



MEMORANDUM

To: Alex Weinhagen, Director of Planning & Zoning
From: David Saladino, P.E.; Ben Swanson
Subject: Hannaford Supermarket – Traffic Engineering Peer Review
Date: 18 June 2013

On behalf of the Hinesburg Select Board, RSG is pleased to submit this peer review of the 04 February 2013 Traffic Impact Assessment (TIA) for the proposed Hannaford Supermarket on Lot 15 of the Commerce Park subdivision in Hinesburg, Vermont.

Outstanding Issues?

YES NO

1.0 PROPOSED DEVELOPMENT PROGRAM

The proposed Hannaford Supermarket project would be located on Lot 15 of the Commerce Park subdivision and would access Commerce Street by way of an existing 50' right-of-way at the location of the existing National Bank of Middlebury entrance. The proposed supermarket would be 36,000 square feet. Additionally, as part of an agreement between the developer and the owner of the existing Lantman's Supermarket east of Charlotte Road in Hinesburg, the Lantman's will close upon opening of the Hannaford Supermarket, and cannot be re-opened as another supermarket.

Outstanding Issues?

YES NO

2.0 GEOGRAPHIC SCOPE OF TRAFFIC ASSESSMENT

VTrans guidelines for Traffic Impact Studies indicate detailed traffic analysis should be conducted at intersections which are expected to receive 75 or more peak hour vehicle trips as a result of a proposed project. The Hannaford TIA followed this guidance and evaluated the following intersections in Hinesburg:

- VT 116/Shelburne Road/CVU Road
- VT 116/Farmall Drive/Commerce Street
- VT 116/Mechanicsville Road
- VT 116/Charlotte Road
- VT 116/Silver Street
- Commerce Street/National Bank of Middlebury & Site Access
- Commerce Street/Mechanicsville Road

Based on our review, we believe the project study area is appropriate.

Outstanding Issues?

YES NO

3.0 BACKGROUND TRAFFIC VOLUMES AND ADJUSTMENTS

Background traffic volumes used in the Hannaford TIA include turning movement count data from 2009 adjusted to represent design hour conditions in 2019. The study assumes a 3%

increase in traffic volumes to the 2019 future year. We agree that this projection is conservative and reasonable given low to no statewide traffic growth projected by VTrans in recent years, as well as the declining trend in Annual Average Daily Traffic (AADT) volumes recorded in Hinesburg over the past decade.

Standard practice for traffic impact studies in Vermont, as noted in the *VTrans Traffic Impact Study Guidelines*¹, is to examine traffic conditions in the year construction is expected to be complete as well as in a future planning year (i.e. 5 years after project opening). Both the Construction Year and Planning Year analyses should assess conditions with and without the addition of project generated traffic. The Hannaford study examines conditions only in the future year (2019) and does not present results for conditions in (2014). While it is atypical to examine only the future year, the analysis does still examine the more conservative future year condition.

The study also focuses analysis on the weekday PM peak hour as the design hour. This hour has the highest volume of background traffic as well as relatively high site traffic generation. The study notes that while Saturday site traffic generation is higher than PM peak hour site traffic generation, the background traffic volumes during the Saturday peak hour are significantly lower than during the weekday PM peak hour and that cumulative traffic volumes post-construction will remain higher during the weekday PM peak hour. We agree that evaluation of the weekday PM peak hour results in the most conservative overall Build scenario traffic volumes. However, the relative increase in traffic volumes at the VT 116/Commerce Street intersection on Saturdays will be significant and we suggest this intersection be retimed following construction to allow for the most efficient operations possible given what will be very different demands for the various signal phases during weekend middays.

Outstanding Issues?

YES NO

4.0 TRIP GENERATION

The Hannaford TIA projects future traffic volumes for the grocery store using trip generation rates presented by the Institute of Transportation Engineers (ITE) publication *Trip Generation 8th Edition*. Since this study was initially conducted, and as noted in the Hannaford TIA, ITE has published an updated *Trip Generation 9th Edition*. A comparison of trip generation for the Supermarket land use (LU 850) between these two publications indicates the earlier 8th Edition is more conservative. Additionally, a VTrans study conducted in 2009 calculated local Vermont trip generation rates for many land uses, including supermarkets. This VTrans local trip generation is also lower than the 8th Edition ITE trip generation. Therefore, we believe the projections used in the Hannaford study are conservative and reasonable.

Outstanding Issues?

YES NO

5.0 TRIP DISTRIBUTION

The Hannaford TIA notes that primary trip distribution is based on “the geographic distribution of surrounding population” and that passby trip distribution is based on “existing traffic patterns”. Examination of the TIA appendix does not clearly indicate how the surrounding area population was determined for this distribution.

