Pond or Lake	0–90 m	12		Layer 2: Proximity to Waterbodies (0-180 m)	
	90-180 m	6			
11) Proximity to Stream-Waterbody Confluences	0–90 m	12		Layer 4: Proximity to Stream-Waterbody Confluences (0-180 m)	
	90-180 m	6			
12) Lake Coves, Peninsulas, and Bayheads	0–90 m	12		Layer 2: Proximity to Waterbodies (0-180 m)	
	90-180 m	6			
C. Wetlands					
13) Proximity to Wetlands*	0–90 m	12		Layer 3: Proximity to Wetlands (0-180 m)	
	90-180 m	6			

Envronmental Predictive Model				ArcheoMapTool GIS Model	Field Inspection Comments
Variable	Proximity	Value	Assigned Score	Variable	
14) Knoll or Swamp Island		32		Layer 3: Proximity to Wetlands (0-180 m)	
D) Valley edge and Glacial Landforms					
15) High Elevated Landform (e.g. Knoll Top, Ridge Crest, Promontory)		12		See Landmarks (Info Layers) and Catchment layers (Water-related Layers)	
16) Valley Edge Features (e.g. Kame Outwash Terrace)		12	**12**	Layer 9 Glacial Outwash and Kame Terrace Soils	
17) Marine/Lake Delta Complexes		12		Layer 9 Glacial Outwash and Kame Terrace Soils Presence	
18) Champlain Sea or Glacial Lake Shore Line**		12		Layer 8: Paleo Lake Soils Proximity (0-180 m)	
E. Other Environmental Factors					
19) Caves and Rockshelters		32		-	
20) Natural Travel Corridors (e.g. Drainage Divides)		12	**12**	See Landmarks (Info Layers) and catchment layers (Water-related Layers)	
21) Existing or Relict Springs	0–90 m	8		-	
	90–180 m	4			
22) Potential or Apparent Prehistoric Quarry for Lithic Material Procurement	0–90 m	8		See Soils with "M" parent material (Under Construction)	
	90–180 m	4			
23) Special Environmental or Natural Area~	0–180 m	32		-	
F. Other High Sensitivity Layers					
24) High Likelihood of Burials		32		See VAI layer (Under Construction)	
25) High Recorded Archeological Site Density		32	**32**	See VAI layer (Under Construction)	
26) High likelihood of containing significant site based on recorded or archival data or oral tradition		32		See VAI layer (Under Construction)	

Envronmental Predictive Model				ArcheoMapTool GIS Model	Field Inspection Comments
Variable	Proximity	Value	Assigned Score	Variable	
G. Negative Factors					
27) Excessive (>15%) or Steep Erosional (>20%) Slopes		-32		See Slope Layer (Info Layers folder)	
28) Previously Disturbed Land***		-32		See Land Use ND Building Footprint Layers (Info Layers folder)	
Total Score:			**76**		

** remains incompletely mapped; digital layer includes paleo lakes and wetlands based on soils data
*** as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence (such as a gravel pit)
~such as Milton acquifer, mountain top, etc. (historic or prehistoric sacred or traditional site locations, other prehistoric site types)
*Environmental predictive model limits wetlands to those > one acre in size; ArchSensMap

APPENDIX I

Local Concerns Meeting

Meeting Notes

Local Concerns Meeting

VT 289/VT 2A Intersection Improvements, Essex, VT

Stantec Project Number: 195310764

Date/Time:	06/21/2012 7:00pm
Place:	Fire Station Conference Room
Next Meeting:	N/A
Attendees:	Abby Lisius, Matt Stevens, Dennis Lutz, Jason Charest, Christine Forde, David Grover, Greg Edwards, Thad Luther
Distribution:	Jason Charest (CCRPC); Christine Forde (CCRPC); Dennis Lutz (Town of Essex); Greg Edwards (Stantec); Thad Luther (Stantec); David Grover (Stantec)

Item: **Action:**

Comments received are as follows:

1. Mr. Stevens asked if the VT 289 eastbound on-ramp bridge over the railroad was wide enough to carry two lanes. Noted at the meeting that this had been looked at briefly. The existing bridge is 26'-8" curb to curb so likely too narrow to carry two lanes.

2. Mr. Stevens noted that on VT 2A northbound at the Susie Wilson Bypass intersection that northbound traffic wanting to access the left turn lane to get into Susie Wilson Bypass westbound will cross over the double yellow striping into the southbound VT 2A lane if cars waiting in the northbound through/right lane are blocking access to the left turn lane. Mr. Stevens stated that he's seen many near misses from people exiting the Steven's Propane driveway as they don't see the oncoming car making the illegal movement around the queue. Noted at meeting that shorter queues will likely mitigate this issue, but it would be evaluated in relation to the alternatives.

3. Mr. Stevens stated that he's seen a lot of drivers using the right hand shoulder to get around cars waiting to make a left off of the VT 289 westbound off ramp.

4. Email received June 21st from Mr. Fletcher

(attached). Delays entering 2A from Gentes bridge due to high 2A volume. Drivers on 2A are trying to let people in, but that just causes near misses/accidents due to traffic in the other direction. Mr. Fletcher asked if striping on 2A like the Essex dump would help.

The meeting adjourned at 7:45pm
The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING SERVICES, INC.

Thaddeus P. Luther, PE
Project Manager
thad.luther@stantec.com

LOCAL CONCERNS MEETING SIGN IN SHEET

June 21, 2012

Name	email	Phone #
Thad Luther	thad.luther@stantec.com	802 864-0223
Dennis Lutz	dlutz@essex.org	802 878-1344
David Grover	david.grover@stantec.com	
Matt Stevens	mstevens1941@gmail.com	238 7614
Abby Lisius	abby.lisius@trevt.com	879-6331

Chittenden County RPC

Essex

Stantec

LOCAL CONCERNS MEETING NOTICE

VT 289/VT 2A Intersection Improvements
Essex, Vermont

Thursday, June 21, 2012
Fire Station Conference Room
190 Sand Hill Road
7:00 PM – 10:00 PM

The Town of Essex and the Chittenden County Regional Planning Commission are sponsoring a public local concerns meeting to discuss existing traffic operations, safety, and related issues on Route 2A between the Route 289 westbound off ramp/Route 2A intersection and the Route 289 eastbound on ramp/Route 2A/Susie Wilson Bypass intersection.

