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Memorandum

To	Anna Sicilia	Page 1
CC	Tony Iacobelli	
Subject	Traffic Impact Assessment of Revised Land Use Scenario Woodbridge Centre Area	
From	Lam Chit (Francis) Li	
Date	June 17, 2010	60114438 /60157602

This memo is prepared as per City's request to update the traffic impact assessment due to the revised preferred land use scenario provided by the City in May, 2010, for the Woodbridge Centre Area. Both the existing and future 2031 traffic analysis results will be presented and discussed in this memo, followed by our conclusions. This memo therefore supercedes AECOM's previous memo dated April 27, 2010.

Existing Traffic Conditions

In addition to the link volume analysis which was conducted in previous memo prepared by AECOM in November 2009, this memo will examine further traffic operations with respect to the key intersections within Woodbridge Centre Area. The existing traffic analysis was carried out based on the available turning movement counts obtained from the City and other recent transportation reports. The previous year counts were factored up and balanced to reflect current year (2009) traffic conditions. **Figure 1** illustrates the balanced intersection turning movement volumes for the existing conditions (~~2009).~~

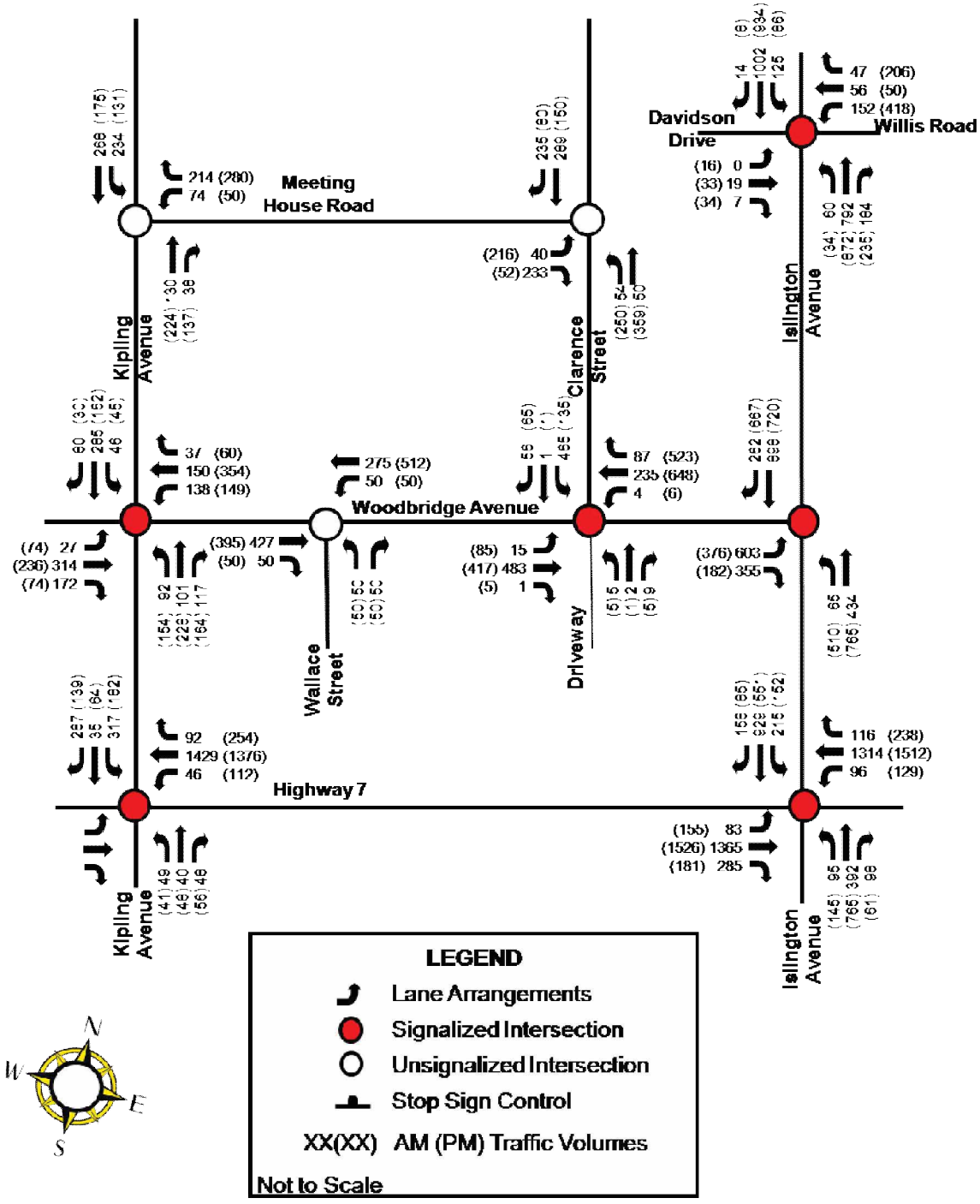
Existing Link Analysis

The capacity of a facility reflects its ability to accommodate a moving stream of vehicles and represents the maximum number of vehicles that can be reasonably expected to pass a given point during a specific period. The volume to capacity (v/c) threshold typically used to identify problems at the mid-block of a roadway is a v/c of 0.85. A higher volume to capacity (V/C) ratio for any roadway section translates to increased level of congestion. The results of our assessment are summarized in **Table 1**.

