Hannaford Supermarket

Hinesburg DRB Hearing
December 20, 2011

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Hannaford Supermarket Traffic Impacts

- **The Traffic Impact Assessment (dated July 20, 2011) was updated for the current application before the DRB.**

- **<u>Incorporated into the updated TIA were the following Project changes</u>:**
  - Drive-up pharmacy window was eliminated
  - Agreement reached to purchase and close Lantman's Supermarket (land and building not included)
  - TIA presents the results of intersection capacity analyses performed using standard Highway Capacity Manual procedures

- **Rick Bryant, P.E. of Llewellyn-Howley has reviewed the updated TIA at the Town's request**

- **<u>Hannaford Project Team input</u>**
  - Existing PM peak hour queues and delays do not match HCM output
  - Challenged L&D with identifying better solutions to improve traffic flow through Hinesburg village

Hannaford Supermarket Traffic Impacts

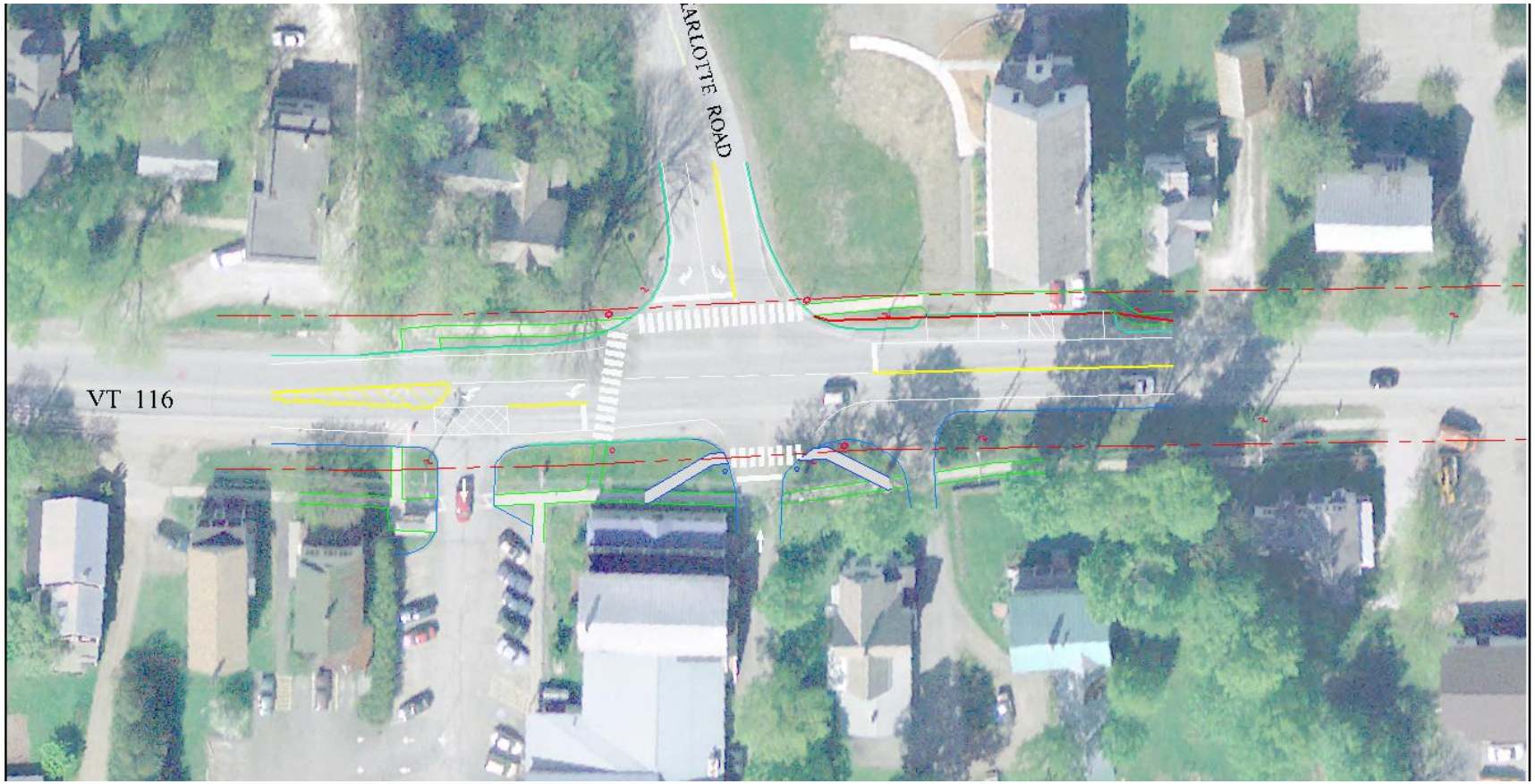
- **Performed a saturation flow rate study and additional intersection capacity analyses at the Charlotte Rd intersection**
  - The saturation flow rate study of southbound Route 116 traffic resulted in an observed rate of 1,500 vph. This includes the effects of uphill grade, trucks and turning vehicles
  - Reduced the southbound Route 116 ideal saturation flow rate from 1,700 vph to 1,600 vph. Using 1,600 vph, after adjustments for grade, trucks and turning vehicles produces an adjusted saturation flow rate of 1,475 vph
- **Examined numerous "what if" scenarios including added turn lanes**
- **Began to use simulation modeling to better analyze traffic congestion and queuing behavior**
- **Performed additional field observations and videotaping of existing intersection geometry and traffic flow**
- **The above analyses determined that replacing the existing EB/WB split phasing with simultaneous EB/WB phasing would result in the greatest improvement of traffic flow at the Charlotte Rd intersection**

