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April 12, 2018

Mr. Ausberto Huertas, Jr.
Building Department Superintendent
Incorporated Village of Garden City
Village Hall
351 Stewart Avenue
Garden City, New York 11530

Re: Traffic Impact Study Review – Response to Comments
555 Stewart Avenue, Garden City (CE 1365 Q)

Dear Mr. Huertas:

The following are responses to a comment letter dated January 18, 2018 regarding our office's traffic study on the above referenced project.

Comment 1. Access to the project is based upon the relocation of a traffic signal owned and operated by the Nassau County Department of Public Works. As such, the adequacy and safety of the access plan cannot be fully judged until County approval of the access plan is provided.

Response: Acknowledged. The study is being reviewed by NCDPW, and improvements to the proposed driveway will be designed to NCDPW standards. The County had previously granted approvals for the proposed relocation of the southbound driveway to be aligned with 550 Stewart Avenue on the south side of the street, with the corresponding median removal and lane assignments.

Comment 2. The Traffic Impact Study examines the potential impacts of the development of a 150-unit rental apartment on the north side of Stewart Avenue between Raymond Court and an access to the Roosevelt Field Mall. The study also includes the potential traffic impact of the development of a parcel on the south side of Stewart Avenue opposite the subject parcel which may ultimately share access to Stewart Avenue at the relocated traffic signal. Two alternate development scenarios were considered for the southerly parcel: a 200-unit rental apartment development or a 93,000-squarefoot office development.

Response: Acknowledged.

Comment 3. Intersection turning movement counts were collected on Tuesday, September 12, 2017 during the weekday morning peak hours (7:00 AM to 9:00 PM) and evening peak hours (4:00 PM to 6:00 PM). The study notes that the evening count at the intersection of Stewart Avenue and Clinton Avenue was began at 3:00 PM rather than 4:00 PM due to the proximity of the Stewart Avenue Elementary School. Count data is not provided in the report and whether the impact of the school

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between 3:00 PM and 4:00 PM was significant was not discussed. The raw count data should be provided in an Appendix.

Response: Raw count data is provided with this letter. The traffic study's Trip Distribution and Assignment sheet notes the intersection peak hours were 8:00-9:00 a.m. and 4:45-5:45 p.m. Please see the excerpt below. Based on this, the school's localized influence on traffic is less pronounced than the increased volumes during peak hours on Stewart Avenue.

		Existing 2017 Volumes	
Approach	AM PM	AM	PM
INTERSECTION: Clinton Road and Stewart A			
NB Left	Peak hours	24	17
Through	begin at:	599	418
Right	800 1645	219	300
SB Left		59	81
Through		361	533
Right		142	89
Osborne LTR		0	0
EB Left		169	177
Through		1,184	1,428
Right		30	60
WB Left		140	374
Through	Peak Hour	1,065	1,089
Right	F factors are:	47	92
Intersection	0.94 0.94	4,039	4,658

Comment 4. Processing of the raw count data is not discussed. Processing would include a determination of approach peak hour factors and heavy vehicle and bus factors. Data is often adjusted by monthly factors to provide Average Daily Traffic (ADT) counts. The data was collected in September and the ADT adjustment would slightly reduce the count data to an "average daily" number. No adjustment need be made, as no adjustment in this case is a conservative approach, but the lack of adjustment should be stated.

Response: As it was not necessary to process the raw counts, it was unnecessary to discuss this in the traffic study. Per the comment, the lack of adjustment is conservative (no impact on the study's results).

Comment 5. Existing 2017 count data is adjusted to the future Build Year of 2019 utilizing a growth factor of 0.6% per year. The growth factor is from the New York State Department of Transportation and is appropriate for use in the study.

Response: Acknowledged.

Comment 6. The study includes two other developments that have either been approved or are undergoing review. Engel Burman at Roosevelt Field, LLC is a 120-unit apartment building and the Marriot OTO, a 163-room hotel. Figure 3-1 of the study indicates that for both other projects 20% of the traffic will originate from the Roosevelt Field Mall Access Road, turn right on Stewart Avenue and proceed west through Clinton Avenue based upon an April 28, 2017 letter submitted to the Village by the Engel Burman project engineer. We note the following deficiencies with respect to the analysis of the other developments:

- a. Trip generation of the other projects is not given.
- b. The Traffic Impact Study for the Marriot OTO dated March 23, 2015 and which should be available in the Village's files, indicates that 10% of the traffic exiting via the Mall Access Road will turn right on Stewart Avenue and 10% will turn left.
- c. While Figure 3-1 shows the site generated traffic from the other developments arriving and departing via the mall access drive, the Traffic Assignment Work Sheets show the site generated traffic passing east and west on Stewart Avenue at the Mall Access Road.
- d. The site generated traffic from the other developments should not have been carried through the Clinton Avenue intersection but distributed to the right, through and left movements proportionally to the existing traffic movements.

Responses:

- a. Below are the total "other project" trip as referenced from the Engel Berman project's letter and calculated using the ITE Trip Generation manual for the Marriott-OTO development.

Engel Burman at Roosevelt Field			Marriott / OTO Development		
	AM	PM		AM	PM
Enter	17	68	Enter	51	50
Exit	70	37	Exit	35	48
Total	87	105	Total	86	98

- b. This is another interpretation of the Marriott-OTO trip distribution (we were not provided with the OTO report's trip distribution). The distribution in the OTO report results in fewer trips added to our study's intersections than what was analyzed. Attached with this report is a modified analysis of the proposed project with the larger (Alternate 2) development on the south side of Stewart Avenue. There are no material changes in the results.
- c. Please see the attached modified analysis with this minor change. There are no material changes in the results.
- d. This is another interpretation of "other project" traffic distribution. The traffic study was conservative by routing all "other project" traffic east-west, since these through movements are more congested than the alternate maneuvers suggested in the comment. The attached modified analysis assigns the "other project" trips according to the comment, and there are no material changes in the results of the study.

Comment 7. The study assigns 70% of the arriving and departing site generated traffic to the east on Stewart Avenue, citing the presence of the Meadowbrook Parkway, a major draw to site traffic. However, we note the existing count data from the intersection of Stewart Avenue at Raymond Court. During the morning peak period, traffic arriving and departing splits equally east and west on Stewart Avenue. During the evening peak period more traffic comes to and from the west. Further evaluation and discussion should be provided as to why residential traffic from the site would be different than residential traffic patterns at Raymond Court.

Response: *Raymond Court is a short, dead-end, residential street with less than 20 homes and less than 25 two-way cars an hour. Its traffic is much too small a sample to be relied upon for trip*

distribution purposes for a different, larger use. Additionally, Raymond Court's intersection on Stewart Avenue is unsignalized, which makes a left turn (to head east towards the Meadowbrook) a more challenging proposition during peak hours, whereas the proposed site will have signalized egress that facilitates the left turn to access the Meadowbrook rather than Clinton Road. Finally, Raymond Court has single-family homes that have a higher component of K-12 students (who would be driven to/from Stewart Elementary School) compared to apartments.

- Comment 8. The Traffic Study uses Synchro 8 to perform the analysis of Existing, No Build, and Build conditions at the study intersections. We note that Synchro 8 has been superseded by Synchro 9 and just recently by Synchro 10. We also offer the following comment specific to the analysis:
- The Synchro summary sheets provided in the Appendix do not provide the signal timing used for the analysis. More importantly they do not include queue lengths for individual movements or show the available storage for individual lane movements. Queueing is a crucial issue in determining project impacts.
 - Nassau County operates a system along Stewart Avenue yet the analysis provides different cycle lengths for adjacent signals. During the morning peak at the Mall Access Road there is a 68 second cycle length (probably too low) while at the site access the cycle length is shown as 119.5 seconds. Signal systems should be identified and the correct timing plans should be used in the analysis.
 - The analysis utilizes the same peak hour factor for all approaches. The correct approach peak hour factor should be used.
 - What is the basis for the heavy vehicle factors used? They are omitted from many print outs.

Response: *The validity of a traffic study is not dependent on the version of traffic analysis software, so long as the same version is utilized to compare existing, No Build, and Build scenarios. Synchro 8 was a supported software package when the traffic study was prepared, and produces HCM 2010 reports, except that the signals at the Mall and at Clinton Road/Glen Cove Road have exclusive pedestrian phases that HCM 2010 methodology does not support. Attached with this letter are HCM 2010 analyses for Stewart Avenue-Raymond Court as well as HCM 2000 reports. There are no material differences from the No Build to Build scenarios associated with the HCM 2010 methodology.*

- Queue reports are attached with this letter. As shown, the proposed apartments with development on the south side of Stewart Avenue yield a peak eastbound left turn queue of one car (calculated below 20 feet means a one-car queue). Please also see Response 9.*
- Timing reports are provided with this letter, which show 120-second cycle lengths confirmed by field timings. Please note that the HCM reports in the study show the actuated timings, not the programmed cycle lengths.*
- The comment references an older procedure. The traffic study correctly utilizes HCM 2010 procedure, using the same Peak Hour Factor for every approach at an intersection: "The use of a single peak hour factor for the entire intersection is intended to avoid the likelihood of creating demand scenarios with conflicting volumes that are disproportionate to the actual volumes during the 15-minute analysis period". A copy of this documentation is attached.*
- The heavy vehicle percentages are based on our traffic counts.*

Comment 9. Critical to the safe operation of the proposed access plan is understanding the queues that will develop at the signalized intersections. While relocating the existing traffic signal 125 feet further west of the Mall Access Road will lessen the potential interference between the two signals, the relocation may cause more queueing interference at the intersection of Stewart Avenue at Raymond Court. Another concern will be queueing at the proposed site access driveway for 550 Stewart Avenue. The site plan shows only a short internal stacking area before the first internal intersection. Will queueing in the driveway potentially interfere with incoming traffic potentially causing a buildup onto Stewart Avenue? Another concern is whether adequate stacking has been provided for the proposed left turn lanes on Stewart Avenue for the proposed access.

