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Transportation: Engineering • Planning • Design

M E M O R A N D U M

Ref: 2042A

To: James Phippard
Brickstone Land Use Consultants, LLC

From: Stephen G. Pernaw, P.E., PTOE

Subject: Proposed Ben's Sugar Shack - Traffic Evaluation
Temple, New Hampshire

Date: November 16, 2020

On September 10, 2020 our office prepared a "trip generation" memorandum on behalf of Brickstone Land Use Consultants, LLC regarding the proposed Ben's Sugar Shack production facility that will be located at the northwest corner of the NH101/NH45/Webster Highway intersection in Temple, New Hampshire. That report included the results of our research into available NHDOT traffic volume data on NH101, and our trip generation estimates for the subject site. Since publication of that memorandum, we have learned that the proposed development constitutes a relocation of Ben's Sugar Shack operation from 83 Webster Highway to the new location adjacent to NH101.

This supplemental "Traffic Evaluation" memorandum expands upon the previous scope of services, and it includes: several findings from our recent site inspections, new intersection counts conducted at the NH101/NH45/Webster Highway intersection, preparation of 2032 Design Hour Volumes for the subject intersection, the results of an auxiliary turn lane warrants analysis, analysis of intersection operations and capacity, evaluation of stopping sight distances, and recommendations to ensure that vehicular access to/from the site will be reasonably safe and efficient from a traffic engineering standpoint for the size and type of development that is proposed.

Figure 1 shows the location of the subject site with respect to the area highway system and nearby traffic count locations.

Executive Summary - It is my professional opinion as a Professional Traffic Operations Engineer (#399) and NH licensed Professional Engineer (#5234) that the existing NH101/NH45/Webster Highway intersection will continue to provide reasonably safe and efficient vehicular access to/from Webster Highway through the 2032 horizon year with the relocated Ben's Sugar Shack production facility (with small market) on Webster Highway. We find no compelling reason to modify the State highway as a result of the proposed development. I base this opinion on the results of our fieldwork, evaluation of the anticipated traffic volumes at the subject intersection, several publications in our technical library, my postgraduate education, and over 30 years of civil engineering experience.

Pernaw & Company, Inc

= AUTOMATIC TRAFFIC RECORDER LOCATION (SGP & CO., INC.)

= AUTOMATIC TRAFFIC RECORDER LOCATION (NHDOT) - Pre-COVID

= INTERSECTION TURNING MOVEMENT COUNT LOCATION

NORTH

2042A

Figure 1

Site Location

Traffic Evaluation, Ben's Sugar Shack, Temple, New Hampshire

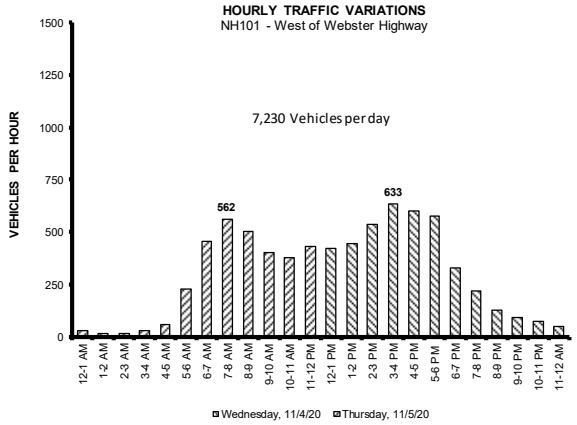
Proposed Development – According to the plan entitled *"Layout Plan"* prepared by Brickstone Land Use Consultants, LLC (see Attachment 1), the proposed development involves the construction of a new 16,080 sf building that will contain a new production facility for maple syrup and a small market area (3,000 sf) for the sale of maple and food products. Access to the subject site is proposed via two new full-access driveways on the west side of Webster Highway. The south site driveway will be located approximately 280-feet north of the NH101 intersection and will be used primarily by customers. The north site driveway will be located approximately 200-feet beyond the south site driveway. The north site driveway will primarily be used by delivery vehicles.

Existing Conditions - Webster Highway is a two-lane local street that extends northeasterly from NH101 to the Wilton town line. In the vicinity of the subject site, Webster Highway measures approximately 21-22 feet in width, with graded shoulders of variable width on both sides of the roadway. There are no pavement markings on this section of Webster Highway. The speed limit is posted at 30 mph for passenger vehicles and 25 mph for trucks. NH101 functions as two-lane arterial roadway that carries through traffic in an east-west direction, and provides access to abutting properties and intersecting streets. The speed limit is posted at 50 mph on this section of NH101.

The NH101/NH 45/Webster Highway intersection was constructed with offset minor approaches; with NH45 intersecting slightly to the east of the Webster Highway approach. Both minor approaches operate under stop sign control. The existing lane configuration is as follows:

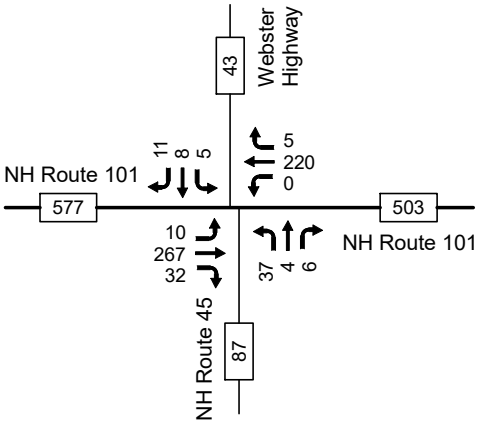
- NH101 EB Approach: One shared left-through lane, one exclusive right-turn lane
- NH101 WB Approach: One shared left-through-right lane
- NH45 NB Approach: One shared left-through-right lane
- Webster Highway SB Approach: One shared left-through-right lane

Existing Traffic Volumes – Figure 1 shows the NHDOT traffic count locations referred to in our previous memorandum along with the corresponding Annual Average Daily Traffic (AADT) volumes. To supplement this data, our office conducted a 24-hour traffic count on NH101 (west of Webster Highway) in November 2020, and collected peak-period intersection turning movement count data at the subject intersection on a typical weekday from 7:00 to 9:00 AM and from 3:00 to 6:00 PM. The following graphic shows that this section of NH101 carried 7,230 vehicles per day (vpd) in November 2020, and that the highest hourly rate of traffic flow occurred during the typical morning and evening commuter periods (see Attachments 2 & 3).

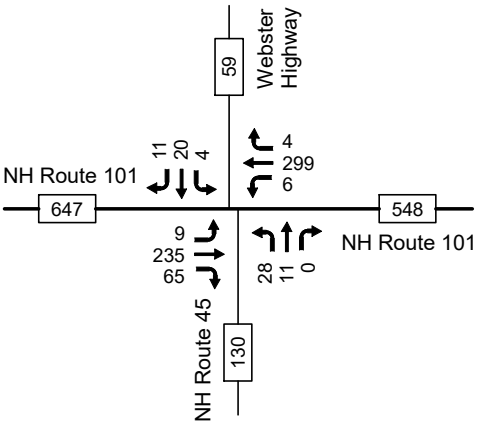


The results of the intersection turning movement counts are summarized on Figure 2 and they show that the highest traffic hour for the intersection occurred from 3:15 to 4:15 PM, when 692 vehicles were observed entering the subject intersection. During the PM peak hour, the westerly leg of the intersection on NH101 carried 647 vehicles (total both directions), and NH45 carried 130 vehicles and Webster Highway carried 59 vehicles (see Attachments 4-12). The previous research of historical count data on NH101 confirmed that traffic levels on weekends are comparable to those on weekdays.

It should be noted that the November 2020 traffic volumes are below normal levels due to the effects of the Covid-19 pandemic. These volumes also require further adjustments to reflect March conditions when the maple syrup business is typically the busiest.



AM Peak Hour
Wednesday, November 5, 2020
7:15 - 8:15 AM



PM Peak Hour
Tuesday, November 4, 2020
3:15 - 4:15 PM

2042A

Note: Traffic volumes reflect COVID-19 conditions as of November 2020

NORTH

Figure 2

2020 Existing Traffic Volumes

Traffic Evaluation, Ben's Sugar Shack, Temple, New Hampshire

Future Traffic Volumes – Figure 3 summarizes the long-range traffic projections for March, both with and without the proposed Ben's Sugar Shack building. These projections are based on the November 2020 traffic volumes, an annual traffic growth rate of 1% per year compounded annually, a monthly adjustment factor of 0.98 to reflect March conditions, and a Covid-19 factor of 1.13. The derivation of these factors is found on Attachments 13-16.

The previous trip generation memorandum included two separate methodologies in estimating the quantity of vehicle-trips that will be produced by the proposed Ben's Sugar Shack facility. The standard method (Method A) involves the use of the trip generation rates and equations published by the Institute of Transportation Engineers[1] (ITE). In this case, the more appropriate ITE Land Use Codes (LUC) are LUC 140 (Manufacturing) and LUC 820 (Retail-Shopping). However, this methodology is not capable of reflecting the various shift schedules, and is based only on the gross floor area of each building component. Consequently, a manual method (Method B) was also considered; one that is based on site-specific information from the applicant concerning employee counts, work shift schedules, delivery schedules, and customer demand. Both trip estimates are summarized in Table 1 below. The manually derived trip estimates are expected to be more indicative of actual post-development conditions as they are based on site-specific information.

Table 1 — Trip Generation Summaries

	METHOD A ITE Trip Rate Method (Average Month Condition)			METHOD B SGP Manual Derivation [3] (Peak Month Condition) [4]
	Manufacturing[1]	Retail [2]	SUM	
AM Peak Hour				
Entering	6 veh	2 veh	8 veh	6 veh
Exiting	2 veh	1 veh	3 veh	6 veh
Total	8 trips	3 trips	11 trips	12 trips
PM Peak Hour				
Entering	3 veh	5 veh	8 veh	**24** veh
Exiting	6 veh	6 veh	12 veh	**24** veh
Total	9 trips	11 trips	20 trips	**48** trips
Weekday (24 Hours)				
Entering	26 veh	57 veh	83 veh	246 veh
Exiting	26 veh	57 veh	83 veh	246 veh
Total	52 trips	114 trips	166 trips	492 trips
Saturday Generator Peak Hour				
Entering	6 veh	7 veh	13 veh	**38** veh
Exiting	6 veh	7 veh	13 veh	**25** veh
Total	12 trips	14 trips	26 trips	**63** trips
Saturday (24 Hours)				
Entering	42 veh	69 veh	111 veh	246 veh
Exiting	42 veh	69 veh	111 veh	246 veh
Total	84 trips	138 trips	222 trips	492 trips

[1] ITE Land Use Code 140 - Manufacturing (13,080 sf) - Trip Rate method

[1] ITE Land Use Code 820 - Manufacturing (3,000 sf) - Trip Rate method

[3] Manual Derivation based on 26 employees, 200 daily customers, 15 trucks from Ben's Maple Sugar Products, LLC

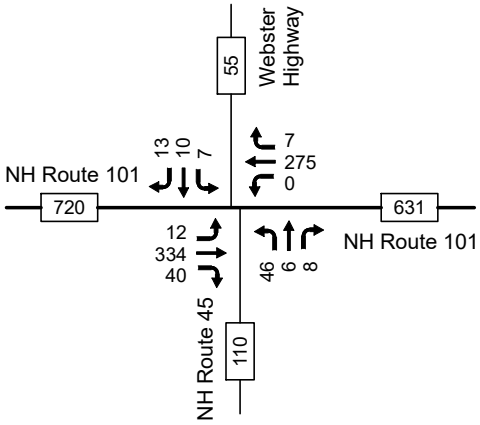
[4] Peak Month for sugar business = March

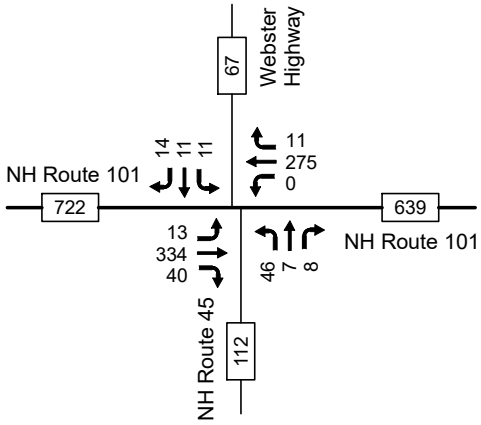
[1] Institute of Transportation Engineers, *Trip Generation*, 10th Edition (Washington, D.C., 2017)

2032 No-Build Volumes

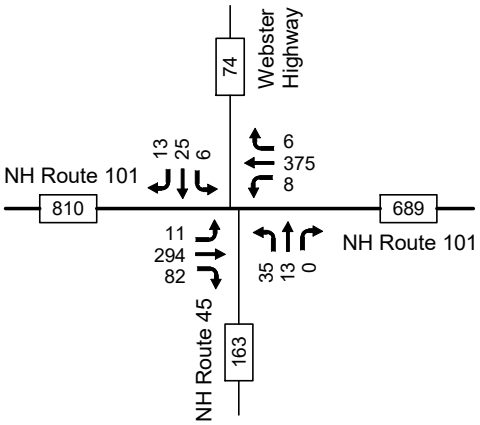
2032 Build Volumes

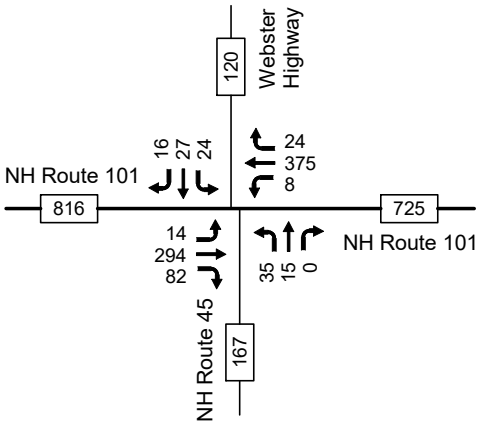
AM Peak Hour





PM Peak Hour





2042A

Note: Traffic volumes reflect March 2032 conditions without COVID-19

NORTH

Figure 3

2032 Traffic Volumes

Traffic Evaluation, Ben's Sugar Shack, Temple, New Hampshire

The higher trip estimates indicate that the new site will generate approximately 48 (PM) and 63 (SAT) vehicle-trips during the peak hour periods in the month of March. Attachment 17 contains diagrams depicting the distribution of site traffic through the subject intersection. The derivation of the trip generation estimates is included our previous memorandum dated September 10, 2020.