It should be noted that the estimation of roadway capacity shown in **Table 1** is based on the future demand forecast modelling capacities assumed in the Final Transportation Study of the Kipling Avenue Corridor Study, prepared by MMM group in September 2009. Generally, lower link capacities are used in demand forecasting models in order to take into consideration intersection delays and other delays due to road conditions. Therefore, link analysis results usually reflect a more general and

higher level analysis, whereas intersection operation analysis is more detail orientated and commonly relied upon for determination of traffic operation conditions.

Figure 1: Existing Balanced (2009) Traffic Volumes – Woodbridge Centre Study Area



As shown in **Table 1** below, Kipling Avenue operates satisfactorily with V/C ratios below 0.85. However, Highway 7 (between Kipling Avenue and Islington Avenue), Islington Avenue (between Willis Road and Woodbridge Avenue) and Meeting House Road appear to operate at or approaching capacity, particularly during the PM peak hour. Woodbridge Avenue (between Kipling Avenue and Islington Avenue) and Clarence Street appear to operate at or above capacity during the PM peak hours. The existing link analysis indicates potential problems along Woodbridge Avenue and Clarence Street that require attention. With additional site traffic generated by proposed planned developments, traffic volumes on the roadways are expected to increase and future monitoring is required.

Table 1: Existing Link Operations during AM and PM Peak Hours in Critical Direction

Street	Existing Volumes		#Lanes/ direction	Capacity per lane	Total Capacity	Critical V/C Ratio
	AM Peak Hour	PM Peak Hour				
Kipling Avenue (between Highway 7 and Woodbridge)	650	550	2	700	1400	0.46
Kipling Avenue (between Woodbridge and Meeting House)	400	400	1	700	700	0.57
Islington (immediate North of Willis)	1150	1100	2	800	1600	0.72
Islington Avenue (between Willis and Woodbridge)	1150	1400	2	800	1600	0.88
Islington Avenue (between Woodbridge and Hwy 7)	1300	1300	2	800	1600	0.81
Clarence Street (between Woodbridge and Meeting House)	550	600	1	600*	600	**1.00**
Highway 7 (between Kipling and Islington)	1750	1850	2	1000	2000	0.93
Woodbridge Avenue (between Kipling and Clarence)	500	700	1	600*	600	**1.17**
Woodbridge Avenue (between Clarence and Islington)	950	1200	2	600*	1200	**1.00**
Meeting House Road (between Clarence and Kipling)	300	350	1	400	400	0.88

**It is noted that the operating capacities of Clarence Street and Woodbridge Avenue are expected to be higher than the modelling capacities assumed in the Final Transportation Study of the Kipling Avenue Corridor Study, prepared by MMM Group in September 2009, on which the previous analysis (memo dated on November 10, 2009) was based. Given observed volumes on the link, road operating capacity on Clarence Street and Woodbridge Avenue would be in the range of 500-700 vphpl. The road capacity value of 600 vphpl adopted in this memo for the link analysis on Clarence Street and Woodbridge Avenue is considered to be a more representative measure within the Woodbridge Centre Area.*

Existing Intersection Operations

Based on the 2009 intersection traffic volumes, operations of the key intersections within the Study Area were investigated using Synchro 7.0 (Build 739) software, which is based on the methodology outlined in the Transportation Research Board's "Highway Capacity Manual, HCM 2000". The capacity analysis results including the existing volume to capacity (v/c) ratios, level of service (LOS) and delays for the signalized and unsignalized intersections are summarized in **Table 2**. The level of service definitions are provided in **Appendix I**. Detailed level of service calculations are attached in **Appendix II**.

Table 2: Existing (2009) Traffic Capacity Analysis

Intersection	Weekday AM Peak Hour						Weekday PM Peak Hour					
	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS
Signalized Intersections												
Woodbridge Ave/ Kipling Ave	15.6	B	-	-	-	-	16.9	B	-	-	-	-
Woodbridge Ave/ Clarence St	28.1	C	-	-	-	-	18.6	B	EBT	0.85	29.3	C
Highway 7/ Kipling Ave	33.0	C	EBT WBT	0.86 0.90	32.9 31.5	C C	32.6	C	EBT	0.85	26.2	C
Highway 7/ Islington Ave	50.3	D	EBT WBT SBT	0.94 0.92 0.87	63.5 44.5 51.0	E D D	49.9	D	EBL EBT WBT NBT SBL	0.91 0.90 0.97 0.88 0.90	90.5 41.1 54.8 57.5 95.4	F D D E F
Davidson Dr. / Islington Ave	9.8	A	-	-	-	-	23.3	C	-	-	-	-
Woodbridge Ave /Islington Ave	24.3	C	-	-	-	-	43.8	D	EBL NBL	0.88 0.89	59.3 34.9	E C
Unsignalized Intersection												
Meeting House Rd/ Kipling Ave	16.1	C	-	-	-	-	13.6	B	-	-	-	-
Meeting House Rd/ Clarence St	13.8	B	-	-	-	-	30.5	D	NBLT	0.89	44.8	E
Woodbridge Ave/ Wallace St	12.7	B	-	-	-	-	18.5	C	-	-	-	-

Under the existing traffic conditions, intersections within the Woodbridge Focus Area operate at satisfactory levels of service during both weekday AM and PM peak hours. However, a number of specific turning movements experience V/C ratios greater than 0.85, which indicates longer queuing and delay.

