

TECHNICAL MEMO #1 EXISTING CONDITIONS

TO:	Sai Sarepalli, PE (CCRPC)
FROM:	Corey Mack, PE Roxanne Meuse, EIT
CC:	
DATE:	June 23, 2016
SUBJECT:	Allen Martin Drive and VT-15 Intersection Scoping Study
	Draft Technical Memorandum #1: Existing Conditions Analysis

The Town of Essex and Chittenden County Regional Planning Commission (CCRPC) have contracted with RSG to conduct an intersection scoping study of VT Route 15 and Allen Martin Drive. This memorandum is Deliverable 2e of the scope of work submitted on March 21, 2016.

Allen Martin Drive serves as the primary access to the Saxon Hill Industrial Park (SHIP). Continued development in the park has led to a concern of traffic congestion and left turn conflicts at the VT-15 and Allen Martin Drive intersection. Ultimate SHIP plans include a secondary access road to River Road / VT-117, but until this road is constructed, Allen Martin Drive is expected to remain the primary vehicle access route to the SHIP.

PURPOSE AND NEED STATEMENT

The purpose and need statement is based on a preliminary review of the study area and concerns articulated at the Local Concerns Meeting on June 7, 2016.

Purpose

The purpose of this project is to ensure that all travelers, including vehicles, freight, pedestrians, and bicyclists can travel safely and efficiently through the Allen Martin Drive / VT-15 intersection, now and in the future. As businesses continue to develop within the SHIP, there have been no changes to the immediate surrounding road network. The Town is concerned that increased traffic has negatively affected the intersection operations and safety, and that this problem will worsen as development of the park continues. Residents cited concern with the speed of vehicles traveling on VT-15 affecting the safety and livability of the area around the intersection. Additionally, changes to the planned regional transportation network have indicated that Allen Martin Drive may serve as an important bypass route in the future.



Need

The need for the project is documented by:

- The Saxon Hill Industrial Park has identified approximately 20 acres of developable land along Corporate Drive and 127 acres of developable land along Thompson Drive;
- Recent traffic impact studies for development within the SHIP indicate that as of 2016 (with those developments in place), the Allen Martin Drive intersection operates at an LOS F and E for NB vehicles in the AM and PM peak hours, respectively;
- The 2008 Route 15 Corridor Study did not review the intersection and therefore did not recommend any improvements at the intersection;
- Local residents feel unsafe crossing VT-15 near Allen Martin Drive on foot, which they do
 at least once daily to access their mailboxes on the opposite side of VT-15; and
- The SHIP includes a trail network for walking and bicycling opportunities into the future, indicating higher bicycle and pedestrian volumes may be present.

STUDY AREA AND CONTEXT

The focus of this study is the T-shaped intersection of Allen Martin Drive and VT-15 / Jericho Road, in Essex, Vermont (Figure 1). The Saxon Hill Industrial Park (SHIP) lies on either side of Allen Martin Drive. The primary study area includes 250 feet from this intersection along each direction of VT-15 and Allen Martin Drive. The secondary study area considers the entire SHIP.

The primary study area is approximately one mile east of Essex Center and two miles west of Jericho's town center, both of which are along VT-15. Allen Martin Drive runs between this intersection and Sand Hill Road, which runs between VT-15 and VT-117.

FIGURE 1: STUDY AREA AND CONTEXT





LAND USE

The Allen Martin Drive / VT-15 intersection is bounded by residential, industrial, and other business-related land uses (Figure 2). There are five driveways for houses within the primary study area; four of these are on the north side of VT-15 and one is on the south side of VT-15, to the west of Allen Martin Drive. Two of the houses are multi-family and one is single-family.

To the south of the intersection, the land use is dominated by the Saxon Hill Industrial Park (SHIP). The SHIP is primarily industrial and commercial land use, with a network of trails through the undeveloped wooded terrain for bicycle and pedestrian use. This network will remain as the SHIP continues to develop.