Additionally, when comparing the TIA distribution to the existing Lantman’s distribution observed in the VTrans turning movement counts at the VT 116/Charlotte Road/Lantman’s intersection, we see that, during the PM peak hour, approximately 77% of the Lantman’s traffic arrives from the north while the Hannaford study has assumed approximately 48% of traffic arrives from the north.

Because the distribution of traffic from the north and south could have implications on the necessary southbound left-turn lane storage length from VT 116 onto Commerce Street, we

¹ http://vtransplanning.vermont.gov/sites/aot_policy/files/documents/trafficresearch/VTransTISguidelinesOct2008.pdf



would like to see more information regarding the underlying assumptions used to determine the trip distribution in the TIA, and/or a revised analysis assuming an overall distribution matching the existing Lantman's traffic distribution.

Outstanding Issues?

YES NO

6.0 TRAFFIC CONGESTION ANALYSIS

The Hannaford TIA relies on methodologies outlined in the 2000 Highway Capacity Manual (HCM) to quantify delay and congestion at the study area intersections and utilizes the Synchro and HCS software programs to implement calculations. Both the underlying resource and software tools used here are consistent with industry standards. However, we note that the version of Synchro used in this analysis is version 6.0 and that two additional versions have since been released. While the edition of Synchro used is not in itself important, we note that an error in how Synchro 6 calculates a factor called Total Lost Time at signalized intersections was corrected in later versions, and if not corrected manually by a user of Synchro 6, two extra seconds of green time, on average, are often applied to each vehicle phase every cycle throughout the peak hour in calculating HCM delays. After reviewing the appendix documents, we note that this error has not been corrected. We suspect adjusting this factor (changing total lost time from 4 to 6 seconds) will increase calculated HCM delays by a few seconds. However, this adjustment would be seen in both the No Build and Build conditions and is not deemed to result in significant changes to the results.

While we agree with the methodology used for the congestion analysis, we note that the projected delay for eastbound Silver Street traffic at the VT 116/Silver Street intersection is 40 seconds per vehicle on average during the afternoon peak hour. This corresponds with an LOS E for this approach in the Build scenario. The *VTrans Traffic Impact Study Guidelines* state:

"VTrans LOS Policy for two-way stop controlled intersections is to maintain a LOS "D," or better, for side roads with volumes exceeding 100 vehicles/hour for a single lane approach, or 150 vehicles/hour for a two lane approach. No LOS criteria are in effect for volumes less than these."¹

At this intersection the design hour volumes show 207 eastbound left-turns and 7 eastbound right turns, for a total approach volume of 214 vehicles per hour. Thus, the build condition on Silver Street does not comply with VTrans policy. While we understand these guidelines do not represent an absolute standard and that reduced levels of service may be acceptable in certain circumstances, we believe additional investigation into potential improvements at this intersection should be considered given the presence of a designated High Crash Location through this intersection (discussed in Section 7.0). In regards to LOS policy at unsignalized intersections, the VTrans guidelines go on to state:

"VTrans' main objective at unsignalized two-way stop controlled intersections is to minimize potential consequences when vehicle operators exit stop-controlled side streets by accepting unsafe gaps in the major street through traffic."

We recommend the detailed crash reports at this intersection be reviewed to determine the degree to which vehicles entering VT 116 traffic with unacceptable gaps has led to crashes at this intersection in the past few years (i.e. post intersection reconfiguration). If this proves to be a major cause of crashes here, additional intersection improvements may be warranted.

If trip distribution assumptions are updated in the TIA to follow more closely with the existing Lantman's distribution (per Section 5.0 recommendation), this intersection will see fewer new project trips and the increase in delay will be correspondingly less.

¹ http://vtransplanning.vermont.gov/sites/aot_policy/files/documents/trafficresearch/VTransTISguidelinesOct2008.pdf



Outstanding Issues?
 YES NO

7.0 SAFETY ANALYSIS

Following standard procedure, the TIA examined crash data for the most recent 5 years of available data and investigated VTrans designated High Crash Locations in the project study area. As noted in the TIA, there are two designated HCLs in the project study area and two additional HCLs nearby on Mechanicsville Road northeast of the project study area. Identified HCL locations include:

- VT 116/Shelburne Falls Road/CVU Road intersection,
- 0.3 mile segment along VT 116 from Silver Street to the north,
- 0.3 mile segment along Mechanicsville Road through the CVU Road/Mechanicsville Road intersection,
- 0.3 mile segment along Mechanicsville Road northeast of the CVU Road/Mechanicsville Road intersection.

The two HCLs within the study area have both been targeted by VTrans in recent years for safety improvements. At the VT 116/Shelburne Falls Road/CVU Road intersection, VTrans is currently designing a new intersection configuration that will upgrade the signal and add new left-turn lanes. Additionally, at the VT 116/Silver Street intersection, VTrans has recently conducted an intersection improvement project, which realigned the intersection and added a new southbound right-turn lane.