During the weekday PM peak hour, eastbound left and southbound left movements at the intersection of Highway 7/ Islington Avenue operate at level of service F, which exceeds the desirable level of service; in highly urbanized areas, Level of Service E during peak hours is usually tolerated.

Future Traffic Conditions

Future Background Traffic

According to the Final Transportation Study of the Kipling Avenue Corridor Study, prepared by MMM Group in September 2009, there will be additional traffic associated with the proposed development of the Kipling Avenue Corridor which immediately surrounds the west part of the study area. The proposed development along the Kipling Avenue Corridor consists of a total of 1022 residential units and 8,422 m^2 of commercial space, for which the total net site trips generated are estimated to be 519 and 663, during the AM and PM peak hours respectively. In addition to the proposed development, the Kipling Avenue Corridor Study also includes the trips generated by previous applications at four different sites surrounding Kipling Avenue in the future traffic analysis. The future total traffic by 2017 as illustrated in Figure 5.5 in the Final Transportation Study of the Kipling Avenue, prepared by MMM Group (in September 2009) at the intersections of Kipling Avenue/ Highway 7, Kipling Avenue/

Woodbridge Avenue and Kipling Avenue/ Meeting House Road are incorporated into this study as future background traffic.

It is assumed that the majority of future background traffic will be generated by the site developments within the Kipling corridor immediately adjacent to the study area and that external trips from other areas will be minimal. Therefore no network growth rate beyond 2017 is applied in this study.

Future Total Traffic

Development Traffic

Focus Area land use information provided by City staff indicated the proposed land use plan will add approximately 276 residential units along the Islington corridor south of Langstaff and north of Willis Road; and approximately 589 residential units within the Heritage Conservation District (HCD) along Woodbridge Avenue. In addition to the residential units, approximately 12,200 square metres commercial/ retail mixed use is also proposed in the Woodbridge heritage area.

The trip generation rates were based on those from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition. **Table 3** provides a summary of trips generated using these rates. Within the Woodbridge heritage area, the multi-purpose commercial and residential land uses will likely generate trips which are inter-related or among on-site developments and therefore, would result in trip reductions between the development and the external street system. Based on the methodology outlined in the Trip Generation Handbook- An ITE Recommended Practice, a reduction in 64 inbound and outbound trips during the PM peak hour are summarized in **Table 3** below. The detail calculation sheet illustrating the application of ITE methodology is attached in **Appendix III.**

As per the Trip Generation Handbook- An ITE Recommended Practice Chapter 5, retail-oriented developments often attract traffic passing by the proposed site, but with its main origin and destination outside of the site. The retail (land use code 820) has an average “pass-by” trip reduction percentage documented as 34% during the PM peak hour. Figure 5.5 in the ITE Handbook also plots the average “pass-by” trip percentages associated with the various sizes of commercial space. Applying the regression equation to 131,320 square feet of the proposed commercial development results in a 36% “pass-by” trip percentage. In this study, a slightly more conservative 30% “pass-by” trip reduction factor has been adopted and applied.

Furthermore, according to the Final Transportation Study of the Kipling Avenue Corridor Study, prepared by MMM Group in September 2009, the future non-automobile modal split is assumed to be 20% for the trips generated by the proposed developments. The 20% non-automobile modal split takes into consideration the existing high non-auto trips (16%) within the study area and future high intensity development coupled with recommended transit network improvements identified in the Moving on Sustainability, York Region Transportation Master Plan Update (November 2009) recently approved by York Region Council. Figure 6.1 in the Master Plan Update illustrates the potential GO Transit rail extension to Bolton passing through City of Vaughan with two potential GO Station locations adjacent to the Woodbridge Centre Area. In addition, according to Figure 7.2 in the Master Plan Update, 2021 transit network improvement recommendation includes upgraded bus rapid transit service on Highway 7 between Pine Valley Drive and the Kennedy GO Station. To the north and west, Rutherford Road and Highway 27 are to be transit priority corridors to accommodate higher frequency and more reliable public transit services. As shown in **Table 3**, the trip generation rates

were further adjusted to reflect this 20% non-auto modal split estimate which is considered to be conservative.

The ultimate planning horizon of 2031 is used in this study, consistent with the horizon for the City wide Official Plan Review.

Table 3: Development Traffic Generation

		Woodbridge Heritage Development							Islington Development						
			AM Peak			PM Peak				AM Peak			PM Peak		
Lane Use	ITE Code	Units/ ft^2	In	Out	Total	In	Out	Total	Units	In	Out	Total	In	Out	Total
Commercial	820	131,320	110	71	181	374	390	764	-	-	-	-	-	-	-
Townhouse	231	-	-	-	-	-	-	-	276	48	145	193	125	90	215
Condominium	230	589	36	177	213	172	85	257	-	-	-	-	-	-	-
Total			146	248	394	546	475	1021		48	145	193	125	90	215
Non-Auto Modal Split (-20%)			-29	-50	-79	-109	-95	-204		-10	-29	-39	-25	-18	-43
Internal/ Multi-Use Trips			0	0	0	-64	-64	-128		0	0	0	0	0	0
Pass-By Trips			0	0	0	-90	-90	-180		0	0	0	0	0	0
Net Total			117	198	315	283	226	509		38	116	154	100	72	172