Analysis of regional population data indicates that the majority of site traffic (approximately 74%) will travel to and from points east via NH101 (see Attachment 18). The minority will utilize NH101 (west), Webster Highway (north) and NH45 (south) to travel to and from the site. This means that the largest increases in traffic flow at the subject intersection will be limited to the westbound right-turn movement from NH101 (inbound vehicles) and the left-turn departure movement from Webster Highway (outbound vehicles).

Net Traffic Impacts – Since the proposed building represents the relocation of the existing business from 83 Webster Highway, the majority of traffic generated by the existing business presently travels through the subject intersection. This means that the net impact to the intersection volumes will actually be limited to the increase in business/traffic as a result of the proposed relocation. It is recognized that the proposed facility is larger and includes additional attractions, and that the trip generating characteristics of the existing business are unknown. Consequently, the 2032 traffic projections and analyses contained herein are based on a very conservative and simplifying assumption: all trips from Table 1 will be treated as new or additional vehicles at the subject intersection (except for those traveling to/from points north on Webster Highway).

Traffic Operations - The long-range (2032) traffic projections were utilized to assess traffic operations at the NH101/NH45/Webster Highway unsignalized intersection according to the methodologies of the Highway Capacity Manual [2] as replicated by the latest edition of the Synchro Traffic Signal Timing Software (Version 10), which also performs unsignalized intersection capacity analyses.

Capacity and Level of Service (LOS) calculations pertaining to unsignalized intersections address the quality of service for those vehicles turning into and out of intersecting side streets. The availability of adequate gaps in the traffic stream on the major street (NH101) actually controls the potential capacity for vehicle movements to and from the minor approaches. Levels of Service are simply letter grades (A-F) which categorize the vehicle delays associated with specific turning maneuvers. Table 2 describes the criteria used in this analysis.

Table 2 — Level-of-Service Criteria for Unsignalized Intersections

Control Delay (seconds/vehicle)	Level of Service by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	v/c > 1.0
0 - 10	A	F
> 10 - 15	B	F
> 15 - 25	C	F
> 25 - 35	D	F
> 35 - 50	E	F
> 50	F	F

Source: Transportation Research Board, Highway Capacity Manual 2010.

[2] Transportation Research Board, *Highway Capacity Manual* (Washington, D.C., 2010).

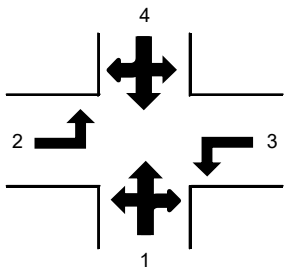
The results of the analysis for 2032 are summarized on Table 3 and confirms that all applicable turning movements at this intersection will continue to operate well below capacity and at Level of Service D or higher with the relocated Ben's Sugar Shack in operation.

Table 3

STOP-Controlled Intersection Capacity Analysis - March 2032
NH Route 101 / Webster Highway / NH Route 45

	2032 Weekday AM Peak Hour				2032 Weekday PM Peak Hour			
	Delay [1]	V/C [2]	LOS [3]	Queue [4]	Delay [1]	V/C [2]	LOS [3]	Queue [4]
1. NH Route 45 - NB Departures								
2032 No Build	18.2	0.20	C	1	18.4	0.20	C	1
2032 Build	23.5	0.25	C	1	25.0	0.27	D	1
2. NH Route 101 - EB LT Arrivals								
2032 No Build	7.9	0.01	A	<1	7.9	0.01	A	<1
2032 Build	8.2	0.01	A	<1	8.3	0.01	A	<1
3. NH Route 101 - WB LT Arrivals								
2032 No Build	0.0	0.00	A	<1	0.0	0.00	A	<1
2032 Build	8.2	0.01	A	<1	8.2	0.01	A	<1
4. Webster Highway - SB Departures								
2032 No Build	14.4	0.08	B	<1	15.0	0.10	C	<1
2032 Build	19.5	0.18	C	1	23.7	0.31	C	1

[1] HCM Control Delay (seconds per vehicle), [2] HCM Volume to Capacity Ratio, [3] HCM Level of Service, [4] HCM 95th Percentile Queue (vehicles)



Calculations pertaining to these analyses are attached (see Attachments 19-22).

Safety – Sight distance at an intersection is an important safety consideration. The operator of a vehicle approaching the subject intersection on NH101 should have an unobstructed view of the intersection and sufficient length of roadway to enable a full stop, should it be required to avoid a collision. Similarly, exiting vehicles from the minor approaches should have sufficient visibility of approaching traffic in order to safely enter the traffic flow on the major street (NH101). The following photographs depict the driver's view looking left and right from the Webster Highway approach to NH101.

Field measurements confirmed that the available sight distance exceeds 500-feet looking left and looking right from the Webster Highway approach to NH101. The available sight distance at this location exceeds the NHDOT 400-foot guideline as specified in the *"Policy for the Permitting of Driveways and Other Accesses to The State Highway System."* As an aside, the required stopping sight distance for the 50-mph posted speed limit is 425-feet. We find that the alignment and grade of the highway to be ideal from a safety standpoint, and that Webster Highway will continue to provide a safe and controlled approach to NH101 in all seasons of the year, regardless of the proposed relocation of Ben's Sugar Shack.

The travel lane configuration at an intersection is another important consideration in terms of both safety and traffic operations. The type of treatment needed to accommodate left-turning vehicles from any street or highway to an intersecting side street (or driveway) can range from no treatment, where turning volumes are low; to the provision of a bypass lane for through traffic to travel around left-turning vehicles; to the addition of a formal center turn lane used exclusively by left-turning vehicles for deceleration and storage while waiting to complete their maneuvers. Analysis of the March 2032 Horizon Year traffic volumes using NCHRP 457 guidelines indicates that left-turn treatment is not necessary on NH101 at the Webster Highway intersection. This means that the existing eastbound through-left lane will continue to function adequately with the anticipated traffic volumes. The results are summarized on Table 4 and the computations are attached (see Attachments 23 and 24).

Table 4	Left-Turn Lane Warrants Analysis - 2032 Build NH Route 101/NH Route 45/Webster Highway	
	2032 AM Build Volumes	2032 PM Build Volumes
Peak Hour Inputs		
Left-Turn Volume (EB)	13	14
Advancing Volume (EB)	387	390
Opposing Volume (WB)	286	407
Percent Lefts	3.4%	3.6%
Speed (mph)	50	50
Limiting Advancing Volume (veh/h)	596	509
Conclusion		
Left-Turn Treatment Warranted	**NO**	**NO**

Similarly, the type of treatment needed to accommodate right-turning vehicles from any street or highway to any intersecting side street (or driveway) can range from a radius only, where turning volumes are low; to the provision of a short 10:1 right-turn taper; to the addition of an exclusive right-turn lane, where turning volumes and through traffic volumes are significant. Analysis of the 2032 Build traffic volume projections using NCHRP 457 guidelines confirmed that right-turn treatment is not warranted on NH101 westbound at the Webster Highway intersection. This means that the existing westbound travel lane on NH101 will continue to function adequately as a shared left-through-right lane for anticipated traffic volumes. The results of these analyses are summarized on Table 5 and the computations are attached (see Attachments 25 & 26).

Table 5	Right-Turn Lane Warrants Analysis - 2032 Build NH Route 101/NH Route 45/Webster Highway	
	2032 AM Build Volumes	2032 PM Build Volumes
Peak Hour Inputs		
Right-Turn Volume (WB)	11	24
Total Approach Volume (WB)	286	407
Speed (mph)	50	50
Limiting Right-Turn Volume (veh/h)	48	31
Conclusion		
Add Right-Turn Bay	**NO**	**NO**

The type of treatment needed to accommodate exiting vehicles from the minor-road approach at a stop-controlled intersection can range from a single lane (shared left-through-right lane) in low-volume conditions, to two exit lanes (shared left-through lane and an exclusive right-turn lane) where turning volumes and through traffic volumes are significant, to multiple exit lanes in extreme cases. Analysis of the March 2032 Build traffic volumes using NCHRP 457 guidelines is summarized on Table 6 and confirms that one departure lane on the Webster Highway approach to NH101 is sufficient for the anticipated traffic volumes (see Attachments 27 & 28). In actuality, the Webster Highway approach to NH101 is flared to the extent that a left turning and right turning vehicle are able to queue side-by-side.

Table 6	Minor-Road Approach Geometry - 2032 Build NH Route 101/NH Route 45/Webster Highway	
	2032 AM Build Volumes	2032 PM Build Volumes
Peak Hour Inputs		
Major-Road Volume (WB-EB)	673	797
% Right-Turns on Minor (SB)	39	24
Minor-Road Approach Volume	36	67
Limiting Minor-Road Volume (veh/h)	273	211
Conclusion		
Consider TWO Approach Lanes	**NO**	**NO**

Based upon the analysis of the post-development traffic volumes contained herein, we find that stop sign control (MUTCD # R1-1) on the Webster Highway approach to NH101 is appropriate. This intersection is not a candidate for traffic signal control as the major street and the minor street traffic levels fall well below the minimum requirements.

Findings, Conclusions & Recommendations

1. The NH101/NH45/Webster Highway intersection currently operates well below capacity and will continue to do so through 2032 with the proposed relocation of Ben's Sugar Shack on Webster Highway.

2. The existing travel lane configuration at the subject intersection is appropriate for the existing and anticipated traffic volumes. Physical modifications to the intersection are not necessary.

3. Stop-sign control is the appropriate traffic control device for the Webster Highway approach to NH101.

4. The existing width of Webster Highway (21-22 feet) is sufficient for the posted speed limit and the 2032 traffic volumes.

5. The location and spacing of the two proposed site driveways on the west side of Webster Highway are appropriate, and both driveways will function safely and adequately with a single approach lane on each leg of each intersection.

6. The physical layout of the northerly site driveway as shown on Attachment 1 is compatible with WB-50 tractor-trailer truck movements (see Attachment 29).

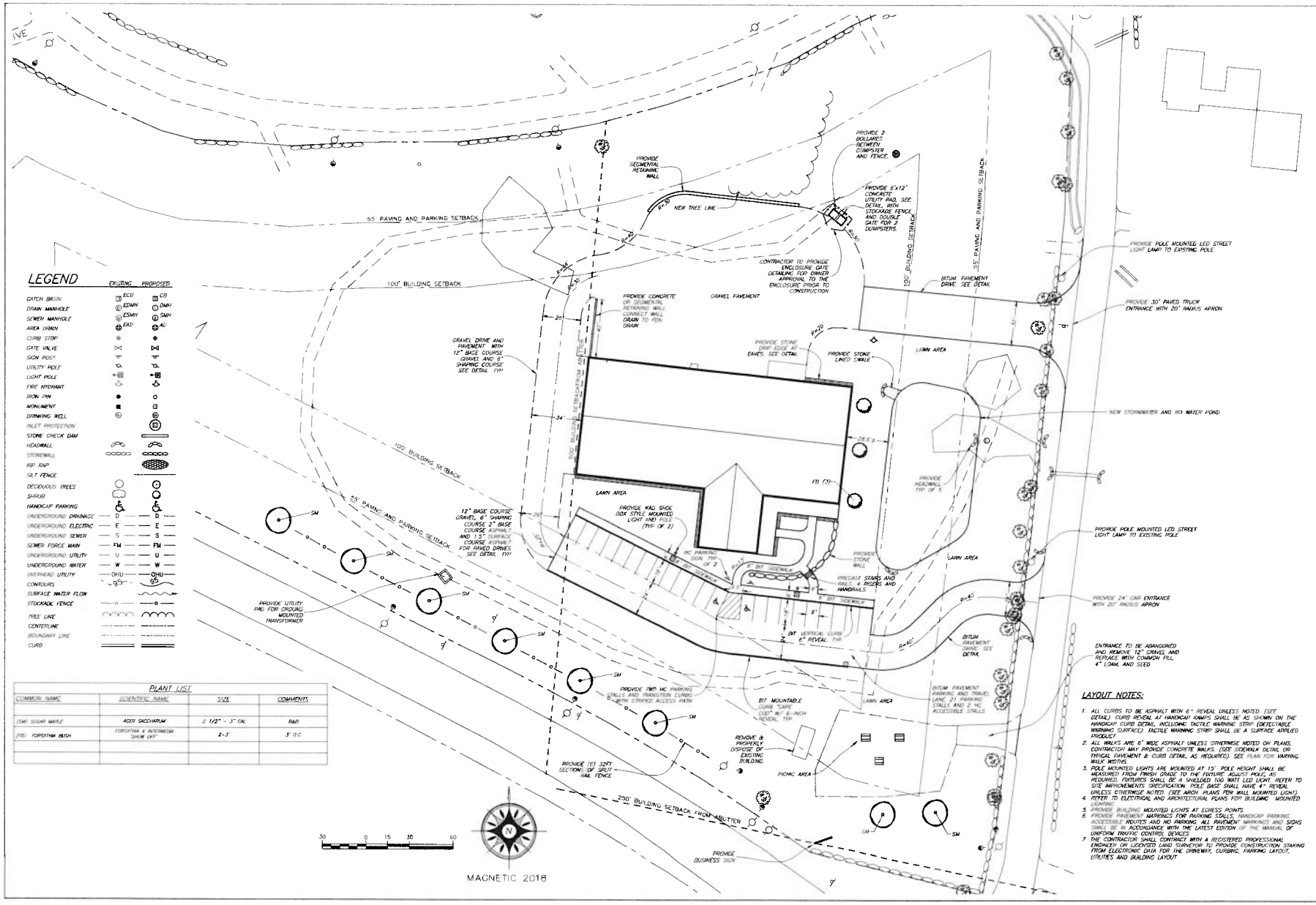
7. It is recommended that clear "sight distance triangles" be established at both site driveway approaches to Webster Highway to ensure that 250-feet of stopping sight distance is provided for drivers exiting from the site. This will require the trimming and maintenance of roadside vegetation within the Webster Highway right-of-way.

