

Transportation: Engineering • Planning • Design

MEMORANDUM

Ref: 2001A

To: Michael Sievert, P.E. MJS Engineering, P.C.

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

Subject: Response to VHB Comments dated March 4, 2021

Date: March 19, 2021

On January 14, 2021 our office published a revised "Traffic/Parking Evaluation" memorandum for the proposed student housing parking lot at 19-21 Main Street in Durham, New Hampshire. We are now in receipt of several comments from VHB, Inc., the Town's peer review consultant. The purpose of this memorandum is to summarize our responses to those comments.

<u>VHB Comment 1</u>: "The applicant should clarify if the proposed parking spaces would be assigned/designated and provide a breakdown of how many spaces would be associated with the existing student housing development at 19-21 Main Street versus the other off-site student housing developments."

SGP & Co., Inc. Response: According to the applicant, 55 parking stalls will be dedicated to the existing student housing development at 19-21 Main Street, and the remaining 125 spaces will be available for other off-site student housing developments.

<u>VHB Comment 2</u>: "VHB concurs that the traffic counts were collected in accordance with standard traffic engineering practice."

SGP & Co., Inc. Response: No response required.

VHB Comment 3: "VHB compared the existing traffic counts with Institute of Transportation Engineers (ITE) trip-generation estimates for a similar use.¹ The existing traffic counts were found to support between 30 and 70 residents.² Based on a review of the Town of Durham's online property assessment information, there are approximately 45 student housing occupants for 19, 19A, 19B, and 21 Main Street.³ The 45 occupants allowed per the Town's assessment information fall within the ITE methodology range for the existing site trips. Therefore, the existing site trips entering and exiting the site are consistent with trip-generation estimates (ITE methodologies)."

SGP & Co., Inc. Response: No response required.

<u>VHB Comment 4</u>: "VHB agrees that the parking observation program is consistent with standard traffic engineering practice. The results show that there are not enough parking spaces (supply = 43 spaces) to accommodate the maximum number of vehicles that currently park within the site overnight (demand = 45 vehicles)."

SGP & Co., Inc. Response: No response required.



<u>VHB Comment 5</u>: "... The study area should be expanded to include the traffic impacts from the Main Street and Madbury Road intersection (e.g., intersection analyses, queueing observations, stop delay study on the site driveway approach, etc.)."

SGP & Co., Inc. Response: In a follow-up conversation with Mr. Plourde, it was agreed that a detailed review of the data collection video collected at the subject intersection in February 2020 (pre-Covid19) would suffice, given the effect of current pandemic on traffic volumes in the area.

Said video was reviewed for the 4:30 to 5:30 PM and 8:00 to 9:00 AM peak hour periods and the detailed results are attached (see Attachments 1-3). To summarize:

- Eastbound queuing on Main Street: Eastbound vehicle queues from the Main Street traffic signal extended to and beyond the site driveway in one instance during the PM peak hour. This driveway was blocked by a standing queue for 47 seconds (from 4:40:29 to 4:41:16), or approximately 1% of the peak hour. Vehicle queues did not extend back to this driveway during the AM peak hour.
- Westbound queuing on Main Street: Westbound queuing on Main Street from the Madbury Road intersection did not extend back to the subject driveway during the AM or PM peak hour periods.
- During the 47 seconds of the PM peak hour that Main Street queuing temporarily blocked the site driveway, no vehicles attempted to enter or exit from the site driveway.
- During both peak hour periods, there was no evidence of an exiting driver switching from a leftturn departure to a right-turn departure due to traffic conditions on Main Street, i.e.; turning right after signaling left to exit.
- Vehicle Queuing on the site driveway approach to Main Street was either nil or one vehicle.
- Exiting drivers were observed to accept a critical headway of 5.0 seconds for left-turn and rightturn departures. This information was utilized to "calibrate" the capacity analysis to reflect local operations (in response to Comment 12).

<u>VHB Comment 6</u>: "Upon review of the historical traffic growth data provided in the Traffic/Parking Evaluation, traffic volumes have experienced a negative trend in traffic growth between 2015 and 2019. For conservative (worse-case) purposes and in compliance with NHDOT guidance, a 1% compounded annual rate was used to account for general population growth and traffic associated with smaller developments in the area. Therefore, VHB finds the historical growth rate methodology acceptable and consistent with standard traffic engineering practice."