Trip Distribution and Assignment

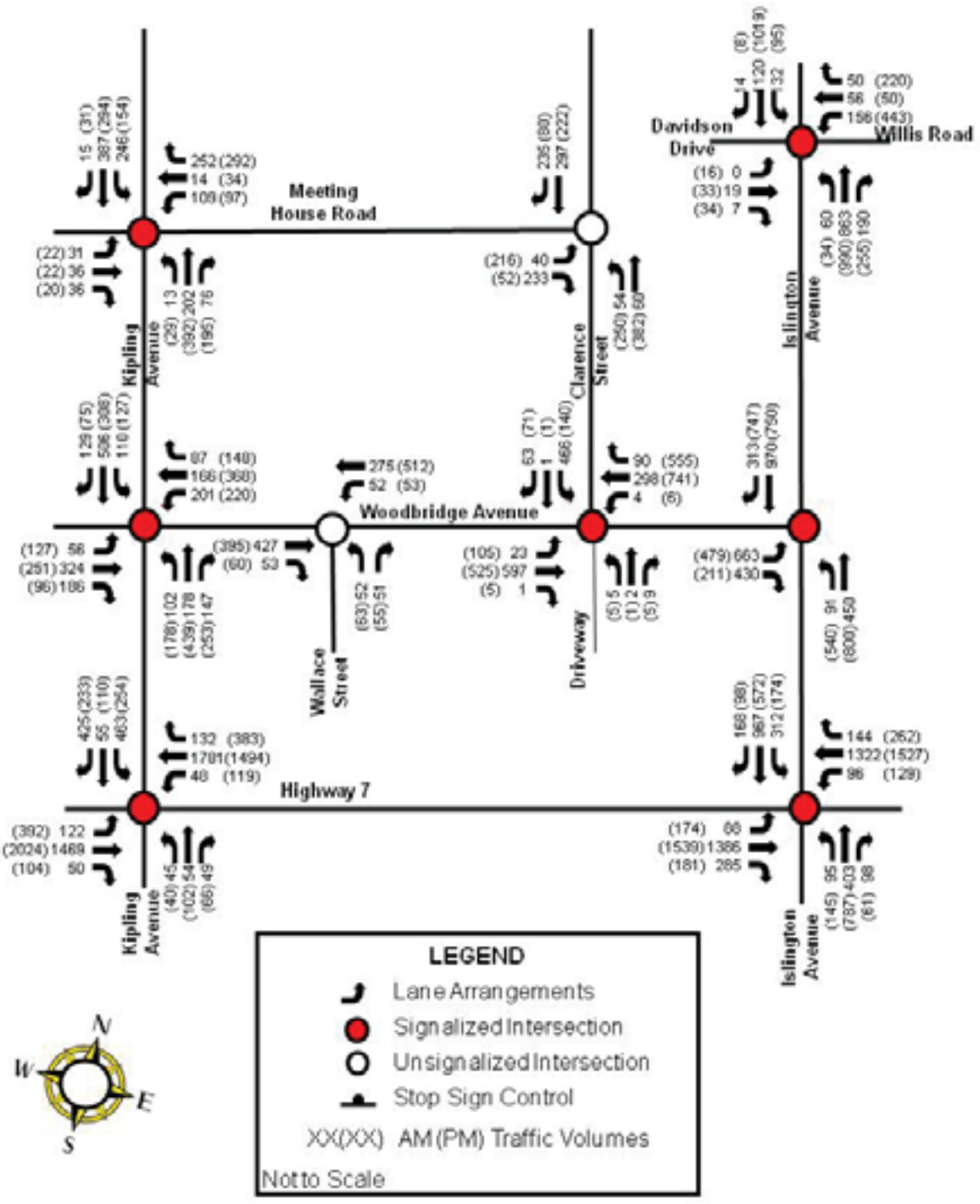
The projected distribution of development traffic to and from the development areas is based on the 2006 Transportation Tomorrow Survey (TTS), a recognized source of information with respect to trip patterns within Vaughan. The TTS is a survey of household trip-making and demographics undertaken across the entire Greater Toronto Area (GTA). The development generated trips were distributed and assigned to the boundary road network based on the proximity of major arterial roads and adjacent land uses. The trip assignment to the road network is based on the assumption that traffic will seek the shortest path with the greatest available capacity. **Table 4** provides a summary of AM and PM peak hour inbound and outbound traffic distribution between the study area and other municipalities within the GTA.

Table 4: Development Traffic Distribution

Area	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
City of Toronto	9.3%	32.1%	2.2%	4.9%
Richmond Hill	3.1%	2.0%	0.6%	0.2%
Markham	0.7%	0.8%	0.3%	0.1%
Study Area	20.0%	14.6%	44.6%	43.2%
Vaughan East of Highway 400	16.7%	15.2%	1.7%	5.5%
Vaughan West of Highway 400	42.0%	26.5%	48.7%	45.5%
Caledon	1.9%	0.2%	0.9%	0.1%
Brampton	2.6%	2.7%	1.0%	0.1%
Mississauga	2.9%	5.9%	0.0%	0.3%
Halton	0.8%	0.0%	0.0%	0.0%
Total	100%	100%	100%	100%

The 2031 future total traffic volume is the sum of the future background traffic and the proposed site-generated traffic. **Figure 2** presents the 2031 future total traffic volumes.