The purpose of this public meeting is to hear your concerns, ideas, and answer your questions about roadway and signalization improvements in this area. If you are unable to attend and have comments/questions please contact Dennis Lutz, Public Works Director/Town Engineer, 5 Jericho Road, Essex Center 05452 or dlutz@essex.org.

Note: Please park on Foster Road and not adjacent to the Fire Station.

LOCAL CONCERNS MEETING NOTICE

VT 289/VT 2A Intersection Improvements
Essex, Vermont

Thursday, June 21, 2012
Fire Station Conference Room
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Note: Please park on Foster Road and not adjacent to the Fire Station.

Luther, Thad

From: Dennis Lutz <dlutz@ESSEX.ORG>
Sent: Friday, June 22, 2012 8:19 AM
To: John Fletcher
Cc: Luther, Thad
Subject: RE: Rt 289 / 2A Improvement Meeting

John,

I understand your message. I am copying my reply to the project engineer so it can be looked at. I believe that when the signal timings are changed and lanes added to the Circ off ramp and Vt2A, the backups will be reduced that affect the Gentes Road intersection.

Dennis

From: John Fletcher [mailto:fletch109.geo@yahoo.com]
Sent: Thursday, June 21, 2012 8:17 PM
To: Dennis Lutz
Subject: Rt 289 / 2A Improvement Meeting

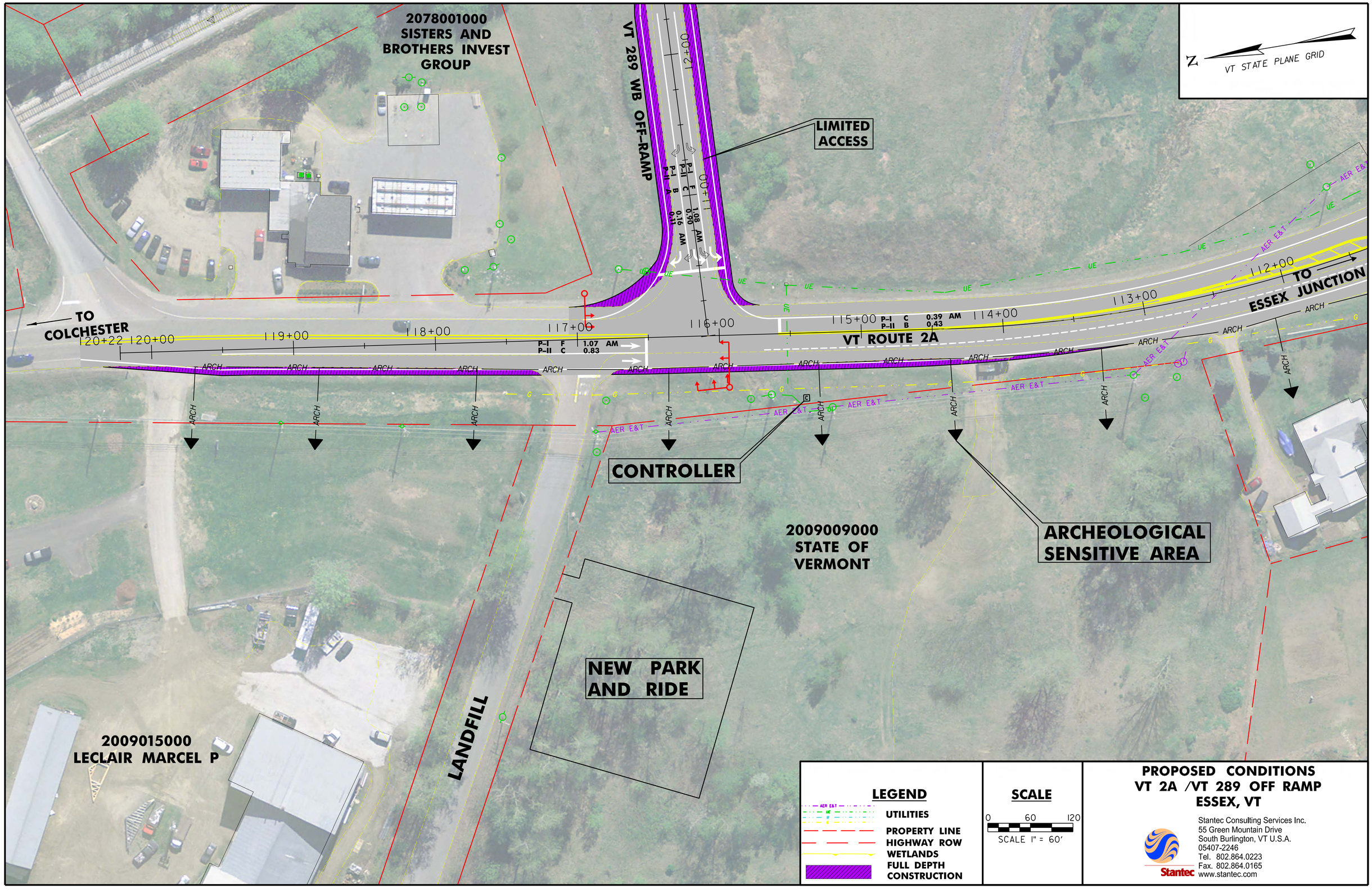
Dennis - unfortunately I can't attend this meeting, but prior to getting laid off with ibm, when I used to leave Discovery/Lamore Rd to use the Gentes bridge in the morning, there would usually be either a long delay in coming off the bridge to merge into traffic (from both directions) on Rt 2A. the timing of the Rt 289 off ramp light wouldn't make much difference to those of us coming off of the Gentes /RR bridge, because as soon as someone would wave us from the Colchester traffic, the cars were already coming from the Essex direction. Too many times I saw near misses/accidents there. I don't know if painting the road from the Colchester end with a similar (or appropriate) marking as what you have at the entrance to the Essex dump would help, but I'd think that you'd also have to remind people to not block that marked pavement area.