SGP & Co., Inc. Response: No response required.

<u>VHB Comment 7</u>: "Based on NHDOT methodologies, peak-month traffic volume adjustments should be based on the closest permanent recorder station that is on a similar type of roadway. The NHDOT Group Averages could be used should no permanent count station on a similar type of roadway be reasonably nearby. Upon review of NHDOT's database, there is a count station located within 1 mile of the development site along US Route 4 (Piscataqua Road) east of NH Route 108 (Dover Road).⁸ Since Main Street adjacent to the site and US Route 4 have different characteristics⁹ and the Group 4 Averages require a higher seasonal adjustment factor (1.20 vs. 1.11), the methodology used provides a conservative (worse-case) analysis. Therefore, VHB finds the seasonal adjustment method reasonable."

SGP & Co., Inc. Response: No response required.



<u>VHB Comment 8</u>: "The site trips associated with the proposed project were estimated based on a ratio of the existing driveway traffic counts per the number of existing spaces applied to the proposed 180 parking spaces. The methodology used in determining the volume of site trips associated with the proposed parking lot expansion project is consistent with standard traffic engineering practice."

SGP & Co., Inc. Response: No response required.

<u>VHB Comment 9</u>: "The proposed 180 parking spaces are intended to serve the student housing development at 19-21 Main Street. In addition, a portion of the proposed parking spaces would be associated with UNH students who would reside at other student housing developments. Should these parking spaces be purposed for another use, then the volume and frequency of the site trips could differ."

SGP & Co., Inc. Response: We concur, the traffic study projections, analyses, and findings apply only to the proposed expansion of the student housing parking lot, and no other hypothetical use.

<u>VHB Comment 10</u>: "The applicant should conduct an assessment to determine which alternate routes motorists may consider (e.g., based on proximity, travel time, roadway characteristics, legislative class, etc.) should the left turns exiting from the site driveway be projected to experience operational deficiencies."

SGP & Co., Inc. Response: The analysis of traffic operations at the subject intersection suggests that drivers exiting left will not experience inordinate delays (2031 PM average control delay = 29 seconds) leaving the site driveway, and then following the "blue" route 0.08 miles on Main Street to reach Madbury Road. The diagram below shows that exiting right on the "yellow" route to reach Madbury Road will involve a travel distance of approximately 1.03 miles that includes one traffic signal and several stop signs. In our view, this is not an attractive alternative route and most exiting drivers will prefer the shorter route to Madbury Road.



<u>VHB Comment 11</u> "The applicant should revise the intersection analyses based on the current HCM 6^{th} edition or provide support and clarification for using the older version."

SGP & Co., Inc. Response: There is no need to revise the analyses as the HCM 2010 methodology did not change with the HCM 6th Edition; the results are identical. Nevertheless, further evaluation of intersection operations, as requested in Comment 12, was completed using the HCM 6th Edition.



<u>VHB Comment 12</u>: "Further evaluation of the intersection operations should be conducted due to the impacts associated with Main Street westbound vehicles extending from Madbury Road to the site driveway that may impact delays, v/c ratios, and queuing (see Comments 5 and 10)."

SGP & Co., Inc. Response: As discussed in the response to Comment 5, the extent of vehicle queuing on Main Street observed during the AM and PM peak hour periods did not significantly impact traffic operations at the subject intersection. These observations demonstrated that drivers exiting left and right from the site driveway accept a critical headway of 5.0 seconds, somewhat less than the default values found in the HCM. Table 3-R (Page 5) summarizes the updated capacity analyses. The vehicle delays and v/c ratios are lower than originally reported due to "calibration" of the critical headways (see Attachments 4-12).

<u>VHB Comment 13</u>: "Therefore, the applicant should conduct an evaluation of the available sight lines at the Main Street and site driveway intersection to ensure that all season safe sight distances will be provided in accordance with the Town's standards."

SGP & Co., Inc. Response: Evaluation of available sight lines at the existing intersection will be conducted by MJS Engineering, P.C. and provided under separate cover.

Based on public input, the Applicant has authorized us to conduct a field visit to view the traffic signal phasing on the Main Street eastbound approach to NH108. We will summarize our findings under separate cover.



