Interstate 89 Exit 19
St. Albans South State Highway &
Vermont Route 104

DRAFT
INTERSECTION SCOPING STUDY UPDATE

Town of St. Albans, Vermont

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Prepared for:

NORTHWEST REGIONAL PLANNING COMMISSION
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1.0 INTRODUCTION

The Exit 19/St. Albans State Highway (SASH)/VT Route 104 intersection in theTown of St. Albans has previously been identified as experiencing traffic congestion and safety issues by the Vermont Agency of Transportation (VTrans) and the Northwest Regional Planning Commission (NRPC). Figure 1 shows this intersection and its surrounding area.

In 2002, the NRPC engaged Lamoureux & Dickinson (L&D) to prepare a Scoping Study and identify the most appropriate improvement alternative for the intersection. By 2003, traffic conditions had deteriorated such that VTrans installed a temporary traffic signal. More recently, the north VT 104 approach has been widened to provide additional storage capacity for the southbound left-turn movement.

Continued traffic growth, safety problems and development of the surrounding area necessitate a comprehensive plan to implement a long-term traffic solution at this intersection. To assist in developing such a plan, L&D has again been engaged to prepare this Scoping Study Update.

This Scoping Report begins with a Purpose and Need Statement for the project followed by a presentation of the information collected about the existing intersection which was obtained in the field, from local and state officials and from relevant State agencies. Various alternatives are then presented which were developed to address the needs of the intersection. Finally, a recommended alternative is identified.

Figure 1 – Project Location

2.0 PURPOSE AND NEED STATEMENT

2.01 Purpose

The purpose of the Exit 19/SASH/VT 104 intersection project is to improve the safety of the intersection for vehicles, bicycles and pedestrians while providing an adequate capacity for all users.

2.02 Need

The intersection is considered deficient based on its poor levels of service and limited multi-modal capabilities.

Poor Level of Service - This intersection provides access to Interstate 89 at Exit 19. It serves two major travel routes; an east-west corridor linking Exit 19 with South Main Street (US Route 7) in the City of St. Albans. VT 104 is also a regional travel corridor linking Exit 19 and the St. Albans area with VT Routes 36 and 105 north and east of St. Albans, and with VT Routes 128 and 15 to the south and east in Fairfax. This intersection is also located in a Regional and Town-designated growth center district. Traffic volumes and conflicting turning movements are heavy during both morning and afternoon peak hours resulting in an overall level of service F for the intersection.

Limited Multi-Modal Capabilities - The intersection is very unfriendly for pedestrians and bicyclists. Minimal shoulders on VT 104 do not provide sufficient space for bicyclists and pedestrians to safely travel outside of the travel way. Additionally, the SASH is a limited-access highway on which pedestrian and bicycle travel are prohibited. Ongoing residential and commercial development in the area of the intersection is resulting in increased bicycle and pedestrian travel in this immediate area.

3.0 EXISTING CONDITIONS

3.01 Design Speed

Posted speed limits in the immediate vicinity of this intersection are 50 mph on SASH and 40 mph on VT 104. Given the functional classifications and traffic volumes (see below), those are appropriate design speeds as well.

FIGURE 2 - Eastbound View of Intersection

3.02 Functional Classification

VTrans' functional classification of VT 104 through this intersection is as a rural major collector. The SASH is classified as an urban principal arterial west of VT 104. The Exit 19 ramps are classified as rural minor arterials. Based on the functional class and traffic volumes on VT 104 and the SASH, this intersection qualifies for all three types of investment categories (reconstruction, rehabilitation or preservation) under VTrans' Level of Improvement Policy.

3.03 Traffic Volumes

Approximately 1,800 vehicles currently (2009) travel through this intersection during the afternoon peak hour on an average day. It is estimated that by the year 2030 approximately 2,100 vehicles will be traveling through this all-way stop controlled intersection during the afternoon peak hour with just normal background growth.

A 12-hour turning movement count was performed by the VTrans at this intersection on June 19 & 20, 2008. Additionally, 7-day automatic traffic recorder counts (recording hourly traffic volumes) were performed during June 2008 on VT 104 north of the intersection (F198), and during June 2007 on each of the four I-89 Exit 19 ramps (F231–F234). Data from these counts was used to calculate year 2010 annual average daily traffic volumes (AADT) on each of the four approaches to the intersection (Table 1). The AADT estimates shown in Table 1 were developed by pivoting the Exit 19 approach AADT using the 2008 12-hour turning movement count totals. This method better accounts for traffic generated by the two convenience stores and other nearby traffic generators north and south of the intersection than do the more distant Route 104 ATR locations (F107 south & F198 north).

Table 1 - Existing (2010) Traffic Volumes

	SASH		VT 104	
	East	West	North	South
AADT (vpd)	14,300	7,300	12,400	7,100
DHV (vph)	1,580		1,300	

3.04 Horizontal Alignment

VT Route 104 and the SASH intersect at approximately a 90 degree angle. There are no significant horizontal curves on either roadway approaching the intersection. The Exit 19 on- and off-ramps immediately to the east have considerable horizontal curvature.