8. It is also recommended that police officer control be available initially at the subject intersection on NH101 when "special events" are scheduled to occur at the site. The need for police presence thereafter should be reassessed based on actual traffic conditions, and Police Department input.

Attachments

cc: Thomas R. Hanna, Esquire

A T T A C H M E N T S



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ROBERT K. STEVENS No. 5615 LICENSED PROFESSIONAL ENGINEER STATE OF NEW HAMPSHIRE

PURPOSE OF DRAWING:
JUNE 9, 2020
PERMITTING

BEN'S SUGAR SHACK

WEBSTER HIGHWAY
TEMPLE, NH

PREPARED FOR:
BEN'S MAPLE PRODUCTS LLC
83 WEBSTER HIGHWAY
TEMPLE, NH

DATE	REVISION

LAYOUT PLAN

DES. BY	HRH
DWN. BY	EEF
CHKD BY	JP
SCALE	AS SHOWN
DATE	06/09/2020
PROJECT NUM.	20-024
DWG. NO.	C-3

SHEET 4 OF 8

Attachment 1

Daily Vehicle Volume Report

Study Date: Wednesday, 11/04/2020
Unit ID: SGP15
Location: NH101 West of Webster Highway

	Eastbound Volume	Westbound Volume	Total Volume
00:00 - 00:59	-	-	-
01:00 - 01:59	-	-	-
02:00 - 02:59	-	-	-
03:00 - 03:59	-	-	-
04:00 - 04:59	-	-	-
05:00 - 05:59	-	-	-
06:00 - 06:59	-	-	-
07:00 - 07:59	-	-	-
08:00 - 08:59	-	-	-
09:00 - 09:59	-	-	-
10:00 - 10:59	-	-	-
11:00 - 11:59	46	27	**73**
12:00 - 12:59	205	216	**421**
13:00 - 13:59	232	216	**448**
14:00 - 14:59	269	270	**539**
15:00 - 15:59	307	326	**633**
16:00 - 16:59	280	322	**602**
17:00 - 17:59	279	297	**576**
18:00 - 18:59	123	208	**331**
19:00 - 19:59	95	126	**221**
20:00 - 20:59	48	80	**128**
21:00 - 21:59	38	55	**93**
22:00 - 22:59	29	46	**75**
23:00 - 23:59	18	30	**48**
Totals	**1969**	**2219**	**4188**
AM Peak Time	**11:00 - 11:59**	**10:59 - 11:58**	**11:00 - 11:59**
AM Peak Volume	**46**	**27**	**73**
PM Peak Time	**15:20 - 16:19**	**15:29 - 16:28**	**15:27 - 16:26**
PM Peak Volume	**342**	**350**	**679**

Daily Vehicle Volume Report

Study Date: Thursday, 11/05/2020
Unit ID: SGP15
Location: NH101 West of Webster Highway

	Eastbound Volume	Westbound Volume	Total Volume
00:00 - 00:59	18	12	**30**
01:00 - 01:59	7	10	**17**
02:00 - 02:59	7	8	**15**
03:00 - 03:59	17	13	**30**
04:00 - 04:59	39	22	**61**
05:00 - 05:59	158	71	**229**
06:00 - 06:59	255	200	**455**
07:00 - 07:59	299	263	**562**
08:00 - 08:59	257	247	**504**
09:00 - 09:59	193	210	**403**
10:00 - 10:59	186	193	**379**
11:00 - 11:59	214	216	**430**
12:00 - 12:59	230	225	**455**
13:00 - 13:59	0	3	**3**
14:00 - 14:59	-	-	-
15:00 - 15:59	-	-	-
16:00 - 16:59	-	-	-
17:00 - 17:59	-	-	-
18:00 - 18:59	-	-	-
19:00 - 19:59	-	-	-
20:00 - 20:59	-	-	-
21:00 - 21:59	-	-	-
22:00 - 22:59	-	-	-
23:00 - 23:59	-	-	-
Totals	**1880**	**1693**	**3573**
AM Peak Time	**07:14 - 08:13**	**06:58 - 07:57**	**07:14 - 08:13**
AM Peak Volume	**309**	**269**	**574**
PM Peak Time	**12:00 - 12:59**	**12:00 - 12:59**	**12:00 - 12:59**
PM Peak Volume	**230**	**225**	**455**

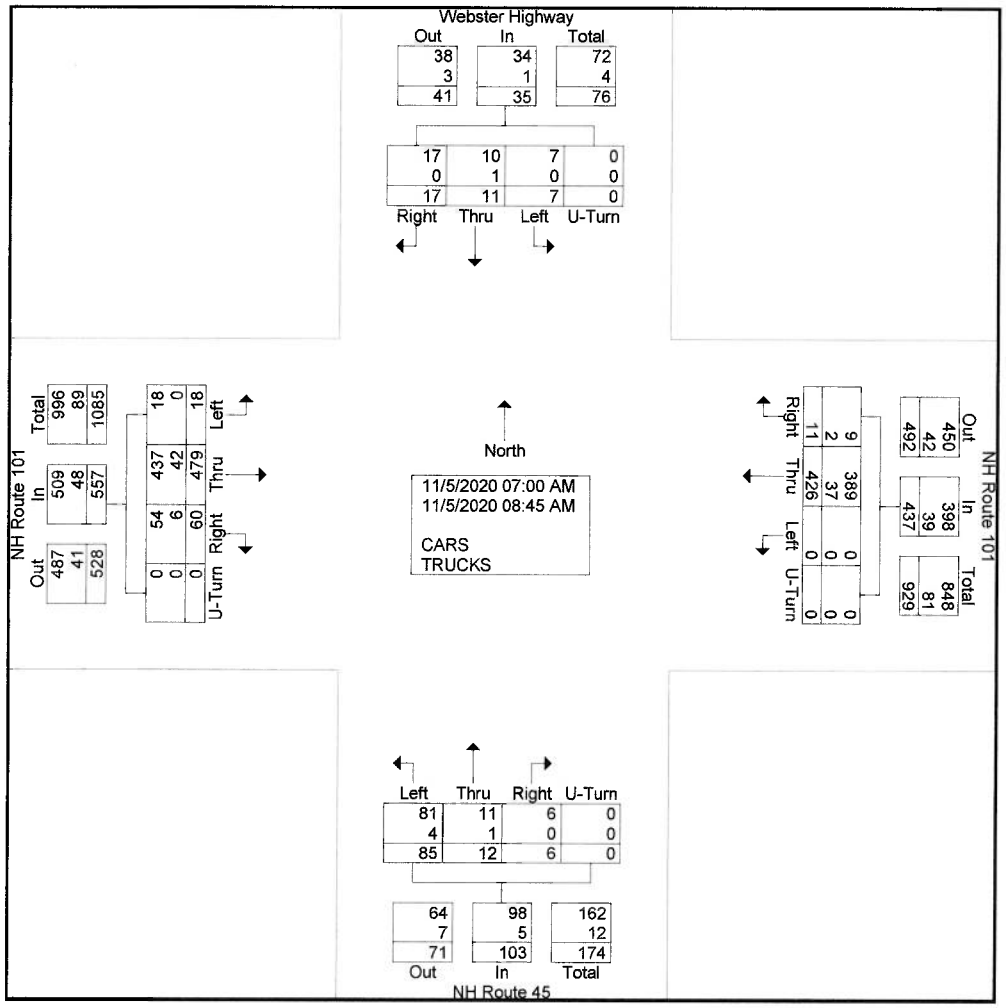
Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Fair
Collected By: MV
Job Number: 2042A
Town/State: Temple, New Hampshire

File Name : 2042A_INT_A_AM_&_PM_795922_11-04-2020
Site Code : 2042A
Start Date : 11/4/2020
Page No : 1 5

Groups Printed- CARS - TRUCKS

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
07:00 AM	1	0	0	0	1	1	54	0	0	55	0	1	15	0	16	9	51	1	0	61	133
07:15 AM	2	2	3	0	7	2	50	0	0	52	1	1	10	0	12	7	83	2	0	92	163
07:30 AM	5	1	0	0	6	0	58	0	0	58	4	0	6	0	10	9	64	2	0	75	149
07:45 AM	1	1	2	0	4	2	58	0	0	60	1	2	10	0	13	9	58	2	0	69	146
Total	9	4	5	0	18	5	220	0	0	225	6	4	41	0	51	34	256	7	0	297	591
08:00 AM	3	4	0	0	7	1	54	0	0	55	0	1	11	0	12	7	62	4	0	73	147
08:15 AM	0	0	1	0	1	2	47	0	0	49	0	1	16	0	17	9	57	1	0	67	134
08:30 AM	3	3	0	0	6	2	54	0	0	56	0	4	9	0	13	7	65	3	0	75	150
08:45 AM	2	0	1	0	3	1	51	0	0	52	0	2	8	0	10	3	39	3	0	45	110
Total	8	7	2	0	17	6	206	0	0	212	0	8	44	0	52	26	223	11	0	260	541
Grand Total	17	11	7	0	35	11	426	0	0	437	6	12	85	0	103	60	479	18	0	557	1132
Apprch %	48.6	31.4	20	0		2.5	97.5	0	0		5.8	11.7	82.5	0		10.8	86	3.2	0		
Total %	1.5	1	0.6	0	3.1	1	37.6	0	0	38.6	0.5	1.1	7.5	0	9.1	5.3	42.3	1.6	0	49.2	
CARS	17	10	7	0	34	9	389	0	0	398	6	11	81	0	98	54	437	18	0	509	1039
% CARS	100	90.9	100	0	97.1	81.8	91.3	0	0	91.1	100	91.7	95.3	0	95.1	90	91.2	100	0	91.4	91.8
TRUCKS	0	1	0	0	1	2	37	0	0	39	0	1	4	0	5	6	42	0	0	48	93
% TRUCKS	0	9.1	0	0	2.9	18.2	8.7	0	0	8.9	0	8.3	4.7	0	4.9	10	8.8	0	0	8.6	8.2



Stephen G. Pernaw & Company, Inc.
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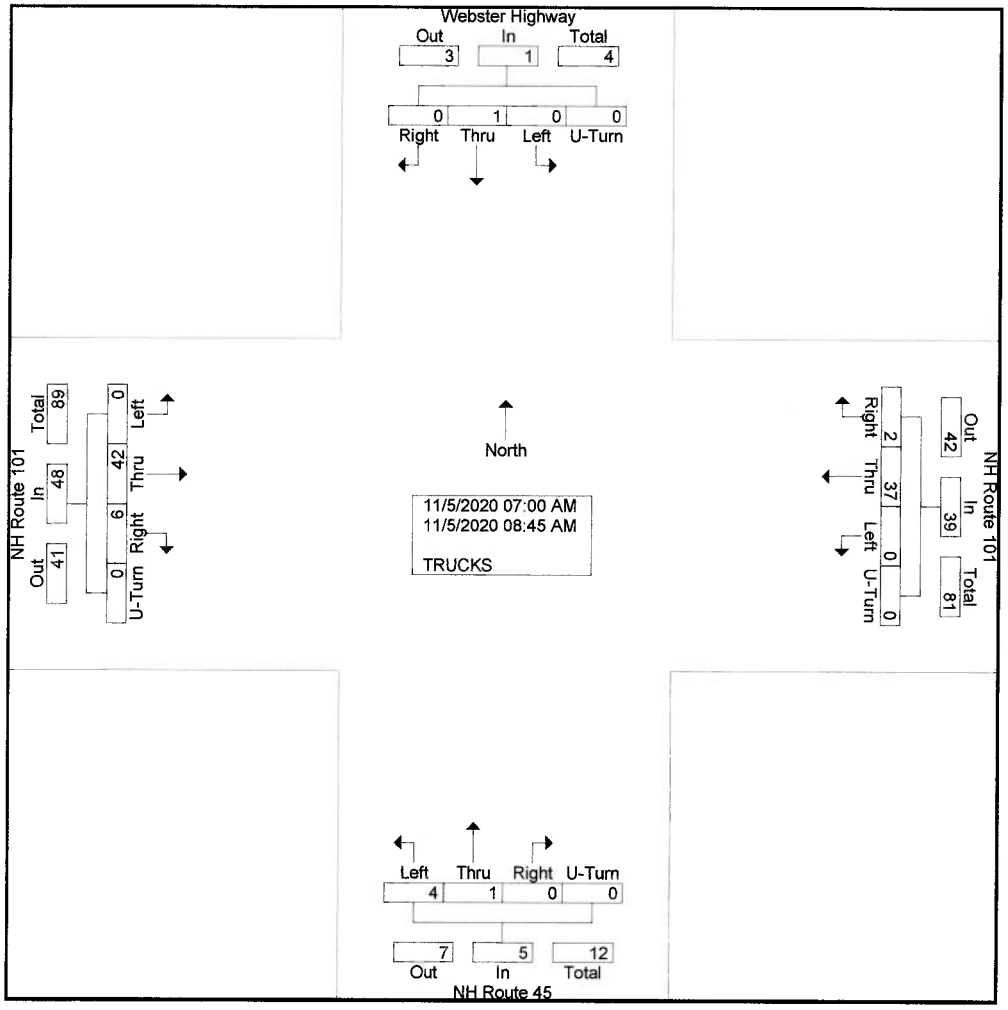
Weather: Fair
Collected By: MV
Job Number: 2042A
Town/State: Temple, New Hampshire