FIGURE 2: LAND USE (CCRPC ECOS VIEWER)





SHIP BUILD-OUT POTENTIAL

The SHIP contains two industrial parks: Corporate Drive and Thompson Drive, illustrated in Figure 3. Both industrial parks have undeveloped lots remaining. As of February 2016, Corporate Drive has 20.42 developable acres across 12 lots. Thompson Drive has 98.91 acres of unrestricted developable space and 28.27 acres of sand extraction space, for a total of 127.18 developable acres.

Figure 3 illustrates the proposed zoning of the entire SHIP, according to a February study focused on the Allen Brook Development within the Thompson Drive commercial park.



FIGURE 3: PROPOSED SAXON HILL ZONING (FEBRUARY 4, 2016)



ROADWAY CLASSIFICATION AND CIRCULATION

Allen Martin Drive and Sand Hill Road are both Class 2 Town Highways and Federal Aid Urban Streets, further classified as major collectors (Figure 4). VT-15 and VT-117 are both state highways and minor arterials with access to VT-289 and the Village of Essex Junction to the west and the Town of Jericho to the east. Approximately 0.5 miles southeast of Sand Hill Road along VT-117 is North Williston Road, a Class 2 Town Highway. South of VT-117 along North Williston Road is a regionally significant bridge over the Winooski River. Another 4.5 miles southeast along VT-117 from North Williston Road lies the US-2 intersection and Exit 11 of I-89 in Richmond.



FIGURE 4: FUNCTIONAL CLASSIFICATION (CCRPC ECOS VIEWER)

Corporate Drive and Thompson Drive are both dead end Class 3 Town Highways wholly located within the Saxon Hill Industrial Park serving the commercial and industrial land uses.

Rural Minor Collector

VT-15 has a speed limit of 40 mph and an average annual daily traffic (AADT) of 10,900 vehicles per day as estimated at automatic traffic recorder (ATR) station D121 in 2013. Allen Martin Drive has a speed limit of 35 mph and an AADT of 2,500 vehicles per day as estimated at ATR station D548 in 2013.

Principal Arterial

INTERSECTION GEOMETRY AND TRAFFIC CONTROL

VTrans District 5 was contacted for documentation of the right-of-way. The District did not have any information available, and recommended assuming a 3-rod (49.5 feet) ROW from the centerline. VT-15 / Jericho Road has one lane in each direction. As it approaches Allen Martin Drive from the west, it also has a right-turn lane and a wide curb for improved truck access onto Allen Martin Drive (Figure 5). Allen Martin Drive has one lane in each direction, with a 60-foot channelized right-turn slip lane. This intersection is stop-controlled, with a stop sign on the median for vehicles turning left onto VT-15 and a stop sign on the east side of the slip lane for vehicles turning right onto VT-15.



FIGURE 5: INTERSECTION DETAIL

Utility poles are located on the south side of VT-15 and the west side of Allen Martin Drive. There is town water and sewer service throughout the project area.

The turning radius of a WB-67 truck was overlaid on the study area for eastbound right turns onto Allen Martin Drive and northbound right turns onto VT-15 (Figure 6). Trucks turning right onto Allen Martin Drive must use the VT-15 through lane. Trucks turning right onto VT-15 may need to cross slightly into the westbound lane.



FIGURE 6: TRUCK TURNING RADIUS



INTERSECTION SIGHT DISTANCE

For vehicles on Allen Martin Drive turning east or west onto VT-15, intersection sight distance is limited by utility poles and by a large stand of mixed trees present along both sides of Allen Martin Drive south of VT-15. There are no horizontal or vertical curves in the project area that significantly impact sight distance. Available sight distance is acceptable for passenger cars in both directions but does not meet the necessary threshold for heavy trucks turning eastbound (Figure 7).



FIGURE 7: INTERSECTION SIGHT DISTANCES



During a site visit, it was observed that drivers on Allen Martin Drive turning west creep past the stop bar to get a better view of vehicles on VT-15 (Figure 8). This happens due to the limited sight distance and because of the placement of the stop bar. Best practice is to align stop bars with the through lane, but the stop bar and the front of the island appear to be aligned with the edge of the eastbound VT-15 right turn lane (Figure 9).