3.05 Clear Zone

The recommended clear zone for new construction and reconstruction projects on uncurbed urban principal arterials with volumes such as those on the SASH is 16 ft for fill slopes. Volumes on the VT 104 south approach warrant a 14 ft clear zone on fill slopes. North approach volumes warrant a 16 ft clear zone.

Where necessary to avoid or minimize disturbance to historic, archaeological, scenic, natural or other resources, the clear zone can be reduced to 10 ft without a design exception. On curbed principal arterials and collector streets, a 2 ft horizontal offset to obstructions from face of curb should be provided. This dimension should be increased to 3 ft near turning radii at intersections.

3.06 Stormwater Drainage

This intersection is located in the Rugg Brook watershed, which is classified as impaired. It is also located at a high point in both intersecting roadways such that stormwater drains away from it in all four directions. Presently stormwater is collected via grassed swales along both VT 104 and the SASH. Both VT 104 and SASH are graded to drain away from the intersection in all four directions. Drainage from the southeast quadrant of this intersection crosses east to west under VT 104 through a 30” culvert located approximately 20 ft south of the intersection. Drainage from the northeast corner of the intersection crosses east to west under VT 104 through a 36” culvert located approximately 315 ft north of the intersection. This drainage continues southwest and crosses to the south side of the SASH through a 36” culvert located approximately 580 ft west of the intersection.

3.07 Residential and Commercial Drives

The northern access to the *Short Stop* (former *Wagon Wheel*) is located approximately 200' south of the intersection on the east side of VT 104. This facility also has a second access onto VT 104 located approximately 200 ft south of the first access. The shared drive to *Walker’s Farm, Home and Tack* store and the *On The Run* convenience store is located approximately 650 ft north of the intersection, again on the east side of VT 104. SASH is a limited access roadway with no access points.

3.08 Right of Way Information
Available right-of-way information indicates that VT 104 has a 99 ft (6 rod) wide right-of-way. The SASH appears to have a 200 ft wide right-of-way. Both are owned and maintained by the State of Vermont (VTrans).

3.09 Roadway Width
All four approaches to this intersection each include an exclusive left-turn lanes plus a combination thru / right-turn lane. Table 2 summarizes the existing approach geometry.

Table 2 – Existing Approach Geometry

		Lane Assignment	Shoulder & Lane Widths (ft)	Left-Turn Storage (ft)
SASH	East (WB)	LT & TH/RT	2-13-13-2	175
	West (EB)	LT & TH/RT	1-11-13-5	260
VT 104	North (SB)	LT & TH/RT	1-11-11-1	125
	South (NB)	LT & TH/RT	1-11-11-2	60

SASH west of this intersection has two westbound departure lanes that merge into one lane west of the intersection. Eastbound, there is one wide departure lane leading towards the Exit 19 on-ramps.

VTrans' design standards recommend 12 ft lane widths for higher speed, free flowing principal arterials such as VT 104 and the SASH. It also recommends an 11 ft minimum width for lanes adjacent to painted islands. The recommended lane width for rural collectors such as VT 104 is 11 ft.

To accommodate shared use of uncurbed urban principal arterials and rural collector roadways by bicycles, 3 ft paved shoulders are also recommended. Because the SASH is classified as a limited access highway, bicycle traffic is not currently permitted along it. All bicycle traffic through this intersection must use VT 104, which has narrow (≤2 ft) shoulders.

3.10 Sight Distances
Available intersection sight distances on all four approaches exceed AASHTO recommended distances of 445 ft for a posted speed limit of 40 mph, and 555 ft for a posted speed of 50 mph.

3.11 Sign Inventory
All four approaches have island signs and object markers at both ends of the raised medians on all four approaches. Full sets of route signs and lane assignment signs exist prior to the intersection on all four approaches. Route confirmation signs exist in all four directions leaving the intersection.

3.12 Surrounding Land Use
Three of the four corner parcels directly adjacent to the intersection are currently developed. The northeast corner parcel is the site of the *Walker's Farm, Home and Tack* store and the *On The Run* convenience store. To the south of the intersection, the *Short Stop* is located in the southeast quadrant of the intersection. To the south of that are the *LaQuinta Inn* and *Mapleville Depot* (multiple commercial & office buildings plus a drive-in bank). In the southwest quadrant is the *Colins-Perley Sports Center* and its athletic fields.

3.13 Terrain
Both VT 104 and the SASH traverse relatively level terrain in the immediate vicinity of this intersection.

3.14 Utilities
Existing municipal water and sewer mains approach this intersection from the north and south on VT 104, but do not pass through it. Similarly, VT Gas gas mains also approach the intersection as far as *Walker's* on the north side and the *Short Stop* on the south side. There is an overhead high-voltage electrical transmission line owned by CVPS that crosses north-south approximately 500 ft east of the intersection. Other overhead electrical (CVPS) and telephone (Fairpoint) wires pass north-south on the west side of the interesection. The electrical wires provide service to the traffic signal and street lights, and terminate at the signal pole in the northwest corner of the intersection.