Table 3-R

Updated STOP-Controlled Intersection Capacity Analysis Main Street / Existing Site Driveway

		Wee	kday A	M Peak	Hour	Wee	ekday F	M Peak	Hour	Satu	ırday Pl	VI Peak	Hour
		Delay ¹	V/C ²	LOS ³	Queue ⁴	Delay ¹	V/C ²	LOS ³	Queue ⁴	Delay ¹	V/C ²	LOS ³	Queue ⁴
Existing Site Drivew a	y - Left & Right-Turn Depa	artures											
	2020 Existing	10.2	0.01	В	<1	16.2	0.05	С	<1	11.9	0.02	В	<1
	2031 No-Build	10.9	0.01	В	<1	22.5	0.07	С	<1	14.0	0.02	в	<1
	2031 Build	11.1	0.03	В	<1	29.3	0.31	D	1	14.7	0.08	В	<1
Main Street - WB Left	-Turn Arrivals												
	2020 Existing	7.6	0.00	А	<1	9.4	0.00	А	<1	8.7	0.00	А	<1
	2031 No-Build	7.7	0.00	А	<1	10.6	0.00	В	<1	9.4	0.00	А	<1
	2031 Build	7.7	0.00	А	<1	10.8	0.01	В	<1	9.5	0.01	А	<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)

Table A	Level-of-Serv Unsignalized	ice Criteria for Intersections
Control Delay	Level of Service by Vo	ume-to-Capacity Ratio
(seconds/vehicle)	v/cs10	<u>w/c>1.0</u>
0 - 10	А	F
> 10 - 15	в	F
> 15 - 25	C	F
>25 - 35	D	F
> 35 - 50	E	F
> 50	F	F

Source: Transportation Research Board, Highway Capacity Manual 2010.



Stephen G. Pernaw & Company, Inc.

ATTACHMENTS



Weekday Peak Hour Vehicle Queuing Observations - Main Street, Durham, NH

Main Street / Existing Site Driveway - Durham, New Hampshire

I. PM Peak Hour Obersevations List (2/12/2020 from 4:30 to 5:30 PM)

			Departure		Gap Size	
Driver #	Movement	Arrival Time	Time	Delay	Accepted	Notes
1	Left Out	4:34:30	4:35:03	0:00:33	8	
2	Left Out	4:36:01	4:36:07	0:00:06	5	
EB Stand	ling Queue Present	4:40:29	4:41:16	0:00:47		
3	Left Out	4:46:05	4:46:22	0:00:17	12	
4	Left Out	4:47:12	4:47:52	0:00:40	5	
5	Left Out	4:54:33	4:54:39	0:00:06	5	
6	Left Out	4:58:21	4:59:48	0:01:27	4	
7	Left Out	5:09:59	5:10:31	0:00:32	7	
8	Back Out	5:10:55	5:10:58	0:00:03	10	
9	Right In	5:13:42	5:13:42	0:00:00		
10	Right In	5:16:01	5:16:01	0:00:00		
11	Right In	5:16:31	5:16:31	0:00:00		
12	Right Out	5:17:43	5:17:43	0:00:00	5	
13	Left In	5:21:03	5:21:10	0:00:07	10	
14	Right Out	5:21:27	5:21:30	0:00:03	7	
15	Right In	5:22:29	5:22:29	0:00:00		
16	Right Out	5:23:20	5:23:37	0:00:17	5	
17	Right In	5:24:19	5:24:19	0:00:00		
18	Left Out	5:24:48	5:25:16	0:00:28	9	
19	Right In	5:03:27	5:03:27	0:00:00		
20	Right In	4:50:30	4:50:30	0:00:00		
21	Right In	4:42:07	4:42:07	0:00:00		

II. Observations Sorted by Movement

Driver #	Movement	Arrival Time	Departure Time	Delay	Gap Size Accepted	
8	Back Out	5:10:55	5:10:58	0:00:03	10	
13	Left In	5:21:03	5:21:10	0:00:07	10	
1	Left Out	4:34:30	4:35:03	0:00:33	8	
2	Left Out	4:36:01	4:36:07	0:00:06	5	critical gap size
3	Left Out	4:46:05	4:46:22	0:00:17	12	
4	Left Out	4:47:12	4:47:52	0:00:40	5	critical gap size
5	Left Out	4:54:33	4:54:39	0:00:06	5	critical gap size
6	Left Out	4:58:21	4:59:48	0:01:27	4 *	Discard / only 1 observation.