Hannaford Supermarket Traffic Impacts

- **Initially proposed the EB/WB signal phasing change to VTrans and were turned down**

- **<u>Met with VTrans on October 31st to propose the following Charlotte Rd intersection modifications</u>:**
  - Change the existing split EB/WB signal phasing at Charlotte Rd to simultaneous EB/WB phasing
  - Add southbound left turn lane to enter Lantman's
  - Move Lantman's exit stop bar and sidewalk forward

Hannaford Supermarket Traffic Impacts



Hannaford Supermarket Traffic Impacts

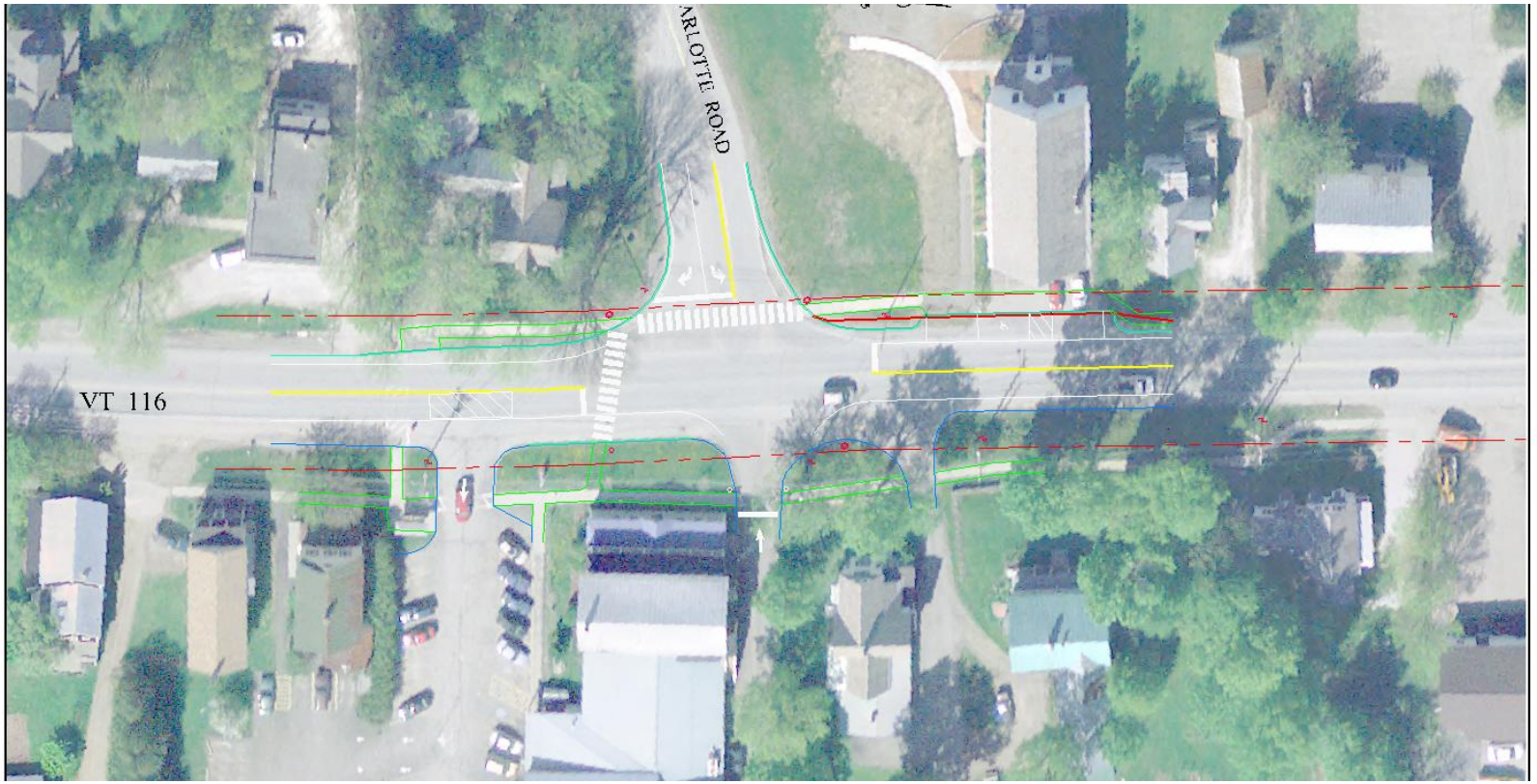
- **Conventional intersection capacity analyses indicated increased capacity and improved level of service for southbound VT 116 traffic**