3.15 Vertical Alignment
Both VT 104 and the SASH are relatively flat in the vicinity of this intersection. With I-89 being somewhat higher to the east, the off-ramps are on a downgrade that bottoms out at their merge point just east of the intersection.

3.16 Crash History
Updated crash data for 2004-2008 was obtained from VTrans. During this 5-year period, a total of 50 crashes were reported at this intersection. An additional 8 crashes were reported at or near the Exit 19 off-ramp merge point. Of the 50 intersection crashes, 20 occurred in 2006-2008 after the October 2005 installation of protected left-turn phasing at the traffic signal.

This intersection is listed in the VTrans 2003-2007 High Crash Location Report with 68 crashes, a crash rate of 2.789 crashes per million vehicles, and an actual/critical ratio of 2.642. In comparison, the 20 crashes in 2006-2008 reduces the crash rate to 1.37 crashes per million vehicles and the actual/critical ratio to 1.296. The types of crashes that occurred during the 2006-2008 period included 8 rear end crashes, 8 crashes involving turning vehicles plus 4 others of various types. While this has been a significant improvement, this intersection remains a high crash location.

3.17 Intersection Capacity & Levels of Service

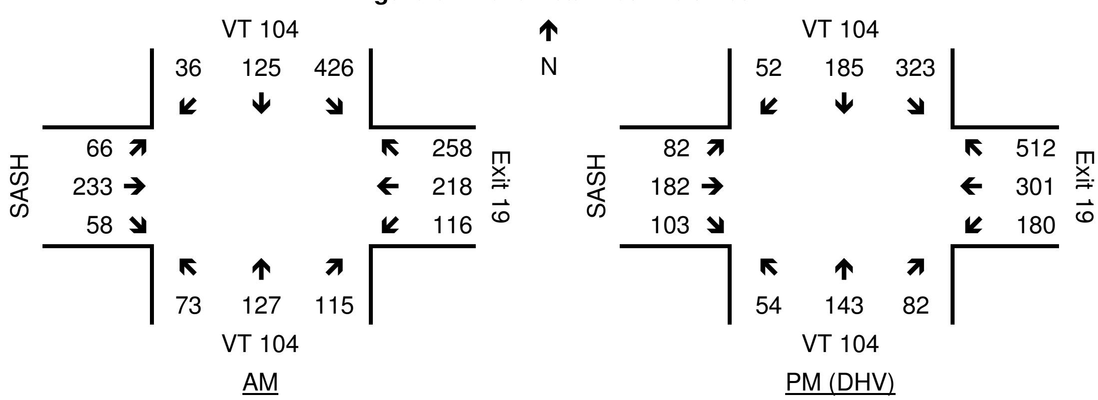
The capacity of the intersection and its existing level of service rating was determined by performing a multi-way stop intersection capacity analysis using the procedures outlined in the *Highway Capacity Manual (HCM)*[1]. The criteria for levels of service at intersections are outlined in Table 3. For this intersection, the desired overall intersection level of service design target is LOS C[2]. In addition, no individual lane or approach should experience v/c ratios exceeding 1.0 or a LOS F rating.

Table 3 - Intersection Level of Service Criteria

LOS	Avg. Vehicular Delay (sec/veh)		LOS	Avg. Vehicular Delay (sec/veh)	
	Signalized	Unsignalized		Signalized	Unsignalized
A	≤10	≤ 10	D	≤ 55	≤ 35
B	≤ 20	≤ 15	E	≤ 80	≤ 50
C	≤ 35	≤ 25	F	> 80	> 50

To determine existing levels of service, the observed morning and afternoon peak hour traffic volumes observed in the June 2008 turning movement count were adjusted to reflect year 2010 design hour conditions (30th highest hour annually). Figure 3 illustrates the estimated year 2010 peak hour volumes. The results of these analyses are shown in Table 4.

Figure 3 – 2010 Peak Hour Volumes



1 Highway Capacity Manual, Transportation Research Board, 2000
2 Highway Design "Level of Service" Policy, Vermont Agency of Transportation, May 31, 2007

Table 4 - Existing (2010) Levels of Service

		AM				PM (DHV)			
		LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)	LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)
Exit 19 SASH	EB LT	D	49	0.64	111	F	116	0.85	176
	EB TH/RT	C	31	0.65	292	C	28	0.46	272
	EB Approach	C	34			D	48		
	WB LT	E	58	0.77	167	D	50	0.68	221
	WB TH/RT	E	58	0.91	503	F	126	1.03	974
	WB Approach	E	58			F	112		
VT 104	NB LT	D	37	0.50	93	D	51	0.50	88
	NB TH/RT	C	34	0.64	249	D	52	0.74	304
	NB Approach	C	35			D	52		
	SB LT	E	59	0.92	485	F	141	1.00	487
	SB TH/RT	B	17	0.23	117	C	32	0.46	241
	SB Approach	D	48			F	95		
OVERALL		**D**	**46**	**0.81**		**F**	**89**	**0.95**	

The above results indicate that this intersection experiences poor levels of service, very long delays and overflowing queues during both peak hour time periods.

