

Ref: 8586

January 29, 2021

Mr. Richard S. Novak, Chair
Zoning Board of Appeals
Town of Sherborn
19 Washington Street
Sherborn, MA 01770

Re: Response to Peer Review of Transportation Impact Assessments
Apple Hill Estates – 31 Hunting Lane
Sherborn, Massachusetts

Dear Chair Novak and Members of the Zoning Board of Appeals:

Vanasse & Associates, Inc. (VAI) is providing responses to the comments that were raised in the January 11, 2021 *Peer Review of Transportation Impact Assessments* prepared by Professional Services Corporation, PC (PSC) in reference to their review of the October 2020 *Transportation Impact Assessment* (the “October 2020 TIA”) prepared by VAI in support of the proposed Apple Hill Estates multifamily residential community to be located at 31 Hunting Lane in Sherborn, Massachusetts (hereafter referred to as the “Project”). Listed below are each of the comments pertaining to the October 2020 TIA identified in the subject letter followed by our response on behalf of the Applicant. Responses to the remaining comments will be provided by others under separate cover.

Comment 14: *Determine whether use of Butler Street minimizes travel time, particularly for westbound traffic during the PM peak hour by conducting timed vehicle runs along both Eliot Street and Butler Street.*

Response: A review of operating conditions at the Route 27/Route 16 intersection indicates that the Route 27 southbound approach operates with limited delay which, when combined with the complexity of the turning maneuvers required to access Butler Street from Hunting Lane and the need to cross both Route 27 and Route 16 at unsignalized intersections would limit the utility of the use of Butler Street by Project-related traffic. Any associated use of Butler Street by project-related traffic would likely be limited to vehicles entering the site that originated from Route 16, or less than five (5) vehicles per hour during the peak hours (based on the higher traffic volumes associated with the revised trip-generation calculations (discussion follows)).

Comment 15: *If warranted, expand the TSA to include the Butler Street/North Main Street (Rte. 27) Intersection.*

Response: As indicated above, the Project is not expected to result in an increase in traffic along Butler Street (less than five (5) vehicles per hour) that would warrant including the Route 27/Butler Street intersection in the study area that was assessed in the October 2020 TIA.

Comment 16: *Provide a copy of the 2016 ATR count on North Main Street north of Eliot St.*

Response: The requested information is attached.

Comment 17: *The 2020 Existing Traffic Volumes were adjusted upward from the volumes counted in 2016. Document the 2016 vs 2020 volume adjustment which are greater than the stated 1.5% per year.*

Response: As documented in the October 2020 TIA, the traffic volume data that was collected as a part of the automatic traffic recorder (ATR) count on Route 27 in 2020 (attached) were compared to the December 2016 traffic volumes that were collected at the same location. The April and December traffic volumes were both adjusted to average-month conditions and the 2016 traffic volumes were expanded to 2020 by applying a background traffic growth rate of 1.5 percent per year (documented in the October 2020 TIA) in order to allow for a comparison of the data. Based on this pre and post COVID-19 traffic count data comparison, the 2020 traffic volume data that was collected as a part of the October 2020 TIA was adjusted upward by 60 percent in order to account for the reduced traffic volumes resulting from the phased “Reopening Massachusetts” plan and the absence of school related traffic. The COVID-19 adjustment factor calculations and supporting data are attached.

The 2016 turning movement counts were not subject to the 60 percent adjustment as they were not impacted by the restrictions associated with the COVID-19 pandemic, and were adjusted to 2020 traffic volume conditions by applying the 1.5 percent per year compounded annual background traffic growth rate (after being seasonally adjusted to average-month conditions).

Comment 18: *Provide copies of any 2020 TMCs. In particular, we note that TMCs are not provided for the Hunting Lane/North Main Street (Rte. 27) Intersection for either 2016 or 2020.*

Response: Manual Turning Movement counts (TMCs) were not conducted in 2020. Traffic volumes at the Route 27/Hunting Lane intersection were developed using the adjusted (COVID-19) peak-hour data obtained from the ATR that was conducted on Hunting Lane west of Route 27 to establish the entering and exiting traffic volumes for Hunting Lane and the traffic volumes on Route 27 at the intersection were derived from the peak-hour traffic volumes at the Route 27/Route 16 intersection, with the assumption that traffic volumes should balance between the intersections (i.e., no material increase or decrease in traffic volumes should occur).

Comment 19: *Verify that the 2020 ATR count of 17,375 (adjusted?) on North Main Street north of Eliot St. is actually 234% of the counted 2020 volume of 7,432.*

Response: In order to verify the average weekday traffic volumes on North Main Street (Route 27) that was presented in the October 2020 TIA, traffic volume data was obtained from a 2019 automatic traffic recorder count that was conducted by MassDOT on Route 27 south of Elliot Street. The subject data was collected on June 3rd (Monday) and 4th (Tuesday) in 2019 and reported an average daily traffic volume of 24,462 vehicles and 25,041 vehicles, respectively, over a 24-hour period. The December 2016 ATR that



was conducted on Route 27 and was the basis of the average weekday traffic volume that was presented in the October 2020 TIA indicated weekday traffic volumes of approximately 15,155 vehicles per day on a weekday which, when seasonally adjusted and expanded to 2020 by applying the 1.5 percent per year compounded annual background traffic and the seasonal adjustment, would represent approximately 17,375 vehicles per day.

Comment 20: *Revise the TIA to incorporate trip generation based on “Single-Family Detached Housing (210)” for 28 dwelling units.*

Response: As requested, the trip-generation calculations for the Project were revised using Institute of Transportation Engineers (ITE)¹ Land Use Code 210, *Single-Family Detached Housing*, the results of which are summarized in Table 5.

Table 5R
TRIP GENERATION SUMMARY

Time Period	Vehicle Trips ^a		
	Entering	Exiting	Total
<i>Average Weekday:</i>	161	161	322
<i>Weekday Morning Peak-Hour:</i>	6	19	25
<i>Weekday Evening Peak-Hour:</i>	19	11	30

^aBased on ITE LUC 210, *Single-Family Detached Housing*; 28 dwelling units.

Figure 6R in the attachments reflects the assignment of the revised traffic volume estimates for the Project to the study area intersections, with Figure 7R depicting the revised 2027 Build condition traffic volumes. Tables 9R and 10R included in the attachments summarize the revised traffic operations analyses for the 2027 Build condition.

A comparison of the analysis results shown in Tables 9R and 10R using the higher traffic volume projections for single-family homes to establish the traffic characteristics of the Project to those presented in Tables 9 and 10 of the October 2020 TIA indicates that the only material change occurred at the intersection of Route 27 at Hunting Lane during the weekday morning peak-hour, where the higher traffic volumes increase the average motorist delay for the Hunting Lane approach by 3.8 seconds which resulted in the level-of-service (LOS) degrading from LOS D to LOS E, and the predicted vehicle queue increasing from one (1) to two (2) vehicles, neither of which would be considered significant.

¹*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.



Comment 21: *The TIA should be revised to discuss delays for all eastbound turns exiting from Hunting Lane due to blockage of the intersection by vehicle queues from the Eliot Street (Rte. 16) /North Main Street (Rte. 27) Intersection.*

Response: During the weekday evening peak-hour, the 95th percentile vehicle queue on the Route 27 southbound approach to Route 16 will extend past Hunting Lane, which is located approximately 500 feet north of Route 16; the average vehicle queue during the weekday evening peak-hour and both the average and 95th percentile vehicle queues during the weekday morning peak-hour do not block the roadway. Table 9R indicates that all movements exiting from Hunting Lane to Route 27 will operate at LOS E during the weekday morning peak-hour and at LOS D during the weekday evening peak-hour under 2027 Build conditions. During the distinct period within the weekday evening peak-hour when vehicle queues from the Route 27/Route 16 intersection block Hunting Lane (approximately 95 percent of the time during the peak-hour the intersection will not be blocked), motorist delays and the resulting residual vehicle queuing may be longer than predicted by the analysis model; however, the queue can be contained along Hunting Lane without impeding the movement of vehicles, pedestrians and bicyclists along Route 27.

In conjunction with the Project, the Applicant has committed to design and implement an optimal traffic signal timing and phasing plan for the intersection subject to receipt of all necessary rights, permits and approvals, with the goal of reducing motorist delays and vehicle queuing.

Comment 22: *The TIA should also estimate the duration queues long enough to block the intersection.*

Response: The predicted 95th percentile vehicle queue from the Route 27/Route 16 intersection was shown to extend past Hunting Lane during specific periods within the weekday evening peak period (4-6 PM) and would be limited in duration, or approximately 3 minutes total within a 60-minute period (i.e., 95 percent of the time during the peak period Hunting Lane would not be blocked). Outside of this distinct period, vehicle queues do not extend past Hunting Lane.

Comment 23: *Revise the TIA to provide a Construction Phase TDM Plan.*

Response: A draft Construction Management Plan (CMP) is attached and will be refined in consultation with the Police Department and the Department of Public Works as the Site Plans are advanced.

Comment 24: *The Applicant's Team should develop a plan and profile of Hunting Lane between North Main Street and the site entrance and identify locations where sight distance is not sufficient for a design speed of 35 miles per hour (recommended to accommodate a posted speed of 30 mph). The plan should also recommend long term improvements to remain in place after construction. Recommended improvements should respect the rural character of the roadway and improvements may be minimized to preserve the rural character of the roadway. Care should be taken to avoid increasing travel speed.*



Response: VAI conducted field measurements of lines of sight along Hunting Lane between the Project site access and Route 27. The filed measurements were performed at 100-foot intervals along the roadway in both directions of travel and were performed in accordance with the methodology established by the American Association of State Highway and Transportation Officials (AASHTO)² for measuring stopping sight distance (SSD) along a roadway. Figure 1A in the attachments summarizes the results of the field measurements and identifies those locations where the available SSD was found to be below the recommended value for the posted speed limit along Hunting Lane, which varies between 20 and 30 miles per hour (mph).

As can be seen on Figure 1A, the only location where the measured SSD was found to be below the recommended minimum value for safe operation was in the eastbound direction (traveling toward Route 27) at the midpoint between the railroad crossing and Route 27, where the horizontal curvature of Hunting Lane limited the available sight line. With the selective trimming/removal of vegetation along the inside of the curve, the available sight lines can be improved to meet or exceed the recommended minimum sight distance for the posted speed limit. The Applicant will undertake the recommended vegetation maintenance activities in the subject area and within the public right-of-way subject to receipt of all necessary rights, permit and approvals.

Comment 25: *A plan should be provided showing recommended temporary improvements for the construction phase. It may be appropriate to remove some of these improvements following completion of construction.*

Response: No temporary improvements appear to be required outside of the selective trimming or removal of roadside vegetation to accommodate construction activities associated with the Project.

Comment 26: *The Applicant's Team should confer with the Sherborn Police Department and initiate consideration of construction phase traffic controls including use of uniformed traffic officers.*

Response: A draft Construction TMP is attached and will be refined in consultation with the Police Department and the Department of Public Works as the Site Plans are advanced, and will include the use of police detail officers when appropriate and required by the Police Department.

²A Policy on Geometric Design of Highway and Streets, 7th Edition; American Association of State Highway and Transportation Officials (AASHTO); Washington D.C.; 2018.



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Page 6 of 6

We trust that this information is responsive to the comments that were raised in the January 11, 2021 *Peer Review of Transportation Impact Assessments* prepared by PSC pertaining to the October 2020 TIA. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact me.

Sincerely,

VANASSE & ASSOCIATES, INC.



Jeffrey S. Dirk, P.E., PTOE, FITE
Managing partner

Professional Engineer in CT, MA, ME, NH, RI and VA

JSD/jsd

Attachments

cc: G. Barsky - Barsky Estate Realty Trust
L. Sweet – LDS Consulting Group (via email)
File



ATTACHMENTS

AUTOMATIC TRAFFIC RECORDER COUNT DATA
COVID-19 ADJUSTMENT DATA
TRIP-GENERATION CALCULATIONS
TRAFFIC VOLUME NETWORKS
TRAFFIC OPERATIONS ANALYSIS SUMMARY TABLES
CAPACITY ANALYSIS WORKSHEETS
DRAFT CONSTRUCTION MANAGEMENT PLAN
HUNTING LANE SIGHT DISTANCE STUDY



AUTOMATIC TRAFFIC RECORDER COUNT DATA





PRECISION
D A T A
INDUSTRIES, LLC

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North Main Street (Route 27)
north of Eliot Street (Route 16)
City, State: Sherborn, MA
Client: Green International/ J. Sobel
NB

165403 A Class
Site Code: TBA

Start Time	Bikes	Cars & Trailers	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total
12/06/1														
6	0	8	1	0	0	0	0	1	0	0	0	0	0	10
01:00	0	5	2	1	0	1	0	0	0	0	0	0	0	9
02:00	0	6	0	0	0	0	0	0	0	0	0	0	0	6
03:00	0	14	3	0	1	0	0	0	0	0	0	0	0	18
04:00	0	31	6	0	4	0	0	0	0	0	0	0	0	41
05:00	0	156	35	0	3	1	0	0	1	0	0	0	0	196
06:00	2	453	104	2	19	3	2	2	0	1	0	0	0	588
07:00	4	573	100	8	18	7	7	3	2	0	0	0	0	722
08:00	2	708	92	10	19	4	4	3	5	0	0	0	0	847
09:00	1	515	89	0	18	6	7	0	1	0	0	0	0	637
10:00	3	445	96	3	14	8	2	2	3	0	0	0	0	576
11:00	1	369	69	11	15	3	5	2	1	0	0	0	0	476
12 PM	4	375	63	1	13	6	2	2	1	0	0	0	0	467
13:00	2	282	65	1	10	4	4	3	2	0	0	0	0	373
14:00	5	317	61	1	12	10	2	0	3	0	0	0	0	411
15:00	8	295	54	5	4	4	0	0	0	0	0	0	0	370
16:00	7	287	46	0	9	3	0	0	1	0	0	0	0	353
17:00	3	320	38	1	5	2	0	0	1	0	0	0	0	370
18:00	6	264	29	2	2	2	0	0	1	0	0	0	0	306
19:00	2	169	22	0	4	0	0	0	0	0	0	0	0	197
20:00	0	135	17	1	1	1	0	0	0	0	0	0	0	155
21:00	0	118	9	0	1	0	0	0	0	0	0	0	0	128
22:00	0	67	3	0	2	0	0	0	0	0	0	0	0	72
23:00	0	33	3	0	0	0	0	0	0	0	0	0	0	36
Percent	0.7%	80.7%	13.7%	0.6%	2.4%	0.9%	0.5%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	06:00	11:00	06:00	10:00	07:00	07:00	08:00	06:00				08:00
Vol.	4	708	104	11	19	8	7	3	5	1				847
PM Peak	15:00	12:00	13:00	15:00	12:00	14:00	13:00	13:00	14:00					12:00
Vol.	8	375	65	5	13	10	4	3	3					467