Response: Queue reports (Response 8) indicate a one-car queue during peak hours.

Below is a separate calculation, using a more conservative approach with more entries using the eastbound left turn lane.

The apartments would have 65 entering trips per hour at most in the busiest hours of the week. It is conservative to consider 50% of entering traffic using the eastbound left turn lane:

- Half of 65 is 33 vehicles per hour, which is 1 car every two minutes, or 1 car per signal cycle*
- With random arrivals, it is conservative to place 2-3 cars in the same signal cycle as a high-peak projection. This equates to 40-60 feet of storage, shorter than the 75 feet of usable storage in the new eastbound left turn lane.*

The actual projected eastbound left turn volume will be smaller than this calculation, so the projected turn lane queue will be accommodated in the proposed turn lane with no impact to Raymond Court.

As noted, the proposed configuration will extend the left turn queue storage space approaching Roosevelt Field Mall, an improvement over current conditions. The proposed eastbound and westbound left turn lane lengths are maximized and will be subject to NCDPW review.

Comment 10. The study does not include an analysis of the latest three years of accidents along the portion of Stewart Avenue studied.

Response: The proposed project will shift the existing signal west to align two currently offset intersections. The proposed configuration will extend the amount of westbound left turn queuing space approaching Roosevelt Field Mall, which can only improve safety compared to current conditions. Total site traffic comprises less than 2% of background intersection volumes.

There is no reason to expect safety conditions to noticeably worsen, associated with this project.

Comment 11. As a minimum, the Traffic Impact Study should compare and discuss the trip generation of the proposed development under rezoning with the trip generation of the as-of-right development with the existing zoning.

Response: Since the proposed development has no discernable traffic impact compared to the No Build scenario with nothing on either property, it can be said there is discernable difference between the existing zoning and proposed use.

CAMERON ENGINEERING

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Proposed: 150 Apartments			Existing Zoning: 29 Homes (per earlier analyses)	
	AM	PM	AM	PM
Enter:	15	65	8	22
Exit:	62	35	22	13
Total:	77 trips	100 trips	30 trips	35 trips

Comment 12. The proposed access plan as depicted on the aerial photograph is not consistent with respect to the site plan's driveway layout. The aerial shows the development of a short fourth through lane eastbound at the site access point, as well as, a left turn lane for the site. The additional through lane may be confusing and require additional signage.

Response: The traffic study provides a correct "schematic" representation. To clarify the future lane assignments, the additional eastbound through lane represents the conversion of the existing left turn lane past this intersection, into an eastbound through lane. This lane will meet and become the eastbound left turn lane that serves the Roosevelt Field mall. Additionally, there will be a new eastbound left turn lane into the site, achieved by removing the existing grass median.

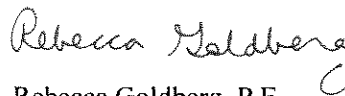
Attached with this letter are the following added documentation items:

- Synchro analysis of the busier (PM) peak hour, with development only on the north side of Stewart Avenue, and with development alternative #2 (the busier south-side potential development), reflecting the alternate H2M "other project" trip distribution, and reflecting HCM 2010 reports for the two of four intersections that are able to be analyzed using HCM 2010 (vs. 2000) methodology.

There are no significant differences associated with the different trip distributions or with the HCM 2010 reports for Raymond Court. There is no need to update the overall traffic study and there are no material changes from the study's results.

Should you have any questions or require additional information, please do not hesitate to contact our office at (516) 827-4900.

Very truly yours,



Rebecca Goldberg, P.E.

Senior Project Manager/Transportation Engineer

Encl. Count data, Level of Service spreadsheet, queue reports, Synchro PM peak hour reports
Cc: Kevin Walsh, Esq.

1-STEWART AV AT CLINTON RD-OSBORNE RD

9-12-17

7:00 AM

Start Time	CLINTON RD Southbound					STEWART AV Westbound					CLINTON RD Northbound				
	Left	Thru	Right	Hard Right	U Turn	Left	Thru	Bear Right	Right	U Turn	Left	Bear Left	Thru	Right	U Turn
7:00 AM	8	82	24	0	0	24	285	1	18	0	1	0	135	45	0
7:15 AM	8	89	29	0	0	22	250	1	12	0	1	0	178	38	0
7:30 AM	12	71	50	1	0	25	339	1	17	0	5	0	178	46	0
7:45 AM	14	68	42	0	0	30	323	1	13	0	8	0	185	60	0
8:00 AM	15	89	39	1	0	21	230	1	8	0	7	0	143	54	0
8:15 AM	12	92	37	0	0	30	257	1	16	0	1	1	136	51	0
8:30 AM	15	90	33	2	0	39	280	1	9	0	3	1	170	55	0
8:45 AM	17	90	29	1	0	50	298	1	10	0	10	1	150	59	0
9:00 AM	7	80	38	0	0	42	243	2	14	0	4	0	89	69	0
9:15 AM	18	77	27	1	0	33	228	0	21	0	4	0	108	62	0
9:30 AM	14	56	33	1	0	42	206	0	12	0	5	0	131	66	0
9:45 AM	15	76	31	0	0	46	236	1	16	0	3	0	121	76	0
3:00 PM	11	77	31	0	0	67	191	6	19	0	3	0	106	53	0
3:15 PM	15	105	20	0	0	75	222	1	22	0	0	0	109	50	0
3:30 PM	24	90	13	0	0	84	239	2	20	1	3	0	128	66	0
3:45 PM	19	115	31	0	0	62	214	6	20	0	8	0	105	82	0
4:00 PM	22	102	19	0	0	94	304	0	25	0	6	1	123	59	0
4:15 PM	14	157	20	1	0	107	227	2	20	0	3	0	106	51	0
4:30 PM	15	109	18	0	0	93	269	5	23	2	6	0	116	54	0
4:45 PM	21	119	28	0	0	80	234	1	27	1	8	0	116	70	0
5:00 PM	21	114	19	0	1	101	283	11	11	0	3	0	94	67	0
5:15 PM	21	140	21	1	0	82	241	1	20	0	5	1	112	80	0
5:30 PM	17	160	20	0	0	109	331	3	18	1	0	0	96	83	0
5:45 PM	19	147	35	0	0	90	267	4	12	0	3	1	83	72	0

Raw Count Data

1-STEWART AV AT CLINTON RD-OSBORNE RD

9-12-17

7:00 AM

Start Time	STEWART AV Eastbound					OSBORNE RD Southeastbound				
	Hard Left	Left	Thru	Right	U Turn	Hard Left	Bear Left	Bear Right	Hard Right	U Turn
7:00 AM	0	18	116	4	0	0	0	0	0	0
7:15 AM	0	45	121	3	0	0	1	0	0	0
7:30 AM	0	35	173	9	0	0	0	1	0	0
7:45 AM	0	46	252	4	0	0	0	0	0	0
8:00 AM	0	40	279	5	0	0	0	0	0	0
8:15 AM	0	41	348	10	0	0	0	0	1	0
8:30 AM	0	46	251	3	0	0	0	0	0	0
8:45 AM	0	42	306	12	0	0	0	0	0	0
9:00 AM	0	35	281	11	0	0	0	0	0	0
9:15 AM	0	21	235	6	0	0	0	1	0	0
9:30 AM	0	31	262	7	0	0	0	0	0	0
9:45 AM	0	27	243	4	0	0	1	0	0	0
3:00 PM	0	25	281	10	1	0	0	0	0	0
3:15 PM	0	38	314	11	0	0	0	1	1	0
3:30 PM	0	46	308	3	0	0	0	0	0	0
3:45 PM	0	48	319	9	0	0	1	1	0	0
4:00 PM	0	49	302	4	0	0	0	1	1	0
4:15 PM	0	42	346	9	0	0	1	0	0	0
4:30 PM	0	47	340	8	0	0	0	0	0	0
4:45 PM	0	50	381	15	0	0	1	0	0	0
5:00 PM	0	51	320	10	0	0	2	0	0	0
5:15 PM	0	48	368	19	0	0	0	2	0	0
5:30 PM	0	28	359	16	0	1	0	1	0	0
5:45 PM	0	38	334	12	0	0	0	0	0	0

Study Name 2-STEWART AV AT RAYMOND CT**Start Date 09-12-2017****Start Time 7:00 AM**

	RAYMOND CT Southbound			STEWART AV Westbound			STEWART AV Eastbound		
Start Time	Left	Right	U-Turn	Thru	Right	U-Turn	Left	Thru	U-Turn
7:00 AM	0	1	0	380	1	0	0	161	0
7:15 AM	1	4	0	362	0	0	3	158	0
7:30 AM	0	2	0	391	0	0	1	227	1
7:45 AM	0	3	0	389	0	0	2	310	0
8:00 AM	3	0	0	315	0	0	3	325	0
8:15 AM	2	7	0	336	0	0	0	388	0
8:30 AM	1	0	0	394	0	0	0	338	0
8:45 AM	3	2	0	362	1	0	1	379	0
9:00 AM	3	0	0	338	0	0	0	357	0
9:15 AM	0	2	0	292	0	0	1	328	0
9:30 AM	0	0	0	274	0	0	1	349	0
9:45 AM	0	1	0	310	0	0	1	337	0
4:00 PM	0	0	0	452	0	0	2	422	0
4:15 PM	1	0	0	383	2	0	1	427	0
4:30 PM	0	4	0	361	0	0	1	424	1
4:45 PM	1	1	0	406	2	0	1	464	1
5:00 PM	0	1	0	429	1	0	4	431	0
5:15 PM	1	2	0	408	0	0	2	461	1
5:30 PM	0	1	0	410	1	0	2	462	1
5:45 PM	1	2	0	369	2	0	3	424	1