3.18 Wetlands

The Agency of Natural Resources Environmental Interest Locator does not show any existing or proposed significant wetlands mapped in the immediate vicinity of this intersection. It does show, however, potential wetland soils mapped on both sides of Rugg Brook as it crosses the SASH approximately 580 ft west of this intersection.

Both the U.S. Army Corps of Engineers (COE) and the Vermont Agency of Natural Resources (ANR) have jurisdiction over wetlands. Improvements at this intersection would require a COE General Permit if greater than 3,000 sf of wetlands under their jurisdiction are impacted. Wetlands typically under COE jurisdiction do not include roadside ditches, cultivated croplands or isolated wetlands not adjacent to streams, rivers and lakes. The ANR regulates significant (Class 1 & 2) wetlands and the 50 ft buffer zone which surrounds them. Any impact to a significant wetland requires a Conditional Use Determination from the ANR.

3.19 Significant Plant and Animal Species

The Agency of Natural Resources Environmental Interest Locator does not show any rare, threatened or endangered species, or any significant natural communities in the immediate area of this intersection. The no impact letters issued by the Agency of Natural Resources Department of Fish and Wildlife and its Nongame and Natural Heritage Program for the 2002 Intersection Scoping Study remain valid.

3.20 Land and Water Conservation Fund Sites

The Vermont Land and Water Conservation Fund list of funded projects (1965-2007) does not include any projects in St. Albans that are located adjacent to or near this intersection.

3.21 Hazardous Materials Sites

The Agency of Natural Resources Environmental Interest Locator indicates that the Short Stop (former Wagon Wheel) in the southeast quadrant of this intersection is an active Vermont hazardous waste site. This site has a long history as a truck stop and convenience store with vehicle maintenance and fuel sales. Groundwater monitoring has determined that the contamination is primarily limited to the property itself, and that the direction of groundwater flow is in the southwest direction away from this intersection.

3.22 Historic Sites and Structures

There are no identified historic sites or structures located in the proximity of this intersection.

3.23 Archaeological Sites

Much of the area immediately surrounding this intersection within the existing highway right-of-ways has been previously disturbed by roadway, drainage and slope construction. As such, there is little, if any, remaining sensitivity for undisturbed prehistoric or historic cultural resources. Should future intersection improvements extend outside the existing right-of-ways, further archaeological examination might be required.

3.24 Agricultural Lands

To the extent that future improvements at this intersection remain within existing highway right-of-ways, there would not be any impacts on agricultural lands. Surrounding parcels, particularly on the northerly side of this intersection, have been historically used for agricultural purposes and contain soil types having significant agricultural potential.

3.25 Drinking Water Sources

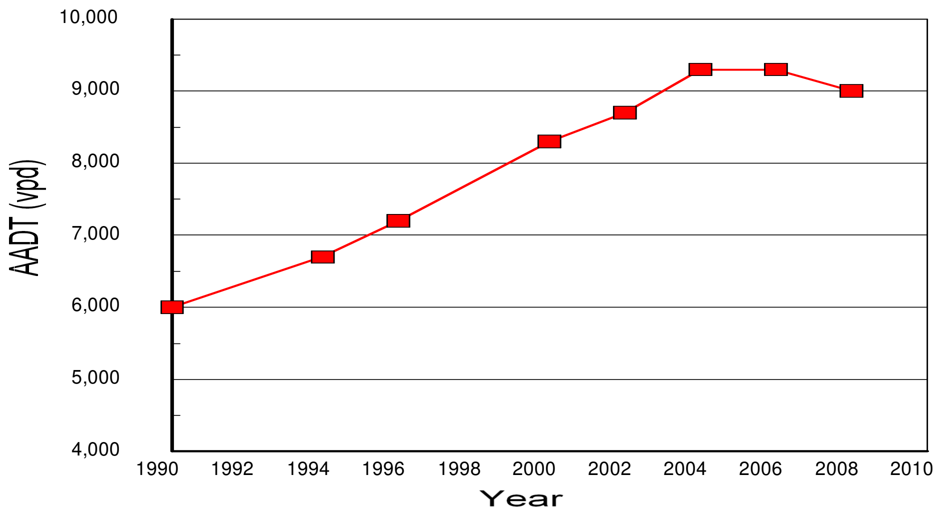
The Short Stop (former Wagon Wheel) convenience store currently obtains its drinking water from a drilled well located on the north side of the store between VT 104 and the paved parking area. As part of a proposed expansion, the Short Stop is proposing to extend the existing 10” municipal water main northerly along the east side of VT 104 and to abandon this well. All other nearby land-uses are served by municipal water.

4.0 FUTURE CONDITIONS

4.01 Background Traffic Growth

Figure 4 illustrates daily traffic volumes at F198 on VT 104 north of this intersection since 1990. Recent years have witnessed a decline in daily volumes. This pattern has occurred statewide; and is largely attributable to higher energy prices and a slowing economy.