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12/07/1														
6	0	15	3	0	0	0	0	0	0	0	0	0	0	18
01:00	0	8	1	1	0	0	0	0	0	0	0	0	0	10
02:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
03:00	0	9	0	0	0	0	0	0	0	0	0	0	0	9
04:00	0	28	6	0	3	0	0	0	0	0	0	0	0	37
05:00	1	155	38	0	3	1	0	0	0	0	0	0	0	198
06:00	0	489	112	2	20	3	0	1	1	0	0	0	0	628
07:00	4	578	112	2	17	5	3	2	2	0	0	0	0	725
08:00	3	692	98	14	12	10	3	3	0	0	0	0	0	835
09:00	1	585	69	1	10	10	3	1	1	0	0	0	0	681
10:00	2	415	71	1	20	3	1	0	1	0	0	0	0	514
11:00	3	443	72	2	15	4	2	2	2	0	0	1	0	546
12 PM	3	394	65	2	17	8	6	1	0	0	0	0	0	496
13:00	7	315	63	2	16	7	7	5	0	1	0	0	0	423
14:00	2	311	54	4	11	6	0	0	1	0	0	0	0	389
15:00	5	321	46	1	10	5	0	1	0	0	0	0	0	389
16:00	8	310	50	2	8	4	0	1	2	0	0	0	0	385
17:00	9	327	45	1	3	1	0	0	0	0	0	0	0	386
18:00	7	261	28	0	3	0	0	0	0	0	0	0	0	299
19:00	0	196	23	1	2	0	0	0	0	0	0	0	0	222
20:00	1	125	15	0	0	0	0	0	0	0	0	0	0	141
21:00	0	140	15	1	3	1	0	0	0	0	0	0	0	160
22:00	0	73	6	0	2	0	0	0	1	0	0	0	0	82
23:00	0	21	5	0	2	0	0	0	0	0	0	0	0	28
Percent	0.7%	81.7%	13.1%	0.5%	2.3%	0.9%	0.3%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	08:00	06:00	08:00	06:00	08:00	07:00	08:00	07:00			11:00		08:00
Vol.	4	692	112	14	20	10	3	3	2			1		835
PM Peak	17:00	12:00	12:00	14:00	12:00	12:00	13:00	13:00	16:00	13:00				12:00
Vol.	9	394	65	4	17	8	7	5	2	1				496



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12/06/1														
6	0	26	3	0	1	0	0	1	0	0	0	0	0	31
01:00	0	4	4	0	1	0	0	0	0	0	0	0	0	9
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	1	0	0	0	0	0	0	0	1
04:00	0	11	3	0	0	0	0	0	0	0	0	0	0	14
05:00	0	41	14	0	0	0	0	0	1	0	0	0	0	56
06:00	2	155	44	1	7	5	0	0	3	0	0	0	0	217
07:00	4	375	42	0	5	4	1	0	1	1	0	0	0	433
08:00	1	321	41	1	8	11	0	1	1	0	0	0	0	385
09:00	4	259	44	1	9	10	0	1	3	0	0	0	0	331
10:00	1	236	53	3	8	11	1	1	0	0	0	0	0	314
11:00	3	293	48	1	11	9	0	1	2	0	0	0	0	368
12 PM	0	359	45	2	6	4	0	0	2	0	0	0	0	418
13:00	3	431	69	5	7	4	0	1	2	0	0	0	0	522
14:00	8	506	66	2	16	3	1	1	2	0	0	0	0	605
15:00	10	563	70	2	7	9	0	2	1	0	0	0	0	664
16:00	11	612	56	0	7	6	2	1	0	0	0	0	0	695
17:00	14	611	44	1	1	2	1	0	0	0	0	0	0	674
18:00	5	567	30	2	1	2	0	1	0	0	0	0	0	608
19:00	0	399	19	0	1	0	0	0	0	0	0	0	0	419
20:00	0	303	20	2	0	0	0	0	0	0	0	0	0	325
21:00	0	245	15	0	2	0	0	1	0	0	0	0	0	263
22:00	0	126	9	1	1	0	0	0	0	0	0	0	0	137
23:00	0	67	5	0	0	0	0	0	0	0	0	0	0	72
Percent	0.9%	86.1%	9.8%	0.3%	1.3%	1.1%	0.1%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	
AM Peak	07:00	07:00	10:00	10:00	11:00	08:00	07:00	00:00	06:00	07:00				07:00
Vol.	4	375	53	3	11	11	1	1	3	1				433
PM Peak	17:00	16:00	15:00	13:00	14:00	15:00	16:00	15:00	12:00					16:00
Vol.	14	612	70	5	16	9	2	2	2					695



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12/07/1														
6	0	26	3	0	1	0	0	1	0	0	0	0	0	31
01:00	0	6	1	0	0	0	0	0	0	0	0	0	0	7
02:00	0	11	2	0	0	0	0	0	0	0	0	0	0	13
03:00	1	3	0	0	0	1	0	0	0	0	0	0	0	5
04:00	0	12	5	0	0	0	0	0	0	0	0	0	0	17
05:00	0	46	8	0	0	0	0	0	0	0	0	0	0	54
06:00	2	162	32	5	0	4	0	0	1	0	0	0	0	206
07:00	2	351	57	0	5	4	0	1	0	0	0	0	0	420
08:00	1	318	50	2	2	6	0	0	2	0	0	0	0	381
09:00	1	271	53	0	10	6	0	0	1	0	0	0	0	342
10:00	0	249	46	0	4	8	1	1	1	0	0	0	0	310
11:00	0	364	53	1	12	7	0	1	0	0	0	0	0	438
12 PM	1	396	55	1	9	6	0	1	2	0	0	0	0	471
13:00	1	418	55	0	7	13	0	2	1	0	0	0	0	497
14:00	2	526	64	1	12	14	2	1	2	0	0	0	0	624
15:00	6	631	84	0	2	5	0	0	0	0	0	0	0	728
16:00	9	598	48	0	3	4	1	0	0	0	0	0	0	663
17:00	12	600	50	0	1	2	1	0	0	0	0	0	0	666
18:00	8	597	37	0	2	2	0	0	0	0	0	0	0	646
19:00	2	375	28	0	1	0	0	0	0	0	0	0	0	406
20:00	1	349	7	0	0	0	0	0	0	0	0	0	0	357
21:00	1	264	19	0	0	0	0	0	0	0	0	0	0	284
22:00	0	115	7	0	0	0	0	0	0	0	0	0	0	122
23:00	0	72	8	0	0	0	0	0	0	0	0	0	0	80
Percent	0.6%	87.0%	9.9%	0.1%	0.9%	1.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	
AM Peak	06:00	11:00	07:00	06:00	11:00	10:00	10:00	00:00	08:00					11:00
Vol.	2	364	57	5	12	8	1	1	2					438
PM Peak	17:00	15:00	15:00	12:00	14:00	14:00	14:00	13:00	12:00					15:00
Vol.	12	631	84	1	12	14	2	2	2					728



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north of Eliot Street (Route 16)
City, State: Sherborn, MA
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NB

165403 A Speed
Site Code: TBA

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
12/06/ 16	0	0	0	1	4	4	1	0	0	0	0	0	0	10	38	35
01:00	0	0	0	1	3	4	1	0	0	0	0	0	0	9	38	35
02:00	0	0	0	1	0	3	2	0	0	0	0	0	0	6	41	37
03:00	0	1	0	0	8	8	1	0	0	0	0	0	0	18	37	34
04:00	0	0	0	2	10	18	9	2	0	0	0	0	0	41	41	37
05:00	0	0	1	7	81	86	21	0	0	0	0	0	0	196	38	35
06:00	1	2	1	38	252	256	36	2	0	0	0	0	0	588	38	34
07:00	4	8	26	91	320	231	38	2	1	0	0	0	1	722	37	33
08:00	6	6	20	132	325	306	49	3	0	0	0	0	0	847	37	33
09:00	1	3	5	76	231	259	55	5	2	0	0	0	0	637	38	34
10:00	5	11	18	57	181	222	76	5	0	0	0	1	0	576	38	34
11:00	4	4	3	36	188	178	59	3	0	0	0	1	0	476	38	35
12 PM	5	8	6	22	157	225	43	1	0	0	0	0	0	467	38	34
13:00	5	7	18	34	106	158	38	6	1	0	0	0	0	373	38	34
14:00	10	4	29	90	132	117	28	1	0	0	0	0	0	411	37	32
15:00	8	11	57	88	128	63	14	1	0	0	0	0	0	370	35	30
16:00	10	18	60	87	137	38	3	0	0	0	0	0	0	353	33	28
17:00	11	22	80	102	121	32	1	1	0	0	0	0	0	370	33	27
18:00	13	7	42	60	117	60	7	0	0	0	0	0	0	306	35	29
19:00	4	6	4	26	77	62	18	0	0	0	0	0	0	197	38	33
20:00	2	3	1	10	53	70	14	2	0	0	0	0	0	155	38	34
21:00	3	6	1	4	48	54	11	0	1	0	0	0	0	128	38	34
22:00	0	0	1	4	17	41	8	1	0	0	0	0	0	72	38	36
23:00	0	1	1	1	5	18	10	0	0	0	0	0	0	36	41	36
Total	92	128	374	970	2701	2513	543	35	5	0	0	2	1	7364		
%	1.2%	1.7%	5.1%	13.2%	36.7%	34.1%	7.4%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%			
AM Peak	08:00	10:00	07:00	08:00	08:00	08:00	10:00	09:00	09:00			10:00	07:00	08:00		
Vol.	6	11	26	132	325	306	76	5	2			1	1	847		
PM Peak	18:00	17:00	17:00	17:00	12:00	12:00	12:00	13:00	13:00					12:00		
Vol.	13	22	80	102	157	225	43	6	1					467		

Stats

15th Percentile : 26 MPH
50th Percentile : 32 MPH
85th Percentile : 37 MPH
95th Percentile : 40 MPH

Mean Speed(Average) : 33 MPH
10 MPH Pace Speed : 30-39 MPH
Number in Pace : 5214
Percent in Pace : 70.8%
Number of Vehicles > 35 MPH : 2596
Percent of Vehicles > 35 MPH : 35.3%



PRECISION
D A T A
INDUSTRIES, LLC

46 Morton Street, Framingham, MA 01702
Office: 508-875-0100 Fax: 508-875-0118
Email: datarequests@pdillc.com

North Main Street (Route 27)
north of Eliot Street (Route 16)
City, State: Sherborn, MA
Client: Green International/ J. Sobel
NB

165403 A Speed
Site Code: TBA

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
12/07/16	0	0	0	1	3	9	4	1	0	0	0	0	0	18	41	37
01:00	0	0	0	2	2	4	1	1	0	0	0	0	0	10	41	36
02:00	0	0	0	0	1	2	3	1	0	0	0	0	0	7	43	40
03:00	0	0	0	0	4	3	1	1	0	0	0	0	0	9	42	36
04:00	0	0	0	0	5	13	16	3	0	0	0	0	0	37	43	39
05:00	0	0	1	4	50	101	39	1	2	0	0	0	0	198	40	37
06:00	0	4	6	72	231	264	48	3	0	0	0	0	0	628	38	34
07:00	6	8	31	89	321	232	35	3	0	0	0	0	0	725	37	33
08:00	2	8	25	102	330	310	53	4	0	0	0	0	1	835	37	33
09:00	1	4	13	55	201	313	90	4	0	0	0	0	0	681	38	35
10:00	3	13	6	25	187	223	50	7	0	0	0	0	0	514	38	34
11:00	7	7	6	56	211	195	57	5	1	0	0	0	1	546	38	34
12 PM	6	8	21	56	230	148	25	1	1	0	0	0	0	496	37	33
13:00	3	1	11	46	181	147	33	1	0	0	0	0	0	423	37	34
14:00	8	5	22	55	167	101	28	2	1	0	0	0	0	389	37	32
15:00	10	7	45	76	159	78	14	0	0	0	0	0	0	389	36	30
16:00	15	12	79	113	132	32	2	0	0	0	0	0	0	385	33	28
17:00	9	7	88	123	134	22	3	0	0	0	0	0	0	386	32	28
18:00	7	2	39	55	123	66	7	0	0	0	0	0	0	299	36	30
19:00	1	1	1	21	99	85	13	1	0	0	0	0	0	222	37	34
20:00	0	2	2	6	61	60	9	1	0	0	0	0	0	141	38	34
21:00	0	4	1	10	52	76	16	1	0	0	0	0	0	160	38	35
22:00	0	2	1	4	28	29	17	1	0	0	0	0	0	82	40	35
23:00	0	0	0	1	9	14	4	0	0	0	0	0	0	28	38	36
Total %	78 1.0%	95 1.2%	398 5.2%	972 12.8%	2921 38.4%	2527 33.2%	568 7.5%	42 0.6%	5 0.1%	0 0.0%	0 0.0%	0 0.0%	2 0.0%	7608		
AM Peak Vol.	11:00 7	10:00 13	07:00 31	08:00 102	08:00 330	09:00 313	09:00 90	10:00 7	05:00 2				1	835		
PM Peak Vol.	16:00 15	16:00 12	17:00 88	17:00 123	12:00 230	12:00 148	13:00 33	14:00 2	12:00 1					496		