File Name : 2042A_INT_A_AM_&_PM_795922_11-04-2020
Site Code : 2042A
Start Date : 11/4/2020
Page No : 1 5

Groups Printed- TRUCKS

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	1	2	0	0	3	6
07:15 AM	0	0	0	0	0	1	7	0	0	8	0	0	0	0	0	1	4	0	0	5	13
07:30 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	1	5	0	0	6	11
07:45 AM	0	0	0	0	0	0	3	0	0	3	0	0	1	0	1	0	8	0	0	8	12
Total	0	0	0	0	0	1	18	0	0	19	0	0	1	0	1	3	19	0	0	22	42
08:00 AM	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	1	4	0	0	5	8
08:15 AM	0	0	0	0	0	1	5	0	0	6	0	0	0	0	0	2	6	0	0	8	14
08:30 AM	0	0	0	0	0	0	4	0	0	4	0	1	3	0	4	0	7	0	0	7	15
08:45 AM	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	6	0	0	6	14
Total	0	1	0	0	1	1	19	0	0	20	0	1	3	0	4	3	23	0	0	26	51
Grand Total	0	1	0	0	1	2	37	0	0	39	0	1	4	0	5	6	42	0	0	48	93
Apprch %	0	100	0	0		5.1	94.9	0	0		0	20	80	0		12.5	87.5	0	0		
Total %	0	1.1	0	0	1.1	2.2	39.8	0	0	41.9	0	1.1	4.3	0	5.4	6.5	45.2	0	0	51.6	



Stephen G. Pernaw & Company, Inc.
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Weather: Fair
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Job Number: 2042A
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File Name : 2042A_INT_A_AM_&_PM_795922_11-04-2020
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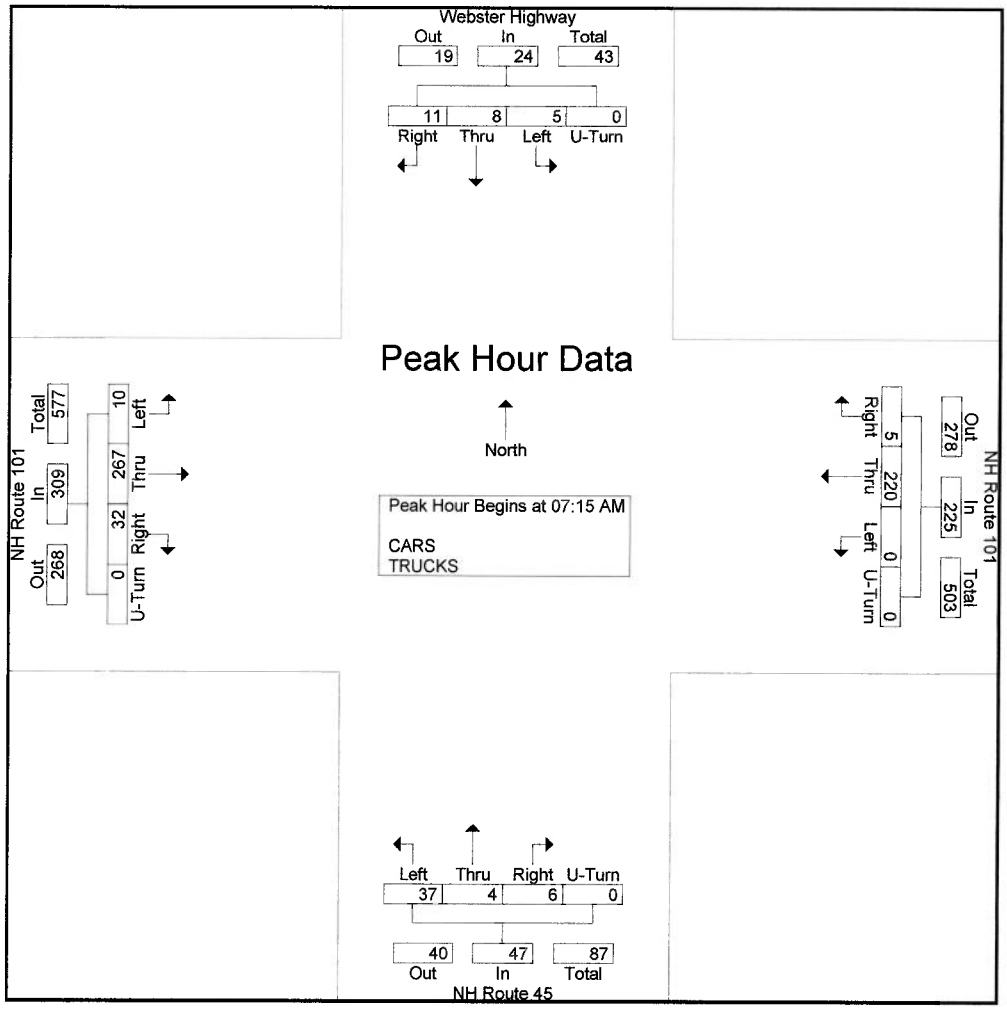
Start Date : 11/4/2020
Page No : 2

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	2	2	**3**	0	**7**	**2**	50	0	0	52	1	1	10	0	12	7	**83**	2	0	**92**	**163**
07:30 AM	**5**	1	0	0	6	0	**58**	0	0	58	**4**	0	6	0	10	**9**	64	2	0	75	149
07:45 AM	1	1	2	0	4	2	58	0	0	**60**	1	**2**	10	0	**13**	9	58	2	0	69	146
08:00 AM	3	**4**	0	0	7	1	54	0	0	55	0	1	**11**	0	12	7	62	**4**	0	73	147
Total Volume	11	8	5	0	24	5	220	0	0	225	6	4	37	0	47	32	267	10	0	309	605
% App. Total	45.8	33.3	20.8	0		2.2	97.8	0	0		12.8	8.5	78.7	0		10.4	86.4	3.2	0		
PHF	.550	.500	.417	.000	.857	.625	.948	.000	.000	.938	.375	.500	.841	.000	.904	.889	.804	.625	.000	.840	.928



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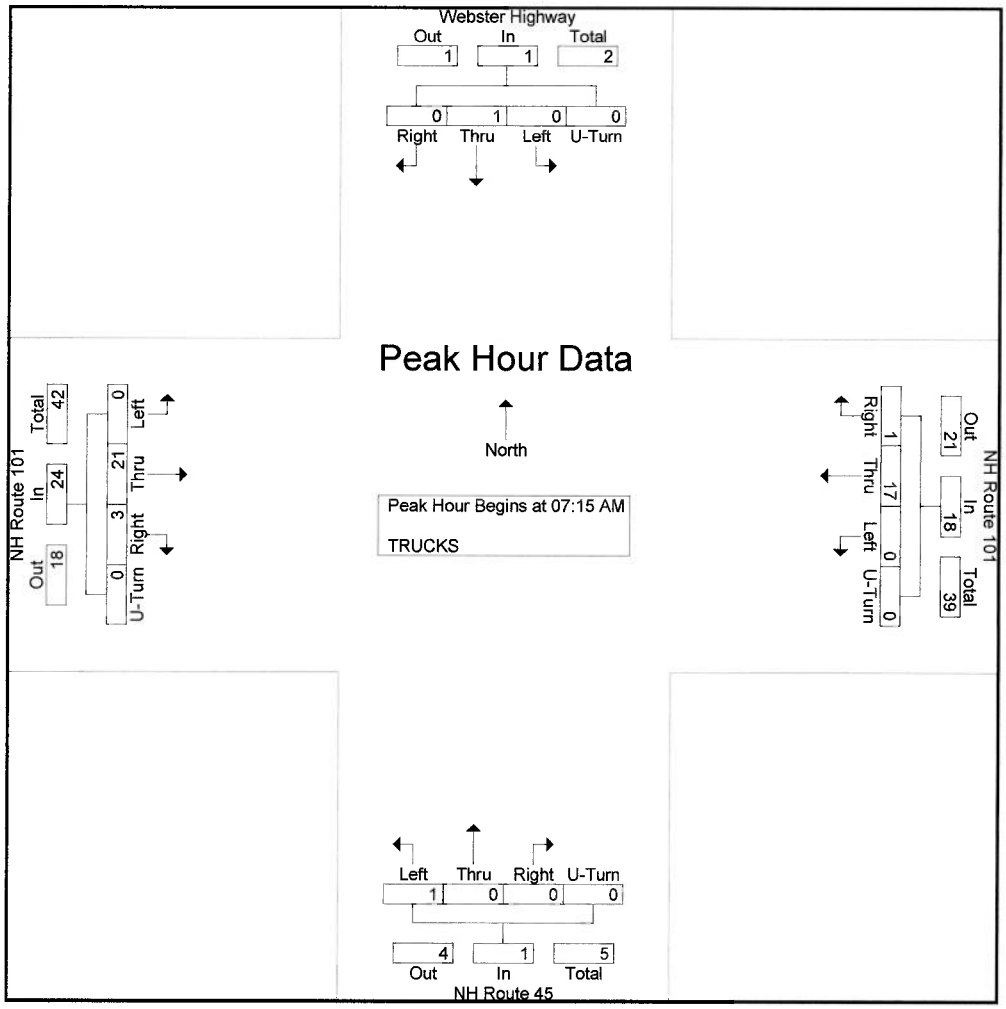
File Name : 2042A_INT_A_AM_&_PM_795922_11-04-2020
Site Code : 2042A
Start Date : 11/[illegible]/2020
Page No : 2 5

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	0	0	0	0	0	**1**	**7**	0	0	**8**	0	0	0	0	0	**1**	4	0	0	5	**13**
07:30 AM	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	1	5	0	0	6	11
07:45 AM	0	0	0	0	0	0	3	0	0	3	0	0	**1**	0	**1**	0	**8**	0	0	**8**	12
08:00 AM	0	**1**	0	0	**1**	0	2	0	0	2	0	0	0	0	0	1	4	0	0	5	8
Total Volume	0	1	0	0	1	1	17	0	0	18	0	0	1	0	1	3	21	0	0	24	44
% App. Total	0	100	0	0		5.6	94.4	0	0		0	0	100	0		12.5	87.5	0	0		
PHF	.000	.250	.000	.000	.250	.250	.607	.000	.000	.563	.000	.000	.250	.000	.250	.750	.656	.000	.000	.750	.846



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Weather: Fair
Collected By: MV
Job Number: 2042A
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File Name : 2042A_INT_A_AM_&_PM_795922_11-04-2020
Site Code : 2042A
Start Date : 11/4/2020
Page No : 1