At the VT 116/Shelburne Falls Road/CVU Road intersection, we believe the planned roadway improvements will greatly improve overall intersection safety, and project this intersection will function effectively and safely with these improvements in place.

At the VT 116/Silver Street intersection, we believe the recent VTrans improvements should be beneficial to overall safety. However, we note the TIA projects relatively long Build scenario delays for the stop-controlled Silver Street approach to this intersection, along with LOS E conditions during the PM peak hour. Additionally, without a detailed investigation of the actual crash reports for the 16 crashes within this HCL, it is impossible to know if the recent VTrans improvements led to a decrease in crashes and could prevent similar crashes in the future.

We suspect at least some portion of the crashes at this intersection were attributed to eastbound left-turning vehicles from Silver Street onto VT 116 northbound failing to yield right-of-way to through traffic on VT 116. This type of crash is often associated with long delays leading to vehicles accepting less-than adequate gaps in through traffic. We suggest detailed crash reports be reviewed at this location. Additionally, if a VTrans Road Safety Audit was performed at the intersection, it should be reviewed to see if additional improvements were identified that could be pursued to further help reduce future crashes at this location.

Additionally, the TIA notes that the effect of VTrans improvements at the VT 116/Silver Street intersection could not yet be observed in crash data reports, because this improvement was conducted so recently. We understand these improvements were installed in 2009. In 2011, when the initial TIA was conducted, data would not have been available for post-improvement years. However, at this point in time, VTrans crash data is available through 2012, and we suggest this data be examined.

Outstanding Issues?
 YES NO

8.0 MITIGATION

To mitigate traffic related impacts, Hannaford is proposing the following mitigation measures by intersection:

VT 116/Commerce Street



- Increase southbound left-turn lane storage from 75 feet to 175 feet;
- Increase westbound right-turn lane storage from 85 feet to 270 feet;
- Relocate the Firehouse Plaza’s western access 130+/- feet to the east; and
- Stripe and sign “Do Not Block Intersection” area on Commerce Street through the Jolley Mobil’s western access.

We believe extending the southbound left and westbound right-turn lanes will benefit operations at this intersection. However, we suggest the overall storage lengths be revisited to address several issues:

1. We have reviewed the turn-lane dimensions calculations and believe there is an error in how the total storage length is calculated relating to a misinterpretation of the “Additional Storage” component of the turn lane calculation.¹ Considering the VTrans prescribed methodology for calculating turn lane dimensions, we believe the overall dimension of 540’ is appropriate for future traffic projections assumed in the study, but suggest the calculations be revisited to calculate correctly when considering the two other issues below. We have not seen calculations for the westbound right-turn lane dimensions but believe 270 feet of storage is reasonable;
2. The posted speed limit on VT 116 is currently 40 mph north of Commerce Street and transitions to 30 mph immediately north of Commerce Street. While a private developer cannot petition VTrans to alter speed limits on state roads, we suggest the Town consider petitioning to move the existing 30 mph speed limit sign farther north to allow for transition to slower prevailing speeds through the intersection and into the village area. If the Town is interested in pursuing this change, we suggest that turn lane dimensions be recalculated for a 30 mph speed limit to see if potential impacts to Patrick Brook could be avoided with a shorter required taper and centerline offset at 30 mph.
3. As noted previously in this memorandum, we believe actual trip distribution from the proposed Hannaford may ultimately follow more closely with the observed distribution accessing the current Lantman’s store and suggest the storage length calculations be revisited assuming a future distribution following the existing Lantman’s distribution.

We agree that potential conflicts could arise between the existing Commerce Street/Firehouse Plaza/Mobil and VT 116/Commerce Street intersections, due to the close proximity of these access points to VT 116 (<100 feet). Moving the Firehouse Plaza access to the east will improve access to the plaza and will help minimize conflicts between the two intersections. While signing and striping a “Do Not Block the Intersection” area in front of the Mobil access will help conditions for vehicles exiting this Mobil access, limiting this access to right-turn in and right-turn out access would further improve conditions here.

Hannaford also proposes to relocate the southbound left-turn lane from VT 116 onto Commerce Street to better accommodate delivery trucks accessing the site. To ensure that this configuration adequately accommodates the design vehicle, we recommend truck turning paths be evaluated for the design vehicle making a southbound left-turn from VT 116 onto Commerce Street, making a northbound right-turn from VT 116 onto Commerce Street, and making a westbound left or right turn from Commerce Street onto VT 116. Additionally, signal timings at this intersection should be checked with the proposed stop-bar configuration to ensure adequate clearance intervals (yellow and all-red time) are provided with the new geometry. These should be calculated following ITE guidelines.