Weekday Peak Hour Vehicle Queuing Observations - Main Street, Durham, NH

Main Street / Existing Site Driveway - Durham, New Hampshire

7	Left Out	5:09:59	5:10:31	0:00:32	7	
18	Left Out	5:24:48	5:25:16	0:00:28	9	
9	Right In	5:13:42	5:13:42	0:00:00		
10	Right In	5:16:01	5:16:01	0:00:00		
11	Right In	5:16:31	5:16:31	0:00:00		
15	Right In	5:22:29	5:22:29	0:00:00		
17	Right In	5:24:19	5:24:19	0:00:00		
19	Right In	5:03:27	5:03:27	0:00:00		
20	Right In	4:50:30	4:50:30	0:00:00		
21	Right In	4:42:07	4:42:07	0:00:00		
12	Right Out	5:17:43	5:17:43	0:00:00	5	critical gap size
14	Right Out	5:21:27	5:21:30	0:00:03	7	
16	Right Out	5:23:20	5:23:37	0:00:17	5	critical gap size

Weekday AM Peak Hour (8:00 to 9:00 AM) - Vehicle Queuing Observations

Main Street / Existing Site Driveway - Durham, New Hampshire

III. AM Peak Hour Obersevations List (2/13/2020 from 8:00 to 9:00 AM)

Driver #	Movement	Arrival Time	Departure Time	Delay	Gap Size Accepted	Notes
1	Left In	8:39:55	8:39:55	0:00:00	5	
2	Left Out	8:41:43	8:41:47	0:00:04	4	
3	Right In	8:56:11	8:56:11	0:00:00		
4	Left Out	8:59:31	8:59:37	0:00:06	7	

IV. Observied Standing Queues

AM: No WB standing queues observed on Main Street from 8:00 to 9:00 AM PM: One EB standing queue observed on Main Street for 47 seconds (4:40:29 to 4:41:16)

V. Critical Gap Sizes - Durham, Main Street

Critical gap for left-turn departures =	5.0 seconds
Critical gap for right-turn departures =	5.0 seconds
Critical gap for left-turn arrivals =	4.1 seconds

Use HCM; field study = 1 AM and PM data point only.



Weekday Peak Hour Vehicle Queuing Observations - Main Street, Durham, NH

Main Street / Existing Site Driveway - Durham, New Hampshire

VI. Other Observations

- 1. During the standing queue on Main Street, no vehicles were observed entering or exiting from the site.
- 2. There was no evidence of an exiting driver switching from a left-turn departure to a right-turn departure.

HCM 6th TWSC <u>1: Site Driveway & Main Street</u>

Intersection	2 Nites	3.3.67	Hick	E-SY	123350	
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBI	NBR
Lane Configurations	1		/	1	M	TIDIT
Traffic Vol. veh/h	150	1	1	161	2	10
Future Vol. veh/h	150	- 1	4	161	~ ~ ~	• 0
Conflicting Dode #/hr	100	1	0	101	2	0
Sign Control	Eroo	Eree	Eroo	- U	Cton	Cton
BT Chonnelized	riee	None	riee	Mana	Stop	Stop
Storogo Longth		None		None	-	None
Storage Length	- 4 0	-	-	-	0	-
ven in Median Storage	,# U	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	81	81	71	71	50	50
Heavy Vehicles, %	13	0	0	6	0	0
Mvmt Flow	185	1	1	227	4	0
Major/Minor	Maior1		Aaior?	- Marcala	Minor1	R. C. M.
Conflicting Flow All		0	186	0	115	196
Stope 1	v	0	100	U	100	100
Stage 2		-			100	-
Staye Z	-	-		-	229	-
	-	-	4.1	9113-3 - 0	5	5
Critical Howy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	- 1	1401	-	702	916
Stage 1	-	-	-	-	851	-
Stage 2	-	-	-	- 101	814	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	1	1401	-	701	916
Mov Cap-2 Maneuver	-	-	-	-	701	-
Stage 1					851	1.000
Stage 2	-	_		-	812	
Oluge Z	1.24	120 (1-176)	1210.001		013	-
Approach	EB	See 1	WB		NB	
HCM Control Delay, s	0		0		10.2	
HCM LOS					В	
Minor Lano/Major Mum		IDI n1	EDT	EPD	W/DI	MOT
Conceity (ush /h)		VDLIII	EBI	EBR	WBL	WBI
Capacity (ven/n)		701	-	-	1401	-
HOW Lane V/C Ratio		0.006	-	-	0.001	-
HCM Control Delay (s)		10.2	-	-	7.6	0
HCM Lane LOS		В	-	-	А	А
HCM 95th %tile Q(veh)		0	-	-	0	-