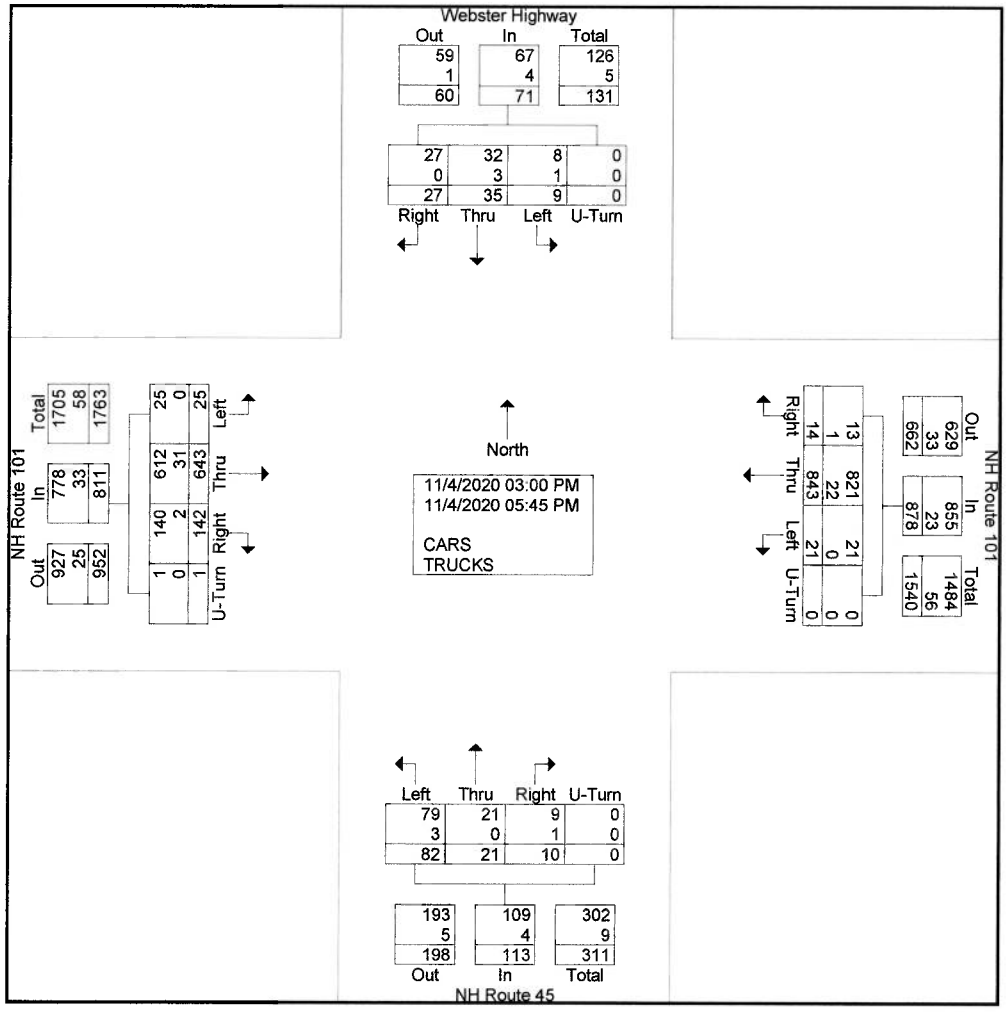
Groups Printed- CARS - TRUCKS

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
03:00 PM	1	5	0	0	6	4	58	2	0	64	1	2	10	0	13	6	58	1	0	65	148
03:15 PM	2	7	1	0	10	0	66	1	0	67	0	3	5	0	8	11	69	2	1	83	168
03:30 PM	5	5	1	0	11	0	76	1	0	77	0	4	6	0	10	13	58	1	0	72	170
03:45 PM	3	4	0	0	7	1	87	2	0	90	0	3	5	0	8	16	69	3	0	88	193
Total	11	21	2	0	34	5	287	6	0	298	1	12	26	0	39	46	254	7	1	308	679
04:00 PM	1	4	2	0	7	3	70	2	0	75	0	1	12	0	13	25	39	3	0	67	162
04:15 PM	1	1	0	0	2	1	75	2	0	78	1	0	9	0	10	5	42	5	0	52	142
04:30 PM	1	3	1	0	5	0	75	0	0	75	0	0	7	0	7	15	25	1	0	41	128
04:45 PM	2	2	1	0	5	1	68	3	0	72	0	1	7	0	8	12	53	2	0	67	152
Total	5	10	4	0	19	5	288	7	0	300	1	2	35	0	38	57	159	11	0	227	584
05:00 PM	6	1	2	0	9	2	71	3	0	76	2	3	4	0	9	12	62	1	0	75	169
05:15 PM	1	1	0	0	2	1	69	2	0	72	3	1	8	0	12	14	75	0	0	89	175
05:30 PM	2	1	1	0	4	1	57	0	0	58	3	2	4	0	9	6	53	5	0	64	135
05:45 PM	2	1	0	0	3	0	71	3	0	74	0	1	5	0	6	7	40	1	0	48	131
Total	11	4	3	0	18	4	268	8	0	280	8	7	21	0	36	39	230	7	0	276	610
Grand Total	27	35	9	0	71	14	843	21	0	878	10	21	82	0	113	142	643	25	1	811	1873
Apprch %	38	49.3	12.7	0		1.6	96	2.4	0		8.8	18.6	72.6	0		17.5	79.3	3.1	0.1		
Total %	1.4	1.9	0.5	0	3.8	0.7	45	1.1	0	46.9	0.5	1.1	4.4	0	6	7.6	34.3	1.3	0.1	43.3	
CARS	27	32	8	0	67	13	821	21	0	855	9	21	79	0	109	140	612	25	1	778	1809
% CARS	100	91.4	88.9	0	94.4	92.9	97.4	100	0	97.4	90	100	96.3	0	96.5	98.6	95.2	100	100	95.9	96.6
TRUCKS	0	3	1	0	4	1	22	0	0	23	1	0	3	0	4	2	31	0	0	33	64
% TRUCKS	0	8.6	11.1	0	5.6	7.1	2.6	0	0	2.6	10	0	3.7	0	3.5	1.4	4.8	0	0	4.1	3.4

Stephen G. Pernaw & Company, Inc.
P.O. Box 1721
Concord, New Hampshire 03302

Weather: Fair
Collected By: MV
Job Number: 2042A
Town/State: Temple, New Hampshire

File Name : 2042A_INT_A_AM_&_PM_795922_11-04-2020
Site Code : 2042A
Start Date : 11/4/2020
Page No : 2



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Site Code : 2042A
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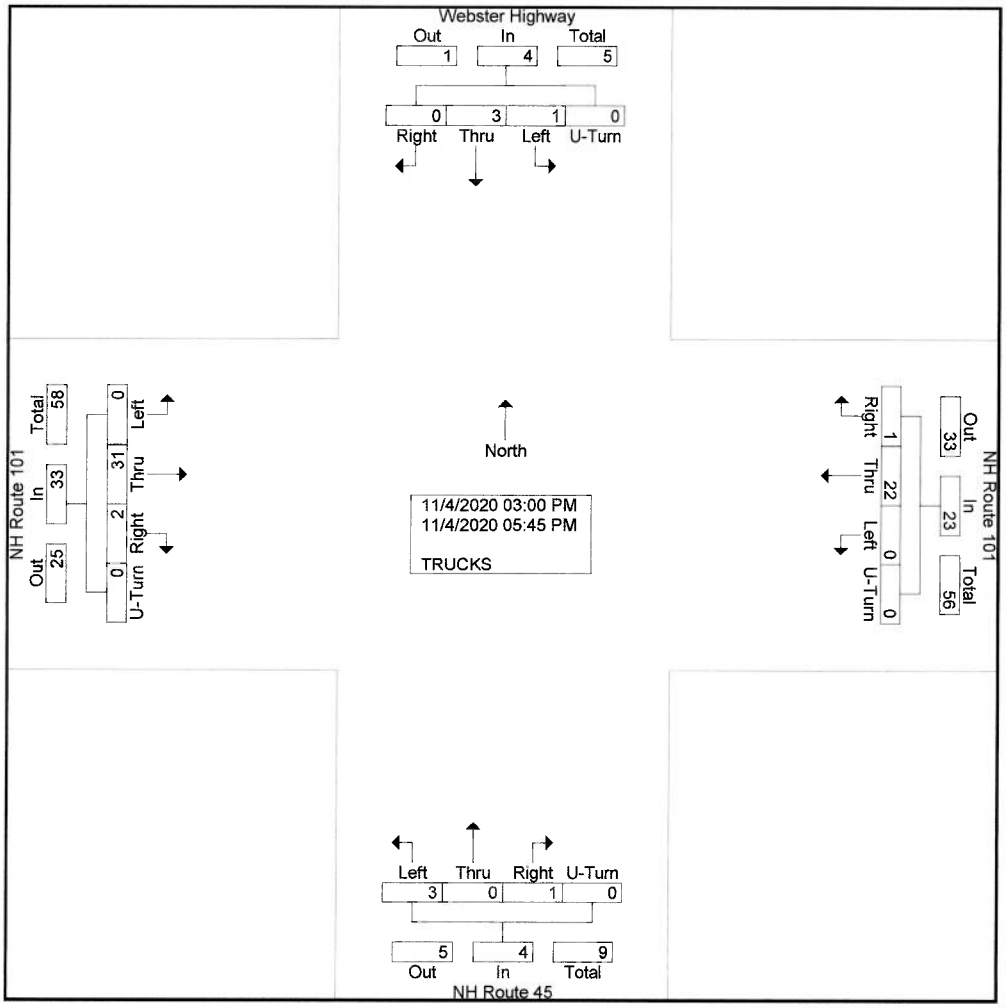
Page No : 1

Groups Printed- TRUCKS

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
03:00 PM	0	0	0	0	0	1	1	0	0	2	0	0	1	0	1	0	6	0	0	6	9
03:15 PM	0	3	0	0	3	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	5
03:30 PM	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	6
03:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	6	0	0	7	9
Total	0	3	1	0	4	1	6	0	0	7	0	0	1	0	1	1	16	0	0	17	29
04:00 PM	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	0	1	0	0	1	4
04:15 PM	0	0	0	0	0	0	1	0	0	1	1	0	1	0	2	0	3	0	0	3	6
04:30 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	1	1	0	0	2	4
04:45 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	3
Total	0	0	0	0	0	0	8	0	0	8	1	0	2	0	3	1	5	0	0	6	17
05:00 PM	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	6
05:15 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	4
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	4
05:45 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	4
Total	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	0	10	0	0	10	18
Grand Total	0	3	1	0	4	1	22	0	0	23	1	0	3	0	4	2	31	0	0	33	64
Apprch %	0	75	25	0		4.3	95.7	0	0		25	0	75	0		6.1	93.9	0	0		
Total %	0	4.7	1.6	0	6.2	1.6	34.4	0	0	35.9	1.6	0	4.7	0	6.2	3.1	48.4	0	0	51.6	



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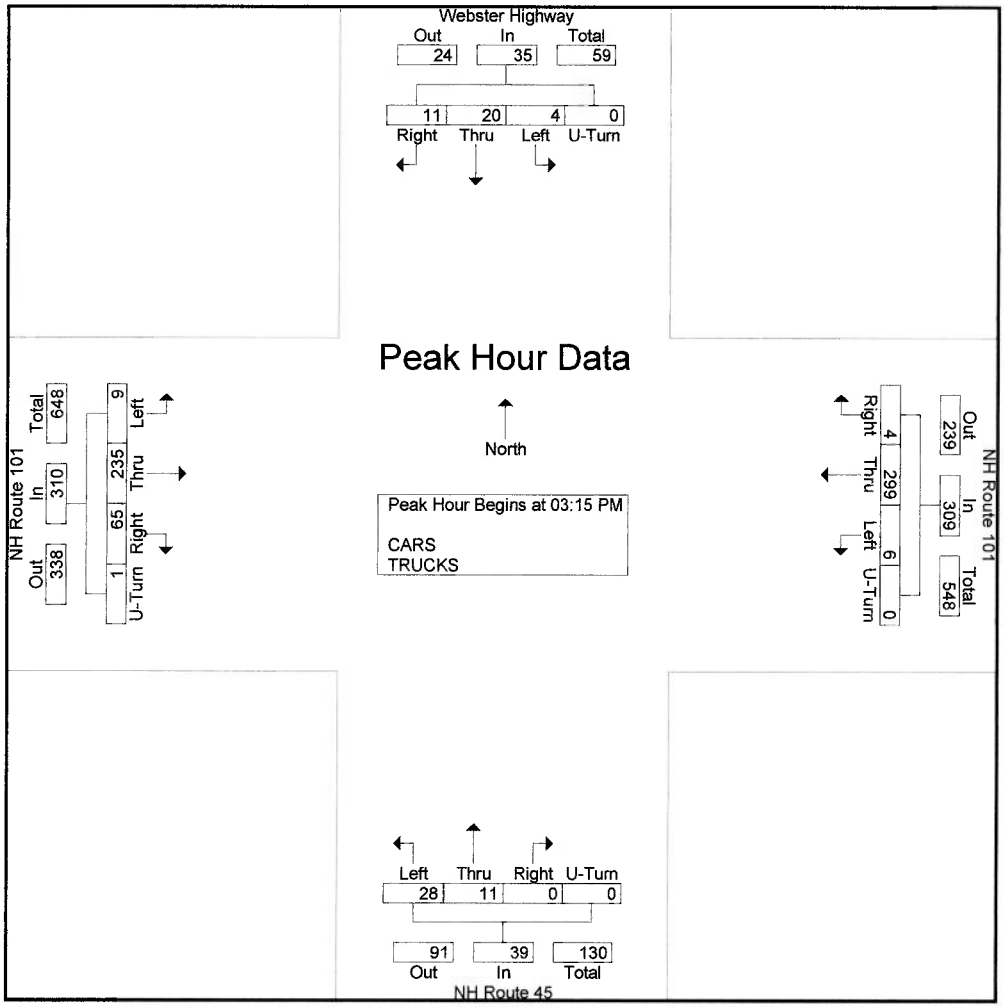
Start Date : 11/4/2020
Page No : 3

	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:15 PM																					
03:15 PM	2	**7**	1	0	10	0	66	1	0	67	0	3	5	0	8	11	**69**	2	**1**	83	168
03:30 PM	**5**	5	1	0	**11**	0	76	1	0	77	0	**4**	6	0	10	13	58	1	0	72	170
03:45 PM	3	4	0	0	7	1	**87**	**2**	0	**90**	0	3	5	0	8	16	69	**3**	0	**88**	**193**
04:00 PM	1	4	**2**	0	7	**3**	70	2	0	75	0	1	**12**	0	**13**	**25**	39	3	0	67	162
Total Volume	11	20	4	0	35	4	299	6	0	309	0	11	28	0	39	65	235	9	1	310	693
% App. Total	31.4	57.1	11.4	0		1.3	96.8	1.9	0		0	28.2	71.8	0		21	75.8	2.9	0.3		
PHF	.550	.714	.500	.000	.795	.333	.859	.750	.000	.858	.000	.688	.583	.000	.750	.650	.851	.750	.250	.881	.898