If the above isn't clear, perhaps a quick call to my cell at 802-522-9985 would help facilitate an understanding. Thanks very much....fletch!

John Fletcher....32 Discovery Road

APPENDIX J

Proposed Plans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SISTERS AND
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VT ROUTE 2A
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P-II B 0,43
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P-II C 0.90
P-I B 0.16 AM
P-II A 0.16
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VERMONT
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AND RIDE
LANDFILL
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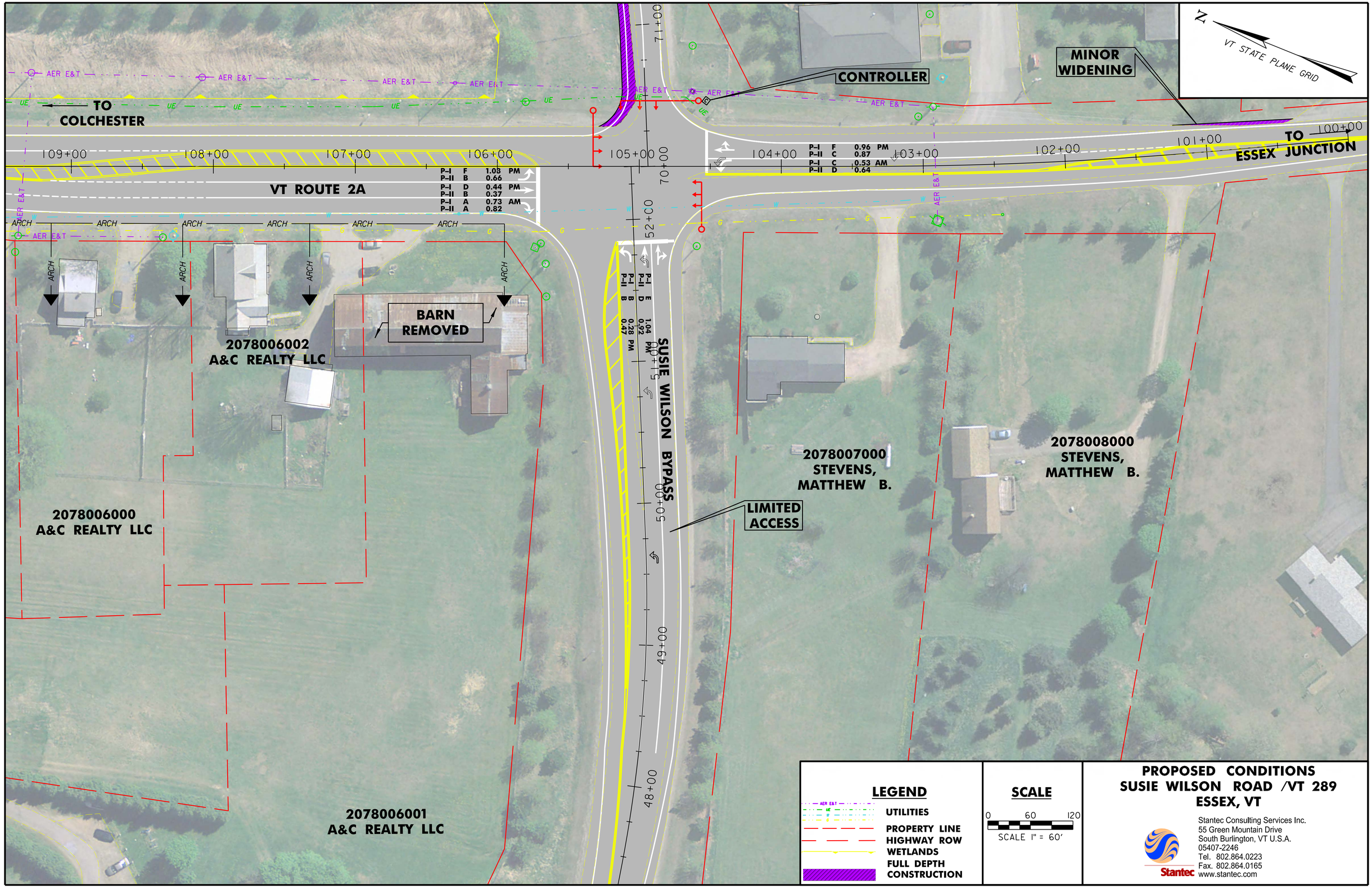
LECLAIR MARCEL P
VT STATE PLANE GRID
LEGEND
UTILITIES
PROPERTY LINE
HIGHWAY ROW
WETLANDS
FULL DEPTH
CONSTRUCTION
SCALE
0 60 120
SCALE 1" = 60'
PROPOSED CONDITIONS
VT 2A /VT 289 OFF RAMP
ESSEX, VT
Stantec Consulting Services Inc.
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com
Stantec