Intersection	Por S	1.50	1998	2.53	1995	2. 1. 2
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ţ,	/	/	1	W	/
Traffic Vol. veh/h	201	1	1	515	12	V 0
Future Vol. veh/h	201	1	1	215	2	0
Conflicting Pede #/hr	201	0	0	210	2	0
Sign Control	Eroo	Eroo	Eroo	Eroo	Stop	Stop
BT Channelized	Fiee	Nono	riee	None	Stop	Nono
Storage Length		None		NONE	0	NULLE
Veh in Median Storage	# 0	-		0	0	-
Grade %	,# 0			0	0	1000
Book Hour Easter	01	01	74	74	50	- E0
	10	01	11	11	50	50
Heavy venicles, %	13	0	0	6	0	0
WIVITE FIOW	248	1	1	303	4	0
Major/Minor M	Major1	1	Major2	BARR	Minor1	Silling
Conflicting Flow All	0	0	249	0	554	249
Stage 1		24033		-	249	
Stage 2	-	_	-	_	305	-
Critical Hdwv			41	1255.53	5	5
Critical Hdwy Sto 1	-	_	-		54	
Critical Hdwy Stg ?		1912	1		5.4	
Follow-up Hdwy	_	_	22		3.5	33
Pot Can-1 Manauvor		105300	1320	1000000	616	862
Stage 1	11-12 - 1-1 		1520	32.00	707	003
Stage 7	-		-		750	-
Distant blocked 0/	-			1000	152	
Platoon blocked, %	-	-	4000	-	045	000
wov Cap-1 Maneuver	-	-	1328	16 10	615	863
Mov Cap-2 Maneuver	-	-	-	-	615	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	751	-
Approach	EB	26.000	WB	10000	NB	1
HCM Control Delay. s	0	BAR	0		10.9	
HCM LOS					В	
					1233	
A.R			FDT		LAUDI	WOT
winor Lane/Major Mvm	t ľ	VBLn1	EBL	EBK	WBL	WBT
Capacity (veh/h)		615	-	-	1328	1.
HCM Lane V/C Ratio		0.007	-	-	0.001	-
HCM Control Delay (s)		10.9	-	-	7.7	0
HCM Lane LOS		В	-	-	A	А
HCM 95th %tile Q(veh)		0	-	-	0	-

Intersection	Sect 14	Contra Maria	States	Star 1	Non A	
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ţ,	/	/	Â	M	
Traffic Vol. veh/h	201	4	4	V215	19	101
Future Vol. veh/h	201	4	4	215	9	0
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	81	81	71	71	50	50
Heavy Vehicles %	12	01	1	6	50	0
Mumt Flow	240	0	0	202	10	0
IVIVITIL FIOW	248	5	0	303	18	U
Major/Minor N	Major1	A PAGE M	Major2	1923	Minor1	The Part of
Conflicting Flow All	0	0	253	0	566	251
Stage 1	-	_	-	-	251	100
Stage 2	-	-	-	_	315	-
Critical Hdwv	-	-	4.1	- 10 M	5	5
Critical Hdwy Sto 1	-	-	_	_	54	-
Critical Hdwy Sto 2	-	-	200		54	1000-000
Follow-up Hdwy	_	_	22	_	3.5	33
Pot Can-1 Maneuver		12.00	1324	-	609	862
Stane 1			1024		795	002
Stage 7		ALC: NO	2135070	SCORES.	744	STREET, STREET, ST
Plateon blocked %			-	-	744	
May Cap 1 Manager	-		1204		000	000
Mov Cap-1 Maneuver			1324		000	002
Nov Cap-2 Maneuver	-	-	-	-	606	-
Stage 1	-	-	-	-	/95	100 - 100
Stage 2	-	-	-	-	740	-
Approach	EB	State 1	WB	The second	NB	
HCM Control Delay, s	0		0.1		11.1	
HCM LOS	-				B	
					5	
Marchensteinet			FOT		14/51	14/07
Minor Lane/Major Mvm	t	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		606	-	-	1324	- A.
HCM Lane V/C Ratio		0.03	-	-	0.004	-
HCM Control Delay (s)		11.1		-	7.7	0
HCM Lane LOS		В	-	-	Α	А
HCM 95th %tile Q(veh)		0.1	-	-	0	-