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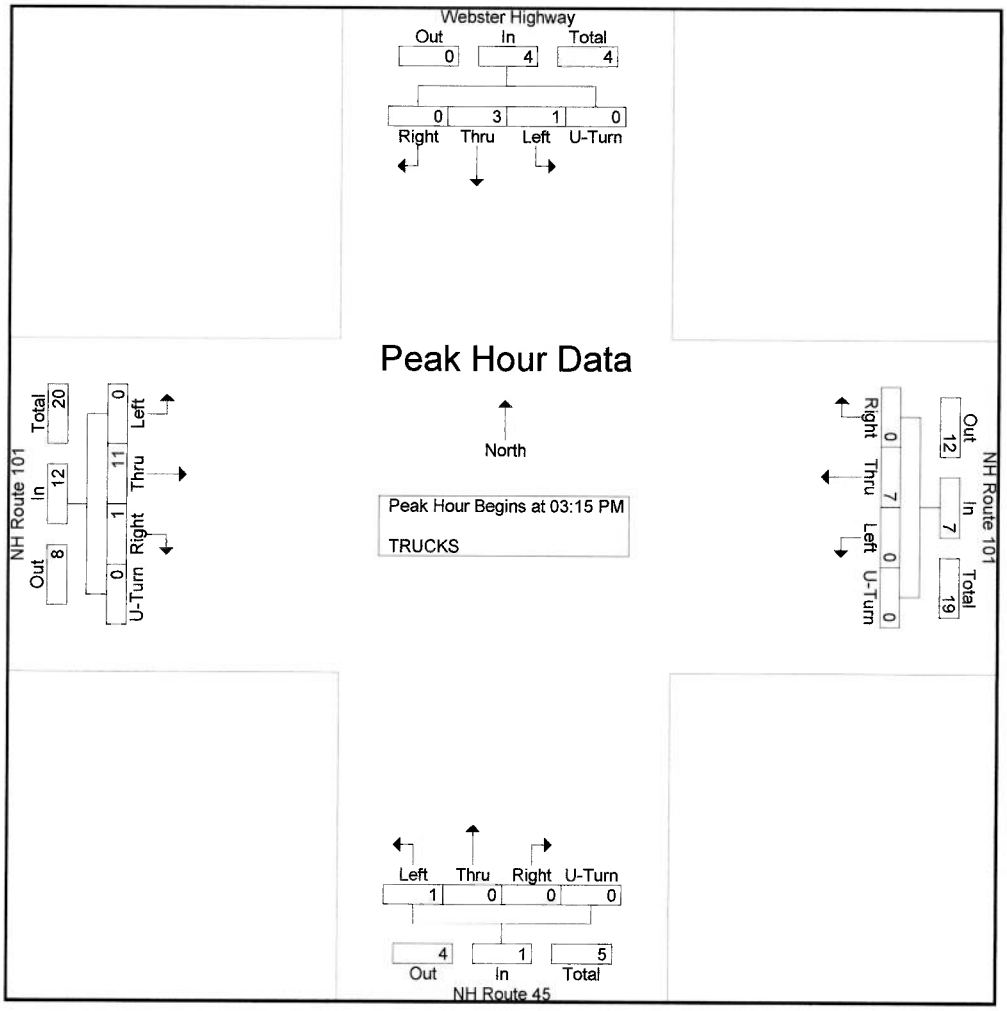
	Webster Highway From North					NH Route 101 From East					NH Route 45 From South					NH Route 101 From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 03:15 PM to 04:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:15 PM																					
03:15 PM	0	**3**	0	0	**3**	0	**1**	0	0	1	0	0	0	0	0	0	1	0	0	1	5
03:30 PM	0	0	**1**	0	1	0	**2**	0	0	**2**	0	0	0	0	0	0	3	0	0	3	6
03:45 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	**1**	**6**	0	0	**7**	**9**
04:00 PM	0	0	0	0	0	0	2	0	0	2	0	0	**1**	0	**1**	0	1	0	0	1	4
Total Volume	0	3	1	0	4	0	7	0	0	7	0	0	1	0	1	1	11	0	0	12	24
% App. Total	0	75	25	0		0	100	0	0		0	0	100	0		8.3	91.7	0	0		
PHF	.000	.250	.250	.000	.333	.000	.875	.000	.000	.875	.000	.000	.250	.000	.250	.250	.458	.000	.000	.429	.667



Seasonal Adjustment Factors
NHDOT Group 4 (Urban Highways)

Stephen G. Pernaw & Company, Inc.

Year 2019 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	11,431	1.12	1.23
Feb	11,848	1.08	1.18
Mar	12,141	1.06	1.15
Apr	12,860	1.00	1.09
May	13,551	0.95	1.03
Jun	13,785	0.93	1.02
Jul	13,942	0.92	1.01
Aug	14,016	0.92	1.00
Sep	13,379	0.96	1.05
Oct	13,339	0.96	1.05
Nov	12,265	1.05	1.14
Dec	11,496	1.12	1.22

Year 2018 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	11,282	1.13	1.24
Feb	11,848	1.08	1.18
Mar	11,828	1.08	1.18
Apr	12,491	1.02	1.12
May	13,587	0.94	1.03
Jun	13,911	0.92	1.00
Jul	13,765	0.93	1.01
Aug	13,945	0.92	1.00
Sep	13,168	0.97	1.06
Oct	13,367	0.96	1.04
Nov	12,215	1.05	1.14
Dec	11,963	1.07	1.17

Year 2017 Monthly Data - Urban

		Adjustment to	
Month	ADT	Average	Peak
Jan	12254	1.21	1.33
Feb	13494	1.10	1.21
Mar	14,335	1.03	1.14
Apr	15004	0.99	1.09
May	15547	0.95	1.05
Jun	16310	0.91	1.00
Jul	15523	0.95	1.05
Aug	15974	0.93	1.02
Sep	15546	0.95	1.05
Oct	15104	0.98	1.08
Nov	14,544	1.02	1.12
Dec	14151	1.05	1.15

Average Peak-Month Factor	**1.14**
November to March Factor	**0.98**

– Sugar Shack Peak Month

Stephen G. Pernaw & Company, Inc.

CALCULATION SHEET

Project:	Ben's Sugar Shack	Job Number:	2042A
Calculated By:	SGP	Date:	11/12/2020
Checked By:	CA	Date:	11/12/2020
Sheet No:	1	Of:	1
Subject:	Adjustment Factors		

Historical Growth Rate:

I. Given:

NHDOT Station Number: 82363055 AADT for 2019 = 9,861 vpd

NHDOT Station Number: 82363055 AADT for 2018 = 9,763 vpd

II. Calculate Annual Growth Rate:

Annual growth rate = 9861 / 9763 = 1.01

Use 1.0% per year, compounded annually, to estimate 2032 traffic volumes

COVID-19 Factor

I. Given:

NHDOT volume on Monday 11/18/19 = 6,872 vpd (Pre-Covid)

NHDOT volume on Tuesday 11/19/19 = 7,018 vpd (Pre-Covid)

NHDOT volume on Wednesday 11/20/19 = 7,325 vpd (Pre-Covid)

NHDOT volume on Monday 11/2/20 = 6,219 vpd (With Covid)

NHDOT volume on Tuesday 11/3/20 = 6,050 vpd (With Covid)

NHDOT volume on Wednesday 11/4/20 = 6,692 vpd (With Covid)

II. Increase Pre-Covid 2019 volumes by 1.0% annual growth rate to reflect 2020 volumes without Covid

Monday = 6,872 X 1.01 = 6,941 vpd

Tuesday = 7,018 X 1.01 = 7,088 vpd

Wednesday = 7,325 X 1.01 = 7,398 vpd

III. Calculate individual factors; then average

Monday: 6,941 / 6,219 = 1.12

Tuesday: 7,088 / 6,050 = 1.17

Wednesday: 7,398 / 6,692 = 1.11

Average = (1.12 + 1.17 + 1.11) / 3 = 1.13

Increase 2020 volumes by 1.13 to reflect volumes without Covid-19

New Hampshire DOT Department of Transportation

MS2 Transportation Data Management System

Excel Version

Pre-COVID

Weekly Volume Report			
Location ID:	02445001	**Type:**	SPOT
Located On:	Gibbons Hwy	:	
Direction:	2-WAY		
Community:	WILTON	**Period:**	Mon 11/18/2019 - Sun 11/24/2019
AADT:	7538		

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	Graph
12:00 AM	27	34	25	34	37	41	52	36	0.5%
1:00 AM	19	25	26	29	32	32	36	28	0.4%
2:00 AM	21	20	22	23	28	37	17	24	0.3%
3:00 AM	42	26	33	39	35	27	14	31	0.4%
4:00 AM	82	72	71	63	77	48	25	63	0.9%
5:00 AM	198	199	220	210	170	77	42	159	2.3%
6:00 AM	461	448	468	433	460	140	73	355	5.1%
7:00 AM	603	568	602	628	553	228	112	471	6.7%
8:00 AM	497	492	523	565	523	340	140	440	6.3%
9:00 AM	383	394	380	458	455	454	229	393	5.6%
10:00 AM	384	355	389	421	397	555	301	400	5.7%
11:00 AM	356	368	370	431	469	585	339	417	6.0%
12:00 PM	357	387	411	478	480	635	395	449	6.4%
1:00 PM	376	413	440	451	505	622	388	456	6.5%
2:00 PM	444	465	471	570	559	613	394	502	7.2%
3:00 PM	530	535	577	601	667	605	376	556	7.9%
4:00 PM	567	594	599	631	702	574	312	568	8.1%
5:00 PM	597	592	598	654	691	491	211	548	7.8%
6:00 PM	347	397	379	440	478	393	206	377	5.4%
7:00 PM	203	222	233	259	269	310	187	240	3.4%
8:00 PM	130	160	190	195	215	231	149	181	2.6%
9:00 PM	133	131	161	170	173	182	81	147	2.1%
10:00 PM	76	71	86	104	109	147	57	93	1.3%
11:00 PM	39	50	51	73	105	120	41	68	1.0%
Total	**6,872**	**7,018**	**7,325**	**7,960**	**8,189**	**7,487**	**4,177**		
24hr Total	6872	7018	7325	7960	8189	7487	4177	7,004	
AM Pk Hr	7:00	7:00	7:00	7:00	7:00	11:00	11:00		
AM Peak	603	568	602	628	553	585	339	554	
PM Pk Hr	5:00	4:00	4:00	5:00	4:00	12:00	12:00		
PM Peak	597	594	599	654	702	635	395	597	
% Pk Hr	8.77%	8.46%	8.22%	8.22%	8.57%	8.48%	9.46%	8.60%	

New Hampshire DOT Department of Transportation

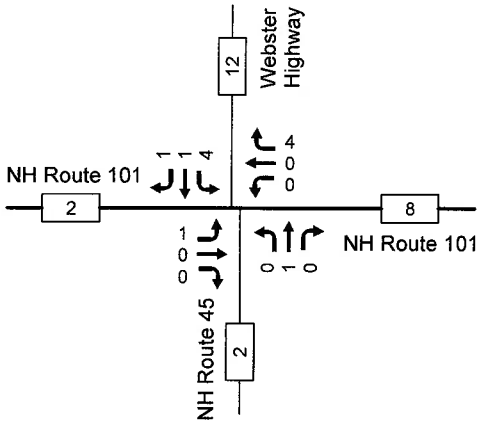
MS2 Transportation Data Management System

Excel Version

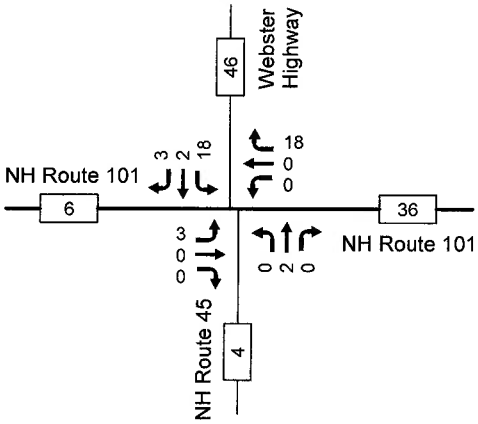
w/ COVID

Weekly Volume Report			
Location ID:	02445001	**Type:**	SPOT
Located On:	Gibbons Hwy	:	
Direction:	2-WAY		
Community:	WILTON	**Period:**	Mon 11/2/2020 - Sun 11/8/2020
AADT:			

Start Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Avg	Graph
12:00 AM	12	25	16					18	0.3%
1:00 AM	17	22	20					20	0.3%
2:00 AM	16	18	27					20	0.3%
3:00 AM	33	22	29					28	0.4%
4:00 AM	76	60	73					70	1.1%
5:00 AM	208	210	212					210	3.3%
6:00 AM	423	325	464					404	6.4%
7:00 AM	514	471	523					503	8.0%
8:00 AM	383	412	423					406	6.4%
9:00 AM	358	351	369					359	5.7%
10:00 AM	372	359	336					356	5.6%
11:00 AM	354	343	391					363	5.7%
12:00 PM	367	366	407					380	6.0%
1:00 PM	363	388	432					394	6.2%
2:00 PM	434	442	510					462	7.3%
3:00 PM	537	526	560					541	8.6%
4:00 PM	515	579	544					546	8.6%
5:00 PM	528	456	525					503	8.0%
6:00 PM	271	235	308					271	4.3%
7:00 PM	169	168	198					178	2.8%
8:00 PM	102	104	124					110	1.7%
9:00 PM	63	73	91					76	1.2%
10:00 PM	55	51	65					57	0.9%
11:00 PM	49	44	45					46	0.7%
Total	**6,219**	**6,050**	**6,692**	**0**	**0**	**0**	**0**		
24hr Total	6219	6050	6692					6,320	
AM Pk Hr	7:00	7:00	7:00						
AM Peak	514	471	523					503	
PM Pk Hr	3:00	4:00	3:00						
PM Peak	537	579	560					559	
% Pk Hr	8.63%	9.57%	8.37%					8.86%	



AM Peak Hour



PM Peak Hour

2042A

NORTH

Attachment

Site Generated Traffic Volumes

Traffic Evaluation, Ben's Sugar Shack, Temple, New Hampshire

Stephen G. Pernaw & Company, Inc.

Location: Temple, New Hampshire
Job Number: 2042A

TRIP DISTRIBUTION ANALYSIS

		Gateway %					Gateway Allocation				
Population		NH101-W	Webster	NH101-E	NH45		NH101-W	Webster	NH101-E	NH45	
	Count										
Temple	1,404	0.10	0.20	0.10	0.60	1.00	140	281	140	842	
Sharon	360	0.50			0.50	1.00	180	0	0	180	
Peterborough	6,716	1.00				1.00	6716	0	0	0	
Greenfield	1,777	0.50	0.50			1.00	889	889	0	0	
Lyndeborough	1,727		0.50	0.50		1.00	0	864	864	0	
Wilton	3,746		0.40	0.60		1.00	0	1498	2248	0	
Mason	1,428				1.00	1.00	0	0	0	1428	
Greenville	2,079				1.00	1.00	0	0	0	2079	
New Ipswich	5,328				1.00	1.00	0	0	0	5328	
Rindge	6,244	0.40			0.60	1.00	2498	0	0	3746	
Jaffrey	5,424	0.90			0.10	1.00	4882	0	0	542	
Dublin	1,593	1.00				1.00	1593	0	0		
Harrisville	965	1.00				1.00	965	0	0		
Hancock	1,665	1.00				1.00	1665	0	0		
Bennington	1,489	0.75	0.25			1.00	1117	372	0		
Francestown	1,585	0.40	0.60			1.00	634	951	0		
New Boston	5,857		0.25	0.75		1.00	0	1464	4393		
Mont Vernon	2,601			1.00		1.00	0	0	2601		
Milford	16,003			1.00		1.00	0	0	16003		
Brookline	5,837			1.00		1.00	0	0	5837		
Amherst	11,599			1.00		1.00	0	0	11599		
Hollis	7,962			1.00		1.00	0	0	7962		
Bedford *	11,506			1.00		1.00	0	0	11506		
Merrimack *	13,119			1.00		1.00	0	0	13119		
Nashua *	44,436			1.00		1.00	0	0	44436		
							0	0	0	0	
	162450						21279	6319	120708	14145	162451
							13.1%	3.9%	74.3%	8.7%	100.0%
						Rounded:	13%	4%	74%	9%	100%

* Adjusted Pop.