LEGEND

- UTILITIES
- PROPERTY LINE
- HIGHWAY ROW
- WETLANDS
- FULL DEPTH CONSTRUCTION

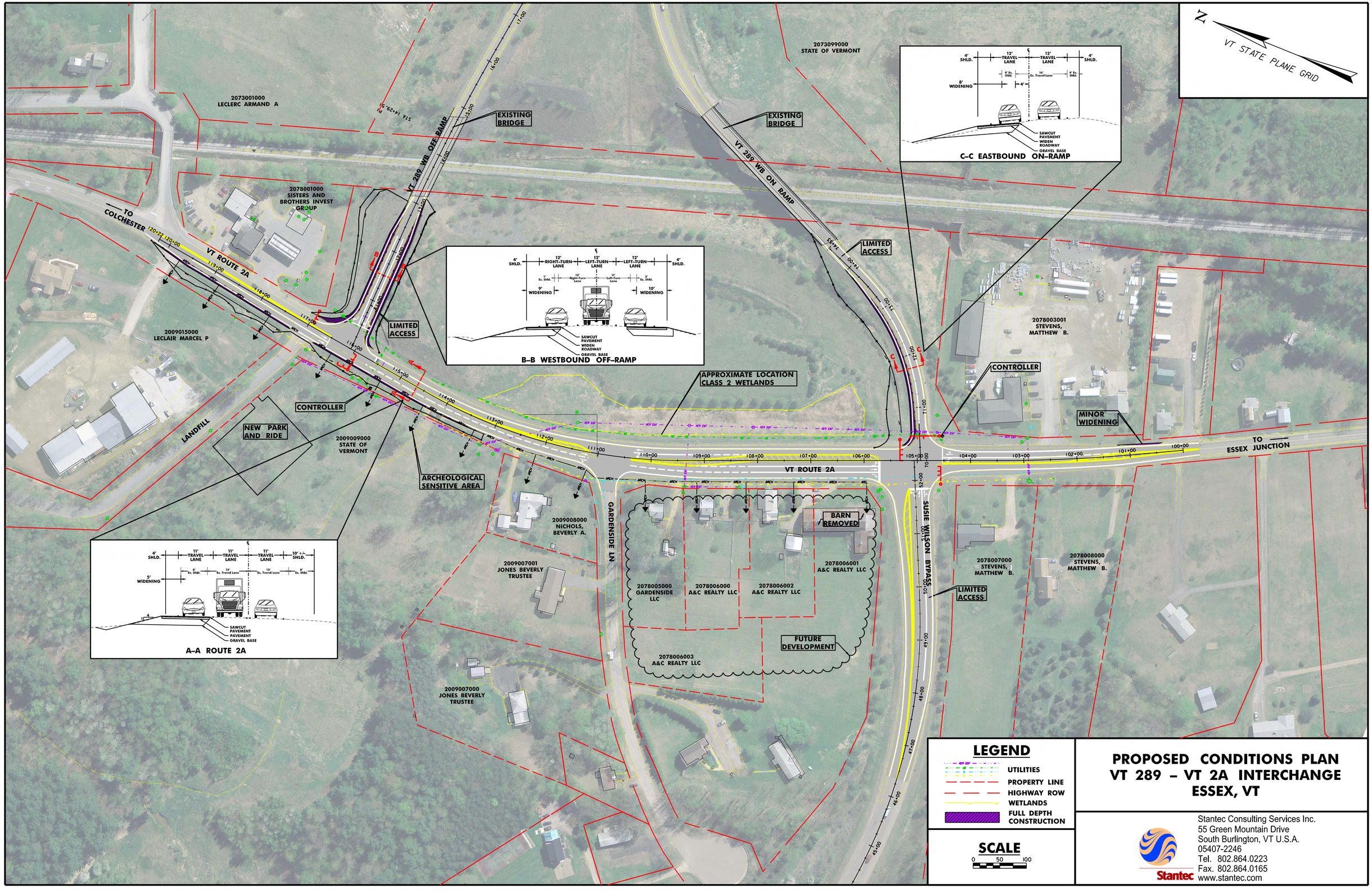
SCALE

0 60 120

SCALE 1" = 60'

PROPOSED CONDITIONS
SUSIE WILSON ROAD /VT 289
ESSEX, VT

Stantec Consulting Services Inc.
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com