Figure 2: Future (2031) Traffic Volumes – Woodbridge Centre Study Area



Future (2031) Link Analysis

The future link volumes are summarized based on the future 2031 traffic volumes shown in **Figure 2**. **Table 5** indicates that with the added development traffic, Clarence Street and Woodbridge Avenue will operate with slightly higher v/c ratio. The v/c ratio along Kipling Avenue (between Woodbridge Avenue and Meeting House Road), Clarence Street (between Woodbridge Avenue and Highway 7), Highway 7 (between Kipling Avenue and Islington Avenue), Woodbridge Avenue (between Kipling Avenue and Islington Avenue) and Meeting House Road (between Clarence Street and Kipling Avenue) indicates potential congestion problems that require attention.

Table 5: Future 2031 Link Operations during AM and PM Peak Hours in Critical Direction

Street	Future Volumes		#Lanes/ direction	Capacity per lane	Total Capacity	Critical V/C Ratio
	AM Peak Hour	PM Peak Hour				
Kipling Avenue (between Highway 7 and Woodbridge)	950	900	2	700	1400	0.68
Kipling Avenue (between Woodbridge and Meeting House)	750	700	1	700	700	**1.07**
Islington (immediate North of Willis)	1250	1250	2	800	1600	0.78
Islington Avenue (between Willis and Woodbridge)	1300	1500	2	800	1600	**0.94**
Islington Avenue (between Woodbridge and Hwy 7)	1450	1350	2	800	1600	0.91
Clarence Street (between Woodbridge and Meeting House)	550	650	1	600	600	**1.08**
Highway 7 (between Kipling and Islington)	2000	2350	2	1000	2000	**1.18**
Woodbridge Avenue (between Kipling and Clarence)	600	800	1	600	600	**1.33**
Woodbridge Avenue (between Clarence and Islington)	1100	1300	2	600	1200	**1.08**
Meeting House Road (between Clarence and Kipling)	400	400	1	400	400	**1.00**

Future (2031) Intersection Operations

Table 6 summarizes the results of the intersection capacity analysis using the existing lane configurations, except for the intersections of Kipling Avenue/ Woodbridge Avenue and Kipling Avenue/ Meeting House Road, both of which will be assumed to have road improvements in place before 2031 as per the recommendation in the Kipling Avenue Corridor Study. The future lane configuration of the study area is shown in **Figure 3**. Detailed level of service calculations are attached in **Appendix IV**.

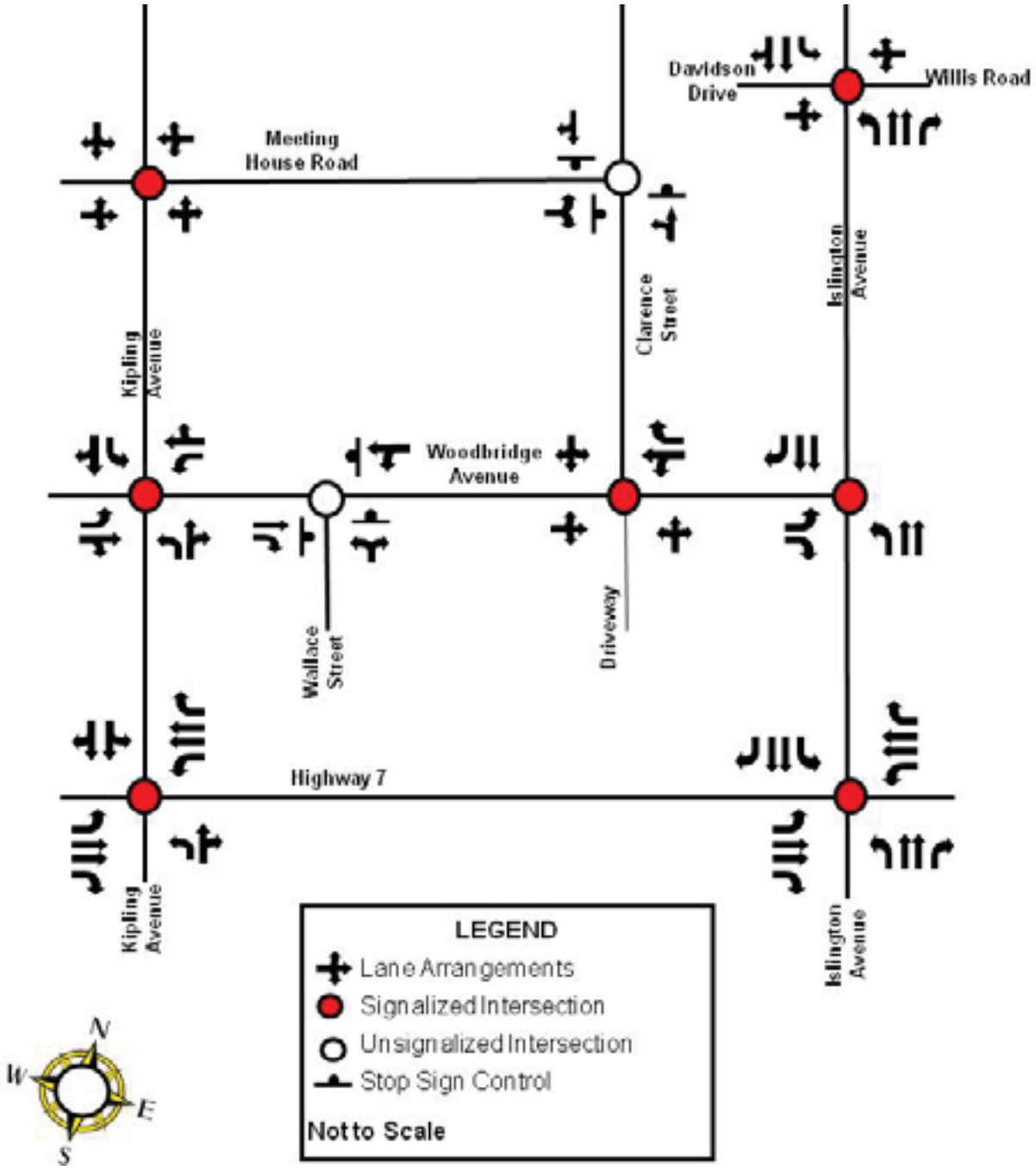
As indicated in **Table 6**, the intersections will operate at an acceptable level of service “D” or better during the AM peak hour, with the exception of Highway 7/ Kipling Avenue, which will operate at an unsatisfactory level of service due to the heavy westbound traffic along Highway 7. During the PM peak hour, the marjority of intersections are expected to operate at level of service “E” or better with some delays. At the two intersections along Highway 7, Kipling Avenue and Islington Avenue, the heavy eastbound and westbound through traffic demands a significant portion of the green time of the