Stats

15th Percentile :	26 MPH
50th Percentile :	32 MPH
85th Percentile :	37 MPH
95th Percentile :	41 MPH
Mean Speed(Average) :	33 MPH
10 MPH Pace Speed :	30-39 MPH
Number in Pace :	5448
Percent in Pace :	71.6%
Number of Vehicles > 35 MPH :	2639
Percent of Vehicles > 35 MPH :	34.7%



PRECISION
D A T A
INDUSTRIES, LLC

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North Main Street (Route 27)
north of Eliot Street (Route 16)
City, State: Sherborn, MA
Client: Green International/ J. Sobel
SB

165403 A Speed
Site Code: TBA

Start Time	1 14	15 19	20 24	25 29	30 34	35 39	40 44	45 49	50 54	55 59	60 64	65 69	70 9999	Total	85th % ile	Ave Speed
12/06/ 16	0	0	0	7	13	8	3	0	0	0	0	0	0	31	37	33
01:00	0	0	0	3	5	1	0	0	0	0	0	0	0	9	33	31
02:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1	33	32
03:00	0	0	0	1	0	0	0	0	0	0	0	0	0	1	28	27
04:00	1	1	0	2	7	3	0	0	0	0	0	0	0	14	35	30
05:00	0	0	3	17	26	8	2	0	0	0	0	0	0	56	35	31
06:00	0	2	10	65	109	30	1	0	0	0	0	0	0	217	33	31
07:00	24	19	43	132	185	28	2	0	0	0	0	0	0	433	33	28
08:00	12	27	45	114	132	50	5	0	0	0	0	0	0	385	33	28
09:00	10	8	28	85	142	54	4	0	0	0	0	0	0	331	34	30
10:00	6	4	9	77	161	56	1	0	0	0	0	0	0	314	34	31
11:00	2	5	11	85	187	76	2	0	0	0	0	0	0	368	35	31
12 PM	2	9	20	88	211	82	6	0	0	0	0	0	0	418	35	31
13:00	6	13	41	167	219	74	2	0	0	0	0	0	0	522	33	30
14:00	56	54	104	191	168	29	3	0	0	0	0	0	0	605	32	25
15:00	274	150	161	51	28	0	0	0	0	0	0	0	0	664	23	16
16:00	329	176	182	8	0	0	0	0	0	0	0	0	0	695	21	14
17:00	308	187	170	9	0	0	0	0	0	0	0	0	0	674	21	14
18:00	159	107	159	93	76	13	1	0	0	0	0	0	0	608	28	20
19:00	2	13	29	154	196	24	1	0	0	0	0	0	0	419	33	29
20:00	0	2	9	114	167	33	0	0	0	0	0	0	0	325	33	30
21:00	0	1	2	60	156	42	2	0	0	0	0	0	0	263	34	32
22:00	0	0	3	37	78	19	0	0	0	0	0	0	0	137	33	31
23:00	0	4	2	9	25	28	4	0	0	0	0	0	0	72	37	33
Total	1191	782	1031	1569	2292	658	39	0	0	0	0	0	0	7562		
%	15.7%	10.3%	13.6%	20.7%	30.3%	8.7%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	08:00	08:00	07:00	11:00	11:00	08:00							07:00		
Vol.	24	27	45	132	187	76	5							433		
PM Peak	16:00	17:00	16:00	14:00	13:00	12:00	12:00							16:00		
Vol.	329	187	182	191	219	82	6							695		

Stats

15th Percentile :	13 MPH
50th Percentile :	26 MPH
85th Percentile :	33 MPH
95th Percentile :	36 MPH
Mean Speed(Average) :	25 MPH
10 MPH Pace Speed :	25-34 MPH
Number in Pace :	3861
Percent in Pace :	51.1%
Number of Vehicles > 35 MPH :	565
Percent of Vehicles > 35 MPH :	7.5%



PRECISION
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North Main Street (Route 27)
north of Eliot Street (Route 16)
City, State: Sherborn, MA
Client: Green International/ J. Sobel
SB

165403 A Speed
Site Code: TBA

Start Time	14	15	16	17	18	19	20	21	22	23	24	25	26	27	Total	85th %ile	Ave Speed
12/07/																	
16	0	0	1	11	13	4	2	0	0	0	0	0	0	0	31	35	31
01:00	0	0	0	4	3	0	0	0	0	0	0	0	0	0	7	32	29
02:00	0	0	0	3	7	2	0	1	0	0	0	0	0	0	13	36	33
03:00	0	0	0	4	0	1	0	0	0	0	0	0	0	0	5	35	29
04:00	0	1	1	5	4	5	1	0	0	0	0	0	0	0	17	37	31
05:00	0	1	3	16	25	8	1	0	0	0	0	0	0	0	54	34	31
06:00	1	3	14	62	99	27	0	0	0	0	0	0	0	0	206	33	30
07:00	49	7	26	138	180	20	0	0	0	0	0	0	0	0	420	32	27
08:00	2	9	31	141	159	36	3	0	0	0	0	0	0	0	381	33	29
09:00	6	6	21	118	148	42	1	0	0	0	0	0	0	0	342	33	30
10:00	1	5	21	85	157	41	0	0	0	0	0	0	0	0	310	33	30
11:00	4	17	43	124	202	47	1	0	0	0	0	0	0	0	438	33	29
12 PM	4	9	52	163	209	33	1	0	0	0	0	0	0	0	471	33	29
13:00	10	23	69	166	186	42	1	0	0	0	0	0	0	0	497	33	28
14:00	15	41	94	246	208	20	0	0	0	0	0	0	0	0	624	32	27
15:00	198	189	207	99	32	3	0	0	0	0	0	0	0	0	728	25	18
16:00	261	175	211	14	2	0	0	0	0	0	0	0	0	0	663	22	15
17:00	288	196	163	18	1	0	0	0	0	0	0	0	0	0	666	21	14
18:00	193	115	122	108	93	15	0	0	0	0	0	0	0	0	646	29	19
19:00	0	1	20	171	199	15	0	0	0	0	0	0	0	0	406	32	30
20:00	0	1	32	139	156	29	0	0	0	0	0	0	0	0	357	33	30
21:00	0	1	7	85	162	29	0	0	0	0	0	0	0	0	284	33	31
22:00	0	0	2	35	70	13	2	0	0	0	0	0	0	0	122	33	31
23:00	0	0	2	18	38	20	2	0	0	0	0	0	0	0	80	36	32
Total	1032	800	1142	1973	2353	452	15	1	0	0	0	0	0	0	7768		
%	13.3%	10.3%	14.7%	25.4%	30.3%	5.8%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			
AM Peak	07:00	11:00	11:00	08:00	11:00	11:00	08:00	02:00							11:00		
Vol.	49	17	43	141	202	47	3	1							438		
PM Peak	17:00	17:00	16:00	14:00	12:00	13:00	22:00								15:00		
Vol.	288	196	211	246	209	42	2								728		

Stats

15th Percentile : 14 MPH
50th Percentile : 26 MPH
85th Percentile : 32 MPH
95th Percentile : 34 MPH

Mean Speed(Average) : 25 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 4326
Percent in Pace : 55.7%
Number of Vehicles > 35 MPH : 378
Percent of Vehicles > 35 MPH : 4.9%



PRECISION
D A T A
INDUSTRIES, LLC

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North Main Street (Route 27)
north of Eliot Street (Route 16)
City, State: Sherborn, MA
Client: Green International/ J. Sobel

165403 A Volume
Site Code: TBA

Start	NB				SB				Combin ed		12/6/201 6 Tue		
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.		
12:00	5		130		12		83		17		213		
12:15	2		113		7		115		9		228		
12:30	2		114		7		115		9		229		
12:45	1	10	110	467	5	31	105	418	6	41	215	885	
01:00	1		90		3		122		4		212		
01:15	2		84		3		152		5		236		
01:30	2		105		1		129		3		234		
01:45	4	9	94	373	2	9	119	522	6	18	213	895	
02:00	3		94		0		131		3		225		
02:15	2		103		1		159		3		262		
02:30	1		106		0		146		1		252		
02:45	0	6	108	411	0	1	169	605	0	7	277	1016	
03:00	2		95		0		175		2		270		
03:15	6		98		1		164		7		262		
03:30	7		89		0		151		7		240		
03:45	3	18	88	370	0	1	174	664	3	19	262	1034	
04:00	4		89		2		182		6		271		
04:15	7		84		4		182		11		266		
04:30	16		107		4		167		20		274		
04:45	14	41	73	353	4	14	164	695	18	55	237	1048	
05:00	27		92		11		169		38		261		
05:15	37		104		10		167		47		271		
05:30	53		98		17		172		70		270		
05:45	79	196	76	370	18	56	166	674	97	252	242	1044	
06:00	106		77		20		176		126		253		
06:15	125		86		59		151		184		237		
06:30	171		65		65		152		236		217		
06:45	186	588	78	306	73	217	129	608	259	805	207	914	
07:00	201		56		78		124		279		180		
07:15	167		57		123		110		290		167		
07:30	152		47		116		91		268		138		
07:45	202	722	37	197	116	433	94	419	318	1155	131	616	
08:00	208		42		101		76		309		118		
08:15	189		40		106		87		295		127		
08:30	238		41		110		86		348		127		
08:45	212	847	32	155	68	385	76	325	280	1232	108	480	
09:00	203		33		76		70		279		103		
09:15	139		41		92		77		231		118		
09:30	106		28		83		51		189		79		
09:45	189	637	26	128	80	331	65	263	269	968	91	391	
10:00	165		20		82		50		247		70		
10:15	134		26		69		39		203		65		
10:30	148		20		78		21		226		41		
10:45	129	576	6	72	85	314	27	137	214	890	33	209	
11:00	121		10		80		27		201		37		
11:15	115		7		90		24		205		31		
11:30	127		11		110		8		237		19		
11:45	113	476	8	36	88	368	13	72	201	844	21	108	
Total	4126		3238		2160		5402		6286		8640		
Percent	65.6%		37.5%		34.4%		62.5%						
Day Total			7364				7562				14926		
Peak	08:00	-	12:00	-	07:15	-	03:45	-	07:45	-	03:45	-	-
Vol.	847	-	467	-	456	-	705	-	1270	-	1073	-	-
P.H.F.	0.890		0.898		0.927		0.968		0.912		0.968		



PRECISION
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North Main Street (Route 27)
north of Eliot Street (Route 16)
City, State: Sherborn, MA
Client: Green International/ J. Sobel

165403 A Volume
Site Code: TBA

Start	NB				SB				Combin ed		12/7/201 6 Wed			
Time	A.M.		P.M.		A.M.		P.M.		A.M.		P.M.			
12:00	3		125		12		112		15		237			
12:15	3		140		8		117		11		257			
12:30	6		110		3		120		9		230			
12:45	6	18	121	496	8	31	122	471	14	49	243	967		
01:00	2		89		2		126		4		215			
01:15	1		99		5		125		6		224			
01:30	2		122		0		121		2		243			
01:45	5	10	113	423	0	7	125	497	5	17	238	920		
02:00	2		103		4		155		6		258			
02:15	2		86		4		164		6		250			
02:30	2		104		4		144		6		248			
02:45	1	7	96	389	1	13	161	624	2	20	257	1013		
03:00	3		112		2		182		5		294			
03:15	1		102		0		189		1		291			
03:30	2		99		1		165		3		264			
03:45	3	9	76	389	2	5	192	728	5	14	268	1117		
04:00	5		98		0		176		5		274			
04:15	6		102		5		166		11		268			
04:30	11		84		7		156		18		240			
04:45	15	37	101	385	5	17	165	663	20	54	266	1048		
05:00	16		84		8		172		24		256			
05:15	28		106		14		156		42		262			
05:30	71		104		17		166		88		270			
05:45	83	198	92	386	15	54	172	666	98	252	264	1052		
06:00	109		75		35		170		144		245			
06:15	141		69		39		172		180		241			
06:30	187		85		54		172		241		257			
06:45	191	628	70	299	78	206	132	646	269	834	202	945		
07:00	198		71		83		100		281		171			
07:15	131		44		114		109		245		153			
07:30	202		56		100		105		302		161			
07:45	194	725	51	222	123	420	92	406	317	1145	143	628		
08:00	207		32		90		97		297		129			
08:15	214		35		105		80		319		115			
08:30	201		34		83		103		284		137			
08:45	213	835	40	141	103	381	77	357	316	1216	117	498		
09:00	194		44		79		72		273		116			
09:15	178		35		94		85		272		120			
09:30	175		57		78		67		253		124			
09:45	134	681	24	160	91	342	60	284	225	1023	84	444		
10:00	129		22		71		44		200		66			
10:15	128		20		69		36		197		56			
10:30	134		23		79		17		213		40			
10:45	123	514	17	82	91	310	25	122	214	824	42	204		
11:00	149		12		80		23		229		35			
11:15	116		4		122		30		238		34			
11:30	156		9		131		15		287		24			
11:45	125	546	3	28	105	438	12	80	230	984	15	108		
Total	4208		3400		2224		5544		6432		8944			
Percent	65.4%		38.0%		34.6%		62.0%							
Day Total			7608				7768				15376			
Peak	08:00	-	12:00	-	11:00	-	03:00	-	07:30	-	03:00	-	-	-
Vol.	835	-	496	-	438	-	728	-	1235	-	1117	-	-	-
P.H.F.	0.975		0.886		0.836		0.948		0.968		0.950			