N
VT STATE PLANE GRID
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LECLERC ARMAND A
2073099000
STATE OF VERMONT
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SISTERS AND BROTHERS INVEST GROUP
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LECLAIR MARCEL P
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STATE OF VERMONT
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STEVENS, MATTHEW B.
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NICHOLS, BEVERLY A.
2009007001
JONES BEVERLY TRUSTEE
2009007000
JONES BEVERLY TRUSTEE
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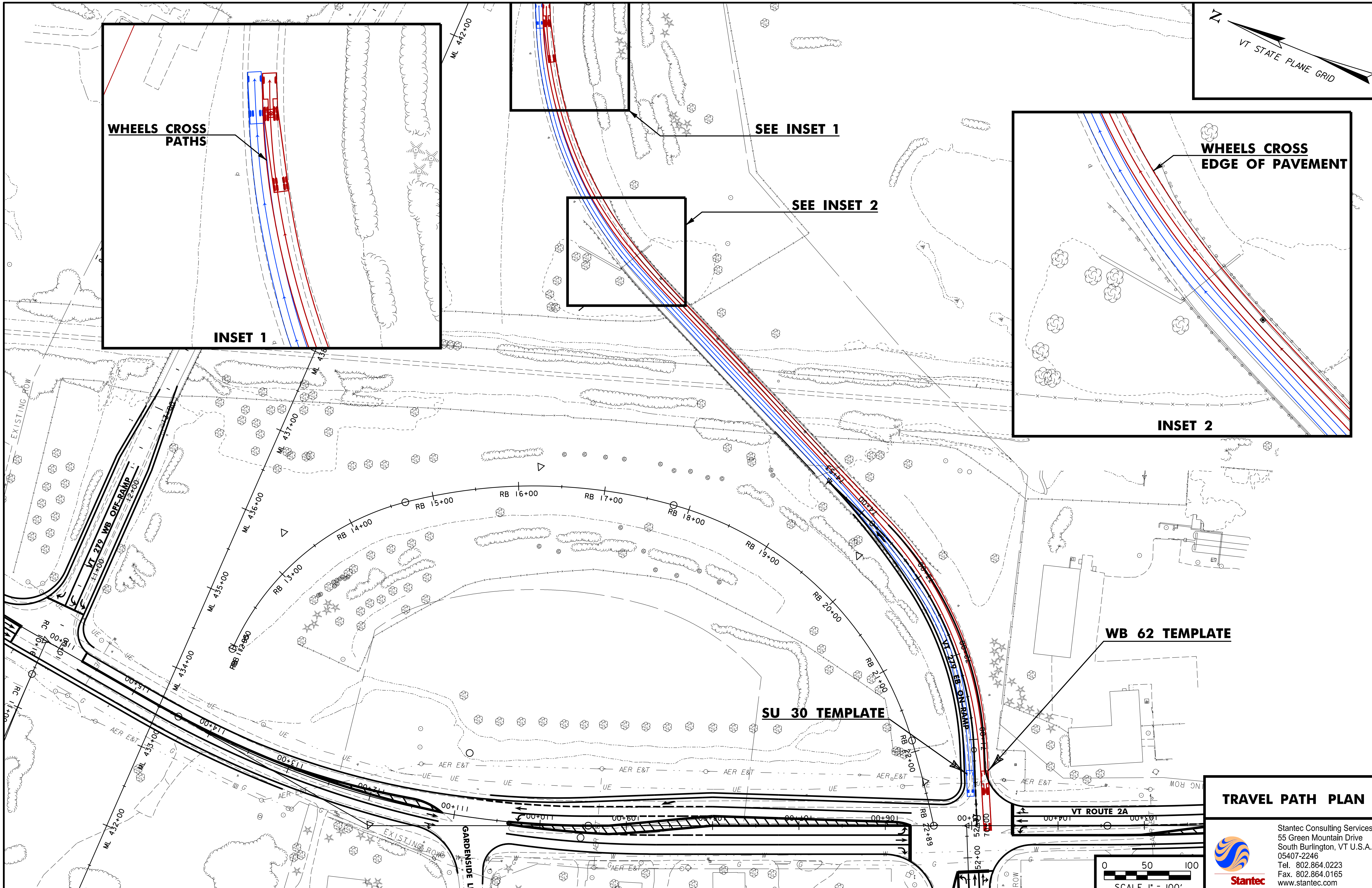
GARDENSIDE LLC
2078006000
A&C REALTY LLC
2078006002
A&C REALTY LLC
2078006001
A&C REALTY LLC
2078006003
A&C REALTY LLC
2078007000
STEVENS, MATTHEW B.
2078008000
STEVENS, MATTHEW B.
TO COLCHESTER
VT ROUTE 2A
VT 289 WB OFF RAMP
VT 289 WB ON RAMP
EXISTING BRIDGE
EXISTING BRIDGE
LIMITED ACCESS
LIMITED ACCESS
LIMITED ACCESS
CONTROLLER
CONTROLLER
NEW PARK AND RIDE
LANDFILL
ARCHEOLOGICAL SENSITIVE AREA
APPROXIMATE LOCATION CLASS 2 WETLANDS
MINOR WIDENING
BARN REMOVED
FUTURE DEVELOPMENT
GARDENSIDE LN
SUSIE WILSON BYPASS
TO ESSEX JUNCTION
B–B WESTBOUND OFF–RAMP
4' SHLD.
12' RIGHT–TURN LANE
12' LEFT–TURN LANE
12' LEFT–TURN LANE
4' SHLD.
5' Ex. Shld.
12' Right–Turn Lane
11' Left–Turn Lane
2' Ex. Shld.
9' WIDENING
10' WIDENING
SAWCUT PAVEMENT
WIDEN ROADWAY
GRAVEL BASE
C–C EASTBOUND ON–RAMP
4' SHLD.
12' TRAVEL LANE
12' TRAVEL LANE
4' SHLD.
4' Ex. Shld.
10' Ex. Travel Lane
4' Ex. Shld.
8' WIDENING
4'
SAWCUT PAVEMENT
WIDEN ROADWAY
GRAVEL BASE
A–A ROUTE 2A
4' SHLD.
11' TRAVEL LANE
11' TRAVEL LANE
11' TRAVEL LANE
10' +/– SHLD.
5' WIDENING
5' Ex. Shld.
13' Ex. Travel Lane
13' Ex. Travel Lane
5' Ex. Shld.
4%
SAWCUT PAVEMENT
PAVEMENT
GRAVEL BASE
LEGEND
UTILITIES
PROPERTY LINE
HIGHWAY ROW
WETLANDS
FULL DEPTH CONSTRUCTION
SCALE
0 50 100
PROPOSED CONDITIONS PLAN
VT 289 – VT 2A INTERCHANGE
ESSEX, VT
Stantec Consulting Services Inc.
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
www.stantec.com
Stantec

APPENDIX K

Truck Turning Movements



TRAVEL PATH PLAN

Stantec Consulting Services Inc
55 Green Mountain Drive
South Burlington, VT U.S.A.
05407-2246
Tel. 802.864.0223
Fax. 802.864.0165
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APPENDIX L

Alternatives Presentation Meeting

TOWN OF ESSEX
SELECTBOARD MINUTES
October 15, 2012

SELECTBOARD: Linda Myers, Chair; Max Levy, Irene Wrenner, Dave Rogerson.

OTHERS PRESENT: Pat Scheidel, Town Manager; Trevor Lashua, Assistant Town Manager; Dennis Lutz, Public Works Director; Greg Duggan, Town Planner; Greg Morgan; Walter Adams; David Grover; Thad Luther; Mike Plageman; Mike Donoghue, Burlington Free Press; Greg Edwards; Christine Forde; Beverly Nichols; Derek Lyman; Thom Jagielski; Barbara Higgins; Jason Starr, Essex Reporter.

Ms. Myers called the meeting to order at 7:30 p.m.

PLEDGE OF ALLEGIANCE

Ms. Myers invited those present to join her in reciting the "Pledge of Allegiance."

PUBLIC HEARING
VT 289/VT 2A Interchange Improvements

Ms. Myers called the Public Meeting to order at 7:31.

Mr. Lutz introduced the issue and updated the members about the first phase of the project, which would be the installment of smart-timing signal controls at the intersection of VT 289 and VT 2A this winter. This would be the first intersection in Vermont to have controls that could identify how many cars are in the lane and could open up the green cycle time. He explained that early on in the process, it was found that just installing new signal controllers was not going to solve all the problems in that intersection. However, once there were lane changes in a project, it required going through a scoping process, which included the ecological and historical sites investigation, etc. He explained that during the process of working with the Vermont Agency of Transportation (VTRANS,) the Chittenden County Metropolitan Planning Organization (CCMPO) and professional planning consultants from Stantac, a public hearing was held to get public input. Mr. Lutz added that other than the normal complaints related to sidewalk cracks and paving needs, he has received no phone calls for Susie Wilson Road, but that for the VT 289/VT 2A intersection, there have been a number of phone calls and e-mails about delays. He reported that Stantac was trying to fast track this project, but there wasn't a fully written report yet. Tonight was the public hearing, and the intent was to return to the Selectboard (SB) for a formal request for approval of the preferred alternative probably at the second SB meeting in November.