signal cycle and thus, results in insufficient green time for other movements, in particularily the eastbound and southbound left-turns.

Table 6: Future (2031) Traffic Capacity Analysis - 20% Non-Auto Modal Split

	Weekday AM Peak Hour						Weekday PM Peak Hour					
Intersection	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS
Signalized Intersections												
Woodbridge Ave/ Kipling Ave	30.3	C	SBTR	0.85	36.1	D	56.0	E	EBL EBTR WBTR NBTR	0.86 0.86 0.96 0.96	92.0 60.2 78.6 66.6	F E E E
Woodbridge Ave/ Clarence St	40.1	D	EBLTR SBLTR	0.94 0.90	52.1 43.6	D D	17.7	B	-	-	-	-
Highway 7/ Kipling Ave	>100	F	EBL EBT WBT SBLTR	0.94 0.89 >1.0 >1.0	>100 34.6 >100 >100	F C F F	69.8	E	EBL EBT WBL WBT SBLTR	>1.0 1.00 0.86 0.97 >1.0	>100 62.8 64.6 51.4 >100	F E E D F
Highway 7/ Islington Ave	48.9	D	EBT WBT SBT	0.95 0.93 0.91	54.8 45.0 56.0	D D E	53.8	D	EBL EBT WBL WBT SBL	>1.0 0.92 0.93 0.96 >1.0	>100 41.5 >100 51.5 >100	F D F D F
Davidson Dr. / Islington Ave	10.2	B	-	-	-	-	23.5	C	-	-	-	-
Woodbridge Ave /Islington Ave	27.3	C	EBL	0.87	41.9	D	52.7	D	EBL NBL	0.93 0.97	68.0 74.1	E E
Meeting House Rd/ Kipling Ave	25.1	C	SBLTR	0.87	29.7	C	24.0	C	-	-	-	-
Unsignalized Intersection												
Meeting House Rd/ Clarence St	14.3	B	-	-	-	-	44.7	E	NBLT	0.95	72.0	F
Woodbridge Ave/ Wallace St	12.7	B	-	-	-	-	19.6	C	-	-	-	-

Figure 3: Future (2031) Link Configuration – Woodbridge Centre Study Area



Sensitivity Analysis

Recognizing that transit modal split targets will be included in both the Region's and Vaughan's new Official Plans, sensitivity analysis with respect to different mode share assumptions has also been conducted. In order to be consistent with work done in the related Transportation Study of Kipling Avenue Corridor Study, all of the preceding analysis has been based on achieving a 20% non-auto mode share; the following traffic operational analysis will examine how increases in non-auto mode shares to 30% and 40% within the Woodbridge Centre Area would impact traffic operations within the study area.

Non-Auto Modal Split – 30%

With non-auto modal split increased to 30%, auto trips generated by the proposed land use will be reduced from 80% to 70%. **Table 7** estimates the results of the intersection capacity analysis using the future lane configuration of the study area shown in **Figure 3**. Detailed level of service calculations are attached in **Appendix V**.

As indicated in **Table 7**, all intersections within the study area would operate at an acceptable overall level of service "D" or better during both the AM and PM peak hours. However, certain turning movements at the Highway 7/ Kipling Avenue and the westbound shared through and right movement at the Kipling Avenue/ Woodbridge Avenue intersection would operate at level of sevice "E" during the PM peak hour.