Accurate Counts
978-664-2565

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586VOL1

Start Time	4/15/2020 Wed	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	3			0	5				
12:15		0	5			1	4				
12:30		0	4			0	3				
12:45		0	7	0	19	0	9	1	21	1	40
01:00		0	2			0	6				
01:15		0	4			0	7				
01:30		0	4			0	2				
01:45		0	4	0	14	0	3	0	18	0	32
02:00		0	5			2	4				
02:15		0	6			0	4				
02:30		0	6			0	4				
02:45		0	5	0	22	0	4	2	16	2	38
03:00		0	2			0	3				
03:15		0	4			0	1				
03:30		0	4			0	4				
03:45		0	1	0	11	0	1	0	9	0	20
04:00		0	2			0	6				
04:15		1	3			1	3				
04:30		0	1			0	0				
04:45		0	2	1	8	0	6	1	15	2	23
05:00		0	1			0	3				
05:15		0	7			1	1				
05:30		0	2			0	1				
05:45		0	5	0	15	0	2	1	7	1	22
06:00		0	2			0	3				
06:15		0	1			1	1				
06:30		1	2			2	1				
06:45		0	3	1	8	0	1	3	6	4	14
07:00		2	1			2	1				
07:15		0	1			1	0				
07:30		2	1			0	1				
07:45		1	2	5	5	1	1	4	3	9	8
08:00		2	1			2	0				
08:15		1	2			3	4				
08:30		4	0			1	1				
08:45		3	0	10	3	2	0	8	5	18	8
09:00		1	0			1	0				
09:15		2	0			3	0				
09:30		1	0			3	0				
09:45		5	0	9	0	5	0	12	0	21	0
10:00		2	0			5	0				
10:15		2	0			5	0				
10:30		2	1			2	0				
10:45		0	0	6	1	1	0	13	0	19	1
11:00		3	0			3	0				
11:15		1	0			4	0				
11:30		8	0			4	0				
11:45		2	0	14	0	7	0	18	0	32	0
Total		46	106			63	100			109	206
Percent		30.3%	69.7%			38.7%	61.3%			34.6%	65.4%

Accurate Counts
978-664-2565

Page 2

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586VOL1

Start Time	4/16/2020 Thu	WB		Hour Totals		EB		Hour Totals		Combined Totals	
		Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon	Morning	Afternoon
12:00		0	2			0	5				
12:15		0	2			0	2				
12:30		0	4			0	5				
12:45		0	2	0	10	0	5	0	17	0	27
01:00		0	2			0	2				
01:15		0	1			0	2				
01:30		0	5			0	2				
01:45		0	4	0	12	0	3	0	9	0	21
02:00		0	6			0	1				
02:15		0	0			0	1				
02:30		0	3			0	2				
02:45		0	2	0	11	0	5	0	9	0	20
03:00		0	5			0	2				
03:15		0	4			0	3				
03:30		0	4			0	4				
03:45		1	3	1	16	1	4	1	13	2	29
04:00		0	2			0	5				
04:15		0	5			0	2				
04:30		0	4			0	5				
04:45		0	2	0	13	0	2	0	14	0	27
05:00		0	8			0	2				
05:15		0	0			1	2				
05:30		0	2			0	0				
05:45		0	0	0	10	1	3	2	7	2	17
06:00		0	0			0	0				
06:15		1	1			0	1				
06:30		0	2			1	2				
06:45		0	1	1	4	1	0	2	3	3	7
07:00		1	4			3	1				
07:15		1	1			1	0				
07:30		1	1			3	0				
07:45		2	0	5	6	2	0	9	1	14	7
08:00		1	0			1	1				
08:15		3	0			5	1				
08:30		2	0			3	0				
08:45		4	2	10	2	2	2	11	4	21	6
09:00		4	0			4	1				
09:15		2	0			3	0				
09:30		2	0			2	1				
09:45		2	0	10	0	1	0	10	2	20	2
10:00		1	0			5	1				
10:15		3	0			11	0				
10:30		1	1			4	2				
10:45		1	0	6	1	3	0	23	3	29	4
11:00		2	1			2	0				
11:15		5	0			8	0				
11:30		5	0			0	0				
11:45		5	0	17	1	1	0	11	0	28	1
Total		50	86			69	82			119	168
Percent		36.8%	63.2%			45.7%	54.3%			41.5%	58.5%
Grand Total		96	192			132	182			228	374
Percent		33.3%	66.7%			42.0%	58.0%			37.9%	62.1%
ADT		ADT 301		AADT 301							

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586VOL1

Start	4/13/2020		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
Time	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	*	*	0	1	0	0	*	*	*	*	*	*	0	0
01:00	*	*	*	*	0	0	0	0	*	*	*	*	*	*	0	0
02:00	*	*	*	*	0	2	0	0	*	*	*	*	*	*	0	1
03:00	*	*	*	*	0	0	1	1	*	*	*	*	*	*	0	0
04:00	*	*	*	*	1	1	0	0	*	*	*	*	*	*	0	0
05:00	*	*	*	*	0	1	0	2	*	*	*	*	*	*	0	2
06:00	*	*	*	*	1	3	1	2	*	*	*	*	*	*	1	2
07:00	*	*	*	*	5	4	5	9	*	*	*	*	*	*	5	6
08:00	*	*	*	*	10	8	10	11	*	*	*	*	*	*	10	10
09:00	*	*	*	*	9	12	10	10	*	*	*	*	*	*	10	11
10:00	*	*	*	*	6	13	6	23	*	*	*	*	*	*	6	18
11:00	*	*	*	*	14	18	17	11	*	*	*	*	*	*	16	14
12:00 PM	*	*	*	*	19	21	10	17	*	*	*	*	*	*	14	19
01:00	*	*	*	*	14	18	12	9	*	*	*	*	*	*	13	14
02:00	*	*	*	*	22	16	11	9	*	*	*	*	*	*	16	12
03:00	*	*	*	*	11	9	16	13	*	*	*	*	*	*	14	11
04:00	*	*	*	*	8	15	13	14	*	*	*	*	*	*	10	14
05:00	*	*	*	*	15	7	10	7	*	*	*	*	*	*	12	7
06:00	*	*	*	*	8	6	4	3	*	*	*	*	*	*	6	4
07:00	*	*	*	*	5	3	6	1	*	*	*	*	*	*	6	2
08:00	*	*	*	*	3	5	2	4	*	*	*	*	*	*	2	4
09:00	*	*	*	*	0	0	0	2	*	*	*	*	*	*	0	1
10:00	*	*	*	*	1	0	1	3	*	*	*	*	*	*	1	2
11:00	*	*	*	*	0	0	1	0	*	*	*	*	*	*	0	0
Lane	0	0	0	0	152	163	136	151	0	0	0	0	0	0	142	154
Day	0		0		315		287		0		0		0		296	
AM Peak	-	-	-	-	11:00	11:00	11:00	10:00	-	-	-	-	-	-	11:00	10:00
Vol.	-	-	-	-	14	18	17	23	-	-	-	-	-	-	16	18
PM Peak	-	-	-	-	14:00	12:00	15:00	12:00	-	-	-	-	-	-	14:00	12:00
Vol.	-	-	-	-	22	21	16	17	-	-	-	-	-	-	16	19

Comb. Total	0	0	315	287	0	0	0	296
ADT	ADT 301	AADT 301						

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586SPD1

WB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
04/15/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
07:00	0	0	0	0	0	0	0	1	2	2	0	0	0	0	5
08:00	0	0	0	1	0	1	2	3	2	0	1	0	0	0	10
09:00	0	0	0	1	0	0	1	2	3	1	1	0	0	0	9
10:00	0	0	0	0	0	1	1	1	0	0	2	0	1	0	6
11:00	1	0	0	0	0	0	1	3	4	4	0	1	0	0	14
12 PM	0	0	0	0	0	1	3	2	5	3	4	0	1	0	19
13:00	0	0	0	0	1	1	2	3	2	1	2	0	1	1	14
14:00	0	0	1	0	1	1	0	2	4	6	5	1	1	0	22
15:00	0	0	0	0	0	0	0	5	3	1	0	1	1	0	11
16:00	1	0	0	0	0	1	2	3	0	0	1	0	0	0	8
17:00	1	0	1	0	0	2	1	1	3	3	1	2	0	0	15
18:00	0	0	0	0	0	0	0	1	0	4	1	2	0	0	8
19:00	0	0	0	0	1	0	0	1	0	0	2	0	1	0	5
20:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0	3
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	0	2	2	3	10	15	28	28	26	20	7	6	1	152

Daily

15th Percentile : 18 MPH
50th Percentile : 25 MPH
85th Percentile : 31 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 25 MPH
10 MPH Pace Speed : 22-31 MPH
Number in Pace : 89
Percent in Pace : 58.6%
Number of Vehicles > 30 MPH : 34
Percent of Vehicles > 30 MPH : 22.4%

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586SPD1

WB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
04/16/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
07:00	0	0	0	0	0	1	0	0	1	1	1	1	0	0	5
08:00	0	0	0	1	0	0	1	1	3	1	2	0	1	0	10
09:00	0	0	0	0	0	0	3	0	3	1	1	1	0	1	10
10:00	1	0	0	0	0	0	1	2	1	1	0	0	0	0	6
11:00	0	0	0	0	1	2	0	5	5	2	1	1	0	0	17
12 PM	0	0	0	0	0	1	2	1	2	2	1	1	0	0	10
13:00	0	0	0	0	0	2	1	1	2	3	2	1	0	0	12
14:00	0	0	0	0	0	3	0	0	4	3	0	1	0	0	11
15:00	2	0	0	0	0	0	5	2	3	2	1	1	0	0	16
16:00	0	0	0	0	1	1	2	2	5	1	0	1	0	0	13
17:00	0	0	0	0	0	1	1	1	3	2	1	1	0	0	10
18:00	0	0	0	0	0	0	0	1	1	0	0	1	1	0	4
19:00	0	0	0	1	0	0	0	1	0	0	3	1	0	0	6
20:00	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	3	0	0	2	2	12	16	19	34	21	13	11	2	1	136

Daily

15th Percentile : 18 MPH
50th Percentile : 25 MPH
85th Percentile : 31 MPH
95th Percentile : 34 MPH

Mean Speed(Average) : 25 MPH
10 MPH Pace Speed : 21-30 MPH
Number in Pace : 79
Percent in Pace : 58.1%
Number of Vehicles > 30 MPH : 27
Percent of Vehicles > 30 MPH : 19.9%

Grand Total	7	0	2	4	5	22	31	47	62	47	33	18	8	2	288
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Overall

15th Percentile : 18 MPH
50th Percentile : 25 MPH
85th Percentile : 31 MPH
95th Percentile : 34 MPH

Mean Speed(Average) : 25 MPH
10 MPH Pace Speed : 22-31 MPH
Number in Pace : 167
Percent in Pace : 58.0%
Number of Vehicles > 30 MPH : 61
Percent of Vehicles > 30 MPH : 21.2%

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586SPD1

EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
04/15/20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
05:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
06:00	0	0	0	0	0	0	0	0	1	1	0	1	0	0	3
07:00	0	0	0	0	0	0	0	0	0	1	1	0	2	0	4
08:00	0	0	0	0	1	0	0	0	1	1	2	3	0	0	8
09:00	0	0	0	0	0	1	0	3	2	3	2	1	0	0	12
10:00	0	0	0	0	0	1	2	0	2	2	3	0	2	1	13
11:00	0	0	0	0	0	1	0	2	4	1	4	5	1	0	18
12 PM	0	0	0	0	0	0	2	4	4	0	6	2	1	2	21
13:00	0	0	0	1	0	0	1	3	4	4	3	1	1	0	18
14:00	0	0	0	0	0	1	1	0	3	1	3	5	2	0	16
15:00	0	0	0	0	0	0	2	1	1	1	1	3	0	0	9
16:00	0	0	0	1	1	0	4	3	3	2	1	0	0	0	15
17:00	1	0	0	0	0	0	0	1	1	0	2	1	0	1	7
18:00	0	0	0	0	0	0	1	1	0	2	1	0	1	0	6
19:00	1	0	0	0	0	0	0	0	0	0	1	1	0	0	3
20:00	2	0	1	0	0	0	0	1	0	1	0	0	0	0	5
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	0	1	2	2	5	13	19	29	20	30	24	10	4	163

Daily

15th Percentile : 20 MPH
50th Percentile : 27 MPH
85th Percentile : 34 MPH
95th Percentile : 36 MPH

Mean Speed(Average) : 27 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 87
Percent in Pace : 53.4%
Number of Vehicles > 30 MPH : 68
Percent of Vehicles > 30 MPH : 41.7%

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586SPD1

EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
04/16/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
06:00	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
07:00	0	0	0	0	0	0	0	2	0	1	2	2	1	1	9
08:00	0	0	0	0	0	0	2	3	2	2	0	2	0	0	11
09:00	0	0	0	0	0	0	1	1	2	1	2	0	1	2	10
10:00	2	0	1	0	2	3	0	1	1	6	4	3	0	0	23
11:00	0	0	0	0	0	0	3	0	2	1	1	1	1	2	11
12 PM	0	0	0	0	0	1	1	1	4	2	4	4	0	0	17
13:00	0	0	0	0	0	0	0	0	1	2	2	2	0	2	9
14:00	0	0	0	0	0	1	0	0	3	2	1	1	1	0	9
15:00	0	0	0	0	0	0	2	2	1	4	3	1	0	0	13
16:00	0	0	0	0	1	1	3	2	1	2	2	1	0	1	14
17:00	0	0	0	1	0	2	0	1	0	2	1	0	0	0	7
18:00	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3
19:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
20:00	0	0	0	0	0	0	1	0	0	1	2	0	0	0	4
21:00	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
22:00	0	0	0	0	0	0	0	1	0	0	1	1	0	0	3
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	1	1	3	9	15	15	17	27	26	21	5	9	151

Daily

15th Percentile : 19 MPH
50th Percentile : 27 MPH
85th Percentile : 33 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 27 MPH
10 MPH Pace Speed : 27-36 MPH
Number in Pace : 80
Percent in Pace : 53.0%
Number of Vehicles > 30 MPH : 61
Percent of Vehicles > 30 MPH : 40.4%

Grand Total	6	0	2	3	5	14	28	34	46	47	56	45	15	13	314
-------------	---	---	---	---	---	----	----	----	----	----	----	----	----	----	-----

Overall

15th Percentile : 19 MPH
50th Percentile : 27 MPH
85th Percentile : 33 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 27 MPH
10 MPH Pace Speed : 25-34 MPH
Number in Pace : 164
Percent in Pace : 52.2%
Number of Vehicles > 30 MPH : 129
Percent of Vehicles > 30 MPH : 41.1%