Modified "PM Peak Hour No Build" Analysis

HCM Signalized Intersection Capacity Analysis

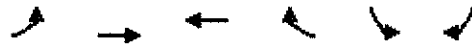
1: Clinton Road & Stewart Avenue

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1458	61	382	1113	96	18	424	308	84	540	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.0	6.0		5.0	6.0			6.0	5.0		6.0	
Lane Util. Factor	1.00	0.91		0.97	0.95			0.95	1.00		0.95	
Frt	1.00	0.99		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)	1694	5006		3173	3232			3265	1463		3190	
Flt Permitted	0.95	1.00		0.95	1.00			0.90	1.00		0.74	
Satd. Flow (perm)	1694	5006		3173	3232			2930	1463		2371	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	191	1551	65	406	1184	102	19	451	328	89	574	97
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	43	0	6	0
Lane Group Flow (vph)	191	1613	0	406	1282	0	0	470	285	0	754	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			4	1		4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	19.3	45.0		21.1	46.8			45.0	66.1		45.0	
Effective Green, g (s)	19.3	45.0		21.1	46.8			45.0	66.1		45.0	
Actuated g/C Ratio	0.15	0.35		0.16	0.37			0.35	0.52		0.35	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	5.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	255	1758		522	1180			1029	754		832	
v/s Ratio Prot	0.11	0.32		c0.13	c0.40				0.06			
v/s Ratio Perm								0.16	0.13		c0.32	
v/c Ratio	0.75	0.92		0.78	1.09			0.46	0.38		0.91	
Uniform Delay, d1	52.1	39.8		51.3	40.6			32.1	18.6		39.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	11.4	8.0		7.2	53.0			0.3	0.3		13.3	
Delay (s)	63.5	47.8		58.4	93.7			32.4	19.0		52.8	
Level of Service	E	D		E	F			C	B		D	
Approach Delay (s)		49.5			85.2			26.9			52.8	
Approach LOS		D			F			C			D	
Intersection Summary												
HCM 2000 Control Delay		58.4					HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		128.1					Sum of lost time (s)		21.0			
Intersection Capacity Utilization		96.6%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

Modified "PM Peak Hour No Build" Analysis

HCM Signalized Intersection Capacity Analysis

2: Stewart Avenue & Mall Access



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	424	1461	1132	142	110	558
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	0.91		0.97	0.91
Frt	1.00	1.00	0.98		0.89	0.85
Flt Protected	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1636	4700	4952		3149	1427
Flt Permitted	0.15	1.00	1.00		0.99	1.00
Satd. Flow (perm)	265	4700	4952		3149	1427
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	437	1506	1167	146	113	575
RTOR Reduction (vph)	0	0	11	0	245	160
Lane Group Flow (vph)	437	1506	1302	0	156	127
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	46.0	46.0	20.0		10.3	30.3
Effective Green, g (s)	46.0	46.0	20.0		10.3	30.3
Actuated g/C Ratio	0.67	0.67	0.29		0.15	0.44
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)	579	3165	1450		474	758
v/s Ratio Prot	c0.22	0.32	c0.26		c0.05	0.05
v/s Ratio Perm	0.29					0.04
v/c Ratio	0.75	0.48	0.90		0.33	0.17
Uniform Delay, d1	13.8	5.4	23.2		25.9	11.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.6	0.1	7.7		0.4	0.1
Delay (s)	19.3	5.5	30.9		26.3	11.5
Level of Service	B	A	C		C	B
Approach Delay (s)		8.6	30.9		20.2	
Approach LOS		A	C		C	
Intersection Summary						
HCM 2000 Control Delay		18.0		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.83				
Actuated Cycle Length (s)		68.3		Sum of lost time (s)	24.0	
Intersection Capacity Utilization		72.5%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

Study Name 3-STEWART AV AT ROOSEVELT FIELD MALL**Start Date 09-12-2017****Start Time 7:00 AM**

	ROOSEVELT MALL ACCESS Southbound			STEWART AV Westbound			STEWART AV Eastbound		
Start Time	Left	Right	U-Turn	Thru	Right	U-Turn	Left	Thru	U-Turn
7:00 AM	2	51	3	335	5	0	27	136	0
7:15 AM	9	49	3	303	7	0	30	124	0
7:30 AM	5	38	1	350	6	0	49	166	0
7:45 AM	5	46	0	343	6	0	63	222	0
8:00 AM	7	60	2	249	9	0	79	274	0
8:15 AM	10	76	4	265	12	0	81	310	0
8:30 AM	3	83	0	312	17	0	82	260	0
8:45 AM	20	64	1	299	18	0	102	296	0
9:00 AM	13	69	1	270	12	0	101	256	0
9:15 AM	11	62	1	225	16	0	72	259	0
9:30 AM	10	57	3	216	19	0	85	269	0
9:45 AM	12	56	3	259	28	0	78	259	0
4:00 PM	20	146	4	290	28	0	88	359	0
4:15 PM	32	130	1	243	26	0	97	350	0
4:30 PM	30	121	2	239	36	0	87	344	0
4:45 PM	27	122	0	276	29	1	100	359	0
5:00 PM	28	156	1	274	43	0	90	374	1
5:15 PM	22	115	2	296	33	1	104	372	0
5:30 PM	26	144	2	272	35	0	107	338	0
5:45 PM	22	130	2	244	29	0	102	349	0

Modified "PM Peak Hour No Build" Analysis

HCM Unsignalized Intersection Capacity Analysis

3: Stewart Avenue & Raymond Court



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	
Volume (veh/h)	13	1857	1687	5	3	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	1857	1687	5	3	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			506			
pX, platoon unblocked	0.77				0.77	0.77
vC, conflicting volume	1692				2334	565
vC1, stage 1 conf vol					1690	
vC2, stage 2 conf vol					645	
vCu, unblocked vol	863				1695	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	99
cM capacity (veh/h)	608				250	842

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	SB 1
Volume Total	13	619	619	619	675	675	342	9
Volume Left	13	0	0	0	0	0	0	3
Volume Right	0	0	0	0	0	0	5	6
cSH	608	1700	1700	1700	1700	1700	1700	470
Volume to Capacity	0.02	0.36	0.36	0.36	0.40	0.40	0.20	0.02
Queue Length 95th (ft)	2	0	0	0	0	0	0	1
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	0.0	0.0	12.8
Lane LOS	B							B
Approach Delay (s)	0.1				0.0			12.8
Approach LOS								B

Intersection Summary								
Average Delay		0.1						
Intersection Capacity Utilization		45.9%		ICU Level of Service		A		
Analysis Period (min)		15						

Modified "PM Peak Hour No Build" Analysis - HCM 2010 Report

HCM 2010 TWSC

3: Stewart Avenue & Raymond Court

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	13	1857	1687	5	3	6
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	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	3	3	0	0	0
Mvmt Flow	13	1857	1687	5	3	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1692	0	2459
Stage 1	-	-	1690
Stage 2	-	-	769
Critical Hdwy	5.3	-	5.7
Critical Hdwy Stg 1	-	-	6.6
Critical Hdwy Stg 2	-	-	6
Follow-up Hdwy	3.1	-	3.8
Pot Cap-1 Maneuver	183	-	54
Stage 1	-	-	92
Stage 2	-	-	384
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	183	-	50
Mov Cap-2 Maneuver	-	-	79
Stage 1	-	-	92
Stage 2	-	-	357

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	30.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	183	-	-	-	149
HCM Lane V/C Ratio	0.071	-	-	-	0.06
HCM Control Delay (s)	26.2	-	-	-	30.7
HCM Lane LOS	D	-	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

"PM Peak Hour Build" with Larger South-Side Development

Queues

1: Clinton Road & Stewart Avenue



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	191	1632	427	1324	470	338	766
v/c Ratio	0.75	0.93	0.79	1.11	0.46	0.39	0.93
Control Delay	71.1	51.1	63.2	98.9	34.4	12.4	58.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.1	51.1	63.2	98.9	34.4	12.4	58.0
Queue Length 50th (ft)	153	479	178	~676	160	106	319
Queue Length 95th (ft)	235	#578	#241	#835	212	173	#448
Internal Link Dist (ft)		1607		1523	965		1102
Turn Bay Length (ft)	210		280			15	
Base Capacity (vph)	288	1750	542	1196	1016	868	827
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.93	0.79	1.11	0.46	0.39	0.93

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.