FIGURE 8: VEHICLES STOPPING PAST THE STOP BAR





FIGURE 9: STOP BAR AND ISLAND SETBACK





Pedestrian, Bicycle, and Transit Connectivity

There is an existing sidewalk along the east side of Allen Martin Drive and a sidewalk along the south side of VT-15 between Sandhill Road and Allen Martin Drive (Figure 10). While there are currently no designated bicycle paths or shared-use paths proximate to the study area, there is a proposed shared-use path parallel to the north side of VT-15 and parallel to the east side of Allen Martin Drive. These paths would provide regional connectivity for pedestrians and bicyclists.

Within the SHIP, a sidewalk runs along the south side of Thompson Drive and stops at the east end of the Reinhart Food Service development. A sidewalk also runs along the south side of Corporate Drive.

The closest transit access to the study area is via the CCTA Route 4 Essex Center bus, which runs along Sandhill Road, making local stops (Figure 11). The CCTA Route 36 Jefferson Commuter bus runs along VT-15; the closest stop to the study area this bus makes is at the Essex Outlets.



FIGURE 10: PEDESTRIAN AND BICYCLE CONNECTIVITY (ECOS VIEWER)





FIGURE 11: TRANSIT ACCESS



CRASH HISTORY

In the past five years (between May 1, 2011 and May 1, 2016), eight crashes have occurred within the primary study area (Table 1 and Figure 1Figure 12). These crashes include six rear ends and two broadsides. Two crashes resulted in injury. There were no alcohol or drugs indicated, no pedestrians, bicycles, or motorcycles involved, and no animals involved in any of the crashes. Most of these crashes occurred during daylight, but with varying road surface conditions. Based on crash reports obtained from VTrans, two crashes appear to be primarily due to slippery road surface conditions, and the remaining six crashes appear to be primarily due to driver error.

The six rear end crashes compose 75% of all the crashes in the past five years. Three of these crashes occurred on the westbound approach. Rear end crashes are typically indicative of variable speed traffic sharing the same lane.



Date	Damage / Injury	Road Surface Condition	Type of Collision
01/29/16	Property Damage Only	Wet	Angle Broadside; NB-L and EB-T
09/22/15	Property Damage Only	Dry	Rear End; NB
06/24/15	Injury	Dry	Broadside; NB-L, EB-T, and WB-T
02/17/15	Property Damage Only	lce	Rear End; EB
11/11/14	Property Damage Only	Dry	Rear End; NB
02/06/14	Property Damage Only	Snow	Rear End; WB; 4 cars
06/11/13	Property Damage Only	Wet	Rear End; WB
09/23/11	Injury	Dry	Rear End; WB

TABLE 1: CRASHES IN THE PRIMARY STUDY AREA, MAY 2011-MAY 2016





Data: May 2011 - May 2016

At the June 8, 2016 local concerns meeting, residents reported a recent westbound multi-car rear end crash not reflected in this data.

There have also been six crashes along Allen Martin Drive during the same time period. None of these resulted in injury (Figure 13).

There are no High Crash Locations proximate to the study area.



FIGURE 13: CRASH HISTORY AT ALLEN MARTIN DRIVE / VT-15 INTERSECTION



NATURAL RESOURCES

There are no significant natural resource concerns within the primary area, but the secondary study area does include resources of note. The secondary study area includes several small bodies of water, streams and/or wetlands (Figure 14) and a moderate to high concentration of biodiversity (Figure 15). Within and around the wetlands are a higher concentration of biodiversity.

Among the natural resources investigated that were not present within the study area were rare, threatened, and endangered species; significant natural communities; and deer wintering areas. The nearest major body of water is Browns River, the closest part of which is located 1,500 feet northeast of the VT-15 and Allen Martin Drive intersection.