Intersection/Approach	2017 No-Build - Split Phasing				2017 Build - Concurrent Phasing			
	LOS	Avg. Delay	v/C Ratio	95% Queue	LOS	Avg. Delay	v/C Ratio	95% Queue
116/Charlotte Rd/Lantman's								
Charlotte Rd EB LT	D	47	0.64	124'	D	46	0.68	165'
Charlotte Rd EB RT	D	38	0.04	0'	C	35	0.04	0'
Lantman's WB LT/TH/RT	D	49	0.69	188'	D	36	0.20	59'
VT 116 NB LT/TH/RT	B	10	0.42	318'	A	6	0.39	261'
VT 116 SB LT/TH/RT	F	92	1.01	1,081'	B	20	0.87	996'
Overall	**E**	**62**	**0.93**		**B**	**19**	**0.84**	

  - Split phasing analyses use existing pm signal timings (40 sec / 13 sec / 13 sec)
  - Concurrent phasing analyses are optimized (50 sec / 16 sec)

Hannaford Supermarket Traffic Impacts

- **East and West Approaches line up**



Hannaford Supermarket Traffic Impacts

- **East and West Approaches line up**

Hannaford Supermarket Traffic Impacts

- **Existing left-turn paths do not overlap**

Hannaford Supermarket Traffic Impacts

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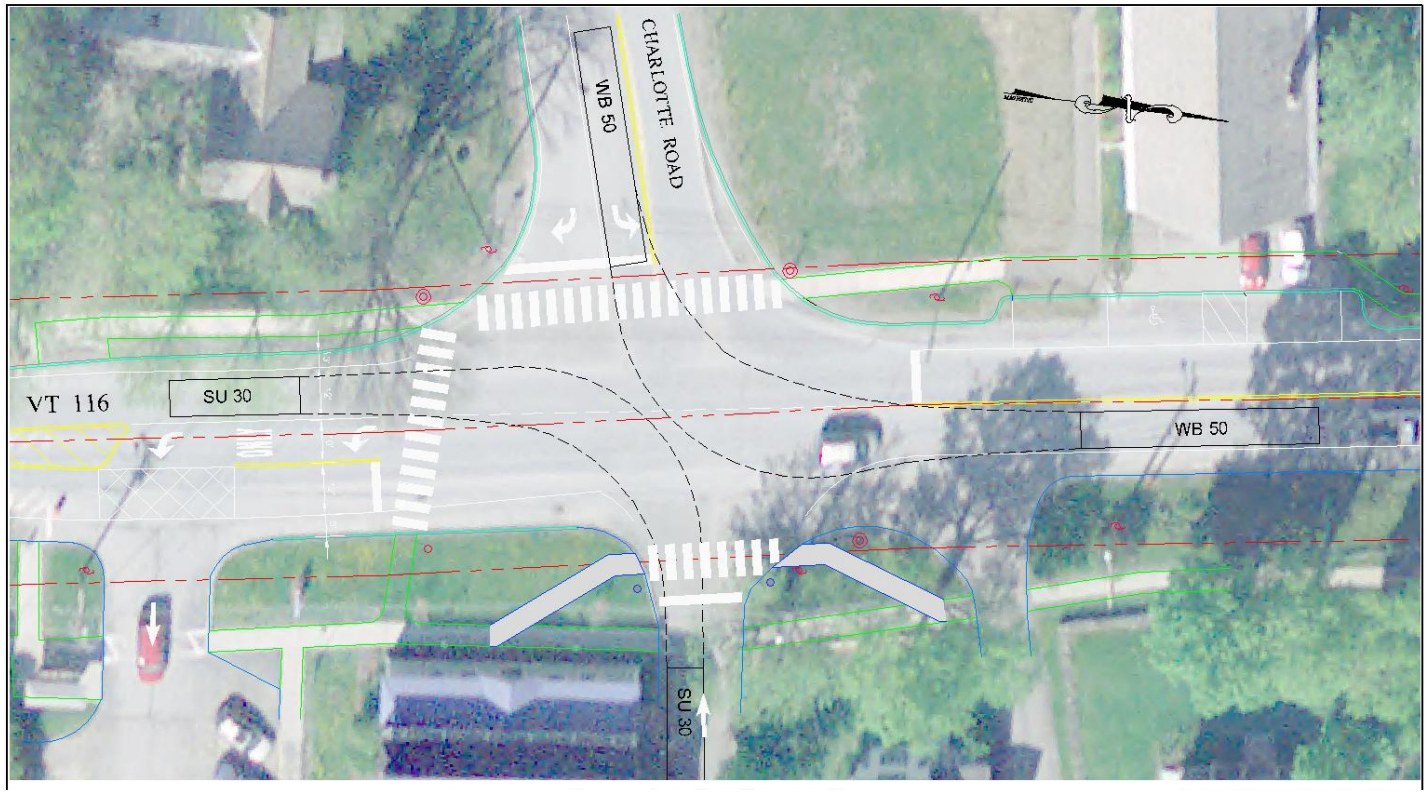