Mr. Greg Edwards, Mr. Thad Luther and Mr. David Grover, from Stantac, gave a PowerPoint presentation on the VT 289/VT 2A Interchange Improvements to the members.

With regards to the landfill road, Mr. Rogerson noted that it did not line up with the VT 289 off ramp so that when cars exit the landfill road, they cut into traffic along VT 2A. He asked if Stantac had given any thought to moving the landfill road over to line it up with the off ramp to help control the increased traffic from the new park and ride. Mr. Luther confirmed for Mr. Rogerson that

Stantac did give some thought to that idea. However, one issue was that moving the road would mean getting into the State right of way, which was a longer process. The second issue was that there was no crash history in that area, so there was not enough of a safety hazard to warrant moving the road. Mr. Lutz added that the landfill hours did not coincide with the peak traffic hours at that intersection. He confirmed for Mr. Rogerson that the park and ride is accessible when the landfill is closed, but that there was a low volume of use.

With regards to the Susie Wilson Bypass and the VT 289 on-ramp, Ms. Myers asked if the two additional lanes on the Susie Wilson Bypass would continue through the entire ramp. Mr. Luther replied, no, because the bridge was not wide enough to accommodate two lanes. Mr. Edwards added that the on ramp lane was about the same length as the queue length of the traffic on the other side of Susie Wilson Road. Therefore, when the light turns green, that traffic will be able to go through in about the same length. Mr. Luther agreed with Ms. Myers that cars will also be turning right, so it will not necessarily be a steady two lanes of traffic. Mr. Walter Adams, having stopped a number of times in traffic on Susie Wilson Road, stated that he found it hard to believe that the additional lanes were going to come close to solving the queue problem when you divide it in half. Mr. Edwards disagreed and stated that the capacity analysis shows that these two lanes will make a significant improvement. Mr. Lutz explained the queue cycles at peak p.m. times with the adaptive signal control and stated that the combination of the additional queue length and the adaptive signal control improves the flow. Mr. Adams argued that he would expect seeing a 10% increase in traffic in this area if people like himself go through Essex Junction at p.m. peak times rather than here because they could get to the other end of the Circ at the same time. He stated that the whole point of the road was to limit traffic to Essex Junction, and it is not working. Mr. Luther agreed that as an intersection is improved, people will seek that route, which would take pressure off of other intersections.

Mr. Adams commented to Mr. Lutz that the reason Public Works is not getting calls about this intersection is because staff is telling people that the signal is controlled by the State of Vermont, which he learned when he called the State of Vermont about this issue. Mr. Lutz clarified that he was getting calls about this intersection. Mr. Adams asked why the light didn't change when there were only a few cars. Ms. Myers commented that the new signaling would change that issue. Mr. Adams didn't understand why the new signaling wasn't part of the deal in the first place. Ms. Myers replied that it was because the Town had not anticipated that the Circ wasn't going to be finished and had the Circ been completed, then there wouldn't have been a problem. Mr. Adams felt that the problem would be even worse with the Circ being finished because there would be even more people who would want to use it.

Ms. Beverly Nichols, a resident at the corner of VT Route 2A and Gardenside Lane, wondered how much the road would be widened as she was concerned about her property. Mr. Luther explained that Stantac was not proposing any widening of VT Route 2A and the location of her property. Ms. Nichols raised a concern about the traffic on VT Route 2A ever since the opening of the intersection. In the morning, people run the light in each direction, and when she tries to get out of her driveway, she is crossing traffic. Another problem is that when she goes out to her mailbox to get her paper or mail, she has to direct traffic because people are coming off the ramp and driving on the berm, already making it a two-lane road.

Mr. Luther thanked Ms. Nichols for that information. Stantac was proposing two lanes, southbound, at Gardenside Lane with shorter cycle lengths, which would provide more gaps than existing conditions. He clarified for Ms. Nichols that the wide shoulder would become the highway. Mr. Greg Morgan asked what it would mean for bike access. Mr. Luther replied that the proposed plan maintains four-foot lanes, which meets the Vermont State Standards for bicycles. Mr. Lutz added that there is enough right-of-way that allows this project to be built within the limits of either State land or State highway. He believes that there isn't a need for taking any land on VT Route 2A, and Mr. Luther agreed. Mr. Lutz added that one of the things that would make the project fast-tracked is not having to go through the State process for a right of way, and the hope was that there was enough room to stay off of private property. Mr. Luther, with regards to an earlier question from Ms. Wrenner, showed on the map attached to the hard copy of the PowerPoint presentation the area where the land off of Gardenside Lane is anticipated to be developed. Stantac received traffic information from that project's engineer and included it in its analysis for the intersection project.

With regards to the VT 289 off-ramp, Mr. Rogerson asked if there is an assumption of increased traffic as a result of the improvements. He asked what assumptions they have with this project because he didn't trust them. Mr. Luther replied that the numbers were increased for growth in the area and any added developments, which was information gathered from the Town. Then the numbers were bumped up another 5%, which, in analysis, is called a "peaking factor" for any increased traffic. Mr. Edwards added that there were also volumes that were adjusted for the 30th highest hour of the year so it is not the lowest hour of the year. Statistically, there would be only 29 hours in the year that would be higher than these volumes, so it is not even the average. Mr. Grover clarified for Mr. Adams that Stantac looked at the historical trends for traffic growth, which was .2% or .3% and perceived a 5% growth, which was conservative enough.

With regards to the VT 289 on-ramp, Mr. Rogerson pointed out that the level of service was increasing from an "E" to a "D" and Mr. Luther agreed. Mr. Luther explained that the increase was not as much as hoped, but that area was under capacity, which is what their preliminary, comparative analysis shows right now.