FIGURE 14: WATER BODIES (ANR NATURAL RESOURCES ATLAS)

🔄 Waterbody

Stream





FIGURE 15: TIERED CONTRIBUTION TO BIODIVERSITY (ANR NATURAL RESOURCES ATLAS)

Component Concentration



Tier 6 = Insufficient Data



HAZARDOUS SITES

There are three hazardous sites in the Saxon Hill Industrial Park, all three of which have been remediated. They are identified in Figure 16 by site number according to the Vermont Agency of Natural Resources Waste Management Database.



FIGURE 16: HAZARDOUS SITES (ANR NATURAL RESOURCES ATLAS)

Hazardous Site

SMAC = Site management activity completed



HISTORICAL AND ARCHAEOLOGICAL SITES

There are no known historical sites in the study area according to the Vermont Agency of Natural Resources (ANR) Natural Resource Atlas. The Allen Brook Development plan identifies archaeological area VT.CH.1043 within the Saxon Hill Industrial Park.

UTILITIES

There are several existing utilities in the study area (Figure 17), including Vermont Gas lines and Champlain Water District lines. The entire study area is within a water service area and several areas of it are within a wastewater service area.



FIGURE 17: UTILITIES (CCRPC ECOS VIEWER)

- Champlain Water District Distribution Line
- Vermont Gas
- Water Service Area
- 💥 Existing Wastewater Service Area

TRAFFIC ANALYSES

PREVIOUS STUDIES

Recent studies relevant to the study area include a VT-15 corridor study and two traffic impact studies for proposed developments within the Saxon Hill Industrial Park. These are summarized below.

Route 15 Corridor Study (August 2008): This study addresses existing conditions and future conditions of VT-15 and offers implementation strategies related to roads, transit, bicycle and pedestrian facilities, and land use. It studies a number of intersections along VT-15 between Winooski and the Essex-Jericho town line, including Sand Hill Road (approximately 4,800 feet from Allen Martin Drive) but not the Allen Martin Drive intersection itself. The study identified VT-15's AADT between Sand Hill Road and the town line of Jericho to be 11,000 vehicles per day in 2005. Truck traffic east of Five Corners in Essex Junction was 3% of the total daily flow in 2005.

Reinhart Food Service Traffic Evaluation (November 2012): This study provides a trip generation and traffic impact assessment for a 125,000 SF warehouse and office for Reinhart Foods off Thompson Drive in the SHIP. Among the intersections included in the project's Traffic Impact Study (TIS) was the intersection of Allen Martin Drive with VT-15. The resulting traffic volumes are presented in the following figures. Note that this study included permitted traffic from the Corporate Drive development "Lot C" within the adjusted volumes. The permitted traffic included 212 AM and 169 PM peak hour trips.







FIGURE 19: 2012 ADJUSTED VOLUMES (INCLUDES LOT C PERMITTED TRAFFIC)





FIGURE 20: 2012 BUILD VOLUMES (INCLUDES EXISTING AND PERMITTED TRAFFIC)

Traffic analysis indicated that the only turns with an unsatisfactory LOS were the northbound left turns, which had an LOS of F in the AM peak and an LOS of E in the PM peak. A traffic signal warrant analysis at this intersection determined that a signal was not warranted, but that a westbound left turn lane was warranted. Trips generated by the new development were not expected to significantly affect this intersection. In addition, a review of intersection sight distance found that there was an adequate sight distance at the Allen Martin Drive intersection with VT- 15.

TABLE 2: 2012 INTERSECTION ANALYSIS DURING PM PEAK HOUR

	NB Left		NB Right	
	No Build	Build	No Build	Build
LOS	E	E	С	С
Delay	37.2	38.6	20.6	21.1

Saxon Hill Corporation Traffic Evaluation (July 2015): This study provides a trip generation and traffic impact assessment for a 14,400 SF warehouse for the Saxon Hill Corporation off of Corporate Drive in the SHIP. This study used a PM traffic count from 2013 and adjusted to 2015, the year of the study. These volumes are shown in the following tables.