Hannaford Supermarket Traffic Impacts

- **East/West visibility across Route 116 is excellent**

Hannaford Supermarket Traffic Impacts

- VTrans requested additional information which was submitted on November 3rd
- Town of Hinesburg supported the proposed changes in a Memorandum dated November 28th to VTrans
- VTrans met on December 1st and approved the proposed changes

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- Having accomplished the above, we still needed to better analyze existing and future traffic conditions in Hinesburg village
- Computerized simulation of traffic flow in corridors having closely spaced intersections such as on Route 116 through Hinesburg village is being increasingly recommended
- The new 2010 *Highway Capacity Manual* recognizes simulation as an "alternative tool"

Hannaford Supermarket Traffic Impacts

- **A key prerequisite to using simulation, however, is to calibrate the model to existing conditions**

- **To help do that, we also observed traffic flow and performed delay studies at the Mechanicsville Road and Silver Street intersections in mid-November**

- **<u>Mechanicsville Rd Observations & Delay Study Results</u>**
  - When southbound Route 116 traffic is slowed (rolling queue) or stopped, Route 116 motorists begin to permit Mechanicsville Rd left-turns to enter on an alternating basis
  - Rick Bryant had also earlier similarly observed the above
  - Existing Mechanicsville Rd peak hour delay = 40 sec/veh (LOS E)
  - Maximum queue length = 9 vehicles; 95th percentile queue length = 5 vehicles

- **<u>Silver St Observations & Delay Study Results</u>**
  - Observed distinct platoons in southbound traffic resulting from upstream traffic signal at Charlotte Rd This typically increases available capacity and reduces delays compared to results of conventional HCM intersection capacity analyses
  - Existing Silver St peak hour delay = 19 sec/veh (LOS C)
  - Maximum queue length = 7 vehicles; 95th percentile queue length = 4 vehicles

Hannaford Supermarket Traffic Impacts

- **<u>Intersection capacity analysis software commonly used in Vermont includes</u>:**
  - Conventional capacity analyses of isolated intersections are typically performed using *Highway Capacity Software* (*HCS*)
  - Along corridors consisting of multiple closely spaced intersections where the objective is to coordinate traffic flow, conventional capacity analyses are typically performed and signal timings are optimized using *Synchro*
  - *Synchro* inputs (volumes, signal timings, etc.) are then used in *SimTraffic* simulation software

- ***SimTraffic* randomly generates individual vehicles using the input volumes, % trucks, % turns, etc. and tracks them as they travel through the corridor**