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586SPD1

WB, EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
04/15/20	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
05:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
06:00	0	0	0	0	0	0	0	0	1	2	0	1	0	0	4
07:00	0	0	0	0	0	0	0	1	2	3	1	0	2	0	9
08:00	0	0	0	1	1	1	2	3	3	1	3	3	0	0	18
09:00	0	0	0	1	0	1	1	5	5	4	3	1	0	0	21
10:00	0	0	0	0	0	2	3	1	2	2	5	0	3	1	19
11:00	1	0	0	0	0	1	1	5	8	5	4	6	1	0	32
12 PM	0	0	0	0	0	1	5	6	9	3	10	2	2	2	40
13:00	0	0	0	1	1	1	3	6	6	5	5	1	2	1	32
14:00	0	0	1	0	1	2	1	2	7	7	8	6	3	0	38
15:00	0	0	0	0	0	0	2	6	4	2	1	4	1	0	20
16:00	1	0	0	1	1	1	6	6	3	2	2	0	0	0	23
17:00	2	0	1	0	0	2	1	2	4	3	3	3	0	1	22
18:00	0	0	0	0	0	0	1	2	0	6	2	2	1	0	14
19:00	1	0	0	0	1	0	0	1	0	0	3	1	1	0	8
20:00	3	0	1	0	0	1	1	1	0	1	0	0	0	0	8
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	0	3	4	5	15	28	47	57	46	50	31	16	5	315

Daily

15th Percentile : 19 MPH
50th Percentile : 26 MPH
85th Percentile : 33 MPH
95th Percentile : 36 MPH

Mean Speed(Average) : 26 MPH
10 MPH Pace Speed : 24-33 MPH
Number in Pace : 169
Percent in Pace : 53.7%
Number of Vehicles > 30 MPH : 102
Percent of Vehicles > 30 MPH : 32.4%

Location : Hunting Lane
Location : at # 31
City/State: Sherborn, MA

8586SPD1

WB, EB

Start Time	1 3	4 6	7 9	10 12	13 15	16 18	19 21	22 24	25 27	28 30	31 33	34 36	37 39	40 999	Total
04/16/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
06:00	0	0	0	0	0	0	1	1	0	1	0	0	0	0	3
07:00	0	0	0	0	0	1	0	2	1	2	3	3	1	1	14
08:00	0	0	0	1	0	0	3	4	5	3	2	2	1	0	21
09:00	0	0	0	0	0	0	4	1	5	2	3	1	1	3	20
10:00	3	0	1	0	2	3	1	3	2	7	4	3	0	0	29
11:00	0	0	0	0	1	2	3	5	7	3	2	2	1	2	28
12 PM	0	0	0	0	0	2	3	2	6	4	5	5	0	0	27
13:00	0	0	0	0	0	2	1	1	3	5	4	3	0	2	21
14:00	0	0	0	0	0	4	0	0	7	5	1	2	1	0	20
15:00	2	0	0	0	0	0	7	4	4	6	4	2	0	0	29
16:00	0	0	0	0	2	2	5	4	6	3	2	2	0	1	27
17:00	0	0	0	1	0	3	1	2	3	4	2	1	0	0	17
18:00	0	0	0	0	0	0	0	1	1	0	1	2	2	0	7
19:00	0	0	0	1	0	0	0	1	0	1	3	1	0	0	7
20:00	0	0	0	0	0	0	1	1	1	1	2	0	0	0	6
21:00	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
22:00	0	0	0	0	0	1	0	1	0	0	1	1	0	0	4
23:00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Total	5	0	1	3	5	21	31	34	51	48	39	32	7	10	287

Daily

15th Percentile : 18 MPH
50th Percentile : 26 MPH
85th Percentile : 32 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 26 MPH
10 MPH Pace Speed : 24-33 MPH
Number in Pace : 149
Percent in Pace : 51.9%
Number of Vehicles > 30 MPH : 88
Percent of Vehicles > 30 MPH : 30.7%

Grand Total	13	0	4	7	10	36	59	81	108	94	89	63	23	15	602
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Overall

15th Percentile : 18 MPH
50th Percentile : 26 MPH
85th Percentile : 32 MPH
95th Percentile : 35 MPH

Mean Speed(Average) : 26 MPH
10 MPH Pace Speed : 24-33 MPH
Number in Pace : 318
Percent in Pace : 52.8%
Number of Vehicles > 30 MPH : 190
Percent of Vehicles > 30 MPH : 31.6%

COVID-19 ADJUSTMENT DATA



Green ATR

Tue 14,928 $\xrightarrow{\text{Avg}}$ 15,155

Raw
Dec 2016

Wed 15,376

Seasonal Adj. = 1.08

Annual growth = $(1.015)^4$
2016 $\rightarrow$ 2020

$\Rightarrow$ Adjusted to 2020 = $15,155 \times 1.08 \times 1.015^4 = 17,375$

Use 2016
data

Raw
April 2020

VAI

Wed 7,501

Seasonal Adj. = 1.03

Adjusted = $7,501 \times 1.03 = 7,730$

Peak:

2016

NB

SB

389

728

1,117

$\downarrow$

1,206

$\frac{735}{1206} = 0.64$ 60%

2020

NB

SB

408

298

705

$\downarrow$

735

60% lower

TRIP-GENERATION CALCULATIONS



Single-Family Detached Housing (210)

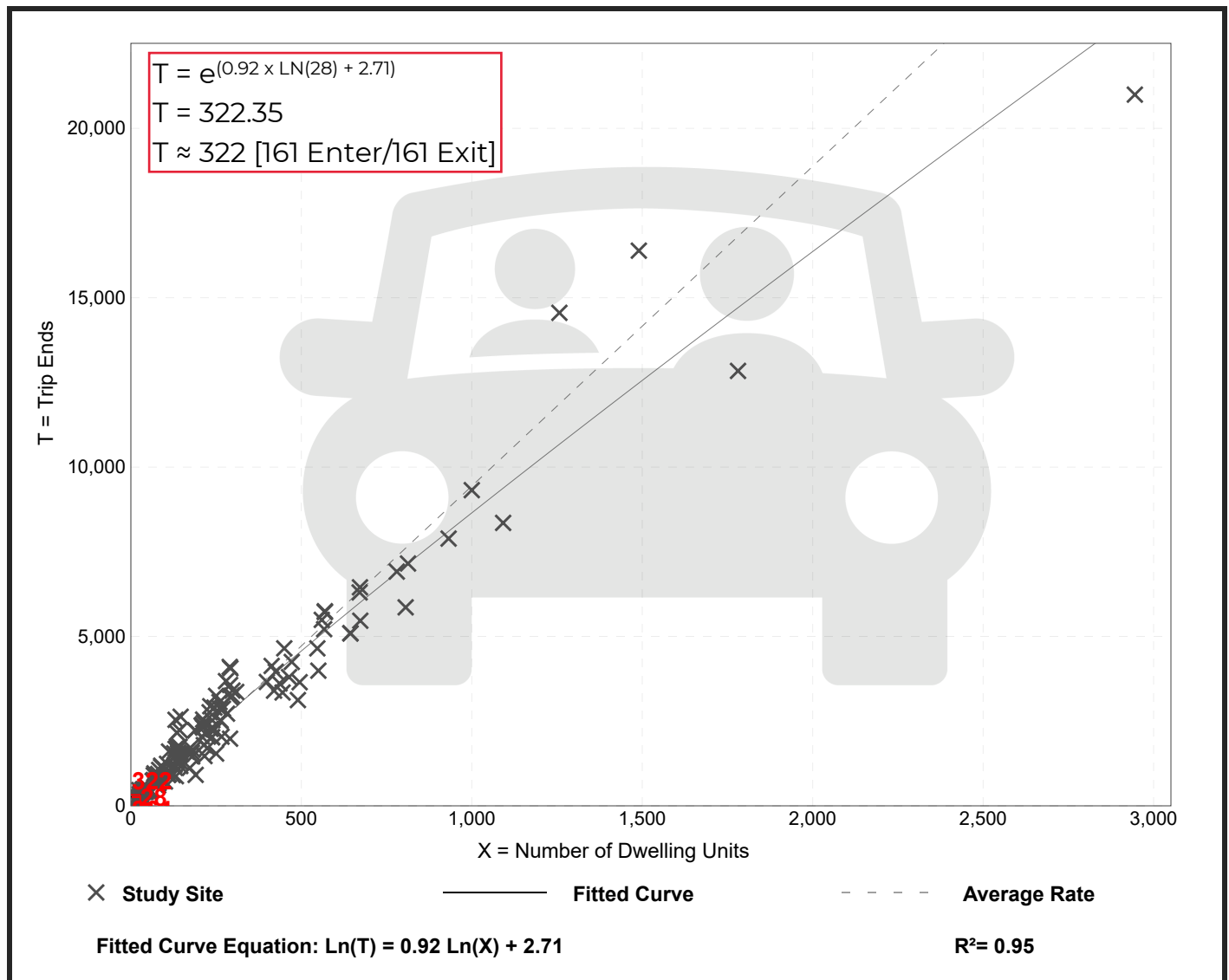
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 173

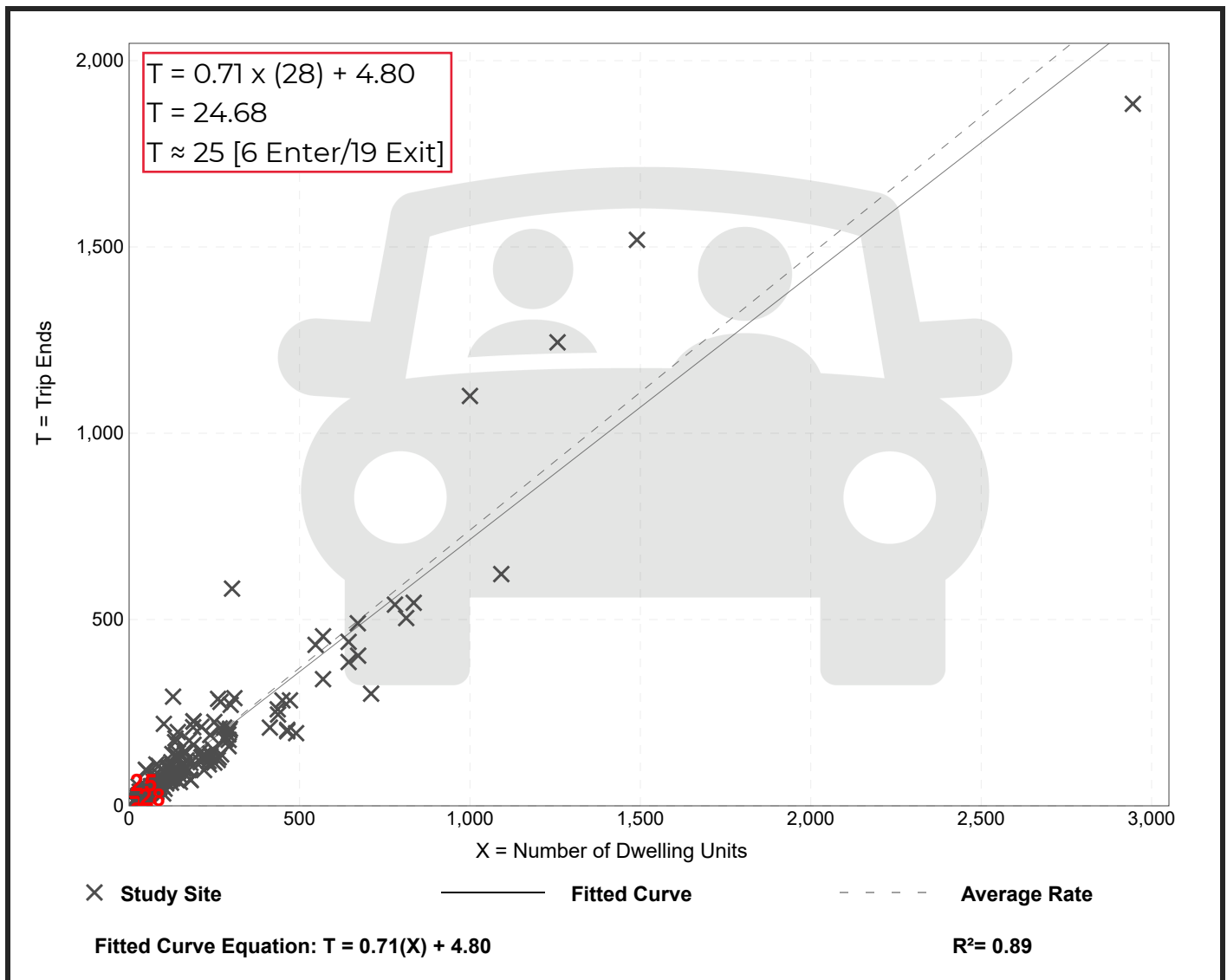
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 190