"PM Peak Hour Build" with Larger South-Side Development

Queues

2: Stewart Avenue & Mall Access



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	447	1632	1393	396	283
v/c Ratio	0.77	0.52	0.95	0.56	0.32
Control Delay	23.5	6.3	39.7	11.6	2.2
Queue Delay	4.2	1.6	0.0	0.0	0.0
Total Delay	27.7	8.0	39.7	11.6	2.2
Queue Length 50th (ft)	114	102	204	21	0
Queue Length 95th (ft)	#264	141	#309	58	34
Internal Link Dist (ft)		177	811	482	
Turn Bay Length (ft)	165				200
Base Capacity (vph)	580	3167	1462	1543	890
Starvation Cap Reductn	75	1286	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.89	0.87	0.95	0.26	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

"PM Peak Hour Build" with Larger South-Side Development

Timings

1: Clinton Road & Stewart Avenue

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø3
Lane Configurations										
Volume (vph)	180	1473	401	1141	18	424	318	89	540	
Turn Type	Prot	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2	1	6		4	1		4	3
Permitted Phases					4		4	4		
Detector Phase	5	2	1	6	4	4	1	4	4	
Switch Phase										
Minimum Initial (s)	5.0	16.0	10.0	16.0	16.0	16.0	10.0	16.0	16.0	3.0
Minimum Split (s)	10.0	22.0	15.0	22.0	23.0	23.0	15.0	23.0	23.0	9.0
Total Split (s)	27.0	51.0	27.0	51.0	51.0	51.0	27.0	51.0	51.0	30.0
Total Split (%)	17.0%	32.1%	17.0%	32.1%	32.1%	32.1%	17.0%	32.1%	32.1%	19%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	5.0		6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	19.3	45.0	21.8	47.5		45.0	72.8		45.0	
Actuated g/C Ratio	0.15	0.35	0.17	0.37		0.35	0.57		0.35	
v/c Ratio	0.75	0.93	0.79	1.11		0.46	0.39		0.93	
Control Delay	71.1	51.1	63.2	98.9		34.4	12.4		58.0	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	71.1	51.1	63.2	98.9		34.4	12.4		58.0	
LOS	E	D	E	F		C	B		E	
Approach Delay		53.2		90.2		25.2			58.0	
Approach LOS		D		F		C			E	

Intersection Summary

Cycle Length: 159

Actuated Cycle Length: 128.8

Natural Cycle: 130

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 62.1

Intersection LOS: E

Intersection Capacity Utilization 97.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Clinton Road & Stewart Avenue

			
27 s	51 s	30 s	51 s
			
27 s	51 s		

"PM Peak Hour Build" with Larger South-Side Development

Timings

4: Stewart Avenue & Site Access

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	20	1885	106	1689	9	0	22	25	0
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	Perm	NA
Protected Phases		4	3	8		2			6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	3	8	2	2	2	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	9.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	88.0	88.0	9.0	97.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	73.3%	73.3%	7.5%	80.8%	19.2%	19.2%	19.2%	19.2%	19.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	Max	Max	None	Max	None	None	None	None	None
Act Effct Green (s)	87.8	87.8	96.8	98.8		6.3	6.3		6.3
Actuated g/C Ratio	0.81	0.81	0.89	0.91		0.06	0.06		0.06
v/c Ratio	0.12	0.40	0.62	0.40		0.08	0.15		0.26
Control Delay	5.2	3.7	22.2	1.7		49.7	2.0		8.9
Queue Delay	0.0	0.0	0.0	0.7		0.0	0.0		0.0
Total Delay	5.2	3.7	22.2	2.4		49.7	2.0		8.9
LOS	A	A	C	A		D	A		A
Approach Delay		3.7		3.5		15.4			8.9
Approach LOS		A		A		B			A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 108.9

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 3.8

Intersection LOS: A

Intersection Capacity Utilization 58.2%

ICU Level of Service B

Analysis Period (min) 15

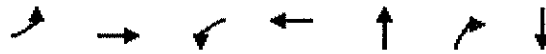
Splits and Phases: 4: Stewart Avenue & Site Access

		
23 s	9 s	88 s
		
23 s	97 s	

"PM Peak Hour Build" with Larger South-Side Development

Queues

4: Stewart Avenue & Site Access



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	21	2031	112	1826	9	23	38
v/c Ratio	0.12	0.40	0.62	0.40	0.08	0.15	0.26
Control Delay	5.2	3.7	22.2	1.7	49.7	2.0	8.9
Queue Delay	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Total Delay	5.2	3.7	22.2	2.4	49.7	2.0	8.9
Queue Length 50th (ft)	3	115	8	73	6	0	0
Queue Length 95th (ft)	11	142	#71	100	22	0	15
Internal Link Dist (ft)		189		177	112		439
Turn Bay Length (ft)							
Base Capacity (vph)	174	5102	181	4553	310	320	300
Starvation Cap Reductn	0	0	0	2187	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.40	0.62	0.77	0.03	0.07	0.13

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

The PM peak hour has higher entering volume than the AM peak hour, so this is the more conservative scenario for eastbound left turn storage review.

"PM Peak Hour Build" with Larger South-Side Development

Timings

2: Stewart Avenue & Mall Access



Lane Group	EBL	EBT	WBT	SBL	SBR	ø3
Lane Configurations						
Volume (vph)	434	1583	1195	110	549	
Turn Type	pm+pt	NA	NA	Prot	pm+ov	
Protected Phases	5	2	6	4	5	3
Permitted Phases	2				4	
Detector Phase	5	2	6	4	5	
Switch Phase						
Minimum Initial (s)	3.0	20.0	20.0	10.0	3.0	10.0
Minimum Split (s)	26.0	26.0	26.0	20.0	26.0	28.0
Total Split (s)	26.0	52.0	26.0	36.0	26.0	32.0
Total Split (%)	21.7%	43.3%	21.7%	30.0%	21.7%	27%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lead		Lag	Lead	Lead	Lag
Lead-Lag Optimize?						
Recall Mode	None	Min	None	None	None	None
Act Effct Green (s)	46.0	46.0	20.0	10.3	36.3	
Actuated g/C Ratio	0.67	0.67	0.29	0.15	0.53	
v/c Ratio	0.77	0.52	0.95	0.56	0.32	
Control Delay	23.5	6.3	39.7	11.6	2.2	
Queue Delay	4.2	1.6	0.0	0.0	0.0	
Total Delay	27.7	8.0	39.7	11.6	2.2	
LOS	C	A	D	B	A	
Approach Delay		12.2	39.7	7.7		
Approach LOS		B	D	A		

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 68.3

Natural Cycle: 120

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 20.7

Intersection LOS: C

Intersection Capacity Utilization 74.5%

ICU Level of Service D

Analysis Period (min) 15

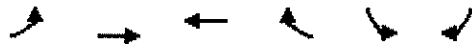
Splits and Phases: 2: Stewart Avenue & Mall Access

ø2	ø4	ø3
52 s	36 s	32 s
ø5	ø6	
26 s	26 s	

"PM Peak Hour Build" with Larger South-Side Development

HCM Signalized Intersection Capacity Analysis

2: Stewart Avenue & Mail Access



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	434	1583	1195	156	110	549
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	0.91		0.97	0.91
Frt	1.00	1.00	0.98		0.89	0.85
Flt Protected	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1636	4700	4949		3150	1427
Flt Permitted	0.15	1.00	1.00		0.99	1.00
Satd. Flow (perm)	265	4700	4949		3150	1427
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	447	1632	1232	161	113	566
RTOR Reduction (vph)	0	0	12	0	240	157
Lane Group Flow (vph)	447	1632	1381	0	156	126
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	46.0	46.0	20.0		10.3	30.3
Effective Green, g (s)	46.0	46.0	20.0		10.3	30.3
Actuated g/C Ratio	0.67	0.67	0.29		0.15	0.44
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)	579	3165	1449		475	758
v/s Ratio Prot	c0.23	0.35	c0.28		c0.05	0.05
v/s Ratio Perm	0.29					0.04
v/c Ratio	0.77	0.52	0.95		0.33	0.17
Uniform Delay, d1	14.2	5.6	23.7		25.9	11.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.3	0.1	14.0		0.4	0.1
Delay (s)	20.6	5.7	37.7		26.3	11.5
Level of Service	C	A	D		C	B
Approach Delay (s)		8.9	37.7		20.1	
Approach LOS		A	D		C	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

"PM Peak Hour Build" with Larger South-Side Development

HCM Unsignalized Intersection Capacity Analysis

3: Stewart Avenue & Raymond Court



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	
Volume (veh/h)	13	1913	1716	5	3	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	1913	1716	5	3	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			506			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	1721				2382	574
vC1, stage 1 conf vol					1718	
vC2, stage 2 conf vol					664	
vCu, unblocked vol	1525				2233	297
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				98	99
cM capacity (veh/h)	414				147	658

Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	SB 1
Volume Total	13	638	638	638	686	686	348	9
Volume Left	13	0	0	0	0	0	0	3
Volume Right	0	0	0	0	0	0	5	6
cSH	414	1700	1700	1700	1700	1700	1700	305
Volume to Capacity	0.03	0.38	0.38	0.38	0.40	0.40	0.20	0.03
Queue Length 95th (ft)	2	0	0	0	0	0	0	2
Control Delay (s)	14.0	0.0	0.0	0.0	0.0	0.0	0.0	17.2
Lane LOS	B							C
Approach Delay (s)	0.1				0.0			17.2
Approach LOS								C

Intersection Summary								
Average Delay		0.1						
Intersection Capacity Utilization		47.0%		ICU Level of Service		A		
Analysis Period (min)		15						