¹ Additionally, the summation of turn lane components shown on Sheet C6 from O’Leary – Burke Civil Associates PLC. calculates a Total Length of 540’ while the summation of components on the right of the equation equals 545’.



Additionally, we recommend signal timings at this intersection be optimized post-construction for the weekday PM and Saturday/Sunday midday peak periods, to best accommodate future traffic volumes.

VT 116/Mechanicsville Road

- Provide \$25,000 in escrow to contribute towards potential signalization of this intersection in the future.

While the study projects long delays for traffic exiting Mechanicsville Road with or without the addition of project traffic, it also notes that actual current operations allow for left-turning traffic to exit Mechanicsville Road due to courteous drivers yielding on VT 116. Improved flows at the downstream VT 116/Charlotte Road intersection may also improve flows on VT 116 in front of Mechanicsville Road and may lead to less opportunity for VT 116 traffic to yield. However, this phenomenon cannot be easily modeled. We suggest post-construction monitoring of this intersection to determine if improvements may be necessary. Improvements, or a portion thereof, could be paid for with the pledged \$25,000 escrow funds if deemed necessary.

VT 116/Charlotte Road

- Replace eastbound and westbound split phasing with concurrent permitted left-turn phasing;
- Move the north/south crosswalk on the westbound (Lantman's) approach closer to the intersection to allow for the westbound stop bar to also move closer to the intersection;

We agree that replacing the existing eastbound and westbound split phasing at this intersection with concurrent permitted left-turn phasing will improve overall operations, particularly for VT 116 traffic. Appropriate signage and notifications should be posted prior to and immediately after this phasing change to ensure drivers are aware that both east- and westbound traffic will receive the green ball at the same time.

Moving the westbound stop bar closer to the intersection will also likely improve operational efficiency through the intersection and will allow for eastbound and westbound traffic to enter the intersection at the same time, and should help prevent eastbound left turning traffic¹ from assuming priority over westbound through and right-turning traffic², which could occur if eastbound traffic were to stop farther back from the intersection.

However, moving the stop bar closer to the intersection will also require moving the crosswalk (and approaching sidewalks) closer to the intersection as well, and we believe there may be physical constraints associated with realigning the sidewalk through the westbound approach, including a large tree and utility pole on the northeast corner of the intersection. The sidewalk alignment north and south of the intersection should be investigated further to determine the feasibility of this realignment.

VT 116/Silver Street

The TIA proposes no mitigation at the VT 116/Silver Street intersection. However, we note that Build scenario delays and level of service on Silver Street do not comply with the VTrans policy

¹ The eastbound left-turn volume is 117 vehicles per hour in the 2019 PM Peak Hour Build scenario.

² The westbound through and right-turn volumes are 14 vehicles per hour and 62 vehicles per hour, respectively, in the 2019 PM Peak Hour Build scenario.



for level-of-service at stop-controlled intersections and that VT 116 through this intersection is identified as a High Crash Location.

9.0 SUMMARY OF OUTSTANDING ISSUES:

- At the VT 116/Commerce Street intersection, weekend peak conditions should be examined post-construction and weekend peak period signal timings should be developed and implemented.
- Additional information should be provided on the underlying assumptions used to determine trip distribution patterns and/or a revised analysis should be conducted assuming an overall distribution matching the existing Lantman's traffic distribution.
- Storage length calculations at the VT 116/Commerce Street intersection should be recalculated following VTrans guidelines and account for potential speed limit changes as well as potential changes in the primary trip distribution pattern.
- The southbound VT 116 30 mph speed limit sign north of the VT 116/Commerce Street intersection should be moved farther north to encourage reduced speed through the intersection and village.
- Truck turning paths should be analyzed for all turning movements through the VT 116/Commerce Street intersection to ensure no conflicts exist with existing curb lines or stop bar placement.
- Appropriate signage and notifications should be posted prior to and immediately after the signal phasing change at the VT 116/Charlotte Road intersection is implemented to ensure drivers are aware that both east- and westbound traffic will receive the green ball at the same time.
- The proposed crosswalk and sidewalk configuration on the westbound approach of the VT 116/Commerce Street intersection should be investigated further to ensure this can be constructed.
- The Build scenario level-of-service at the VT 116/Silver Street intersection is LOS E, which does not comply with VTrans Policy for unsignalized intersections. Additionally, VT 116 through this intersection is identified as a High Crash Location. Crash data should be examined more closely at this intersection and justification should be provided confirming that projected LOS E conditions are acceptable and that additional site-generated traffic will not exacerbate existing safety issues at this intersection.

Please feel free to contact us with any questions on this review.