Figure 4 – 1990-2008 AADT Traffic Growth

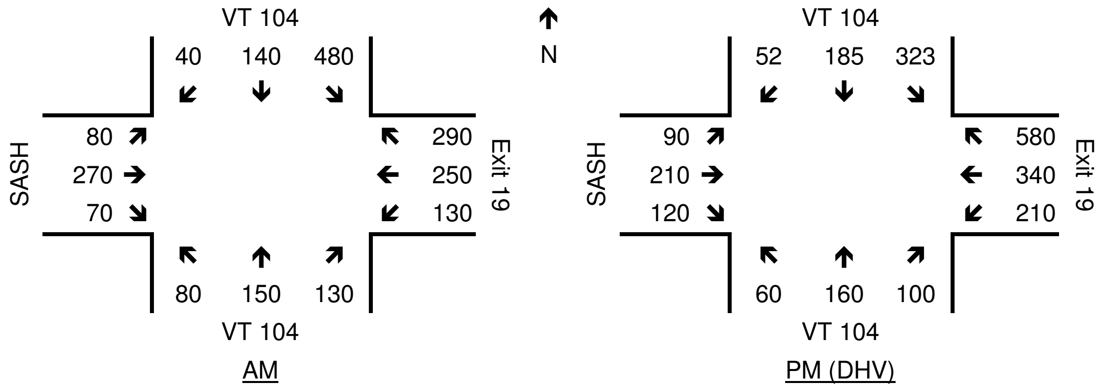


Future traffic conditions in this updated study will be examined using a 20 year projection from 2010 to 2030. The first step in developing future traffic projections is to identify an appropriate background traffic growth rate. VTrans has developed statewide growth rates for primary and secondary rural highways based on regression analyses of CTC (continuous count stations) statewide. For this location, the current VTrans projections (based on 2008 traffic data) estimate a 20 year growth rate of 13%; equivalent to 0.65% annually. Table 5 and Figure 5 illustrate the projected future traffic volumes.

Table 5 - Future (2030) Traffic Volumes

	SASH		VT 104	
	East	West	North	South
AADT (vpd)	16,100	8,300	14,000	8,100
DHV (vph)	1,780		1,460	

Figure 5 – 2030 Peak Hour Volumes
(with only background growth)



4.02 Other Major Developments

As noted earlier, this intersection is located in a Regional and Town designated growth center (South Wing – Northwest Regional Growth Center). Several major developments have been proposed and approved but not yet constructed, and others are in discussion stages. The current status of the proposed developments was determined from existing permits, traffic studies and other sources Table 6 summarizes the major other developments that are included in this scoping study update.

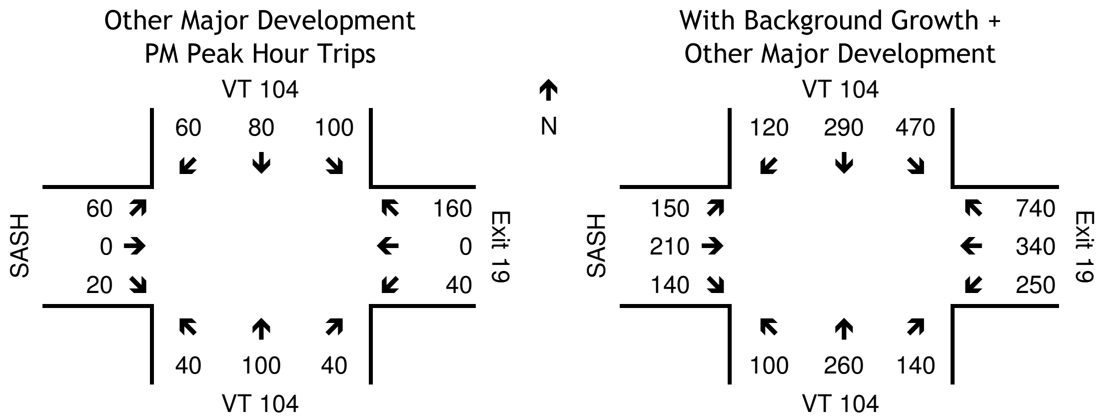
Table 6 – Exit 19 Major Developments

Name	Type	Status	New Peak Hour Trips*	New Trips @ Intersection*
Brookside	Residential	Permitted	91	55
Ingleside Realty	Retail/Commercial	Conceptual	800	520
Mapleville Depot	Office/Commercial	Permitted	87	70
Short Stop (Wagon Wheel)	Convenience Store & Restaurant	Permits Pending	64	55
Total			1,042	700

* excluding pass-by trips

The above developments are estimated to increase future design hour volumes (pm peak hour) at this intersection by 340 vph and 560 vph on the east and north approaches, respectively. Figure 6 illustrates the estimated pm peak hour turning movement patterns of the 700 new peak hour trips.

Figure 6 – 2030 PM Peak Hour Volumes (DHV)



This added traffic represents an additional 19% growth on the easterly Exit 19 approach and an additional 38% growth on the northerly VT 104 approach.