"PM Peak Hour Build" with Larger South-Side Development

HCM Signalized Intersection Capacity Analysis

1: Clinton Road & Stewart Avenue

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1473	61	401	1141	106	18	424	318	89	540	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.0	6.0		5.0	6.0			6.0	5.0		6.0	
Lane Util. Factor	1.00	0.91		0.97	0.95			0.95	1.00		0.95	
Frt	1.00	0.99		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)	1694	5006		3173	3230			3265	1463		3189	
Flt Permitted	0.95	1.00		0.95	1.00			0.89	1.00		0.73	
Satd. Flow (perm)	1694	5006		3173	3230			2912	1463		2351	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.96	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	191	1567	65	427	1214	110	19	451	338	95	574	97
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	44	0	7	0
Lane Group Flow (vph)	191	1629	0	427	1320	0	0	470	294	0	759	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			4	1		4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	19.3	45.0		21.8	47.5			45.0	66.8		45.0	
Effective Green, g (s)	19.3	45.0		21.8	47.5			45.0	66.8		45.0	
Actuated g/C Ratio	0.15	0.35		0.17	0.37			0.35	0.52		0.35	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	5.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	253	1748		537	1191			1017	758		821	
v/s Ratio Prot	0.11	0.33		c0.13	c0.41				0.07			
v/s Ratio Perm								0.16	0.14		c0.32	
v/c Ratio	0.75	0.93		0.80	1.11			0.46	0.39		0.93	
Uniform Delay, d1	52.5	40.4		51.4	40.7			32.5	18.7		40.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	12.1	9.6		8.0	61.1			0.3	0.3		16.0	
Delay (s)	64.5	50.0		59.3	101.8			32.8	19.0		56.3	
Level of Service	E	D		E	F			C	B		E	
Approach Delay (s)		51.5			91.4			27.1			56.3	
Approach LOS		D			F			C			E	
Intersection Summary												
HCM 2000 Control Delay	62.0			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio	1.04											
Actuated Cycle Length (s)	128.8			Sum of lost time (s)			21.0					
Intersection Capacity Utilization	97.8%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

"PM Peak Hour Build" with Larger South-Side Development

HCM Signalized Intersection Capacity Analysis

4: Stewart Avenue & Site Access

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Volume (vph)	20	1885	45	106	1689	46	9	0	22	25	0	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lane Util. Factor	1.00	0.86		1.00	0.91			1.00	1.00		1.00	
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1805	6328		1805	5020			1805	1615		1759	
Flt Permitted	0.11	1.00		0.07	1.00			0.99	1.00		0.82	
Satd. Flow (perm)	217	6328		134	5020			1880	1615		1494	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1984	47	112	1778	48	9	0	23	26	0	12
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	22	0	37	0
Lane Group Flow (vph)	21	2029	0	112	1825	0	0	9	1	0	1	0
Heavy Vehicles (%)	0%	3%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	87.7	87.7		96.7	96.7			4.1	4.1		4.1	
Effective Green, g (s)	87.7	87.7		96.7	96.7			4.1	4.1		4.1	
Actuated g/C Ratio	0.79	0.79		0.87	0.87			0.04	0.04		0.04	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	171	5008		177	4381			69	59		55	
v/s Ratio Prot		0.32		0.02	c0.36							
v/s Ratio Perm	0.10			c0.53				c0.00	0.00		0.00	
v/c Ratio	0.12	0.41		0.63	0.42			0.13	0.01		0.03	
Uniform Delay, d1	2.7	3.5		3.1	1.4			51.6	51.4		51.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	1.5	0.2		7.2	0.3			0.9	0.1		0.2	
Delay (s)	4.1	3.8		10.3	1.7			52.5	51.5		51.6	
Level of Service	A	A		B	A			D	D		D	
Approach Delay (s)		3.8			2.2			51.8			51.6	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay	3.9			HCM 2000 Level of Service			A					
HCM 2000 Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	110.8			Sum of lost time (s)			15.0					
Intersection Capacity Utilization	58.2%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

"PM Peak Hour Build" with Larger South-Side Development

HCM 2010 TWSC

3: Stewart Avenue & Raymond Court

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	13	1913	1716	5	3	6
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	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	3	3	0	0	0
Mvmt Flow	13	1913	1716	5	3	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1721	0	2510
Stage 1	-	-	1719
Stage 2	-	-	791
Critical Hdwy	5.3	-	5.7
Critical Hdwy Stg 1	-	-	6.6
Critical Hdwy Stg 2	-	-	6
Follow-up Hdwy	3.1	-	3.8
Pot Cap-1 Maneuver	177	-	51
Stage 1	-	-	88
Stage 2	-	-	374
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	177	-	47
Mov Cap-2 Maneuver	-	-	76
Stage 1	-	-	88
Stage 2	-	-	347

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	31.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	177	-	-	-	144
HCM Lane V/C Ratio	0.073	-	-	-	0.063
HCM Control Delay (s)	26.9	-	-	-	31.7
HCM Lane LOS	D	-	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

"PM Peak Hour Build" with Larger South-Side Development

HCM 2010 Signalized Intersection Summary

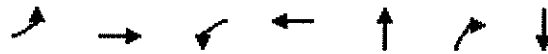
4: Stewart Avenue & Site Access

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	1885	45	106	1689	46	9	0	22	25	0	11
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1846	1900	1900	1846	1900	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	21	1984	47	112	1778	48	9	0	23	26	0	12
Adj No. of Lanes	1	4	0	1	3	0	0	1	1	0	1	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	3	3	0	3	3	0	0	0	0	0	0
Cap, veh/h	270	5018	119	278	4358	118	139	0	69	95	2	18
Arrive On Green	0.78	0.78	0.78	0.04	0.86	0.86	0.04	0.00	0.04	0.04	0.00	0.04
Sat Flow, veh/h	259	6429	152	1810	5046	136	1680	0	1615	892	49	434
Grp Volume(v), veh/h	21	1470	561	112	1184	642	9	0	23	38	0	0
Grp Sat Flow(s),veh/h/ln	259	1587	1819	1810	1680	1822	1680	0	1615	1376	0	0
Q Serve(g_s), s	2.1	10.4	10.4	1.2	7.9	7.9	0.0	0.0	1.5	2.5	0.0	0.0
Cycle Q Clear(g_c), s	2.1	10.4	10.4	1.2	7.9	7.9	0.5	0.0	1.5	3.0	0.0	0.0
Prop In Lane	1.00		0.08	1.00		0.07	1.00		1.00	0.68		0.32
Lane Grp Cap(c), veh/h	270	3717	1420	278	2902	1574	139	0	69	115	0	0
V/C Ratio(X)	0.08	0.40	0.40	0.40	0.41	0.41	0.06	0.00	0.34	0.33	0.00	0.00
Avail Cap(c_a), veh/h	270	3717	1420	280	2902	1574	319	0	273	301	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	2.8	3.7	3.7	3.1	1.5	1.5	49.1	0.0	49.5	50.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.3	0.8	0.9	0.4	0.8	0.2	0.0	2.8	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	4.6	5.5	0.9	3.6	4.3	0.3	0.0	0.7	1.2	0.0	0.0
LnGrp Delay(d),s/veh	3.4	4.0	4.5	4.0	2.0	2.3	49.3	0.0	52.4	52.0	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D		D	D		
Approach Vol, veh/h	2052			1938			32			38		
Approach Delay, s/veh	4.2			2.2			51.5			52.0		
Approach LOS	A			A			D			D		
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2	3	4		6		8				
Phs Duration (G+Y+Rc), s		9.5	8.9	88.1		9.5		97.0				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0		5.0				
Max Green Setting (Gmax), s		18.0	4.0	83.0		18.0		92.0				
Max Q Clear Time (g_c+11), s		3.5	3.2	12.4		5.0		9.9				
Green Ext Time (p_c), s		0.2	0.0	62.2		0.2		71.0				
Intersection Summary												
HCM 2010 Ctrl Delay				4.0								
HCM 2010 LOS				A								

"PM Peak Hour Build" - Develop Apartments Only

Queues

1: Clinton Road & Stewart Avenue



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	191	1627	411	1292	470	335	765
v/c Ratio	0.75	0.93	0.78	1.09	0.46	0.39	0.92
Control Delay	70.7	50.2	62.4	91.9	34.2	12.4	56.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.7	50.2	62.4	91.9	34.2	12.4	56.8
Queue Length 50th (ft)	153	477	170	~646	160	105	318
Queue Length 95th (ft)	235	#575	228	#805	211	171	#446
Internal Link Dist (ft)		1607		1523	965		1102
Turn Bay Length (ft)	210		280			15	
Base Capacity (vph)	290	1757	544	1188	1022	871	832
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.93	0.76	1.09	0.46	0.38	0.92

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.