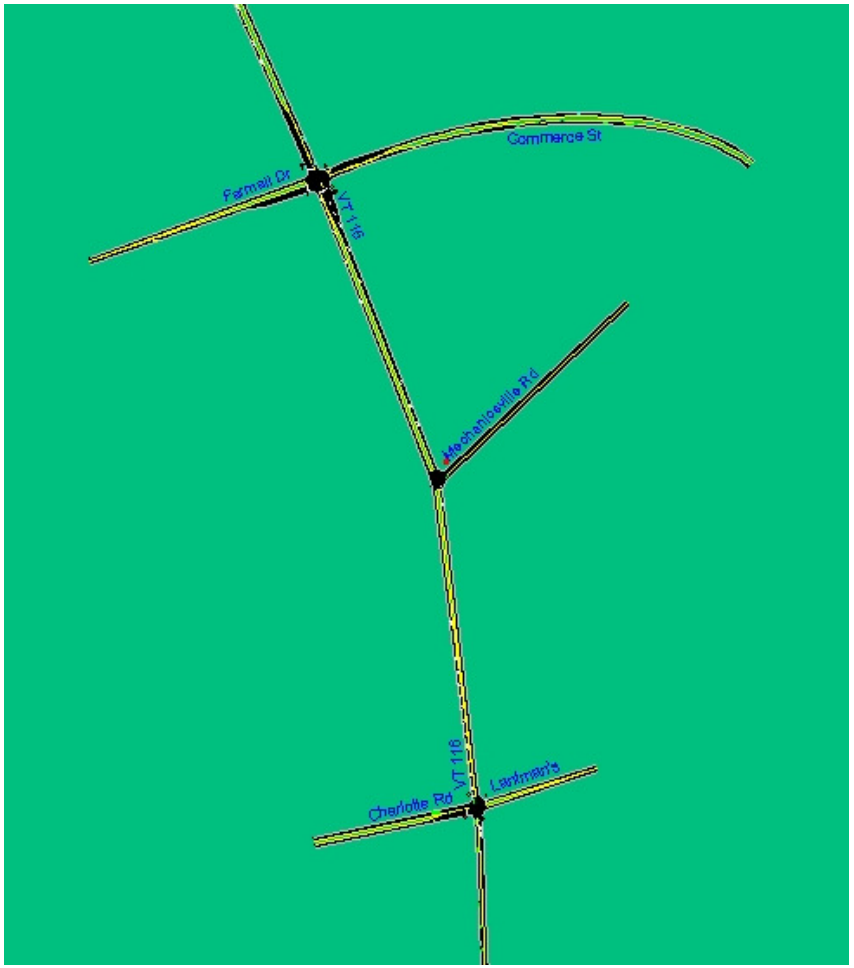
- **Each simulation is performed for a 60-minute peak hour time period. Because results can vary between individual simulations, a minimum of five simulations is recommended in order to calculate average delays. Maximum queue lengths are not averaged**

Hannaford Supermarket Traffic Impacts

- ***SimTraffic*** **models real-time traffic flow and queuing behavior**
- **Motorists perceive one continuous queue extending from Charlotte Rd north on Route 116**
- ***SimTraffic*** **revealed that there are separate queues at each intersection (Charlotte Rd, Mechanicsville Rd and Commerce St) that cumulatively add up to the full queue experienced by motorists**
- **Along Route 116 north of Charlotte Rd,** ***SimTraffic*** **also shows that that at any given point in time, there are often slow-moving "rolling" queues in places, and stopped queues in other places**
- **The** ***SimTraffic*** **model calibrates reasonably well with existing conditions**