Intersection	1200	148 A. A	6003 BH	Stal-	VIII AL	and and a second
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBI	WBT	NBI	NBR
ane Configurations	1.				W	TENT
Traffic Vol voh/h	719	10	1	270		12
Future Vol. veh/h	712	* 0 0	4	¥ 31Z	V 9	• 3
Future voi, ven/n	712	8	1	312	9	3
Conflicting Peds, #/hr	_ 0	_ 0	_ 0	_ 0	0	0
Sign Control	⊦ree	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	2.53	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage,	,# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	80	80	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	809	9	1	465	12	4
				and the second second		Concession in the
Major/Minor N	/lajor1		Major2	Sec. 12	Minor1	a the search
Conflicting Flow All	0	0	818	0	1281	814
Stage 1	-	-	-		814	-
Stage 2	-	-	-	-	467	-
Critical Hdwy	-	-	4.1	-	5	5
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	_		_		5.4	1.000
Follow-up Hdwy	-	-	22	-	3.5	33
Pot Can-1 Maneuver	_		810		304	500
Stane 1		-	013		130	500
Stage 2	12 2 3 3 3	23133	-	Sel Charles	409	
Slaye Z	-	-			030	-
Platoon blocked, %	-	-	0.10	-	000	-
Mov Cap-1 Maneuver	-	-	819	-	303	500
Mov Cap-2 Maneuver	-	-	-	-	303	-
Stage 1	-	-		-	439	-
Stage 2	-	-	-	-	634	-
San Carlo Barris						
Approach	EB		WB	The Martin	NB	1000
HCM Control Delay	0	and the second	0		16.2	Contraction of the local division of the loc
HCM LOS	U		U		10.2	
					U	
Minor Lane/Major Mvm	1	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		336	100		819	-
HCM Lane V/C Ratio		0.048	-	-	0.002	-
HCM Control Delay (s)		16.2		-	9.4	0
HCM Lane LOS		C	-	_	A	A
HCM 95th %tile O(veh)		01		in the second	0	
nom oour rune a(ven)		0.1	1		U	

Intersection	Silling.	16-16-		STAR	34 164	1
Int Delay, s/veh	0.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1		/	1	M	142014
Traffic Vol veh/h	95/	10	1	VAI02		12
Future Vol. veh/h	05/	Q Q	1	109	0	* 3
Conflicting Pede #/hr	904 A	0	0	490	9	0
Sign Control	Eroo	Eroo	Eroo	Eroo	Ctop	Ctop
BT Channelized	riee	None	riee	Mana	Stop	None
Storage Length		NONE		NONE	-	NOTE
Veh in Median Storage	# 0			-	0	-
Crode %	,# U			0	0	
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	80	80	75	75
Heavy Vehicles, %	1	0	0	2	0	0
Mvmt Flow	1084	9	1	623	12	4
Major/Minor	Major1	1759	Major2	135 A	Minor1	1412 141
Conflicting Flow All	<u>Λ</u>	0	1093	0	1714	1080
Stane 1	U	U	1035	U	1080	1009
Stage 2			0000		605	
Critical Udua	-	-	4 4	-	020 F	-
Critical Hours Cha 4		-	4.1	-	0	D
Children Howy Stg 1	-	-	-	-	5.4	-
Chucal Howy Stg 2	7	-	-		5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	646	-	195	380
Stage 1	-	-	-	-	326	-
Stage 2	- 11	-	-	-	537	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	- 10	646	-	195	380
Mov Cap-2 Maneuver	-	-	-	-	195	-
Stage 1	_		-	-	326	
Stage 2	-	-	-	_	536	_
					000	
Assessed		Constantion	14/17		NIC	
Approach	EB	and a	WB	Sur Ste	NB	19-205
HCM Control Delay, s	0		0		22.5	
HCM LOS					С	
Minor Lane/Maior Mym	t I	VBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		202			646	
HCM Lane V/C Datio		0.072		-	040	
HCM Control Dolor (a)		0.01Z	1000000	-	10.0	-
HOM CONTROL Delay (S)		22.5	-	-	10.0	U
HUM Lane LOS		C	-	-	В	A
HCM 95th %tile Q(veh)		0.2	-	-	0	