5.0 ALTERNATIVES

5.01 Alternative 1 (NO-BUILD)

Figure 7 shows the existing geometric conditions at the intersection. This alternative would retain existing conditions, except that future traffic congestion conditions and delays would continue to increase. Additional capacity analyses were performed for projected 2030 DHV conditions, the results of which are shown in Table 7. With only background growth, the results show the westbound and southbound approaches experiencing oversaturated (v/c ratio > 1) traffic congestion conditions and overall delays in the 3+ minute per vehicle range. Adding anticipated other major development in the Exit 19 area causes all four approaches to experience oversaturated conditions and overall delays to increase to the 8 minute per vehicle range.

Table 7 – Alternative 1
2030 PM Peak Hour Levels of Service

		with only Background Growth				with Background Growth + Other Major Development			
		LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)	LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)
Exit 19 SASH	EB LT	F	181	0.95	193	F	640	1.28	387
	EB TH/RT	C	31	0.56	329	D	44	0.60	475
	EB Approach	E	63			F	223		
	WB LT	D	53	0.73	270	E	76	0.81	394
	WB TH/RT	F	371	1.18	1161	F	806	1.42	1902
	WB Approach	F	312			F	669		
VT 104	NB LT	D	51	0.51	95	F	88	0.75	226
	NB TH/RT	E	63	0.83	372	F	418	1.18	785
	NB Approach	E	61			F	352		
	SB LT	F	351	1.15	573	F	858	1.43	976
	SB TH/RT	C	33	0.52	282	D	54	0.77	624
	SB Approach	F	217			F	483		
OVERALL		**F**	**214**	**1.09**		**F**	**499**	**1.36**	

At both of the above overall delay levels, it can be reasonably anticipated that traffic safety would also be adversely impacted by motorists becoming impatient. This alternative is obviously the least costly option, but is not responsive at all to the purpose and need statement for this intersection.

Figure 7 – Existing Conditions

5.02 Alternative 2 (SIGNALIZED INTERSECTION WITH IMPROVEMENTS)

The basic intent of this alternative is to modify the existing geometry and lane assignments at this intersection to provide additional capacity to meet projected 2030 traffic volumes. Further widening of this intersection will also necessitate replacement of the existing span-wire mounted traffic signals with pole mounted signals.

Because of the two future growth scenarios, this alternative is further separated into Alternative 2A, including only background growth, and Alternative 2B, including both background growth and other major development. The purpose of having two alternatives is to better identify those specific geometric and traffic signal improvements that will be required to accommodate future Exit 19 development and to isolate the incremental cost of those improvements.

Alternative 2A

Figure 8 illustrates Alternative 2A. The proposed improvements associated with this alternative include:

- adding an exclusive right-turn lane to the westbound Exit 19 approach,
- realigning and signalizing the Exit 19 NB/SB off-ramp merge intersection located just to the east,
- lengthening the southbound left-turn lane on VT 104 to provide additional storage capacity,
- replacing the existing traffic signals with new pole-mounted signals, and
- provisions for future sidewalks and pedestrian signals through the project area.

Alternative 2B

Figure 9 illustrates Alternative 2B. The proposed improvements associated with this alternative include:

- adding double right-turn lanes to the westbound approach,
- widening VT 104 north of the intersection to provide two northbound departure lanes,
- adding double left-turn lanes to the southbound VT 104 approach,
- providing two eastbound departure lanes leading up to the Exit 19 on-ramps.
- realigning and signalizing the Exit 19 NB/SB off-ramp merge intersection located just to the east,
- widening the Exit 19 NB off-ramp to provide two approach lanes at the NB/SB off-ramp merge intersection,
- lengthening the left-turn lanes on all four approaches to provide additional storage capacity,
- replacing the existing traffic signals with new pole-mounted signals, and
- provisions for future sidewalks and pedestrian signals through the project area.

Table 8 shows the results of the capacity analyses for Alternatives 2A and 2B.

Figure 8 – Alternative 2A (Traffic Signal Control)

Figure 9 – Alternative 2B (Traffic Signal Control)

Table 8 – Alternative 2
2030 PM Peak Hour Levels of Service

		Alternative 2A				Alternative 2B			
		LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)	LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)
SASH	EB LT	E	70	0.79	137	D	49	0.75	197
	EB TH/RT	D	50	0.85	332	D	53	0.87	333
	EB Approach	D	54			D	52		
Exit 19	WB LT	D	50	0.88	198	E	55	0.90	266
	WB TH	C	29	0.66	230	C	31	0.71	196
	WB RT	D	48	0.37	159	C	32	0.27	137
	WB Approach	D	43			D	36		
VT 104	NB LT	D	37	0.50	79	E	68	0.79	148
	NB TH/RT	D	37	0.73	240	E	59	0.91	418
	NB Approach	D	37			E	61		
	SB LT	D	42	0.84	413	D	41	0.82	252
	SB TH/RT	B	18	0.40	183	C	25	0.67	375
	SB Approach	C	32			C	33		
OVERALL		**D**	**41**	**0.82**		**D**	**42**	**0.92**	

While the above results do not satisfy the LOS C design target for an overall intersection rating, the proposed improvements associated with each alternative represent a reasonable level of improvement given the increased environmental impacts and construction cost of the additional work that would be needed to reach LOS C.