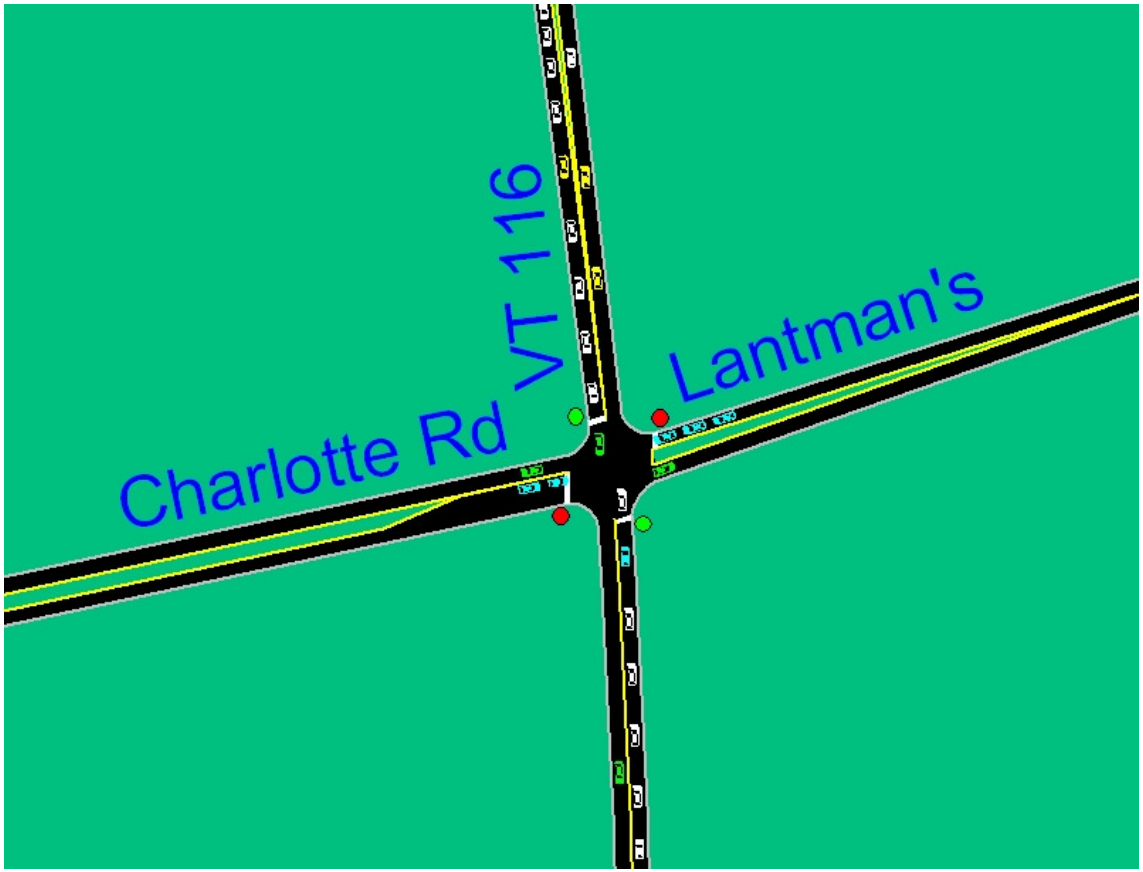
Hannaford Supermarket Traffic Impacts

- ***SimTraffic* Network – Hinesburg village**



Hannaford Supermarket Traffic Impacts

- ***SimTraffic* Network - Intersection Detail**



Hannaford Supermarket Traffic Impacts

- ***SimTraffic* Results – Commerce St & Mechanicsville Rd**

Intersection/Approach	2017 No-Build			2017 Build		
	LOS	Avg. Delay	Max. Queue	LOS	Avg. Delay	Max. Queue
Commerce St						
Farmall Dr LT/TH	C	25	60’	C	23	60’
Farmall Dr RT	B	14	71’	B	11	54’
Commerce St LT/TH	D	41	144’	-	-	-
Commerce St RT	A	6	124’	-	-	-
Commerce St LT	-	-	-	D	38	178’
Commerce St TH/RT	-	-	-	A	9	206’
Route 116 NB LT	C	31	94’	D	36	104’
Route 116 NB TH	B	15	302’	C	21	354’
Route 116 NB RT	A	7	100’	A	9	102’
Route 116 SB LT	D	40	177’	D	36	200’
Route 116 SB TH/RT	C	23	564’	C	24	452’
Overall	**C**	**22**		**C**	**24**	
Mechanicsville Rd						
VT 116 SB LT/TH	D	36	689’	A	4	95’
Mechanicsville Rd LT/RT	D	38	224’	F	71	318’

  - Reduced level of service and increased delay on Mechanicsville Rd levels in the Build analysis vs. the No-Build analysis is caused by eliminating yield control on the Route 116 southbound approach

Hannaford Supermarket Traffic Impacts

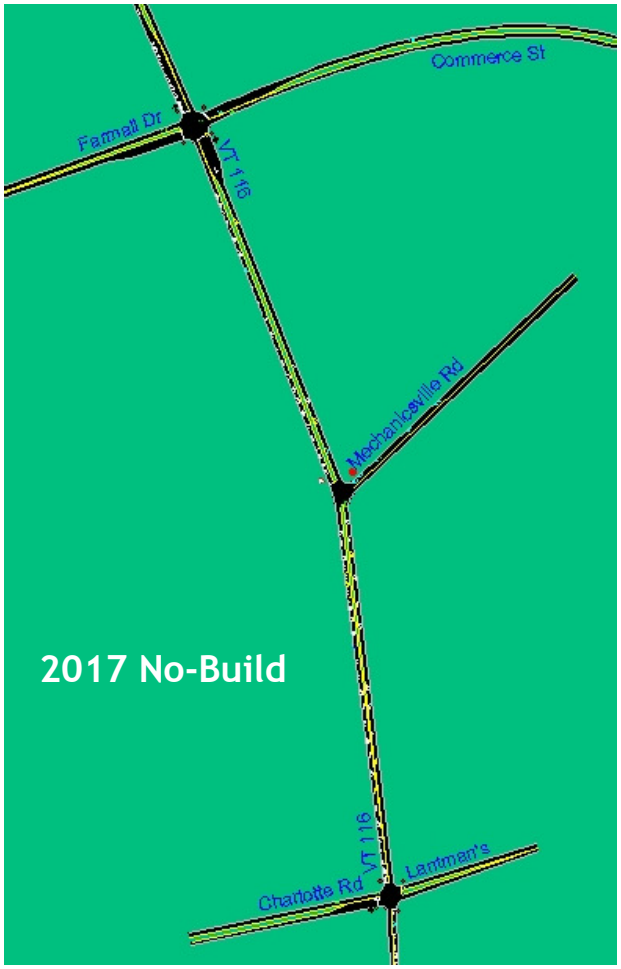
- ***SimTraffic* Results – Charlotte Rd**