Table 7: Future (2031) Traffic Capacity Analysis – 30% Non-Auto Modal Split

	Weekday AM Peak Hour						Weekday PM Peak Hour					
Intersection	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS
Signalized Intersections												
Woodbridge Ave/ Kipling Ave	24.6	C	-	-	-	-	37.4	D	WBTR NBTR	0.90 0.87	56.9 40.1	E D
Woodbridge Ave/ Clarence St	28.1	C	-	-	-	-	15.8	B	-	-	-	-
Highway 7/ Kipling Ave	46.6	D	EBL WBT SBLTR	0.85 0.97 1.00	73.7 38.4 98.2	E D F	40.7	D	EBL EBT WBT SBLTR	0.92 0.93 0.90 0.85	76.5 33.7 37.9 57.4	E C D E
Highway 7/ Islington Ave	42.6	D	EBT WBT	0.89 0.85	50.5 36.7	D D	42.3	D	EBT WBT	0.88 0.92	44.7 42.5	D D
Davidson Dr. / Islington Ave	9.3	A	-	-	-	-	21.9	C	-	-	-	-
Woodbridge Ave /Islington Ave	24.2	C	-	-	-	-	50.0	D	EBL NBL	0.88 0.87	54.8 30.2	D C
Meeting House Rd/ Kipling Ave	20.4	C	-	-	-	-	21.1	C	-	-	-	-
Unsignalized Intersection												
Meeting House Rd/ Clarence St	12.1	B	-	-	-	-	22.4	C	-	-	-	-
Woodbridge Ave/ Wallace St	11.3	B	-	-	-	-	15.1	C	-	-	-	-

Non-Auto Modal Split – 40%

Similarly, with the non-auto modal split increased to 40%, auto trips generated by the proposed land use will be reduced further from 70% to 60%. **Table 8** estimates the results of the intersection capacity analysis. Detailed level of service calculations are attached in **Appendix VI**.

As indicated in **Table 8**, all intersections within the study area will operate at a satisfactory level of service during both the AM and PM peak hours. It is identified that at this level of non-auto modal split, the two key intersections along Highway 7, at Kipling Avenue and at Islington Avenue, are both expected to operate acceptably with overall level of service "D" and individual movements at levels of service "E" or better. The westbound through movement at Kipling Avenue/ Woodbridge Avenue intersection would also operate satisfactorily in both peak hours.

Table 8: Future (2031) Traffic Capacity Analysis – 40% Non-Auto Modal Split

	Weekday AM Peak Hour						Weekday PM Peak Hour					
Intersection	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS	Average Delay (s)	Overall LOS	Critical Movement (V/C ≥0.85)	V/C	Delay (s)	LOS
Signalized Intersections												
Woodbridge Ave/ Kipling Ave	21.9	C	-	-	-	-	30.7	C	-	-	-	-
Woodbridge Ave/ Clarence St	23.2	C	-	-	-	-	14.8	B	-	-	-	-
Highway 7/ Kipling Ave	30.5	C	WBT SBLTR	0.90 0.87	26.9 50.8	C D	34.9	C	EBL EBT	0.86 0.87	51.1 29.1	D C
Highway 7/ Islington Ave	43.2	D	EBT WBT	0.87 0.86	55.8 41.1	E D	40.8	D	WBT	0.87	39.9	D
Davidson Dr. / Islington Ave	8.9	A	-	-	-	-	20.5	C	-	-	-	-
Woodbridge Ave /Islington Ave	22.8	C	-	-	-	-	42.4	D	-	-	-	-
Meeting House Rd/ Kipling Ave	17.9	B	-	-	-	-	19.1	B	-	-	-	-
Unsignalized Intersection												
Meeting House Rd/ Clarence St	10.8	B	-	-	-	-	15.8	C	-	-	-	-
Woodbridge Ave/ Wallace St	10.3	B	-	-	-	-	12.6	B	-	-	-	-

Conclusions

Future traffic analysis indicates that the additional site traffic generated onto area roadways results in a slight increase in v/c ratios along Woodbridge Avenue and Clarence Street, as compared with the current roadway operations. Based on the intersection capacity analysis results, which is considered to be a more detailed and reliable approach (adopting the industry accepted HCM methodology), future traffic growth will be accommodated in the future during both the AM and PM peak hours, albeit at levels lower than desired assuming a 20% non-auto modal split. The Regional intersection of Highway 7/ Kipling Avenue will operate beyond its estimated capacity in the AM peak period with some movements likely to experience significant delays. Close monitoring of the traffic conditions within and adjacent to the Woodbridge Centre Area, therefore, will be necessary in conjunction with the proposed development being constructed in the future. The achievement of a 30% non-auto modal split, more in line with Regional and City targets, would significantly improve future traffic operations and result in acceptable levels of service throughout the study area.

Parallel routes to Woodbridge Avenue providing secondary access to future proposed developments via Kipling Avenue or Islington Avenue might also be examined and investigated. Should diversion of site generated trips onto other parallel roadways be feasible, traffic operations along Woodbridge Avenue would be improved.

Travel Demand Management (TDM) strategies recommended in the York Region Transportation Master Plan Update (November 2009) include developing TDM plans for major new developments in the next two years. Strategies enticing new transit users, and targeting employees, students and the elderly should be pursued in future action plans, in an attempt to reduce single occupant vehicle use. This would include the promotion of a walk-in commuter rail station (i.e. no commuter parking) on the proposed Bolton line serving the Woodbridge Core study area. With the successful implementation of TDM strategies, traffic operations within the Woodbridge Centre Area would be expected to improve somewhat, relative to that estimated in this memo.