5.03 Alternative 3 (ROUNDABOUT)

Figure 10 shows the conceptual geometry of a roundabout at this intersection. This alternative involves the construction of a 180 ft diameter multi-lane roundabout. The center of the roundabout would be an 89 ft diameter landscaped circular island. To the outside of that will be a 14 ft truck apron, two 15 ft wide travel lanes and a 3 ft shoulder.

The newly proposed NCHRP Report 572 roundabout capacity methodology was used to analyze the capacity and levels of service of a roundabout at this intersection. The advantage of using this methodology over other previously used methods is that it is the result of an extensive study and actual observed performance of U.S. roundabouts. Table 9 shows the results of the capacity analyses for Alternative 3.

Figure 10 – Alternative 3 (Roundabout)

Table 9 Alternative 3 (Roundabout)
2030 PM Peak Hour Levels of Service

		with only Background Growth				with Background Growth + Other Major Development			
		LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)	LOS	Avg. Delay (sec/veh)	v/c Ratio	95% Queue (ft)
Exit 19 SASH	EB LT/TH	A	8	0.32	35	B	12	0.45	58
	EB TH/RT	A	8	0.32	35	B	12	0.45	58
	EB Approach	A	8			B	12		
	WB LT/TH	A	10-	0.60	105	C	17	0.75	173
	WB TH/RT*	B	11	0.64	118	E	36	0.94	345
	WB Approach	B	10			D	28		
VT 104	NB LT/TH	A	7	0.31	33	B	13	0.57	90
	NB RT	A	6	0.14	13	A	7	0.22	20
	NB Approach	A	7			B	11		
	SB LT	A	10-	0.50	70	C	15	0.67	130
	SB TH/RT	A	8	0.37	43	B	12	0.59	98
	SB Approach	A	9			B	14		
OVERALL		**A**	**9**	**0.48**		**C**	**19**	**0.67**	

* functions as an exclusive right-turn lane during the pm peak period

Maximum queue lengths for projected 2030 DHV conditions and the two-lane roundabout are much more manageable. The only queues of any significance will be on the westbound approach from Exit 19, where the 95% queue for the right-turn movement onto VT 104 North will equals 345 ft. To better accommodate that queuing and provide sufficient space for the weaving that takes place, the off-ramp merge point is shown being realigned to a point 480 ft east of the intersection.

5.04 RECOMMENDED PREFERRED ALTERNATIVE

Based on the information presented in this study, the No-Build alternative (Alternative 1) does not address the traffic congestion and multi-modal issues which presently exist and therefore does not meet the purpose and need statement. Widening of this intersection with continued traffic signal control (Alternatives 2A and 2B) is not a viable alternative due to poor levels of service and long queue lengths.

Alternative 3, a multi-lane roundabout, continues to be the recommended preferred alternative. This alternative has the potential to provide the best levels of service with the shortest queue lengths, and satisfies the purpose and needs of this project. Provisions for future bicycle and pedestrian facilities can also be easily incorporated into the final design for the roundabout.

6.0 PROJECT COSTS AND FINANCING

6.01 Cost Estimates

Table 10 presents preliminary opinions of probable costs for Alternatives 2A, 2B & 3. The costs for each alternative will need to be refined as part of the future project design. The costs shown in Table 10 do not include any allowances for right-of-way acquisition.

Table 10 – Preliminary Opinion of Probable Costs

	Alternative 2A	**Alternative 2B**	**Alternative 3**
Construction	$800,000	$1,400,000	$1,400,000
Contingency (20%)	$160,000	$280,000	$280,000
Project Management (5%)	$40,000	$70,000	$70,000
Engineering Design (10%)	$80,000	$140,000	$140,000
Construction Inspection	$120,000	$210,000	$210,000
Total	**$1,200,000**	**$2,100,000**	**$2,100,000**

Because roundabouts offer improved safety, reduced delays and lower operation and maintenance costs, their total life-cycle costs are lower than signalized intersection alternatives.

6.02 Project Financing

Highway construction projects have historically been funded through the VTrans' Statewide Transportation Improvement Program (STIP). Projects identified in the STIP are then funded through the State Transportation Program that is approved by the state legislature each year. These two programs outline which projects will receive state and federal transportation funds.

There are a number of state and federal transportation funding programs that this project could qualify under. The primary funding programs that this project could qualify for include the federal Surface Transportation Program (STP) and Highway Safety Improvement Program (HSIP). There is a 10-20% state and/or local match requirement for STP projects.

Projects utilizing state and federal funds are typically prioritized in a process that begins at the regional planning commission level, and ultimately must undergo the VTrans project development process. The latter may take several years and does not necessarily guarantee timely funding. Overall, it may take 5-10 years to complete the scoping and design process and begin actual construction.