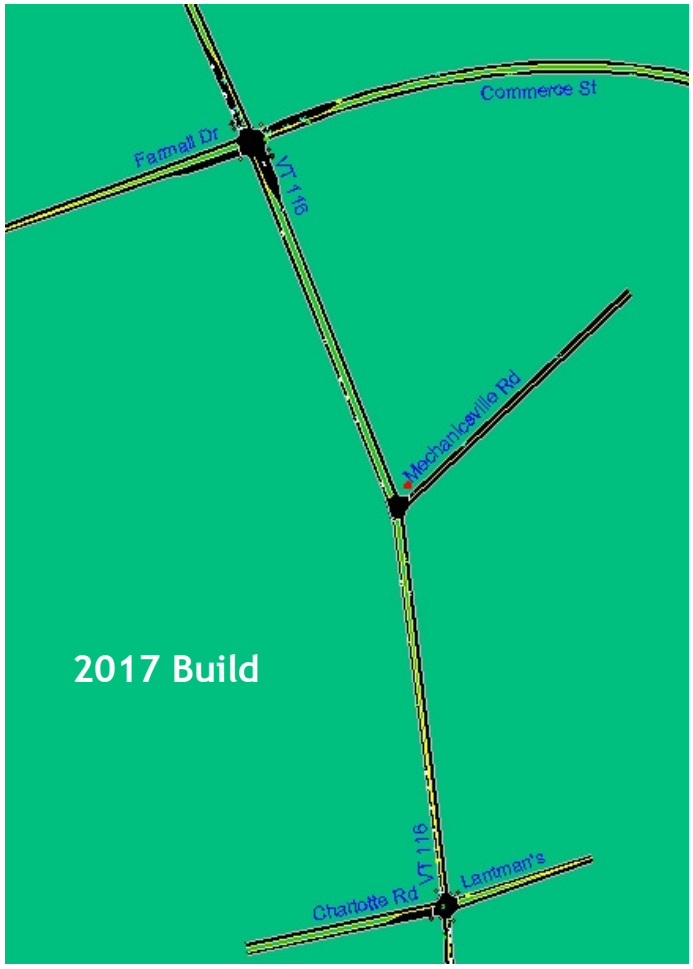
Intersection/Approach	2017 No-Build -Split Phasing			2017 Build - Concurrent Phasing		
	LOS	Avg. Delay	Max. Queue	LOS	Avg. Delay	Max. Queue
Charlotte Rd						
Charlotte Rd LT	D	38	100’	D	50	103’
Charlotte Rd RT	B	13	79’	B	18	195’
Lantman’s LT/TH/RT	D	46	192’	C	24	85’
Route 116 NB LT/TH/RT	D	44	631’	C	30	605’
Route 116 SB TH/RT	E	71	1,046’	C	20	842’
Overall	**E**	**58**		**C**	**25**	

  - 2017 No-Build analysis performed using existing split EB/WB signal phasing and existing pm signal timings (40 sec / 13 sec / 13 sec)
  - 2017 Build analysis performed using proposed simultaneous EB/WB signal phasing and non-optimized signal timings (53 sec / 13 sec)

Hannaford Supermarket Traffic Impacts

- ***SimTraffic* - Examples of Existing and Proposed Queue Lengths**





Hannaford Supermarket Traffic Impacts

Michael Oman's Trip Generation Projections for Lantman's

- **Unrealistic assumptions of future trip generation potential:**
  - Shopping Centers generally include a supermarket or other large anchor store. The average shopping center size in the ITE Shopping Center category for the pm peak hour time period equals 379,000 sq ft
  - Most recent (December 12th) projections assume a mix of co-located uses (offices, video rental store, drive-in bank and fast food restaurant) that is pure fantasy.
    - The assumed uses have been cherry-picked from the very highest trip generators
    - Technology has made video stores obsolete
    - Both a drive-in bank and a fast food restaurant would want to be located in the front of the building for visibility purposes

- **Even if the Lantman property should continue to generate pm peak hour trips at current levels, future traffic conditions at the Charlotte Rd intersection will still be improved over existing conditions. The proposed overall intersection level of service would be D instead of the no-build E rating**