HCM 2010 TWSC
1: Webster Highway/NH Route 45 & NH Route 101

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	334	40	0	275	7	46	6	8	7	10	13
Future Vol, veh/h	12	334	40	0	275	7	46	6	8	7	10	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	100	94	94	90	90	90	86	86	86
Heavy Vehicles, %	0	8	9	0	8	20	3	0	0	0	13	0
Mvmt Flow	14	398	48	0	293	7	51	7	9	8	12	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	300	0	0	446	0	0	736	726	398	755	771	297
Stage 1	-	-	-	-	-	-	426	426	-	297	297	-
Stage 2	-	-	-	-	-	-	310	300	-	458	474	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2	7.1	6.63	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.1	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.1	5.63	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3	3.5	4.117	3.3
Pot Cap-1 Maneuver	1273	-	-	1125	-	-	333	354	656	328	318	747
Stage 1	-	-	-	-	-	-	604	589	-	716	648	-
Stage 2	-	-	-	-	-	-	698	669	-	587	540	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1273	-	-	1125	-	-	313	349	656	315	313	747
Mov Cap-2 Maneuver	-	-	-	-	-	-	313	349	-	315	313	-
Stage 1	-	-	-	-	-	-	595	580	-	705	648	-
Stage 2	-	-	-	-	-	-	672	669	-	564	532	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	18.2	14.4
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	340	1273	-	-	1125	-	-	419
HCM Lane V/C Ratio	0.196	0.011	-	-	-	-	-	0.083
HCM Control Delay (s)	18.2	7.9	0	-	0	-	-	14.4
HCM Lane LOS	C	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.3

HCM 2010 TWSC
1: Webster Highway/NH Route 45 & NH Route 101

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↕			↕			↕	
Traffic Vol, veh/h	11	294	82	8	375	6	35	13	0	6	25	13
Future Vol, veh/h	11	294	82	8	375	6	35	13	0	6	25	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	86	86	86	75	75	75	80	80	80
Heavy Vehicles, %	0	5	2	0	2	0	4	0	0	25	15	0
Mvmt Flow	13	334	93	9	436	7	47	17	0	8	31	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	443	0	0	427	0	0	841	821	334	873	911	440
Stage 1	-	-	-	-	-	-	360	360	-	458	458	-
Stage 2	-	-	-	-	-	-	481	461	-	415	453	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.14	6.5	6.2	7.35	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.5	-	6.35	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	6.35	5.65	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.536	4	3.3	3.725	4.135	3.3
Pot Cap-1 Maneuver	1128	-	-	1143	-	-	282	312	712	247	261	621
Stage 1	-	-	-	-	-	-	654	630	-	541	546	-
Stage 2	-	-	-	-	-	-	562	569	-	572	548	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1128	-	-	1143	-	-	244	304	712	232	254	621
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	304	-	232	254	-
Stage 1	-	-	-	-	-	-	644	621	-	533	541	-
Stage 2	-	-	-	-	-	-	511	563	-	548	540	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	23.5	19.5
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	258	1128	-	-	1143	-	-	303
HCM Lane V/C Ratio	0.248	0.011	-	-	0.008	-	-	0.182
HCM Control Delay (s)	23.5	8.2	0	-	8.2	0	-	19.5
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.7

HCM 2010 TWSC
1: Webster Highway/NH Route 45 & NH Route 101

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	334	40	0	275	11	46	7	8	11	11	14
Future Vol, veh/h	13	334	40	0	275	11	46	7	8	11	11	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	100	94	94	90	90	90	86	86	86
Heavy Vehicles, %	0	8	9	0	8	20	3	0	0	0	13	0
Mvmt Flow	15	398	48	0	293	12	51	8	9	13	13	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	305	0	0	446	0	0	742	733	398	760	775	299
Stage 1	-	-	-	-	-	-	428	428	-	299	299	-
Stage 2	-	-	-	-	-	-	314	305	-	461	476	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.13	6.5	6.2	7.1	6.63	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.5	-	6.1	5.63	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.5	-	6.1	5.63	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.527	4	3.3	3.5	4.117	3.3
Pot Cap-1 Maneuver	1267	-	-	1125	-	-	330	350	656	325	316	745
Stage 1	-	-	-	-	-	-	603	588	-	714	647	-
Stage 2	-	-	-	-	-	-	695	666	-	584	539	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1267	-	-	1125	-	-	309	344	656	311	311	745
Mov Cap-2 Maneuver	-	-	-	-	-	-	309	344	-	311	311	-
Stage 1	-	-	-	-	-	-	593	579	-	703	647	-
Stage 2	-	-	-	-	-	-	666	666	-	559	530	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	18.4	15
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	336	1267	-	-	1125	-	-	402
HCM Lane V/C Ratio	0.202	0.012	-	-	-	-	-	0.104
HCM Control Delay (s)	18.4	7.9	0	-	0	-	-	15
HCM Lane LOS	C	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.3

HCM 2010 TWSC
1: Webster Highway/NH Route 45 & NH Route 101

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↕			↕			↕	
Traffic Vol, veh/h	14	294	82	8	375	24	35	15	0	24	27	16
Future Vol, veh/h	14	294	82	8	375	24	35	15	0	24	27	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	86	86	86	75	75	75	80	80	80
Heavy Vehicles, %	0	5	2	0	2	0	4	0	0	25	15	0
Mvmt Flow	16	334	93	9	436	28	47	20	0	30	34	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	464	0	0	427	0	0	861	848	334	891	927	450
Stage 1	-	-	-	-	-	-	366	366	-	468	468	-
Stage 2	-	-	-	-	-	-	495	482	-	423	459	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.14	6.5	6.2	7.35	6.65	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.5	-	6.35	5.65	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.5	-	6.35	5.65	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.536	4	3.3	3.725	4.135	3.3
Pot Cap-1 Maneuver	1108	-	-	1143	-	-	273	301	712	240	255	613
Stage 1	-	-	-	-	-	-	649	626	-	534	540	-
Stage 2	-	-	-	-	-	-	553	557	-	566	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1108	-	-	1143	-	-	231	292	712	222	247	613
Mov Cap-2 Maneuver	-	-	-	-	-	-	231	292	-	222	247	-
Stage 1	-	-	-	-	-	-	637	614	-	524	534	-
Stage 2	-	-	-	-	-	-	496	551	-	537	535	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.2	25	23.7
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	246	1108	-	-	1143	-	-	275
HCM Lane V/C Ratio	0.271	0.014	-	-	0.008	-	-	0.305
HCM Control Delay (s)	25	8.3	0	-	8.2	0	-	23.7
HCM Lane LOS	D	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	1.1	0	-	-	0	-	-	1.2

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Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

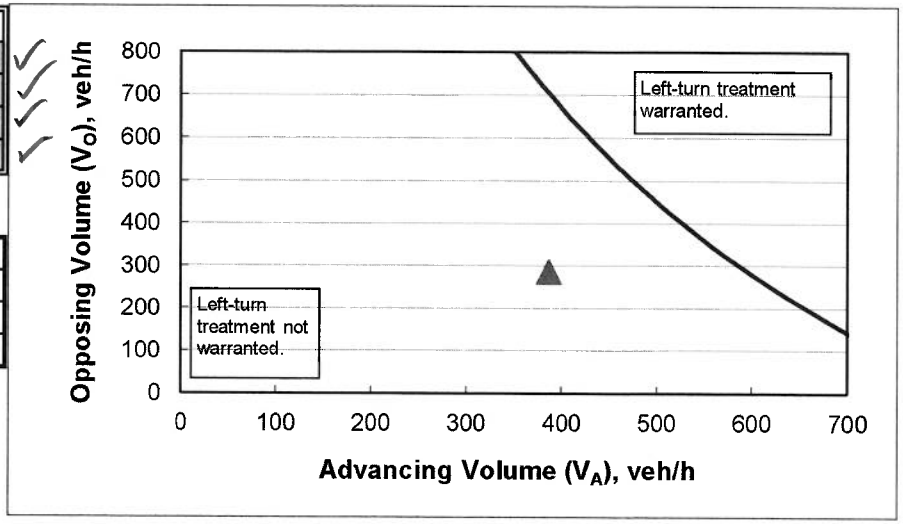
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	387
Opposing volume (V_O), veh/h:	286

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	596
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

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Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

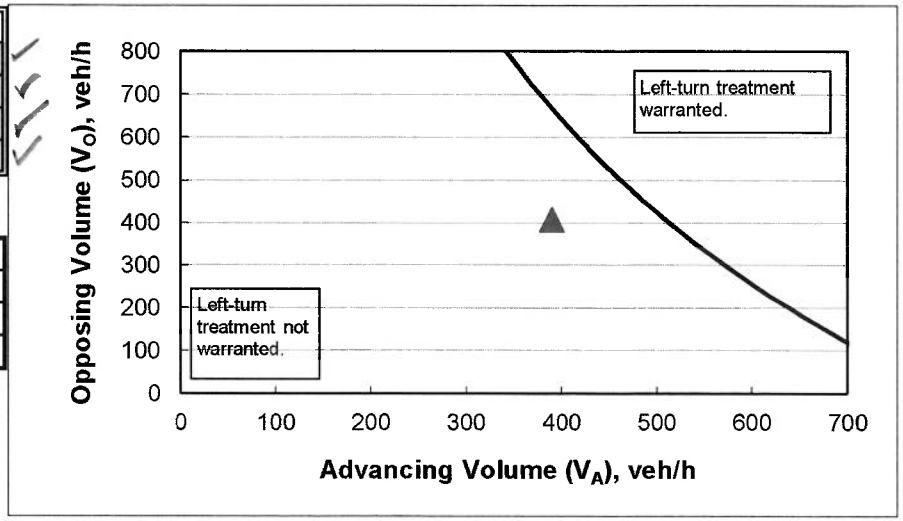
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	390
Opposing volume (V_O), veh/h:	407

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	509
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

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Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	286
Right-turn volume, veh/h:	11

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	48
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

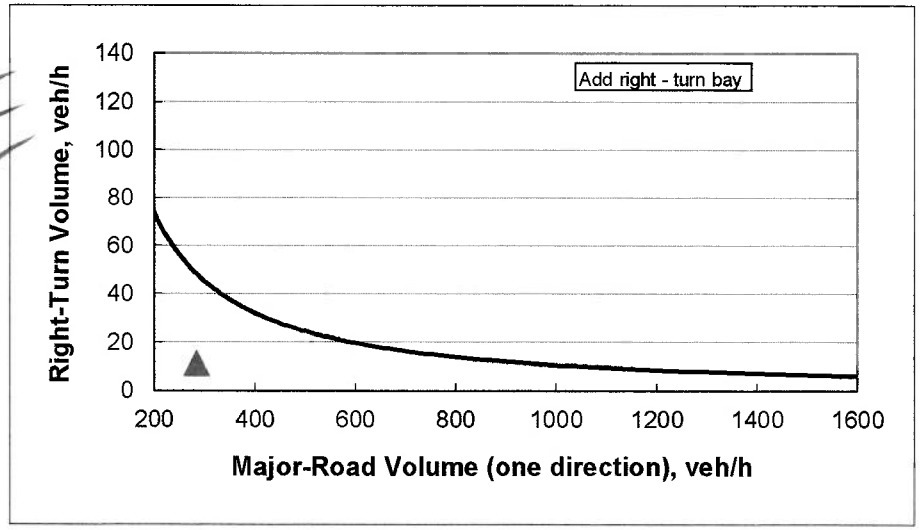

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Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	407
Right-turn volume, veh/h:	24

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	31
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	