Other local funding mechanisms could be used to supplement or replace the conventional state/federal funding programs outlined above. The principal advantage gained in going this route is that it provides greater local control over the project development and design schedule. Available local funding mechanisms include:

- **Municipal General Obligation Bonds** – Municipalities may, with voter approval, issue bonds in order to raise capital funds to construct infrastructure improvements, including highways, intersections, sidewalks, etc. The bond term generally matches the anticipated economic life of the improvement being funded, which for transportation-related infrastructure is typically 20 years. The bonds are typically administered by the Vermont Municipal Bond Bank, a quasi-state agency. Payments are made annually.

  Another municipal bonding option is to utilize the Vermont State Infrastructure Bank (SIB). This program, operated by the Vermont Economic Development Authority in conjunction with the Vermont Agency of Transportation and the Federal Highway Administration, is available to assist in the construction or reconstruction of highways, roads and bridges. There is a 20% local match and a requirement that the project be part of VTrans' STIP in order to qualify for federal highway funding.

  Vermont State Statutes require municipalities to obtain voter approval for any capital loans or bonds that have more than a five year term. Thus, bonding is generally required as part of the following local funding mechanisms as well. In the absence of any of the following mechanisms to raise revenues, municipal general obligation bonds are repaid by an increase in the town's property tax.

- **Traffic Impact Fees** – Vermont State Statutes 24 V.S.A § 5203 gives municipalities the authority to create impact fees in order to help pay for capital projects that are included in the municipality's approved capital plan. Impact fees permit municipalities to allocate a proportionate share of a capital project's cost to future development based on the amount of impact created by such development. The statutes require that impact fees be calculated using a reasonable formula that is based on a standard service level.

  The primary disadvantage of collecting impact fees is that they must be used for the designated project that they were collected for within six years. Failing that, the municipality risks having to return unused impact fees if requested by the then current property owner(s).

  Traffic impact fees recently adopted by other Vermont municipalities have been in the range of $500-$1,000 per weekday pm peak hour trip end. Accepted practice is to use the total number of development-generated peak hour trips, which for the Exit 19 area is projected to equal just over 1,000 trip ends. Thus, traffic impact fees could generate as much as $1 million over the next 20 year period. The primary challenge in using this method to fund improvements at Exit 19 would be the uncertainty and variability associated with traffic impact fees being paid by a relatively small number of future developments.

- **Special Assessment Districts** – Vermont State Statutes 24 V.S.A § 3251 also gives municipalities the authority to create special assessment districts (SAD) for the purpose of constructing public improvements which are of benefit to a limited area of a municipality to be served by the improvement(s). Creating a SAD essentially provides a source of revenue in order to pay back bonds issued by the municipality. They can be created either by simple majority voter approval or by unaminous property owner consent. Once established, the special assessments are calculated as an additional tax on the grand list of the properties located within the SAD. A SAD normally expires once the project bonds have been repaid. One of the difficulties of establishing a special assessment district is in how to factor future development growth in calculating a projected tax rate. If the relied upon development does not occur, property owners could potentially be asked to make up the difference by paying a greater than originally anticipated tax rate.
- **Tax Incremental Financing** - Recent legislation (24 V.S.A § 1892) enacted by the Vermont Legislature has provided additional economic benefits gained from tax incremental financing (TIF). TIF requires establishing a geographic district similar to that of a SAD. Unlike a SAD, however, establishing a TIF does not require voter approval. Initial approval together with continuing oversight by the Vermont Economic Development Council is required in order to incur indebtedness to be repaid with TIF revenues or to use the education property tax increment (32 V.S.A § 5404). The incremental increased tax revenue resulting from future development, including the education property tax increment under certain circumstances, can then be used by the municipality to repay bonds for the construction of municipal infrastructure projects within the TIF District. Establishing a TIF District requires careful economic calculations and projections in order to ensure that the anticipated revenues will be sufficient to cover the annual bond payments.

  The following factors should be present to consider utilizing the TIF District financing tool:
  - There is an area within the municipality that requires development or redevelopment to become economically viable.
  - The building or improvement of public infrastructure is essential to ensure the real property development or redevelopment within the TIF District.
  - Normal and available financing mechanisms are not available or are insufficient to ensure the public infrastructure improvements.
  - There are parties interested in developing the area if the infrastructure is built/improved.
  - The incremental property taxes generated by the expected real property development is sufficient to retire the public infrastructure debt, and/or additional sources of revenue are expected.

With regards to the proposed Exit 19/SASH/VT 104 intersection improvements, we recommend that the Town of St. Albans, with NRPC assistance (and perhaps acting as the designated Municipal Project Manager), consider becoming the lead agency to advance this Project through scoping, design and ultimately construction. To fund this Project, we recommend that the Town consider:

- establishing a town-wide traffic impact fee ordinance, the revenues from which could be used to initially fund project development, design and also to partially offset future construction costs, and
- establishing either a special assessment district or a tax incremental financing district to provide a reliable long-term source of additional revenue to repay future project construction bonds.

APPENDIX A
Traffic Data

APPENDIX B
Intersection Capacity Analyses

APPENDIX C
Correspondence