Intersection		384 H	1/10 200		127-1225	235.22
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	ţ,	and the second second	/	1	M	-
Traffic Vol. veh/h	954	34	1	198	38	12
Future Vol. veh/h	954	34	4	498	38	12
Conflicting Peds #/hr	004	0	0	-50	0	0
Sign Control	Free	Free	Free	Free	Stop	Ston
RT Channelized	TIEC	Mone	1166	None	Stop	None
Storage Length	_	- NONG		NOTIC	0	NONE
Veh in Median Storage	# 0			ړ ۱	0	-
Grade %	, π 0		00.3203	0	0	
Dook Your Easter	00	00	00	00	75	75
	00	00	00	00	10	10
Heavy venicles, %	1004	0	U	200	0	10
WWITH FIOW	1084	39	5	623	51	16
Major/Minor I	Major1	1	Major2	-2012	Minor1	119 11 12
Conflicting Flow All	0	0	1123	0	1737	1104
Stage 1	-	-	-	10.11	1104	-
Stage 2	-	-	-	-	633	-
Critical Hdwy	-	-	4.1	-	5	5
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	- 1254	-	5.4	-
Follow-up Hdwv	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	629		191	374
Stage 1	-	_	-	a far an	320	-
Stage 2	_	1	1.2		533	1
Platoon blocked %	_	_			000	
Mov Cap-1 Maneuver			629		189	374
Mov Cap-2 Maneuver	-	_	023		180	014
Stane 1	-	1000	-		300	
Stage 2		394		1.11	520	-
Slaye Z	-	-	-		JZI	-
Approach	EB	N.B.S.	WB	25.25	NB	1
HCM Control Delay, s	0		0.1	12.5%	29.3	101233
HCM LOS					D	
Minor Lane/Major Mum	+		EDT	EPD	W/DI	W/DT
	IL	NBLNI	EBI	EBK	WBL	WBI
Capacity (veh/h)		214			629	- 12 -
HCM Lane V/C Ratio		0.312	-	-	0.008	-
HCM Control Delay (s)		29.3	-	-	10.8	0
HCM Lane LOS		Ď	-	-	В	Α
HCM 95th %tile Q(veh)	31212	1.3		-	0	-

Intersection		Wat also	The Start	E State	North L	11-12
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBI	NBR
Lane Configurations	1	LUIN	HUL		M	RDR
Traffic Vol. yoh/h	55A	. 2	V n	417	T	1
Future Vol. veh/h	504	V Z	- 2	417	* 1	× 3
Future voi, ven/n	554	2	2	417	1	3
Conflicting Peds, #/hr	0	0	0	_ 0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	- 12	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage	,# 0		-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	93	93	50	50
Heavy Vehicles. %	2	0	0	2	0	0
Mymt Flow	609	2	2	448	2	6
	000	-	-	110	-	U
	(along) the					
Major/Minor	Major1	Raci	Major2	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Minor1	123.20
Conflicting Flow All	0	0	611	0	1062	610
Stage 1	-	-		-	610	
Stage 2	-	-	-	-	452	-
Critical Hdwv	- 11		4.1	-	5	5
Critical Hdwy Sto 1	-	_	_	-	54	-
Critical Hdwy Stg 2			1.500		5.4	
Follow-up Hdwy			2.2		3.5	22
Pot Cap 1 Manauluar	-	N.S. IN	070	1000	277	5.5
Store 1	•		9/0	-	5//	010
Stage 1	-	-	-		546	-
Stage 2			24.1	-	645	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	978	- 10	376	610
Mov Cap-2 Maneuver	-	-	-	-	376	-
Stage 1	-	-	- 111	-	546	-
Stage 2	-	-	-	-	643	-
U						
Approach	EP	N 25 C	W/P	and the second	NP	(Salaran
HCM Control Dolou	CB	ALC: NO.	VVB	ALC: NOT ALC: NOT	14.0	10000
HOM LOC	0		0		11.9	
					В	
Minor Lane/Major Mvm	it I	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		528	-		978	
HCM Lane V/C Ratio		0.015	-	-	0.002	_
HCM Control Delay (s)		11 0		34.7	87	0
HCM Long LOS		11.J D		Hell In Th	0.1	0
HOM OF A		D		-	A	A
now your write Q(veh)		0	2 20 7	-	0	1000