Hannaford Supermarket Traffic Impacts

Lantman's Property Redevelopment

- **Future PM Peak Hour Trip Generation of entire 14,760 sq ft ground floor + 4 upstairs apartments:**
  - ≤50 peak hour trips
    - Residential
    - Medical Office
    - Factory Outlet Store
    - Hard Goods Retail (Department Store)
    - General Office
    - Specialty Retail Center
    - Health/Fitness Club
    - Furniture Store
  - ≤100 peak hour trips
    - Medical Office
    - Hardware/Paint Store
    - Free-Standing Discount Store
    - Apparel Store
  - ≤125 peak hour trips
    - Quality Restaurant
    - Automotive Parts Sales

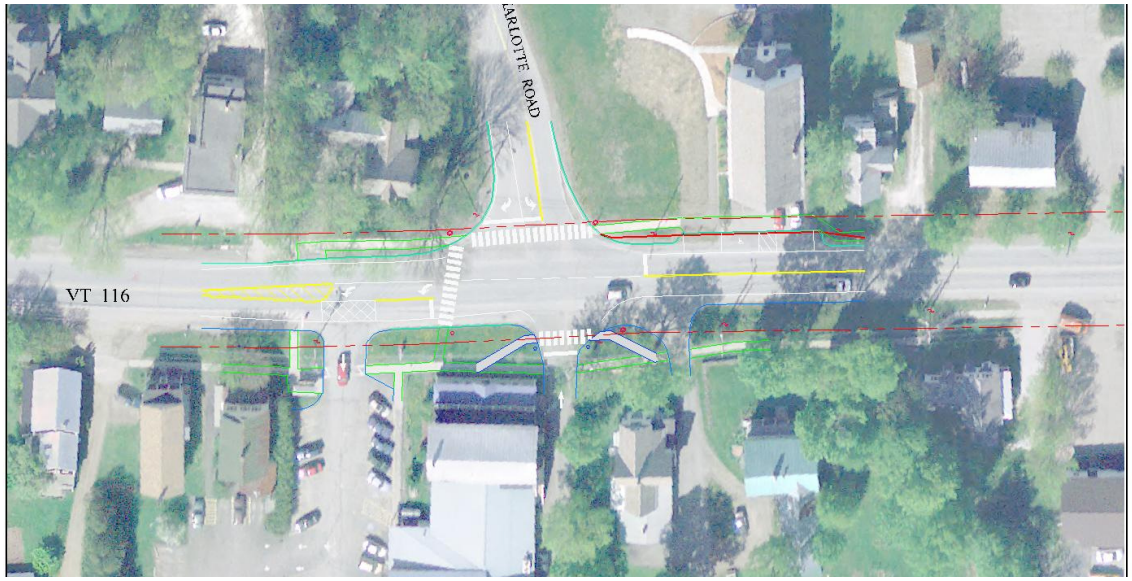
- **Future PM Peak Hour Trip Generation of two 7,380 sq ft ground floor modules + 4 upstairs apartments:**
  - ≤100 peak hour trips
    - High Turnover Restaurant + General Office
    - Health/Fitness Club + either General or Medical Office
  - ≤125 peak hour trips
    - Day Care Center + either Medical Office or Health/Fitness Club
    - High Turnover Restaurant + either Medical Office or Health/Fitness Club

Hannaford Supermarket Traffic Impacts

Northbound Left-Turns at Charlotte Rd

- **The proposed southbound left-turn pocket lane is not critical to the operation of the intersection or to the results presented herein. Our analyses are based on only two lanes, one lane in each direction, not the four "de-facto" lanes that presently exist**

- **There is ample room in the intersection for vehicles wanting to turn left to pull forward and for other vehicles to pass on the right**



Hannaford Supermarket Traffic Impacts

CVU Road/Shelburne Falls Rd Intersection Crash History

- **Of the 21 reported crashes for the 2005-2009 five-year period, only 7 of those occurred during the AM and PM peak periods and on days when school was in session**

- **The intersection itself is not a high crash location. VTrans' high crash location calculations for highway sections do not take into account the presence of a major intersection such as this**

Hannaford Supermarket Traffic Impacts

Summary - with Hannaford and the proposed Charlotte Rd modifications:

- **Delays at the Charlotte Rd intersection will decrease substantially with resulting improved levels of service**
- **PM peak hour queue lengths on Route 116 will decrease substantially south of Commerce St**
- **Hannaford's traffic impacts are not only fully mitigated, but will also result in a net overall improvement in traffic flow through Hinesburg village**