"PM Peak Hour Build" - Develop Apartments Only

Timings

2: Stewart Avenue & Mall Access



Lane Group	EBL	EBT	WBT	SBL	SBR	ø3
Lane Configurations						
Volume (vph)	426	1484	1175	110	548	
Turn Type	pm+pt	NA	NA	Prot	pm+ov	
Protected Phases	5	2	6	4	5	3
Permitted Phases	2				4	
Detector Phase	5	2	6	4	5	
Switch Phase						
Minimum Initial (s)	3.0	20.0	20.0	10.0	3.0	10.0
Minimum Split (s)	26.0	26.0	26.0	20.0	26.0	28.0
Total Split (s)	26.0	52.0	26.0	36.0	26.0	32.0
Total Split (%)	21.7%	43.3%	21.7%	30.0%	21.7%	27%
Yellow Time (s)	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
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lead		Lag	Lead	Lead	Lag
Lead-Lag Optimize?						
Recall Mode	None	Min	None	None	None	None
Act Effct Green (s)	46.0	46.0	20.0	10.3	36.3	
Actuated g/C Ratio	0.67	0.67	0.29	0.15	0.53	
v/c Ratio	0.76	0.48	0.94	0.56	0.32	
Control Delay	22.5	6.0	37.7	11.6	2.2	
Queue Delay	3.6	1.3	0.0	0.0	0.0	
Total Delay	26.1	7.3	37.7	11.6	2.2	
LOS	C	A	D	B	A	
Approach Delay		11.5	37.7	7.7		
Approach LOS		B	D	A		

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 68.3

Natural Cycle: 110

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 19.8

Intersection LOS: B

Intersection Capacity Utilization 73.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Stewart Avenue & Mall Access

	ø2		ø4		ø3
52 s		36 s		32 s	
	ø5		ø6		
26 s		26 s			

Build PM - north side only

"PM Peak Hour Build" - Develop Apartments Only

Timings

1: Clinton Road & Stewart Avenue

										
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	ø3
Lane Configurations										
Volume (vph)	180	1468	386	1119	18	424	315	88	540	
Turn Type	Prot	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2	1	6		4	1		4	3
Permitted Phases					4		4	4		
Detector Phase	5	2	1	6	4	4	1	4	4	
Switch Phase										
Minimum Initial (s)	5.0	16.0	10.0	16.0	16.0	16.0	10.0	16.0	16.0	3.0
Minimum Split (s)	10.0	22.0	15.0	22.0	23.0	23.0	15.0	23.0	23.0	9.0
Total Split (s)	27.0	51.0	27.0	51.0	51.0	51.0	27.0	51.0	51.0	30.0
Total Split (%)	17.0%	32.1%	17.0%	32.1%	32.1%	32.1%	17.0%	32.1%	32.1%	19%
Yellow Time (s)	3.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.0	2.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Lost Time (s)	5.0	6.0	5.0	6.0		6.0	5.0		6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lag	Lead
Lead-Lag Optimize?										
Recall Mode	None	Min	None	Min	None	None	None	None	None	None
Act Effct Green (s)	19.3	45.0	21.4	47.1		45.0	72.4		45.0	
Actuated g/C Ratio	0.15	0.35	0.17	0.37		0.35	0.56		0.35	
v/c Ratio	0.75	0.93	0.78	1.09		0.46	0.39		0.92	
Control Delay	70.7	50.2	62.4	91.9		34.2	12.4		56.8	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Total Delay	70.7	50.2	62.4	91.9		34.2	12.4		56.8	
LOS	E	D	E	F		C	B		E	
Approach Delay		52.3		84.8		25.1			56.8	
Approach LOS		D		F		C			E	

Intersection Summary

Cycle Length: 159

Actuated Cycle Length: 128.4

Natural Cycle: 120

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 59.6

Intersection LOS: E

Intersection Capacity Utilization 96.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Clinton Road & Stewart Avenue

			
27 s	51 s	30 s	51 s
			
27 s	51 s		

Build PM - north side only

"PM Peak Hour Build" - Develop Apartments Only

Queues

2: Stewart Avenue & Mall Access



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	439	1530	1372	396	282
v/c Ratio	0.76	0.48	0.94	0.56	0.32
Control Delay	22.5	6.0	37.7	11.6	2.2
Queue Delay	3.6	1.3	0.0	0.0	0.0
Total Delay	26.1	7.3	37.7	11.6	2.2
Queue Length 50th (ft)	110	92	200	21	0
Queue Length 95th (ft)	#255	128	#302	58	34
Internal Link Dist (ft)		177	811	482	
Turn Bay Length (ft)	165				200
Base Capacity (vph)	580	3167	1461	1543	890
Starvation Cap Reductn	75	1333	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.87	0.83	0.94	0.26	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

"PM Peak Hour Build" - Develop Apartments Only

Timings

4: Stewart Avenue & Site Access



Lane Group	EBL	EBT	WBT	SBL
Lane Configurations				
Volume (vph)	20	1885	1689	25
Turn Type	Perm	NA	NA	Prot
Protected Phases		4	8	6
Permitted Phases	4			
Detector Phase	4	4	8	6
Switch Phase				
Minimum Initial (s)	4.0	4.0	4.0	4.0
Minimum Split (s)	23.0	23.0	23.0	23.0
Total Split (s)	97.0	97.0	97.0	23.0
Total Split (%)	80.8%	80.8%	80.8%	19.2%
Yellow Time (s)	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Max	Max	Max	None
Act Effct Green (s)	106.0	106.0	106.0	7.4
Actuated g/C Ratio	0.91	0.91	0.91	0.06
v/c Ratio	0.11	0.34	0.40	0.31
Control Delay	3.0	1.6	1.8	46.4
Queue Delay	0.0	0.0	0.8	0.0
Total Delay	3.0	1.6	2.6	46.4
LOS	A	A	A	D
Approach Delay		1.6	2.6	46.4
Approach LOS		A	A	D

Intersection Summary

Cycle Length: 120	
Actuated Cycle Length: 116.8	
Natural Cycle: 50	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 2.5	Intersection LOS: A
Intersection Capacity Utilization 45.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Stewart Avenue & Site Access

		ø4	
		97 s	
		ø8	
		97 s	
ø6		23 s	

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"PM Peak Hour Build" - Develop Apartments Only

Queues

4: Stewart Avenue & Site Access



Lane Group	EBL	EBT	WBT	SBL
Lane Group Flow (vph)	21	1984	1826	38
v/c Ratio	0.11	0.34	0.40	0.31
Control Delay	3.0	1.6	1.8	46.4
Queue Delay	0.0	0.0	0.8	0.0
Total Delay	3.0	1.6	2.6	46.4
Queue Length 50th (ft)	2	65	80	20
Queue Length 95th (ft)	8	92	117	55
Internal Link Dist (ft)		189	177	439
Turn Bay Length (ft)				
Base Capacity (vph)	189	5757	4554	281
Starvation Cap Reductn	0	0	2238	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.11	0.34	0.79	0.14

Intersection Summary

The PM peak hour has higher entering volume than the AM peak hour, so this is the more conservative scenario for eastbound left turn storage review.

"PM Peak Hour Build" - Develop Apartments Only

HCM Signalized Intersection Capacity Analysis 1: Clinton Road & Stewart Avenue

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1468	61	386	1119	98	18	424	315	88	540	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.0	6.0		5.0	6.0			6.0	5.0		6.0	
Lane Util. Factor	1.00	0.91		0.97	0.95			0.95	1.00		0.95	
Frt	1.00	0.99		1.00	0.99			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		0.99	
Satd. Flow (prot)	1694	5006		3173	3232			3265	1463		3189	
Flt Permitted	0.95	1.00		0.95	1.00			0.89	1.00		0.73	
Satd. Flow (perm)	1694	5006		3173	3232			2919	1463		2356	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.96	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	191	1562	65	411	1190	102	19	451	335	94	574	97
RTOR Reduction (vph)	0	3	0	0	4	0	0	0	44	0	6	0
Lane Group Flow (vph)	191	1624	0	411	1288	0	0	470	291	0	759	0
Turn Type	Prot	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			4	1		4	
Permitted Phases							4		4	4		
Actuated Green, G (s)	19.3	45.1		21.3	47.1			45.0	66.3		45.0	
Effective Green, g (s)	19.3	45.1		21.3	47.1			45.0	66.3		45.0	
Actuated g/C Ratio	0.15	0.35		0.17	0.37			0.35	0.52		0.35	
Clearance Time (s)	5.0	6.0		5.0	6.0			6.0	5.0		6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	254	1758		526	1185			1023	755		825	
v/s Ratio Prot	0.11	0.32		c0.13	c0.40				0.06			
v/s Ratio Perm								0.16	0.13		c0.32	
v/c Ratio	0.75	0.92		0.78	1.09			0.46	0.39		0.92	
Uniform Delay, d1	52.3	40.0		51.3	40.6			32.3	18.7		40.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	11.8	8.7		7.4	53.2			0.3	0.3		15.1	
Delay (s)	64.1	48.7		58.7	93.8			32.6	19.1		55.0	
Level of Service	E	D		E	F			C	B		E	
Approach Delay (s)		50.3			85.3			27.0			55.0	
Approach LOS		D			F			C			E	
Intersection Summary												
HCM 2000 Control Delay		59.0					HCM 2000 Level of Service		E			
HCM 2000 Volume to Capacity ratio		1.02										
Actuated Cycle Length (s)		128.4					Sum of lost time (s)		21.0			
Intersection Capacity Utilization		96.9%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

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"PM Peak Hour Build" - Develop Apartments Only

HCM Signalized Intersection Capacity Analysis

2: Stewart Avenue & Mall Access



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰↰	↰
Volume (vph)	426	1484	1175	156	110	548
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	12	12	12
Total Lost time (s)	6.0	6.0	6.0		6.0	6.0
Lane Util. Factor	1.00	0.91	0.91		0.97	0.91
Frt	1.00	1.00	0.98		0.89	0.85
Flt Protected	0.95	1.00	1.00		0.99	1.00
Satd. Flow (prot)	1636	4700	4947		3150	1427
Flt Permitted	0.15	1.00	1.00		0.99	1.00
Satd. Flow (perm)	265	4700	4947		3150	1427
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	439	1530	1211	161	113	565
RTOR Reduction (vph)	0	0	12	0	240	157
Lane Group Flow (vph)	439	1530	1360	0	156	125
Turn Type	pm+pt	NA	NA		Prot	pm+ov
Protected Phases	5	2	6		4	5
Permitted Phases	2					4
Actuated Green, G (s)	46.0	46.0	20.0		10.3	30.3
Effective Green, g (s)	46.0	46.0	20.0		10.3	30.3
Actuated g/C Ratio	0.67	0.67	0.29		0.15	0.44
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)	579	3165	1448		475	758
v/s Ratio Prot	c0.22	0.33	c0.27		c0.05	0.05
v/s Ratio Perm	0.29					0.04
v/c Ratio	0.76	0.48	0.94		0.33	0.17
Uniform Delay, d1	14.0	5.4	23.6		25.9	11.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.7	0.1	11.9		0.4	0.1
Delay (s)	19.6	5.5	35.4		26.3	11.5
Level of Service	B	A	D		C	B
Approach Delay (s)		8.7	35.4		20.2	
Approach LOS		A	D		C	