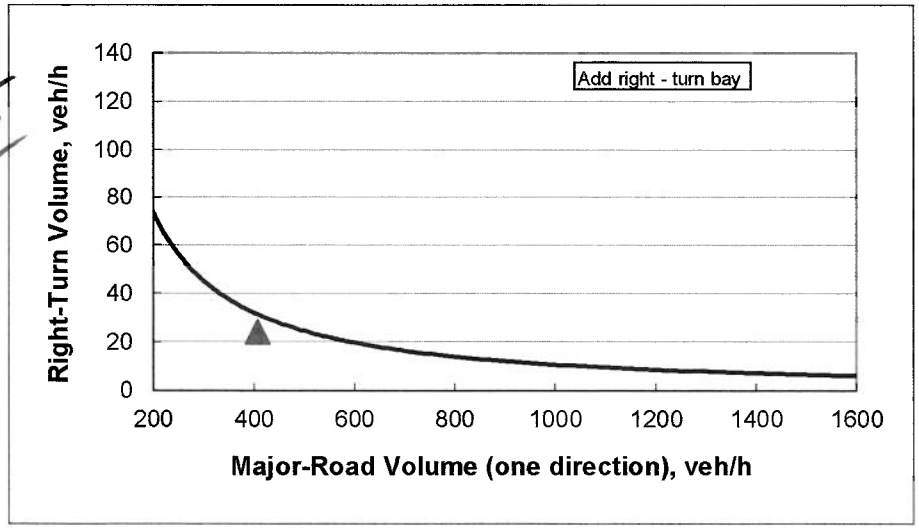

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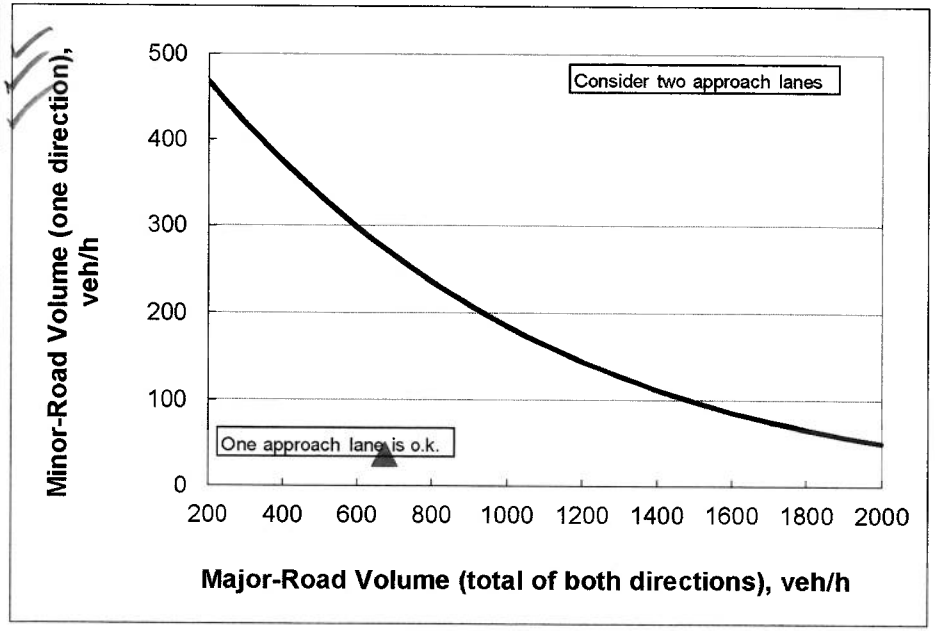
Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	673
Percentage of right-turns on minor road, %:	39%
Minor-road volume (one direction), veh/h:	36

OUTPUT

Variable	Value
Limiting minor-road volume (one direction), veh/h:	273
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	



CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM

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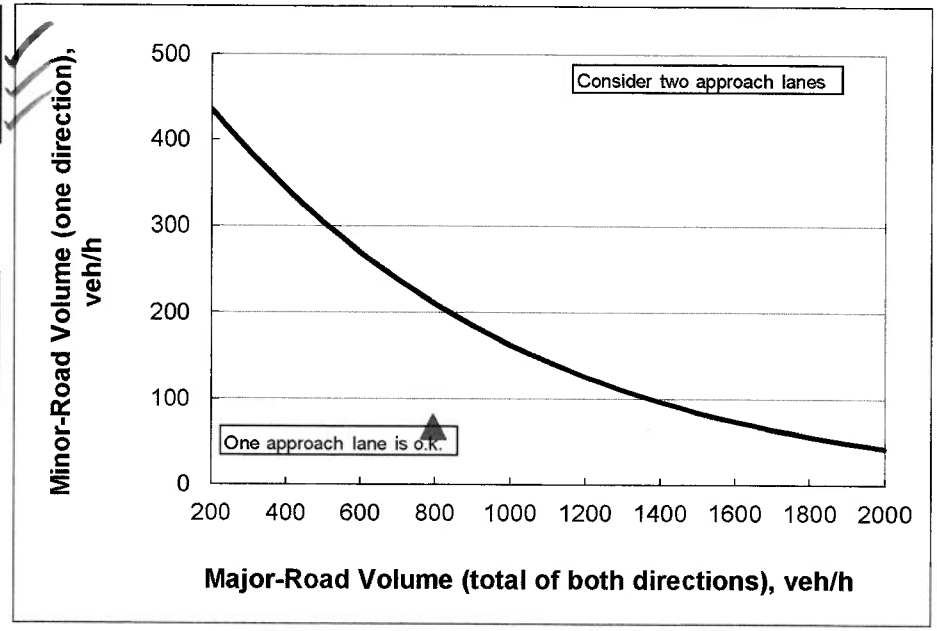
Figure 2 - 4. Guideline for determining minor-road approach geometry at two-way stop-controlled intersections.

INPUT

Variable	Value
Major-road volume (total of both directions), veh/h:	797
Percentage of right-turns on minor road, %:	24%
Minor-road volume (one direction), veh/h:	67

OUTPUT

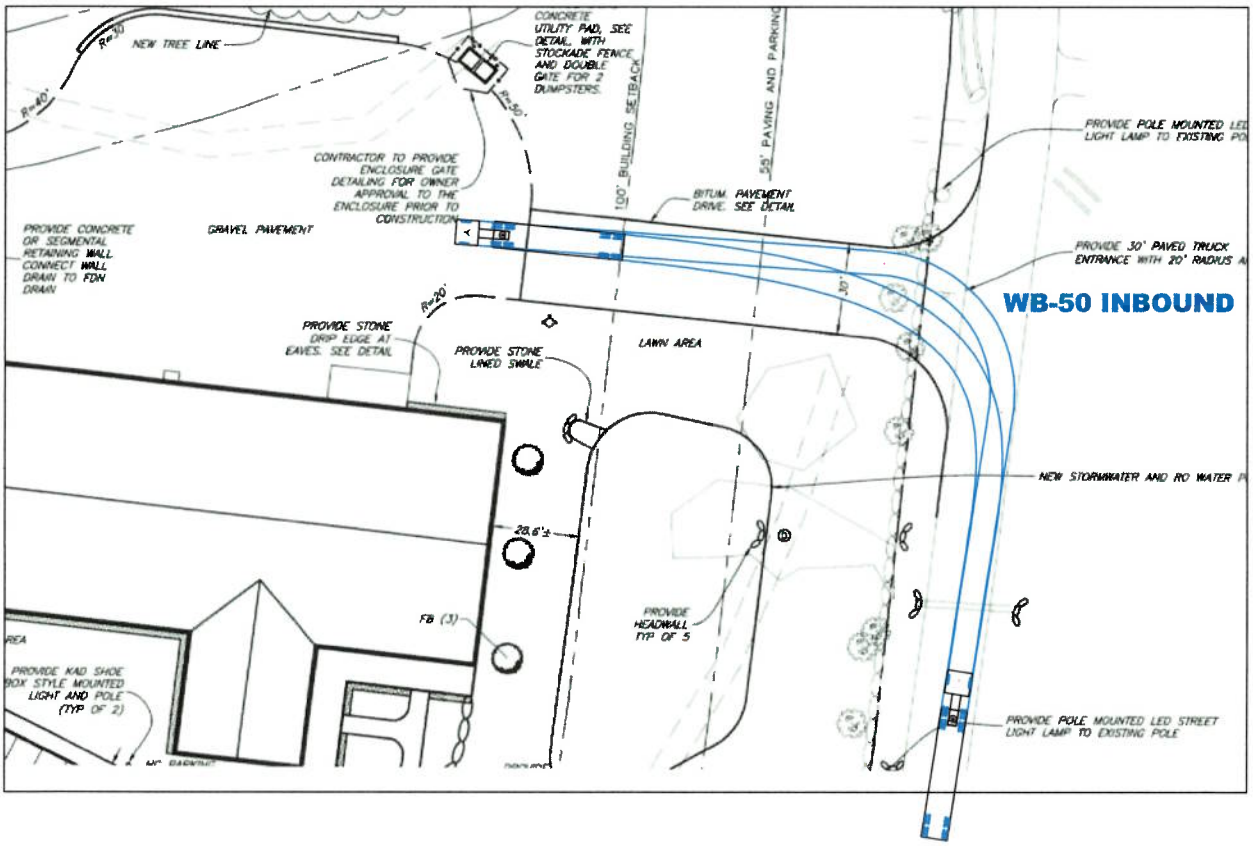
Variable	Value
Limiting minor-road volume (one direction), veh/h:	211
Guidance for determining minor-road approach geometry:	
ONE approach lane is o.k.	

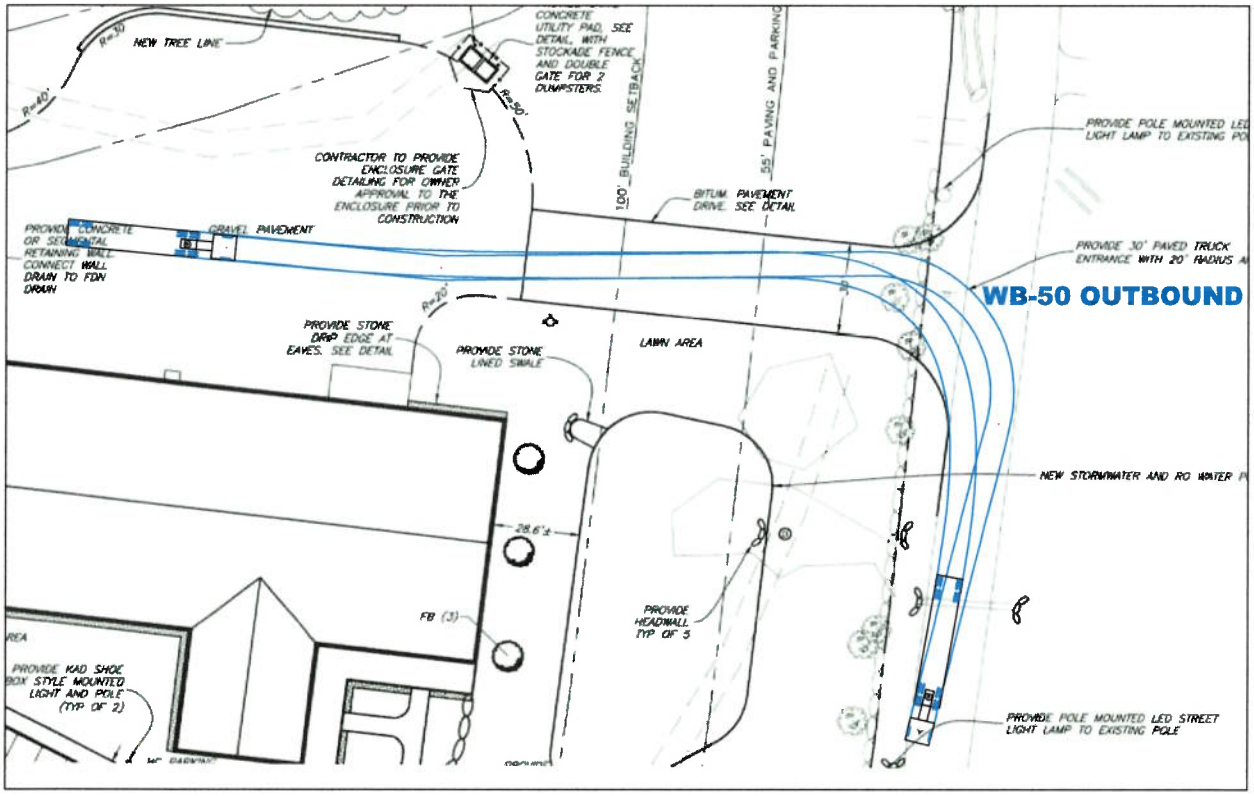


CALIBRATION CONSTANTS

Minor Road	Critical gap, s:	Follow-up gap, s:
Right-turn capacity, veh/h:	6.2	3.3
Left-turn and through capacity, veh/h:	6.5	4.0

* according to Table 17 - 5 of the HCM


WB-50 INBOUND
NEW TREE LINE
CONCRETE UTILITY PAD, SEE DETAIL, WITH STOCKADE FENCE AND DOUBLE GATE FOR 2 DUMPSTERS.
CONTRACTOR TO PROVIDE ENCLOSURE GATE DETAILING FOR OWNER APPROVAL TO THE ENCLOSURE PRIOR TO CONSTRUCTION
100' BUILDING SETBACK
55' PAVING AND PARKING
BITUM. PAVEMENT DRIVE. SEE DETAIL
PROVIDE POLE MOUNTED LED LIGHT LAMP TO EXISTING POLE
PROVIDE 30' PAVED TRUCK ENTRANCE WITH 20' RADIUS
GRAVEL PAVEMENT
PROVIDE CONCRETE OR SEGMENTAL RETAINING WALL. CONNECT WALL DRAIN TO FDN DRAIN
PROVIDE STONE DRIP EDGE AT EAVES. SEE DETAIL
PROVIDE STONE LINED SWALE
LAWN AREA
NEW STORMWATER AND RO WATER
28.6'±
FB (3)
PROVIDE HEADWALL TYP OF 5
PROVIDE KAD SHOE BOX STYLE MOUNTED LIGHT AND POLE (TYP OF 2)
PROVIDE POLE MOUNTED LED STREET LIGHT LAMP TO EXISTING POLE


WB-50 OUTBOUND
NEW TREE LINE
CONCRETE UTILITY PAD, SEE DETAIL, WITH STOCKADE FENCE AND DOUBLE GATE FOR 2 DUMPSTERS.
CONTRACTOR TO PROVIDE ENCLOSURE GATE DETAILING FOR OWNER APPROVAL TO THE ENCLOSURE PRIOR TO CONSTRUCTION
100' BUILDING SETBACK
55' PAVING AND PARKING
BITUM. PAVEMENT DRIVE. SEE DETAIL
PROVIDE POLE MOUNTED LED LIGHT LAMP TO EXISTING POLE
PROVIDE 30' PAVED TRUCK ENTRANCE WITH 20' RADIUS
GRAVEL PAVEMENT
PROVIDE CONCRETE OR SEGMENTAL RETAINING WALL. CONNECT WALL DRAIN TO FDN DRAIN
PROVIDE STONE DRIP EDGE AT EAVES. SEE DETAIL
PROVIDE STONE LINED SWALE
LAWN AREA
NEW STORMWATER AND RO WATER
28.6'±
FB (3)
PROVIDE HEADWALL TYP OF 5
PROVIDE KAD SHOE BOX STYLE MOUNTED LIGHT AND POLE (TYP OF 2)
PROVIDE POLE MOUNTED LED STREET LIGHT LAMP TO EXISTING POLE