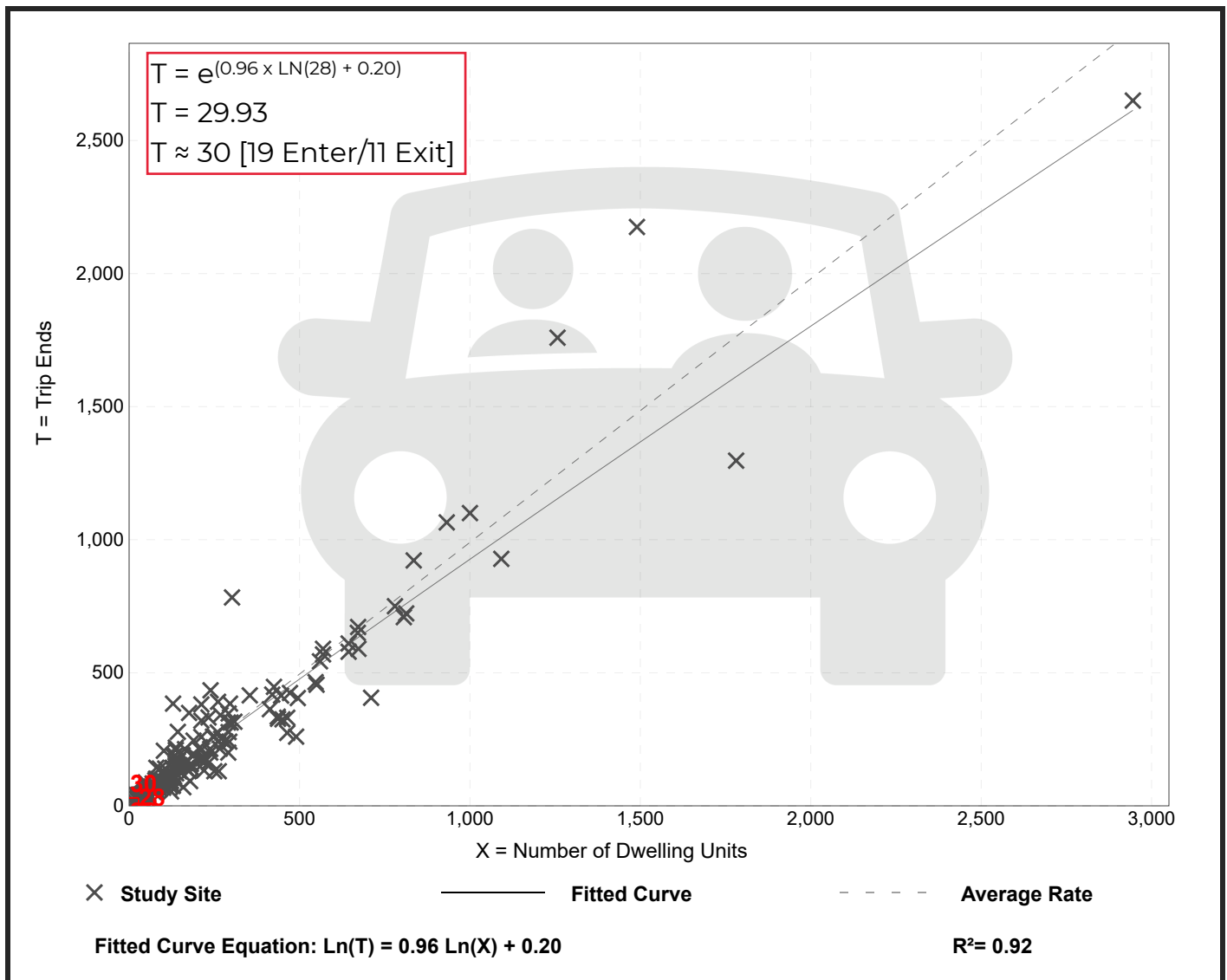
Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

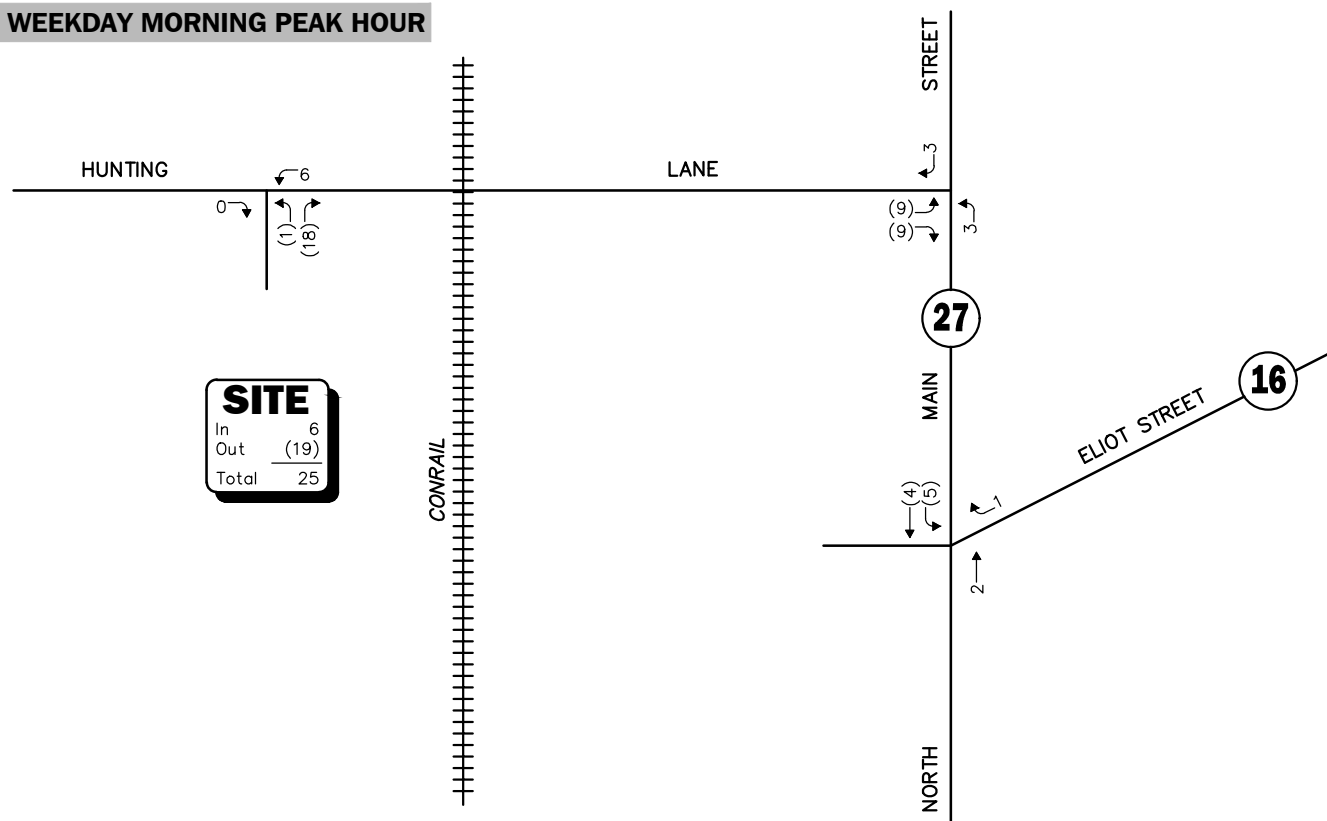
Data Plot and Equation



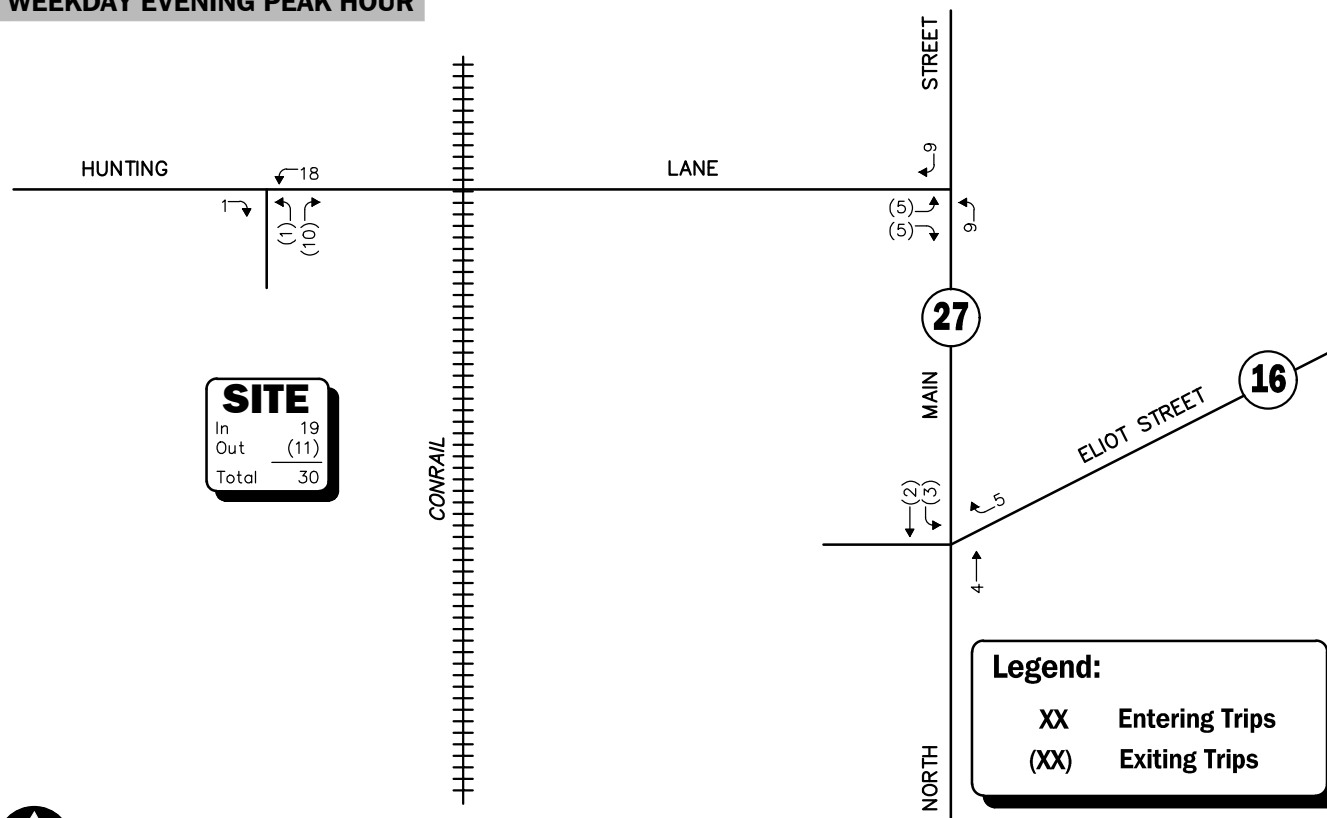
TRAFFIC VOLUME NETWORKS



WEEKDAY MORNING PEAK HOUR



WEEKDAY EVENING PEAK HOUR



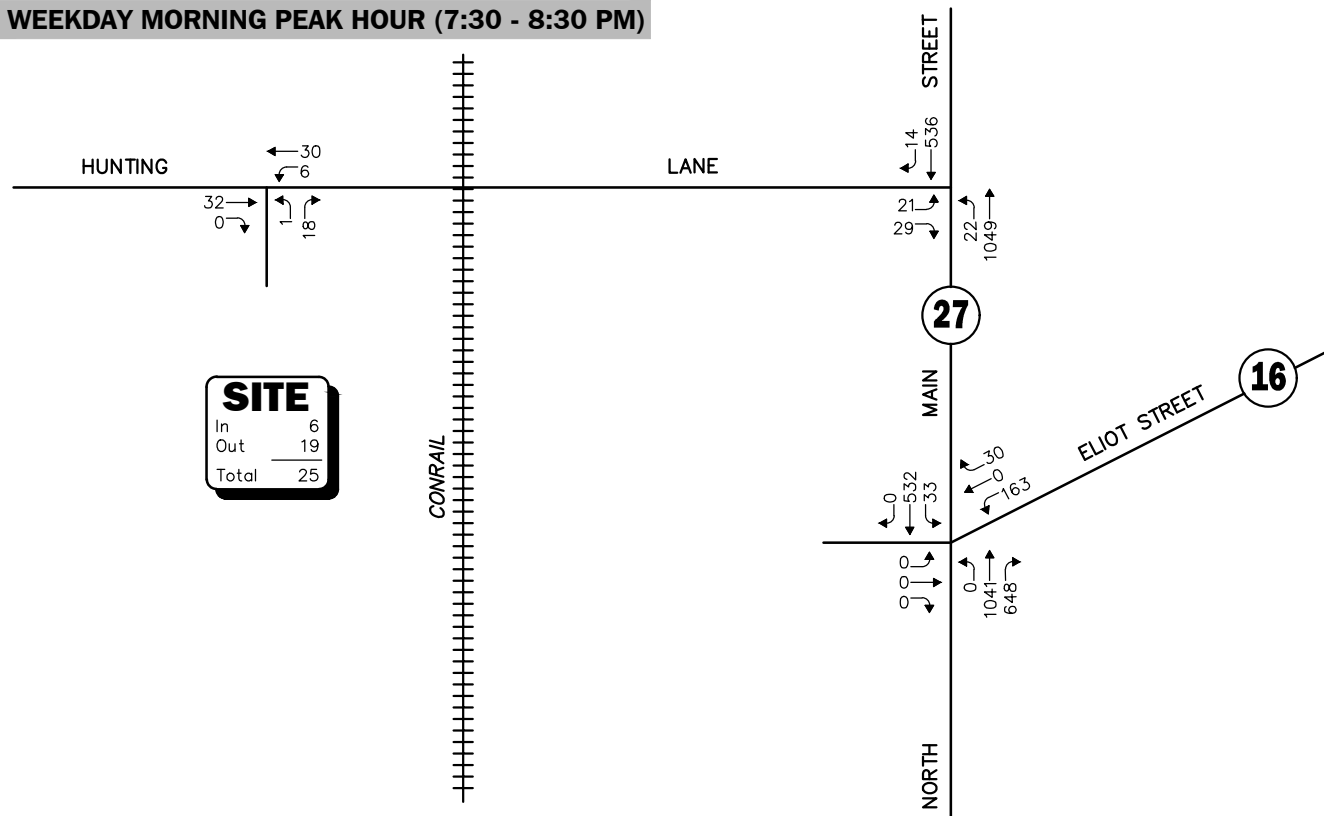
Legend:

- XX Entering Trips
- (XX) Exiting Trips



Figure 6R

WEEKDAY MORNING PEAK HOUR (7:30 - 8:30 PM)



WEEKDAY EVENING PEAK HOUR (4:45 - 5:45 PM)