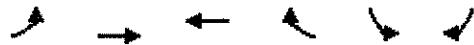
Intersection Summary

HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	68.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

"PM Peak Hour Build" - Develop Apartments Only

HCM Unsignalized Intersection Capacity Analysis 3: Stewart Avenue & Raymond Court



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑		↰	
Volume (veh/h)	13	1868	1707	5	3	6
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	1868	1707	5	3	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (ft)			506			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	1712				2358	572
vC1, stage 1 conf vol					1710	
vC2, stage 2 conf vol					649	
vCu, unblocked vol	1515				2207	294
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				98	99
cM capacity (veh/h)	417				149	662

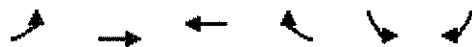
Direction, Lane #	EB 1	EB 2	EB 3	EB 4	WB 1	WB 2	WB 3	SB 1
Volume Total	13	623	623	623	683	683	346	9
Volume Left	13	0	0	0	0	0	0	3
Volume Right	0	0	0	0	0	0	5	6
cSH	417	1700	1700	1700	1700	1700	1700	309
Volume to Capacity	0.03	0.37	0.37	0.37	0.40	0.40	0.20	0.03
Queue Length 95th (ft)	2	0	0	0	0	0	0	2
Control Delay (s)	13.9	0.0	0.0	0.0	0.0	0.0	0.0	17.0
Lane LOS	B							C
Approach Delay (s)	0.1				0.0			17.0
Approach LOS								C

Intersection Summary								
Average Delay		0.1						
Intersection Capacity Utilization		46.1%		ICU Level of Service		A		
Analysis Period (min)		15						

"PM Peak Hour Build" - Develop Apartments Only

HCM Signalized Intersection Capacity Analysis

4: Stewart Avenue & Site Access



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	20	1885	1689	46	25	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0		5.0	
Lane Util. Factor	1.00	0.86	0.91		1.00	
Frt	1.00	1.00	1.00		0.96	
Flt Protected	0.95	1.00	1.00		0.97	
Satd. Flow (prot)	1805	6346	5020		1759	
Flt Permitted	0.11	1.00	1.00		0.97	
Satd. Flow (perm)	209	6346	5020		1759	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	1984	1778	48	26	12
RTOR Reduction (vph)	0	0	1	0	11	0
Lane Group Flow (vph)	21	1984	1825	0	27	0
Heavy Vehicles (%)	0%	3%	3%	0%	0%	0%
Turn Type	Perm	NA	NA		Prot	
Protected Phases		4	8		6	
Permitted Phases	4					
Actuated Green, G (s)	103.9	103.9	103.9		5.0	
Effective Green, g (s)	103.9	103.9	103.9		5.0	
Actuated g/C Ratio	0.87	0.87	0.87		0.04	
Clearance Time (s)	5.0	5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	182	5545	4386		73	
v/s Ratio Prot		0.31	c0.36		c0.02	
v/s Ratio Perm	0.10					
v/c Ratio	0.12	0.36	0.42		0.36	
Uniform Delay, d1	1.1	1.4	1.5		55.4	
Progression Factor	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.3	0.2	0.3		3.1	
Delay (s)	2.3	1.6	1.8		58.5	
Level of Service	A	A	A		E	
Approach Delay (s)		1.6	1.8		58.5	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	2.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	118.9	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

"PM Peak Hour Build" - Develop Apartments Only

HCM 2010 TWSC

3: Stewart Avenue & Raymond Court

Intersection

Int Delay, s/veh 0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	13	1868	1707	5	3	6
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	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	1	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	3	3	0	0	0
Mvmt Flow	13	1868	1707	5	3	6

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1712	0	2483
Stage 1	-	-	1710
Stage 2	-	-	773
Critical Hdwy	5.3	-	5.7
Critical Hdwy Stg 1	-	-	6.6
Critical Hdwy Stg 2	-	-	6
Follow-up Hdwy	3.1	-	3.8
Pot Cap-1 Maneuver	179	-	53
Stage 1	-	-	89
Stage 2	-	-	382
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	179	-	49
Mov Cap-2 Maneuver	-	-	77
Stage 1	-	-	89
Stage 2	-	-	354

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	31.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	179	-	-	-	145
HCM Lane V/C Ratio	0.073	-	-	-	0.062
HCM Control Delay (s)	26.7	-	-	-	31.5
HCM Lane LOS	D	-	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Build PM - north side only

"PM Peak Hour Build" - Develop Apartments Only

HCM 2010 Signalized Intersection Summary

4: Stewart Avenue & Site Access

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Volume (veh/h)	20	1885	1689	46	25	11		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1845	1846	1900	1900	1900		
Adj Flow Rate, veh/h	21	1984	1778	48	26	12		
Adj No. of Lanes	1	4	3	0	0	0		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Percent Heavy Veh, %	0	3	3	3	0	0		
Cap, veh/h	278	5561	4422	119	33	15		
Arrive On Green	0.88	0.88	0.88	0.88	0.03	0.03		
Sat Flow, veh/h	259	6604	5212	136	1165	538		
Grp Volume(v), veh/h	21	1984	1184	642	39	0		
Grp Sat Flow(s),veh/h/ln	259	1586	1680	1822	1747	0		
Q Serve(g_s), s	1.8	5.9	7.1	7.1	2.3	0.0		
Cycle Q Clear(g_c), s	8.8	5.9	7.1	7.1	2.3	0.0		
Prop In Lane	1.00			0.07	0.67	0.31		
Lane Grp Cap(c), veh/h	278	5561	2945	1597	49	0		
V/C Ratio(X)	0.08	0.36	0.40	0.40	0.79	0.00		
Avail Cap(c_a), veh/h	278	5561	2945	1597	300	0		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00		
Uniform Delay (d), s/veh	2.1	1.2	1.2	1.2	50.7	0.0		
Incr Delay (d2), s/veh	0.5	0.2	0.4	0.8	23.5	0.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.2	2.5	3.3	3.7	1.4	0.0		
LnGrp Delay(d),s/veh	2.6	1.3	1.6	2.0	74.2	0.0		
LnGrp LOS	A	A	A	A	E			
Approach Vol, veh/h	2005		1826		39			
Approach Delay, s/veh	1.4		1.8		74.2			
Approach LOS	A		A		E			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				97.0		8.0		97.0
Change Period (Y+Rc), s				5.0		5.0		5.0
Max Green Setting (Gmax), s				92.0		18.0		92.0
Max Q Clear Time (g_c+I1), s				10.8		4.3		9.1
Green Ext Time (p_c), s				71.2		0.0		72.5
Intersection Summary								
HCM 2010 Ctrl Delay	2.3							
HCM 2010 LOS	A							
Notes								
User approved volume balancing among the lanes for turning movement.								

Build PM - north side only

Level of Service for Signalized Intersection - Stewart Avenue and Clinton Road

AM Peak Hour	2017 Existing Volumes			2019 No Build Volumes			2019 Build Volumes Build North Side Only			2019 Build Volumes Alternate 1			2019 Build Volumes Alternate 2			
	Movement	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS
	Eastbound Left	61.2	0.73	E	61.7	0.73	E	61.6	0.73	E	61.7	0.73	E	61.7	0.73	E
	Through-Right	30.7	0.67	C	31.1	0.68	C	31.4	0.69	C	31.7	0.69	C	31.8	0.70	C
	Westbound Left	55.6	0.51	E	55.8	0.51	E	56.0	0.53	E	56.1	0.54	E	56.0	0.53	E
	Through-Right	69.6	1.01	E	79.1	1.04	E	83.9	1.06	F	88.9	1.07	F	84.8	1.06	F
	Northbound LT	33.9	0.60	C	34.2	0.61	C	34.2	0.61	C	34.2	0.61	C	34.2	0.61	C
	Right	22.2	0.30	C	22.2	0.31	C	22.1	0.31	C	22.0	0.31	C	22.4	0.33	C
	Southbound LTR	38.1	0.72	D	39.1	0.74	D	39.2	0.75	D	39.6	0.75	D	41.5	0.79	D
	INTERSECTION	44.6	0.88	D	47.7	0.90	D	49.2	0.91	D	50.9	0.87	D	49.7	0.88	D

PM Peak Hour

Eastbound Left	63.2	0.74	E	63.4	0.75	E	63.5	0.75	E	64.1	0.75	E	64.3	0.75	E
Through-Right	45.6	0.90	D	48.6	0.92	D	49.1	0.93	D	51.0	0.94	D	50.7	0.94	D
Westbound Left	58.2	0.77	E	58.3	0.78	E	58.6	0.78	E	58.6	0.78	E	59.2	0.79	E
Through-Right	84.8	1.06	F	95.8	1.09	F	96.9	1.10	F	98.8	1.10	F	104.2	1.11	F
Northbound LT	32.1	0.44	C	32.4	0.46	C	32.5	0.46	C	32.6	0.46	C	32.8	0.46	C
Right	18.8	0.37	B	18.9	0.37	B	19.0	0.38	B	19.1	0.39	B	19.0	0.38	B
Southbound LTR	48.9	0.88	D	51.5	0.90	D	53.7	0.91	D	55.9	0.92	E	55.2	0.92	E
INTERSECTION	54.7	0.96	D	59.0	1.01	E	59.8	1.01	E	61.2	1.02	E	62.7	1.03	E