With regards to the Susie Wilson Bypass, Mr. Adams asked, why can't the right turners turn unrestricted, and why do they have to stop at the light at all? Mr. Luther replied that, currently, for Phase 1, cars were permitted to turn right with a green light. Mr. Adams asked why don't you widen the road and let the right handers turn the corner and not have to stop at that light at all. Mr. Luther explained that the feeling was that it would result in another merge situation further up the Susie Wilson bypass and that two receiving lanes were not needed for the volume of traffic. In addition, it's better for them to have their own space for increased safety at the intersection because if they go at the same time, there's more of a chance for conflict.

With regards to the slide showing the peak period of the merge on VT 289, Mr. Lutz explained how the smart-timing signal would work. He stated that if it worked here, then there were a lot of other places where this signaling could be put to good use. It's a relatively new technology and the first of its kind in Vermont.

Mr. Levy asked about the unintended consequence of having more traffic flowing towards Susie Wilson Road and Five Corners on Route 2A and whether Stantac looked at the impacts to those

roads. Mr. Luther thought it was fair to say that as an interchange is improved, people will realize they can get through that way, but he thought that traffic seeks equilibrium. This intersection would improve, and traffic would slide to the next corridor. Mr. Rogerson commented that, in effect, Mr. Luther was saying that the problem was not being solved, but being moved from one end of Susie Wilson Road to the other. Mr. Luther did not think that was fair to say and stated that there were improvements made on the Susie Wilson Bypass, which he believed was under capacity, and the improvements to this intersection would make it work. Ms. Myers pointed out that this was anticipated when the two right turns were added at the intersection of Susie Wilson Road and Route 15 from the traffic that was coming off the Circ. Mr. Lutz added that the reason the Town was in this situation was because the Circ was not being built into Colchester. The Town knows that this intersection is the worst spot, and it had to be fixed. There might be some capacity problems on the Susie Wilson Road/Route 15 intersection with the left lane turning into the Village, but there were some ideas about how to address that issue. The question is what to do to solve as much of the problem as possible at various locations along the corridor, and this intersection was the one that needed to be fixed today.

Ms. Barbara Higgins commented that one area that hasn't been addressed is the p.m. traffic on Route 15 by the Town Center because that light backs up. She asked, what is the plan, if any, for improvements in that area? She understood that traffic was being moved on to the Circ in the evening, but wondered how to get it off of Route 15. Mr. Lutz explained that this area is not as high of a priority and that some of the problem was that the controllers are old. He reported that part of a CCMPO study is looking at changing those controllers over to affect timing better, and if the smart-timing signal works, then the intersection by the Town Center and Ehler's might be another location to consider for smart-timing signals. Mr. Adams added that, ultimately, the traffic that goes through the Village is exasperating (sic) the issue at the Circ because it is causing the light to change. He also bets that the State has spent $100,000 replacing the sign at the end of the median on the bridge, which he sees down all the time. He hoped that the State would be smart enough to cut that median so the sign could be placed further back to allow the trucks to make that corner.

Ms. Myers commented that the four communities, which were directly affected by the Circ not being built and were serving on the Circ Alternative Task Force, went into this effort with skepticism. She did not think that the skepticism has been allayed in the process, but each community was tasked with determining its highest priority plan, and for Essex, it was this intersection. She named the projects for the other three communities and emphasized that there were other Essex projects in the queue, but that the first one was this intersection. She stated that nothing is going to replace the Circ, but if the Town could not do the Circ, then it was going to try to do the best it could to help traffic be alleviated and to move forward.

Ms. Myers adjourned the Public Hearing at 8:20 and called a five minute recess.

Ms. Myers called the meeting back to order at 8:25 p.m.

PUBLIC TO BE HEARD

Mr. Scheidel pointed out an additional memorandum dated October 15, 2012 from Mr. Lashua to the Town Manager and the Selectboard (SB) regarding the public event calendar related to the

Selection of a Preferred Alternative for the VT2A-VT289 Interchange Scoping Study-Dennis Lutz

Mr. Lutz introduced the issue of whether or not the SB will select a preferred alternative for the referenced scoping study to enable the project to proceed into the next phase of project implementation. He provided background to the issue, which included that a public hearing was held on the referenced project at the SB's October 15th meeting and the recommendation was to approve alternative #2, the full build-out option.

Mr. Levy, with regards to the 90% of State grants for the right of way on the Susie Wilson Bypass Approach, asked whether State grants were really available to cover costs incurred by the Town for the right of way. Mr. Lutz believed that there was enough room on the Susie Wilson Bypass for the right of way and felt that the Town could almost re-stripe what is already paved so he didn't think it was an issue. The worst case scenario in that part of the project was adding a couple feet of asphalt along with some striping for a total cost of about $30,000 to $40,000. The risk to the Town is low because 10% of that total cost would be a few thousand dollars.

IRENE WRENNER MOVED AND BRAD LUCK SECONDED A MOTION TO APPROVE THE VT2A-VT289 INTERCHANGE SCOPING STUDY AND SELECT ALTERNATIVE #2, THE "FULL BUILD-OUT" OPTION, AS THE PREFERRED ALTERNATIVE. THE MOTION PASSED 4-0.

Request from Town of Westford to Enter into a Mutual Aid Agreement-Dennis Lutz

Mr. Lutz introduced the issue of whether or not the SB shall agree to enter into a Public Works Mutual Aid Agreement with the Town of Westford as requested by the Westford Selectboard.

Mr. Lutz explained that public works has historically not entered into these kind of agreements formally. However, informally, the Town has always traded off equipment and services if there is a need. He gave an example of such a trade-off and confirmed for Mr. Levy that the example was an informal agreement. Mr. Lutz explained that even though it might be a good idea to have a more formal agreement in the future, at this point in time, none of the neighboring communities, like Colchester or Milton, were interested in entering into formal agreements. However, neighboring communities were willing to talk about the idea.

Mr. Lutz explained that his recommendation was to not enter into a formal agreement with Westford, but to forward a letter indicating a willingness to informally respond to emergency situations when requested and when Essex has the capability to respond without detriment to providing services within the Town. He added that it may be time for the public works directors to get together and collectively, as a region, discuss whether the idea of a formal agreement has merit, but it is not part of his recommendation at this time. Mr. Lutz talked about how there were issues related to indemnification and liability that needed to be addressed. For example, one of the communities is very concerned about how to handle whether it would be responsible for another communities' employee or equipment if something happens.