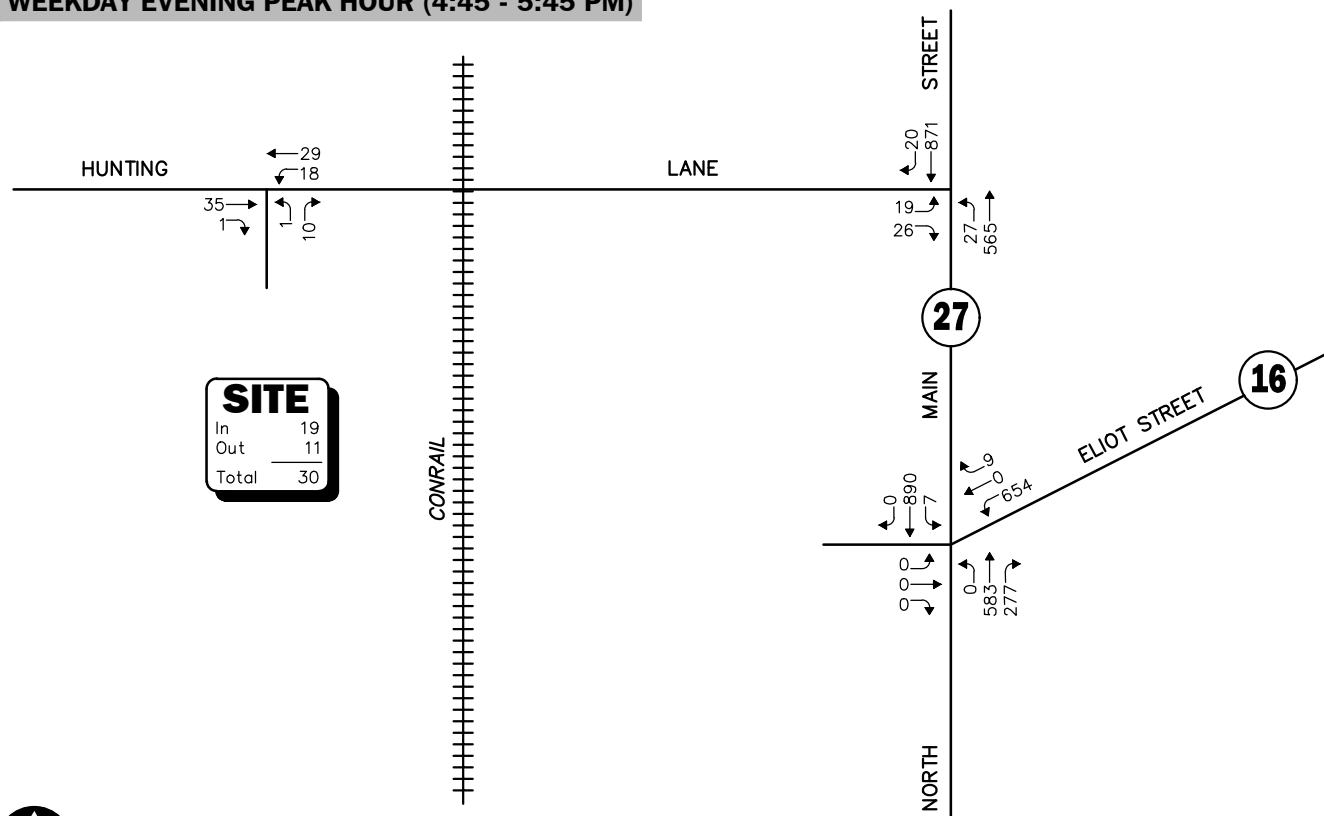


Figure 7R

2027 Build
Peak Hour Traffic Volumes

TRAFFIC OPERATIONS ANALYSIS SUMMARY TABLES



Table 9R
UNSIGNALIZED INTERSECTION LEVEL-OF-SERVICE AND VEHICLE QUEUE SUMMARY

Unsignalized Intersection/ Peak Hour/Movement	2020 Existing				2027 No-Build				2027 Build			
	Demand ^a	Delay ^b	LOS ^c	Queue ^d 95 th	Demand	Delay	LOS	Queue 95 th	Demand	Delay	LOS	Queue 95 th
<i>North Main Street (Route 27)/Hunting Lane:</i>												
<i>Weekday Morning Peak-Hour:</i>												
Hunting Lane EB LT/RT	29	23.3	C	1	22	29.9	D	1	50	37.8	E	2
Route 27 NB LT/TH	953	0.1	A	0	1,068	0.2	A	0	1,071	0.2	A	0
Route 27 SB RT/TH	485	0.0	A	0	547	0.0	A	0	550	0.0	A	0
<i>Weekday Evening Peak-Hour:</i>												
Hunting Lane EB LT/RT	31	24.2	C	1	35	30.1	D	1	45	34.5	D	1
Route 27 NB LT/TH	517	0.3	A	0	583	0.3	A	0	592	0.5	A	0
Route 27 SB RT/TH	786	0.0	A	0	882	0.0	A	0	891	0.0	A	0
<i>Project Site Roadway/Hunting Lane:</i>												
<i>Weekday Morning Peak-Hour:</i>												
Hunting Lane EB RT/TH	--	--	--	--	--	--	--	--	32	0.0	A	0
Hunting Lane WB LT/TH	--	--	--	--	--	--	--	--	36	1.2	A	0
Project Site Roadway NB LT/RT	--	--	--	--	--	--	--	--	19	8.6	A	0
<i>Weekday Evening Peak-Hour:</i>												
Hunting Lane EB RT/TH	--	--	--	--	--	--	--	--	36	0.0	A	0
Hunting Lane WB LT/TH	--	--	--	--	--	--	--	--	47	2.8	A	0
Project Site Roadway NB LT/RT	--	--	--	--	--	--	--	--	11	8.6	A	0

^aDemand in vehicles per hour.

^bAverage control delay per vehicle (in seconds).

^cLevel-of-Service.

^dQueue length in vehicles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 10R
SIGNALIZED INTERSECTION LEVEL-OF-SERVICE SUMMARY

Signalized Intersection/Peak Hour	2020 Existing				2027 No-Build				2027 Build			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d Avg/95 th	V/C	Delay	LOS	Queue Avg/95 th	V/C	Delay	LOS	Queue Avg/95 th
Route 27/Eliot Street (Route 16):												
<i>Weekday Morning:</i>												
Rte. 16 WB LT	0.58	26.1	C	98/139	0.62	27.1	C	111/110	0.62	27.1	C	111/110
Rte. 16 WB RT	0.04	21.1	C	1/12	0.05	20.9	C	2/12	0.06	20.9	C	2/12
Rte. 27 NB TH	0.82	14.3	B	288/970 ^f	0.92	24.4	C	417/760 ^f	0.93	24.6	C	420/762 ^f
Rte. 27 NB RT	0.35	0.8	A	0/27	0.39	0.8	A	0/0	0.39	0.8	A	0/0
Rte. 27 SB LT/TH	0.56	7.9	A	150/580 ^f	0.89	24.3	C	226/476 ^f	0.92	28.5	C	241/493 ^f
Overall	--	10.8	B	--	--	18.7	B	--	--	19.8	B	--
<i>Weekday Evening:</i>												
Rte. 16 WB LT	1.15	>80.0	F	356 ^e /587	1.42	>80.0	F	468 ^e /669 ^f	1.42	>80.0	F	468 ^e /669 ^f
Rte. 16 WB RT	0.00	16.4	B	0/5	0.01	19.7	B	1/8	0.02	19.8	B	2/13
Rte. 27 NB TH	0.55	9.7	A	140/213	0.57	9.7	A	167/253	0.58	9.7	A	169/255
Rte. 27 NB RT	0.15	0.6	A	0/0	0.17	0.5	A	0/0	0.17	0.5	A	0/0
Rte. 27 SB LT/TH	0.80	16.2	B	264/414	0.84	17.4	B	331/567 ^f	0.85	17.9	B	336/625 ^f
Overall	--	38.4	D	--	--	70.3	E	--	--	70.2	E	--

^aVolume-to-capacity ratio.

^bControl (signal) delay per vehicle in seconds.

^cLevel-of-Service.

^dQueue length in feet.

^eVolume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.

^f95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

Table 12R
MITIGATED SIGNALIZED INTERSECTION LEVEL-OF-SERVICE SUMMARY

Signalized Intersection/Peak Hour	2027 No-Build				2027 Build				2027 Build with Mitigation			
	V/C ^a	Delay ^b	LOS ^c	Queue ^d Avg/95 th	V/C	Delay	LOS	Queue Avg/95 th	V/C	Delay	LOS	Queue Avg/95 th
Route 27/Eliot Street (Route 16):												
<i>Weekday Morning:</i>												
Rte. 16 WB LT	0.62	27.1	C	111/110	0.62	27.1	C	111/110	0.62	27.1	C	111/110
Rte. 16 WB RT	0.05	20.9	C	2/12	0.06	20.9	C	2/12	0.06	20.9	C	2/12
Rte. 27 NB TH	0.92	24.4	C	417/760 ^f	0.93	24.6	C	420/762 ^f	0.93	24.6	C	420/762 ^f
Rte. 27 NB RT	0.39	0.8	A	0/0	0.39	0.8	A	0/0	0.39	0.8	A	0/0
Rte. 27 SB LT/TH	0.89	24.3	C	226/476 ^f	0.92	28.5	C	241/493 ^f	0.92	28.5	C	241/493 ^f
Overall	--	18.7	B	--	--	19.8	B	--	--	19.8	B	--
<i>Weekday Evening:</i>												
Rte. 16 WB LT	1.42	>80.0	F	468 ^e /669 ^f	1.42	>80.0	F	468 ^e /669 ^f	1.07	76.3	E	352 ^e /547 ^f
Rte. 16 WB RT	0.01	19.7	B	1/8	0.02	19.8	B	2/13	0.01	13.7	B	2/10
Rte. 27 NB TH	0.57	9.7	A	167/253	0.58	9.7	A	169/255	0.69	15.5	B	204/315
Rte. 27 NB RT	0.17	0.5	A	0/0	0.17	0.5	A	0/0	0.17	0.6	A	0/0
Rte. 27 SB LT/TH	0.84	17.4	B	331/567 ^f	0.85	17.9	B	336/625 ^f	1.02	51.1	D	421 ^e /678 ^f
Overall	--	70.3	E	--	--	70.2	E	--	--	43.0	D	--

^aVolume-to-capacity ratio.

^bControl (signal) delay per vehicle in seconds.

^cLevel-of-Service.

^dQueue length in feet.

^eVolume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.

^f95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

NB = northbound; SB = southbound; EB = eastbound; WB = westbound; LT = left-turning movements; TH = through movements; RT = right-turning movements.

CAPACITY ANALYSIS WORKSHEETS

Route 127/Hunting Lane

Route 127/Route 16

Hunting Lane/Project Site Driveway



Route 127/Hunting Lane



Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	29	22	1049	536	14
Future Vol, veh/h	21	29	22	1049	536	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	32	24	1140	583	15

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1779	591	598	0	-	0
Stage 1	591	-	-	-	-	-
Stage 2	1188	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	90	507	979	-	-	-
Stage 1	553	-	-	-	-	-
Stage 2	289	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	84	507	979	-	-	-
Mov Cap-2 Maneuver	84	-	-	-	-	-
Stage 1	516	-	-	-	-	-
Stage 2	289	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	37.8	0.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	979	-	163	-	-
HCM Lane V/C Ratio	0.024	-	0.333	-	-
HCM Control Delay (s)	8.8	0	37.8	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.4	-	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	26	27	565	871	20
Future Vol, veh/h	19	26	27	565	871	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	28	29	614	947	22

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1630	958	969	0	-	0
Stage 1	958	-	-	-	-	-
Stage 2	672	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	112	312	711	-	-	-
Stage 1	373	-	-	-	-	-
Stage 2	508	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	105	312	711	-	-	-
Mov Cap-2 Maneuver	105	-	-	-	-	-
Stage 1	350	-	-	-	-	-
Stage 2	508	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	34.5	0.5	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	711	-	170	-	-
HCM Lane V/C Ratio	0.041	-	0.288	-	-
HCM Control Delay (s)	10.3	0	34.5	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

Route 127/Route 16



Lanes, Volumes, Timings
5: North Main Street & Eliot Street

2027 build morning peak hour

01/19/2021

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	163	30	1041	648	33	532	
Future Volume (vph)	163	30	1041	648	33	532	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	90		155	0		
Storage Lanes	1	1		1	0		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850		0.850			
Flt Protected	0.950					0.997	
Satd. Flow (prot)	1752	1272	1827	1553	0	1893	
Flt Permitted	0.950					0.572	
Satd. Flow (perm)	1752	1272	1827	1553	0	1086	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		44		675			
Link Speed (mph)	40		30			30	
Link Distance (ft)	285		340			370	
Travel Time (s)	4.9		7.7			8.4	
Peak Hour Factor	0.59	0.59	0.96	0.96	0.89	0.89	
Heavy Vehicles (%)	3%	27%	4%	4%	1%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	276	51	1084	675	0	635	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	12		0			0	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA	
Protected Phases	8		2	8		6	9
Permitted Phases	8	8		2	6		
Detector Phase	8	8	2	8	6	6	
Switch Phase							
Minimum Initial (s)	1.0	1.0	5.0	1.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	51.0	26.0	51.0	51.0	15.0
Total Split (%)	28.3%	28.3%	55.4%	28.3%	55.4%	55.4%	16%
Maximum Green (s)	20.0	20.0	45.0	20.0	45.0	45.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0		-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	None	Min	Min	None
Walk Time (s)							7.0

Lanes, Volumes, Timings
5: North Main Street & Eliot Street

2027 build morning peak hour

01/19/2021

	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Group							
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effect Green (s)	18.7	18.7	47.1	73.9		47.1	
Actuated g/C Ratio	0.25	0.25	0.64	1.00		0.64	
v/c Ratio	0.62	0.14	0.93	0.43		0.92	
Control Delay	31.0	9.4	29.3	0.9		35.0	
Queue Delay	0.0	0.0	0.0	0.0		0.0	
Total Delay	31.0	9.4	29.3	0.9		35.0	
LOS	C	A	C	A		D	
Approach Delay	27.6		18.4			35.0	
Approach LOS	C		B			D	
Queue Length 50th (ft)	111	2	420	0		241	
Queue Length 95th (ft)	110	12	#762	0		#493	
Internal Link Dist (ft)	205		260			290	
Turn Bay Length (ft)		90		155			
Base Capacity (vph)	523	410	1165	1547		692	
Starvation Cap Reductn	0	0	0	0		0	
Spillback Cap Reductn	0	0	0	0		0	
Storage Cap Reductn	0	0	0	0		0	
Reduced v/c Ratio	0.53	0.12	0.93	0.44		0.92	