Intersection	C. M.	OR SHARE	316715	Set Barres	30.20	Sales -
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBI	WBT	NBI	NBR
Lane Configurations	±.	LDI	TIDE		1100	TUN
Traffic Vol. yoh/h	744	10	10	H FEO	T	1
Future Vol. veh/h	741	• 2	• 2	V 000V	1	V 3
Future Vol, Ven/n	/41	2	2	558	1	3
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	- 15
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	93	93	50	50
Heavy Vehicles, %	2	0	0	2	0	0
Mymt Flow	814	2	2	600	2	6
					-	
			-			
Major/Minor N	lajor1	1	Major2	N	linor1	SAL .
Conflicting Flow All	0	0	816	0	1419	815
Stage 1	-	-	-	-	815	-
Stage 2	-	_	-	-	604	-
Critical Hdwy	-	- 11.15	4.1	-	5	5
Critical Hdwy Stg 1	-	-	-	-	5.4	
Critical Hdwy Stg 2	-	-	-	1	5.4	125
Follow-up Hdwy	_	_	22	_	3.5	33
Pot Cap-1 Maneuver	-	10 (A)	820	1-5. Lat.	264	100
Stane 1		-	020		130	-100
Store 2	Contraction of	C. Street		Children and	409	
Distoon blocked %	-		-	-	000	S./ 3
Mattoon Diocked, %	-	-	000	-		
Mov Cap-1 Maneuver	-	-	820	- Alt	263	499
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	12.0-9	439	- 46
Stage 2	-	-	-	-	548	-
Approach	EB	Service Services	WB		NB	100
HCM Control Delay s	0		0	110202	14	
HCM LOS	U		U		R	
NOM LOO					U	
Minor Lane/Major Mvmt		NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		408	-	-	820	-
HCM Lane V/C Ratio		0.02	-	- 1	0.003	-
HCM Control Delay (s)		14	-	-	9.4	0
HCM Lane LOS		В	-	-	А	A
HCM 95th %tile Q(veh)		0.1	-	-	0	637272
					v	

Intersection		S. Start	a shall		Mar T	and the second
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBI	NBR
Lane Configurations	Ť.		/	1	M	
Traffic Vol. veh/h	7/1	. 8		559	1	12
Future Vol. veh/h	7/1	0	0	559	4	+ 10
Conflicting Pode #/br	141	0	9	000	4	13
Sign Control	Eroo	Eroo	Eroo	Eroo	Stop	Ctop
BT Channelized	riee	None	Fiee	Nana	Stop	Slop
Storogo Longth		none	-	None	-	None
Storage Length	щ о щ о	-	-	-	0	-
Ven in Median Storage,	,# U		1999	0	0	
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	93	93	50	50
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	814	9	10	600	8	26
Major/Minor	Aaior1		Major?	16-21 24	Minor1	10 200
Conflicting Flow All	0	0	873	n	1/120	810
Store 1	U	0	023	U	040	019
Stage 7		6-635 ·		-	019	
Stage 2	-	-	-	-	620	-
	-	-	4.1	-	5	5
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	•		1.8 -	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	- 2.6	816	-	259	497
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	1	540	-
Platoon blocked, %	-	_		-		
Mov Cap-1 Maneuver	-		816		254	497
Mov Cap-2 Maneuver	-	-	-	-	254	
Stage 1	1600				437	
Stage 2			1.50		530	
Jaye z	12 12 1.14	and the second			030	
Approach	EB	Sec. 15	WB		NB	Maria La
HCM Control Delay, s	0	13.11.3	0.2		14.7	
HCM LOS					В	
					11000	
Minor Lane/Major Mvm		NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)		406	-	-	816	
HCM Lane V/C Ratio		0.084	-	-	0.012	-
HCM Control Delay (s)		14.7	-		9.5	0
HCM Lane LOS		В	-	-	А	А
HCM 95th %tile Q(veh)		0.3			0	