Memorandum

TO: Patrick C. Scheidel, Town Manager and the Selectboard
FROM: Dennis Lutz, P.E., Public Works Director
DATE: 8 November 2012
SUBJECT: Selection of a Preferred Alternative for the VT2A-VT289 Interchange Scoping Study

ISSUE: The issue is whether or not the Selectboard will select a preferred alternative for the referenced scoping study to enable the project to proceed into the next phase of project implementation.

DISCUSSION: A Public Hearing was held on the referenced project at the Selectboard's October 15th meeting. A number of alternatives were considered in the scoping process. Some alternatives or elements of alternatives were eliminated early in scoping primarily because they did not meet the goals and objectives of the study or did not provide a substantive improvement to safety or congestion.

At the time of the Public Hearing, a written copy of the report detailing the alternatives considered in the process was not available, although the oral presentation covered the alternatives that were considered. The written report in draft form has been completed and a copy is included with this memorandum. There is also an Appendix to the study which is large and contains all the background information and reports including items such as the Historic Structures Report and the Archaeological Resource Assessment. The Appendix documents are on file at the Public Works offices and will be maintained as part of the project files.

There are two primary alternatives that remain for consideration:

1) Alternative 1 consists of the improvements to the intersections involving signal controller changes, new signal heads and installation of a fully actuated and coordinated signal system. Phase one is currently being constructed as a maintenance project by VTRANS and it will be completed by the spring of 2013. For this study, Alternative 1 is considered the "No-build" option, since no additional improvements would be made other than what is already planned under the VTRANS maintenance contract.
2) Alternative #2 is considered the "Full-build-out" option, since it includes the addition of geometric improvements such as added lanes, bike lane considerations, resurfacing, new signage and related work. The estimated cost of Alternative #2 is $1,187,500. The majority of the work is within the limits of State Highway Right of Way, with the exception of the work on the Susie Wilson Bypass approach to VT2A.

There has been no discussion of cost sharing between the Town and VTRANS yet on this project. It is a high priority Circumferential Highway Alternative Project and is in a position to move forward quickly for conceptual designs, final designs, permitting and any Right of Way acquisition. Although the Town's position should be one of total funding of the entire project

by VTRANS, there may be some portion of the costs associated with the work on the Susie Wilson Road Bypass that may be passed on to the Town. This number, although uncalculated, should be small given the relatively small proportion of the costs associated with this portion of the work and the fact that it would be eligible for 90% State aid. The issue of cost sharing is a separate item to be considered at a future date should the issue even arise. The question to be answered at this time involves only the identification of a preferred alternative. It should be noted that the project cannot proceed without the selection of a preferred alternative by the Selectboard.

It is clear from the report that the improvements associated with Alternative #2 are essential to meeting the purpose and needs of the study as outlined on page 19 of the report. The capacity improvements noted on pages 26 through 29 are significant when compared to the No-build option.

RECOMMENDATION: It is recommended that the Selectboard approve the VT2A-VT289 Interchange Scoping Study and select Alternative #2, the "Full–build–out" option as the preferred alternative.

APPENDIX M

Complete Streets Reporting Form

CHITTENDEN COUNTY RPC
Communities Planning Together

110 West Canal Street, Suite 202
Winooski, Vermont 05404-2109
802-846-4490
www.ccrpcvt.org

CCRPC Complete Streets Project Reporting Form

This project reporting form and attached checklist can serve to document that Complete Streets practices and principles were considered and implemented where appropriate for the project listed below. This form should be completed after preliminary plans and retained in the project file.

Municipality: Essex

Study Name: VT 2A – VT 289 Interchange Scoping Study

Date: March 13, 2013

Complete Streets Exemptions:

Is the use of the transportation facility by pedestrians, bicyclists, or other users prohibited by law?

VT 289 is a limited access highway and those users are prohibited. VT2A is a state route that does not prohibit those users.

Is the cost of including complete streets principles disproportionate to the need or probable use?

No.

Are complete streets principles outside the scope of the subject project because of its very nature?

No.

Supporting documentation can be attached to this document and retained in the project's file. For all other instances a brief description of the Complete Streets practices and principles that have been incorporated into the subject project's design can be included below.

Describe Complete Streets elements included in project:

This area of VT 2A currently does not experience significant pedestrian or bicycle travel. There are no existing sidewalks within or adjacent to the project area. Susie Wilson Bypass is designated as a bike route and exhibits wide shoulders. Shoulders on VT 2A are wide enough to safely accommodate bicycle travel and pedestrians. The project will maintain sufficient shoulder width for bicycle and pedestrian use

Complete Streets - Municipal Planning/Scoping Project Checklist

Obtain the Municipal/Regional Plan(s)

- ☑ Determine multi-modal status of subject facility per plan(s) recommendations

Determine Land Use Context

- ☑ Ascertain land use type & density: existing; future/desired
- ☑ Determine context zone: existing; future/desired

Identify Current Transportation Modes and Facilities; Transportation Data

- ☑ Determine roadway classification: existing; future/desired
- ☑ Determine pedestrian and bicycle facilities: existing; future/desired
- ☑ Identify existing and projected transit service features
- ☑ Obtain current and projected traffic volumes
- ☑ Identify current and projected pedestrian/bicyclist use
- ☑ Obtain existing crash data (including pedestrian and bicycle crashes)

Identify Constraints on Transportation Project Development

- ☑ Determine existing roadway right-of-way
- ☑ Determine location of traveled way within right-of-way
- ☑ Assess potentially available private front yard space
- ☑ Identify existing natural resource constraints
- ☑ Identify existing historic resource constraints

Other Factors (explain any that apply)

- ☐ Environment _____
- ☐ Economic development_____
- ☐ Aesthetics_____
- ☐ Historic preservation_____
- ☐ Health_____

Describe Alternatives Considered

Alternatives considered can be found in section 7.0 Intersection Alternatives.

Describe Preferred Alternative and indicate complete streets elements in final recommendation

The Preferred Alternative can be found in section 7.7 Preferred Alternative