Intersection Summary

Area Type: Other

Cycle Length: 92

Actuated Cycle Length: 73.9

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 23.4

Intersection LOS: C

Intersection Capacity Utilization 76.6%

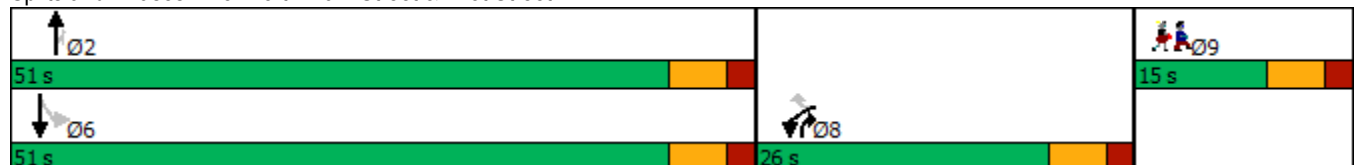
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: North Main Street & Eliot Street



HCM Signalized Intersection Capacity Analysis

5: North Main Street & Eliot Street

2027 build morning peak hour

01/19/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	163	30	1041	648	33	532
Future Volume (vph)	163	30	1041	648	33	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1752	1272	1827	1553		1893
Flt Permitted	0.95	1.00	1.00	1.00		0.57
Satd. Flow (perm)	1752	1272	1827	1553		1087
Peak-hour factor, PHF	0.59	0.59	0.96	0.96	0.89	0.89
Adj. Flow (vph)	276	51	1084	675	37	598
RTOR Reduction (vph)	0	33	0	73	0	0
Lane Group Flow (vph)	276	18	1084	602	0	635
Heavy Vehicles (%)	3%	27%	4%	4%	1%	0%
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	16.7	16.7	45.1	61.8		45.1
Effective Green, g (s)	18.7	18.7	47.1	65.8		47.1
Actuated g/C Ratio	0.25	0.25	0.64	0.89		0.64
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	443	322	1166	1553		693
v/s Ratio Prot	c0.16		c0.59	0.10		
v/s Ratio Perm		0.01		0.29		0.58
v/c Ratio	0.62	0.06	0.93	0.39		0.92
Uniform Delay, d1	24.4	20.9	11.9	0.7		11.6
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.7	0.1	12.7	0.2		16.8
Delay (s)	27.1	20.9	24.6	0.8		28.5
Level of Service	C	C	C	A		C
Approach Delay (s)	26.2		15.5			28.5
Approach LOS	C		B			C
Intersection Summary						
HCM 2000 Control Delay			19.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			73.8		Sum of lost time (s)	14.0
Intersection Capacity Utilization			76.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
5: North Main Street & Eliot Street

2027 build evening peak hour

01/19/2021

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Lane Configurations							
Traffic Volume (vph)	654	9	583	277	7	890	
Future Volume (vph)	654	9	583	277	7	890	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0	90		155	0		
Storage Lanes	1	1		1	0		
Taper Length (ft)	25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.850		0.850			
Flt Protected	0.950						
Satd. Flow (prot)	1752	1615	1863	1615	0	1900	
Flt Permitted	0.950					0.995	
Satd. Flow (perm)	1752	1615	1863	1615	0	1890	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)		3		311			
Link Speed (mph)	40		30			30	
Link Distance (ft)	285		340			370	
Travel Time (s)	4.9		7.7			8.4	
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Heavy Vehicles (%)	3%	0%	2%	0%	1%	0%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	711	10	655	311	0	975	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	12		0			0	
Link Offset(ft)	0		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA	
Protected Phases	8		2	8		6	9
Permitted Phases	8	8		2	6		
Minimum Initial (s)	1.0	1.0	5.0	1.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	51.0	26.0	51.0	51.0	15.0
Total Split (%)	28.3%	28.3%	55.4%	28.3%	55.4%	55.4%	16%
Maximum Green (s)	20.0	20.0	45.0	20.0	45.0	45.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Min	None	Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							11.0
Pedestrian Calls (#/hr)							0
Act Effect Green (s)	22.0	22.0	47.0	77.0		47.0	

Lanes, Volumes, Timings
5: North Main Street & Eliot Street

2027 build evening peak hour

01/19/2021

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø9
Actuated g/C Ratio	0.29	0.29	0.61	1.00		0.61	
v/c Ratio	1.42	0.02	0.58	0.19		0.85	
Control Delay	227.5	17.4	11.6	0.3		21.1	
Queue Delay	0.0	0.0	0.0	0.0		0.0	
Total Delay	227.5	17.4	11.6	0.3		21.1	
LOS	F	B	B	A		C	
Approach Delay	224.6		7.9			21.1	
Approach LOS	F		A			C	
Queue Length 50th (ft)	~468	2	169	0		336	
Queue Length 95th (ft)	#669	13	255	0		#625	
Internal Link Dist (ft)	205		260			290	
Turn Bay Length (ft)		90		155			
Base Capacity (vph)	500	463	1137	1615		1153	
Starvation Cap Reductn	0	0	0	0		0	
Spillback Cap Reductn	0	0	0	0		0	
Storage Cap Reductn	0	0	0	0		0	
Reduced v/c Ratio	1.42	0.02	0.58	0.19		0.85	

Intersection Summary

Area Type: Other

Cycle Length: 92

Actuated Cycle Length: 77

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.42

Intersection Signal Delay: 71.5

Intersection LOS: E

Intersection Capacity Utilization 95.3%

ICU Level of Service F

Analysis Period (min) 15

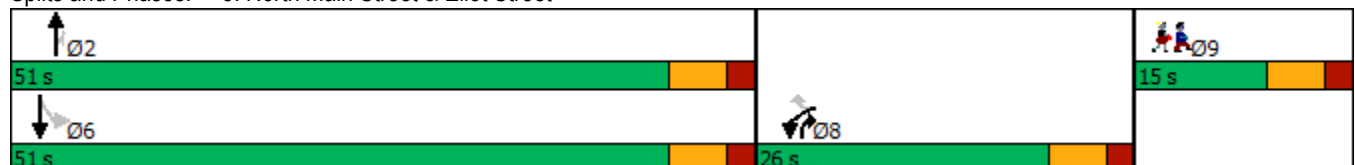
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: North Main Street & Eliot Street



HCM Signalized Intersection Capacity Analysis

5: North Main Street & Eliot Street

2027 build evening peak hour

01/19/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	654	9	583	277	7	890
Future Volume (vph)	654	9	583	277	7	890
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1752	1615	1863	1615		1899
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	1752	1615	1863	1615		1890
Peak-hour factor, PHF	0.92	0.92	0.89	0.89	0.92	0.92
Adj. Flow (vph)	711	10	655	311	8	967
RTOR Reduction (vph)	0	2	0	32	0	0
Lane Group Flow (vph)	711	8	655	279	0	975
Heavy Vehicles (%)	3%	0%	2%	0%	1%	0%
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	20.0	20.0	45.0	65.0		45.0
Effective Green, g (s)	22.0	22.0	47.0	69.0		47.0
Actuated g/C Ratio	0.29	0.29	0.61	0.90		0.61
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	500	461	1137	1615		1153
v/s Ratio Prot	c0.41		0.35	0.05		
v/s Ratio Perm		0.00		0.12		c0.52
v/c Ratio	1.42	0.02	0.58	0.17		0.85
Uniform Delay, d1	27.5	19.7	9.0	0.5		12.1
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	201.3	0.0	0.7	0.1		5.9
Delay (s)	228.8	19.8	9.7	0.5		17.9
Level of Service	F	B	A	A		B
Approach Delay (s)	225.9		6.8			17.9
Approach LOS	F		A			B
Intersection Summary						
HCM 2000 Control Delay			70.2		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.13			
Actuated Cycle Length (s)			77.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			95.3%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Queues
5: North Main Street & Eliot Street

2027 build evening peak hour with mitigation

01/19/2021

					
Lane Group	WBL	WBR	NBT	NBR	SBT
Lane Group Flow (vph)	711	10	655	311	975
v/c Ratio	1.07	0.02	0.69	0.19	1.02
Control Delay	79.1	11.6	18.2	0.3	53.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	79.1	11.6	18.2	0.3	53.8
Queue Length 50th (ft)	~352	2	204	0	~421
Queue Length 95th (ft)	#547	10	315	0	#678
Internal Link Dist (ft)	205		260		290
Turn Bay Length (ft)		90		155	
Base Capacity (vph)	666	616	944	1615	958
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.07	0.02	0.69	0.19	1.02

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis 2027 build evening peak hour with mitigation

5: North Main Street & Eliot Street

01/19/2021

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	654	9	583	277	7	890
Future Volume (vph)	654	9	583	277	7	890
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1752	1615	1863	1615		1899
Flt Permitted	0.95	1.00	1.00	1.00		0.99
Satd. Flow (perm)	1752	1615	1863	1615		1890
Peak-hour factor, PHF	0.92	0.92	0.89	0.89	0.92	0.92
Adj. Flow (vph)	711	10	655	311	8	967
RTOR Reduction (vph)	0	2	0	35	0	0
Lane Group Flow (vph)	711	8	655	276	0	975
Heavy Vehicles (%)	3%	0%	2%	0%	1%	0%
Turn Type	Prot	Perm	NA	pm+ov	Perm	NA
Protected Phases	8		2	8		6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	25.0	25.0	34.0	59.0		34.0
Effective Green, g (s)	27.0	27.0	36.0	63.0		36.0
Actuated g/C Ratio	0.38	0.38	0.51	0.89		0.51
Clearance Time (s)	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	666	614	944	1615		958
v/s Ratio Prot	c0.41		0.35	0.06		
v/s Ratio Perm		0.00		0.11		c0.52
v/c Ratio	1.07	0.01	0.69	0.17		1.02
Uniform Delay, d1	22.0	13.7	13.3	0.5		17.5
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	54.3	0.0	2.2	0.1		33.6
Delay (s)	76.3	13.7	15.5	0.6		51.1
Level of Service	E	B	B	A		D
Approach Delay (s)	75.4		10.7			51.1
Approach LOS	E		B			D
Intersection Summary						
HCM 2000 Control Delay			43.0		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.15			
Actuated Cycle Length (s)			71.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			95.3%		ICU Level of Service	F
Analysis Period (min)			15			
c Critical Lane Group						

Hunting Lane/Project Site Driveway



Intersection						
Int Delay, s/veh	2.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	32	0	6	30	1	18
Future Vol, veh/h	32	0	6	30	1	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	0	7	33	1	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	35	0	82	35
Stage 1	-	-	-	-	35	-
Stage 2	-	-	-	-	47	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1576	-	920	1038
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	975	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1576	-	915	1038
Mov Cap-2 Maneuver	-	-	-	-	915	-
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	970	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		1.2		8.6	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1031	-	-	1576	-	
HCM Lane V/C Ratio	0.02	-	-	0.004	-	
HCM Control Delay (s)	8.6	-	-	7.3	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0	-	

Intersection						
Int Delay, s/veh	2.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	35	1	18	29	1	10
Future Vol, veh/h	35	1	18	29	1	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	1	20	32	1	11
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	39	0	111	39
Stage 1	-	-	-	-	39	-
Stage 2	-	-	-	-	72	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1571	-	886	1033
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	951	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1571	-	874	1033
Mov Cap-2 Maneuver	-	-	-	-	874	-
Stage 1	-	-	-	-	983	-
Stage 2	-	-	-	-	939	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		2.8		8.6	
HCM LOS	A					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	1016	-	-	1571	-	
HCM Lane V/C Ratio	0.012	-	-	0.012	-	
HCM Control Delay (s)	8.6	-	-	7.3	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	0	-	

DRAFT CONSTRUCTION MANAGEMENT PLAN



**CONSTRUCTION MANAGEMENT PLAN
APPLE HILL ESTATES
31 HUNTING LANE
SHERBORN, MASSACHUSETTS**

The Project proponent will implement a Construction Management Plan (CMP) in coordination with Town of Sherborn in order to facilitate safe and efficient access to the Project site and travel along Hunting Lane during construction activities. Summarized below are several measures which will be undertake during the construction phase of the Project.

- Prior to construction activities, a Temporary Traffic Control Plan (TTCP) will be submitted to the Department of Public Works (DPW) and the Police Department for review and approval. The TTCP will depict the location of the construction entrance, traffic and sediment control measures, traffic control devices and the location of any construction activities that will occur with the public right-of-way along Hunting Lane.
- A pre-construction meeting will be held with the DPW and the Police Department prior to the initiation of construction activities.
- The contact information for the general contractor or construction superintendent will be provided to the DPW and the Police Department.
- Hours of construction will be as defined by the Zoning By Laws of the Town or as established in the Comprehensive Permit Decision.
- Police details will be used when construction activities will occur that may disrupt travel along Hunting Lane.
- All contractors will be required to access the project site by way of Hunting Lane to the east of the site. This required access route will be included in all construction contracts and materials suppliers will also be informed of the required travel route to access the project site.
- Employees will be encouraged to car/vanpool in order to reduce construction-related traffic.
- Secure on-site storage will be provided for tools and equipment in an effort to minimize construction-related vehicle trips to the site.
- Full or partial street closures will be avoided to the extent possible. Should a partial street closure be necessary in order to off-load construction materials and/or complete construction-related activities, the closure will be limited to off-peak periods as defined by the DPW and the Police Department so as to minimize the impact of vehicular and pedestrian flow.
- Construction worker parking will be expressly prohibited along Hunting Lane. Construction contracts for the project will include notification of this prohibition.

HUNTING LANE SIGHT DISTANCE STUDY





Legend:

- (C) Clear Sight Distance Provided from Route 27
- (H) Horizontal (Curve) Constraint
 - Point of Measurement
- XX→ Available Sight Distance
- XX→ Shorter than Reccomended

Speed	Minimum Stopping Sight Distance
15 MPH	80'
20 MPH	115'
25 MPH	155'
30 MPH	200'
35 MPH	250'

NOTE: THIS PLAN IS FOR REVIEW PURPOSES ONLY AND IS NOT INTENDED FOR CONSTRUCTION.

Source: Google Earth.

0 50 100 Scale in Feet



Figure 1A

Hunting Lane Sight Distance Study