PM Peak Hour - alternate distribution per H2M letter

No material
difference from
the traffic study
findings

Eastbound Left	63.5	0.75	E	64.1	0.75	E	Alternate 2 is the higher-volume condition so Alternate 1 was not re-analyzed	64.5	0.75	E
Through-Right	47.8	0.92	D	48.7	0.92	D		50.0	0.93	D
Westbound Left	58.4	0.78	E	58.7	0.78	E		59.3	0.80	E
Through-Right	93.7	1.09	F	93.8	1.09	F		101.8	1.11	F
Northbound LT	32.4	0.46	C	32.6	0.46	C		32.8	0.46	C
Right	19.0	0.38	B	19.1	0.39	B		19.0	0.39	B
Southbound LTR	52.8	0.91	D	55.0	0.92	E		56.3	0.93	E
INTERSECTION	58.4	1.01	E	59.0	1.02	E		62.0	1.04	E

Level of Service for Signalized Intersection - Stewart Avenue and Roosevelt Field Mall

AM Peak Hour	2017 Existing Volumes			2019 No Build		2019 Build Volumes Build North Side Only			2019 Build Volumes Alternate 1			2019 Build Volumes Alternate 2			
	Movement	Delay	v/c Ratio	LOS	Delay	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS
	Eastbound Left	13.0	0.62	B	13.4	B	13.7	0.63	B	18.4	0.73	B	14.0	0.64	B
	Through	4.8	0.36	A	4.8	A	4.9	0.38	A	5.6	0.50	A	4.9	0.39	A
	Westbound Thr-Right	30.1	0.89	C	32.7	C	33.7	0.93	C	42.4	0.98	D	47.9	1.00	D
	Southbound Left	25.6	0.17	C	25.6	C	25.6	0.18	C	26.3	0.33	C	25.6	0.18	C
	Right	11.1	0.08	B	11.1	B	11.1	0.09	B	11.5	0.17	B	11.1	0.09	B
	INTERSECTION	17.5	0.73	B	18.6	B	18.9	0.76	B	22.1	0.86	C	25.2	0.79	C

PM Peak Hour

	Eastbound Left	17.2	0.71	B	17.8	B	18.1	0.73	B	14.0	0.64	B	18.9	0.74	B
	Through	5.4	0.47	A	5.5	A	5.6	0.49	A	4.9	0.40	A	5.8	0.52	A
	Westbound Thr-Right	29.8	0.89	C	32.2	C	35.7	0.94	D	34.9	0.93	C	37.9	0.95	D
	Southbound Left	26.3	0.32	C	26.3	C	26.3	0.33	C	25.6	0.18	C	26.3	0.33	C
	Right	11.5	0.16	B	11.5	B	11.5	0.17	B	11.1	0.09	B	11.5	0.17	B
	INTERSECTION	17.4	0.83	B	18.3	B	19.6	0.84	B	19.3	0.73	B	20.2	0.85	C

PM Peak Hour - alternate distribution per H2M letter

No material difference from the traffic study findings	Eastbound Left	19.3	B	19.6	0.76	B	Alternate 2 is the higher-volume condition so Alternate 1 was not re-analyzed	20.6	0.77	C
	Through	5.5	A	5.5	0.48	A		5.7	0.52	A
	West Thr-Right	30.9	C	35.4	0.94	D		37.7	0.95	D
	Southbound Left	26.3	C	26.3	0.33	C		26.3	0.33	C
	Right	11.5	B	11.5	0.17	B		11.5	0.17	B
	INTERSECTION	18.0	B	19.7	0.85	B		20.4	0.86	C

Level of Service for Unsignalized Intersection - Stewart Avenue and Raymond Court

AM Peak Hour	2017 Existing Volumes			2019 No Build Volumes			2019 Build Volumes Build North Side Only			2019 Build Volumes Alternate 1			2019 Build Volumes Alternate 2			
	Movement	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS	Delay	v/c Ratio	LOS
	Eastbound Left	9.6	0.00	A	9.7	0.00	A	12.3	0.00	B	12.2	0.00	B	12.4	0.00	B
	Through-Right	0.0	0.30	A	0.0	0.30	A	0.0	0.31	A	0.0	0.31	A	0.0	0.31	A
	Westbound Left	0.0	0.35	A	0.0	0.36	A	0.0	0.36	A	0.0	0.36	A	0.0	0.37	A
	Through-Right	0.0	0.35	A	0.0	0.18	A	0.0	0.18	A	0.0	0.18	A	0.0	0.19	A
	Southbound LTR	10.9	0.07	B	12.7	0.04	B	17.7	0.07	C	17.5	0.07	C	17.9	0.07	C
	INTERSECTION	0.2	0.38	A	0.1	0.39	A	0.1	0.39	A	0.1	0.40	A	0.1	0.40	A

PM Peak Hour

Eastbound Left	11.0	0.02	B	11.0	0.02	B	13.9	0.03	B	13.8	0.03	B	14.0	0.03	B
Through-Right	0.0	0.36	A	0.0	0.37	A	0.0	0.37	A	0.0	0.37	A	0.0	0.38	A
Westbound Left	0.0	0.39	A	0.0	0.40	A	0.0	0.40	A	0.0	0.41	A	0.0	0.40	A
Through-Right	0.0	0.39	A	0.0	0.20	A	0.0	0.20	A	0.0	0.21	A	0.0	0.21	A
Southbound LTR	12.2	0.01	B	12.8	0.02	B	17.0	0.03	C	16.4	0.03	C	17.2	0.03	C
INTERSECTION	0.1	0.45	A	0.1	0.46	A	0.1	0.46	A	0.1	0.47	A	0.1	0.47	A

PM Peak Hour - alternate distribution per H2M letter

2000 HCM Analysis:	Eastbound Left	11.0	0.02	B	13.9	0.03	B	Alternate 2 is the higher-volume condition so Alternate 1 was not re-analyzed	14.0	0.03	B
	Through-Right	0.0	0.36	A	0.0	0.37	A		0.0	0.38	A
	Westbound Left	0.0	0.40	A	0.0	0.40	A		0.0	0.40	A
	Through-Right	0.0	0.20	A	0.0	0.20	A		0.0	0.20	A
	Southbound LTR	12.8	0.02	B	17.0	0.03	C		17.2	0.03	C
	INTERSECTION	0.1		A	0.1		A		0.1		A
2010 HCM Analysis:	Eastbound Left	26.2	0.07	D	26.7	0.07	D		26.9	0.07	D
	Through-Right	0.0		A	0.0		A		0.0		A
	Westbound Left	0.0		A	0.0		A		0.0		A
	Through-Right	0.0		A	0.0		A		0.0		A
	Southbound LTR	30.7	0.06	D	31.5	0.06	D		31.7	0.06	D
	INTERSECTION	0.2		A	0.2		A		0.2		A

No material difference from the traffic study findings

Level of Service for Site Driveway - Stewart Avenue and Site Driveway

AM Peak Hour 2019 - Only Build North Side

Movement	Delay	v/c Ratio	LOS
Eastbound Left	1.5	0.02	A
Through-Right	1.9	0.31	A
Westbound Left			
Through-Right	2.2	0.37	A
Northbound LT (R)			
Right			
Southbound LTR	56.7	0.46	E
INTERSECTION	3.2	0.37	A

2019 Alternate 1

Delay	v/c Ratio	LOS
1.8	0.02	A
2.3	0.31	A
11.3	0.30	B
8.6	0.38	A
51.4	0.03	D
64.5	0.44	E
7.0	0.38	A

2019 Alternate 2

Delay	v/c Ratio	LOS
3.1	0.02	A
4.1	0.33	A
2.2	0.08	A
2.6	0.38	A
54.1	0.44	D
51.3	0.21	D
50.1	0.06	D
6.6	0.40	A

PM Peak Hour

Eastbound Left	2.4	0.12	A
Through-Right	1.6	0.36	A
Westbound Left			
Through-Right	1.8	0.42	A
Northbound LT (R)			
Right			
Southbound LTR	58.5	0.36	E
INTERSECTION	2.2	0.41	A

3.2	0.13	A
2.3	0.38	A
6.8	0.26	A
2.6	0.44	A
55.7	0.50	E
52.6	0.25	D
4.1	0.44	A

PM Peak Hour - alternate distribution per H2M letter

2000 HCM Analysis:

Eastbound Left	2.3	0.12	A
Through-Right	1.6	0.36	A
Westbound Left			
Through-Right	1.8	0.42	A
Northbound LT (R)			
Right			
Southbound LTR	58.5	0.36	E
INTERSECTION	2.2	0.41	A

2010 HCM Analysis:

Eastbound Left	2.6	0.08	A
Through-Right	1.3	0.36	A
Westbound Left			
Through-Right	1.6	0.40	A
Northbound LT (R)			
Right			
Southbound LTR	74.2	0.79	E
INTERSECTION	2.3		A

No material difference from the traffic study findings

Alternate 2 is the higher-volume condition so Alternate 1 was not re-analyzed	4.1	0.12	A
	3.8	0.41	A
	10.3	0.63	B
	1.7	0.42	A
	52.5	0.13	D
	51.5	0.01	D
	51.6	0.03	D
	3.9	0.63	A

Alternate 2 is the higher-volume condition so Alternate 1 was not re-analyzed	3.4	0.08	A
	4.0	0.40	A
	4.0	0.41	A
	2.0	0.41	A
	49.3	0.06	D
	52.4	0.34	D
	52.0	0.33	D
	4.0		A