FIGURE 21: 2013 RAW VOLUMES





FIGURE 22: 2015 ADJUSTED VOLUMES







A capacity analysis performed during the PM peak period for the intersection of Allen Martin Drive and VT-15 in 2013 projected LOS and delay in 2015 for a No Build and Build scenario. This analysis determined that the capacity of the No Build scenario was acceptable except for northbound left turns, which had an LOS of E and a delay of 44.2 seconds in the PM peak. However, the new development would only generate one additional trip taking this turn, resulting in no change in the LOS and less than a one second increase of delay.

	NB Left		NB Right	
	No Build	Build	No Build	Build
LOS	E	E	С	С
Delay	44.2	45.1	22.7	22.8

TABLE 3: 2015 PROJECTED INTERSECTION ANALYSIS DURING PM PEAK HOUR

2016 OBSERVED TRAFFIC VOLUMES

RSG performed a 12-hour turning movement count on April 14, 2016 (6AM to 6PM) at the intersection of VT-15 and Allen Martin Drive. Given that the intersection directly serves the Saxon Hill Industrial Park, truck volumes were expected to be high; trucks were noted to account for 4% of the total AM peak hour traffic volume, and a negligible portion of the PM peak hour traffic volume.

Following VTrans traffic study guidelines, observed peak hour traffic volumes were adjusted to represent the design hour volume (DHV)¹. Design hour adjustment factors are based on VTrans automatic traffic recorder (ATR) D121, located on VT-15 approximately 1.4 miles east of Allen Martin Drive. The calculations to adjust observed traffic volumes to the DHV are as follows:

- The most recently observed AADT at ATR D121 was 10,900 vehicles in 2013. This AADT was adjusted to 2016 using a growth factor of 0.99, equaling a 2016 estimated AADT of 10,791 vehicles.
- 2. The k factor of VT-15 is 0.1061. Plugging this k factor and the 2016 AADT into the equation DHV = AADT * k leads to a **DHV** of 10,791 * 0.1061 = **1,140 vehicles**.
- 3. Because ATR D121 is east of the Allen Martin Drive intersection, vehicles in the 2016 Allen Martin Drive / VT-15 traffic count that entered the intersection from the east or exited the intersection heading east were added together. The total number of vehicles from the **peak** hour of this count that likely passed ATR D121 are 1,011 vehicles.
- 4. The adjustment factor between 1,011 and 1,140 is 1.13. Therefore, the observed traffic volumes at the Allen Martin Drive intersection were **increased by 13%** to adjust to the DHV.

The raw and adjusted volumes are shown in the following figures.



FIGURE 24: 2016 RAW AND ADJUSTED PEAK HOUR VOLUMES

The following chart shows hourly traffic volumes by direction. Westbound traffic has a peak in the morning, between 6:00am and 9:00am, and is roughly steady the rest of the day except for a smaller peak between 3:00pm and 4:00pm. Eastbound traffic rises over the course of the day and begins to

¹ The DHV is the 30th highest hour of traffic for the year and is used as the design standard in Vermont.

increase more rapidly at approximately 2:30pm. Northbound traffic is roughly steady throughout the day and begins to increase around 2:30pm, reaching a peak around 4:45pm.



FIGURE 25: 12-HOUR COUNT SUMMARY (RAW VOLUMES)

SUMMARY OF ISSUES

The following issues are apparent from the existing conditions assessment:

- There appears to be a high rate of westbound rear-end crashes at the intersection;
- Residents report speeding vehicles and engine braking;
- There appears to be poor intersection performance for the Allen Martin Drive approach to VT-15 in the AM and PM peak hours; and
- Sight distance is limited to the west along VT-15 from Allen Martin Drive.

NEXT STEPS

- Traffic Analysis Technical Memorandum #2: RSG will perform additional traffic adjustments to account for the Act 250 permitted traffic volumes; calculate Level of Service and delay for all approaches to the intersection for base year (2016) and future year (2036) traffic volumes; prepare turn lane and signal warrants, and determine the traffic growth necessary to meet warrants not currently met.
- **Develop of Draft Alternatives:** RSG shall prepare a draft list of short-, mid-, and long-term alternatives to address the issues highlighted in the Existing Conditions.