Regarding the future traffic operations along Highway 7 at the intersections of Islington Avenue and Kipling Avenue, further road improvements along the bottleneck section of Highway 7 between Kipling Avenue and Islington Avenue, should be considered and addressed by the Region in upgrading rapid transit within the Highway 7 corridor and/ or by Metrolinx in upgrading the rail crossing of Highway 7 in conjunction with implementation of commuter rail service to Bolton.

FL/DG: 17/06/2010

Appendix I

Level of Service Definitions

Capacity and Level of Service Definitions

- Level A – (Volume / Capacity Ratio 0.0-0.30)
  - At this level of service, vehicles rarely wait longer than one red indication to clear the intersection, turning movements are made easily, and the drivers are not obstructed by other vehicles.
- Level B– (Volume / Capacity Ratio 0.30-0.45)
  - At this level of service, drivers will often have to yield to opposing traffic before making turns,and will begin to feel somewhat restricted within groups of vehicles approaching an intersection.
- Level C– (Volume / Capacity Ratio 0.45-0.66)
  - At this level of service, the flow of traffic is stable. Drivers will have to yield to opposing traffic before making left turns, and may occasionally have to wait longer than one traffic signal cycle to clear the intersection. Short queues may develop for a few cycles.
- Level D– (Volume / Capacity Ratio 0.66-0.80)
  - At this level of service, the motorist experiences increasing restriction and instability of traffic flow. There are substantial delays to approaching vehicles during short peaks with the peak period, and it becomes difficult to find gaps in traffic to complete left turns.
- Level E– (Volume / Capacity Ratio 0.80-1.00)
  - At this level of service, capacity is reached and the flow of traffic is not stable. There are frequent queues of vehicles approaching intersections and delays to vehicles may extend to several signal cycles.
- Level F– (Volume / Capacity Ratio >1.00)
  - At this level, capacity is exceeded. There are persistent long queues of vehicles waiting on all approaches to the intersection and vehicles will often have to wait numerous signal cycles to clear the intersection.

Appendix II

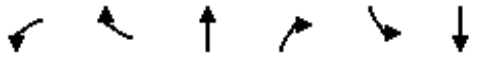
Intersection Capacity Analysis

(Existing 2009 Condition)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	1368	52	46	1429	92	49	40	48	317	35	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1690	3380	1512	1789	3380	1526	1755	1726			3207	
Flt Permitted	0.07	1.00	1.00	0.08	1.00	1.00	0.29	1.00			0.77	
Satd. Flow (perm)	125	3380	1512	143	3380	1526	530	1726			2533	
Peak-hour factor, PHF	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. Flow (vph)	67	1368	52	46	1429	92	49	40	48	317	35	287
RTOR Reduction (vph)	0	0	23	0	0	28	0	0	0	0	0	0
Lane Group Flow (vph)	67	1368	29	46	1429	64	49	88	0	0	639	0
Heavy Vehicles (%)	8%	8%	8%	2%	8%	7%	4%	0%	4%	2%	6%	5%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	62.4	56.8	56.8	62.0	56.6	56.6	40.8	40.8			40.8	
Effective Green, g (s)	62.4	56.8	56.8	62.0	56.6	56.6	40.8	40.8			40.8	
Actuated g/C Ratio	0.52	0.47	0.47	0.52	0.47	0.47	0.34	0.34			0.34	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	138	1600	716	148	1594	720	180	587			861	
v/s Ratio Prot	c0.02	0.40		0.01	c0.42			0.05				
v/s Ratio Perm	0.23		0.02	0.15		0.04	0.09				c0.25	
v/c Ratio	0.49	0.86	0.04	0.31	0.90	0.09	0.27	0.15			0.74	
Uniform Delay, d1	21.9	28.0	17.0	20.2	29.0	17.5	28.8	27.5			35.0	
Progression Factor	1.00	1.00	1.00	1.59	0.94	1.38	1.00	1.00			1.00	
Incremental Delay, d2	2.7	4.9	0.0	0.6	4.1	0.0	3.7	0.5			5.9	
Delay (s)	24.6	32.9	17.0	32.7	31.5	24.2	32.5	28.1			40.9	
Level of Service	C	C	B	C	C	C	C	C			D	
Approach Delay (s)		32.0			31.1			29.7			40.9	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	74	214	130	38	234	268
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	74	214	130	38	234	268

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	288	168	502
Volume Left (vph)	74	0	234
Volume Right (vph)	214	38	0
Hadj (s)	-0.36	-0.10	0.13
Departure Headway (s)	5.3	5.3	5.1
Degree Utilization, x	0.42	0.25	0.71
Capacity (veh/h)	633	628	687
Control Delay (s)	12.1	10.1	20.4
Approach Delay (s)	12.1	10.1	20.4
Approach LOS	B	B	C

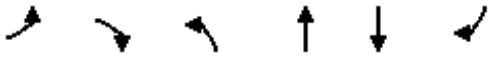
Intersection Summary			
Delay	16.1		
HCM Level of Service	C		
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	314	172	138	150	37	92	101	117	46	285	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			0.95			0.95	
Frt	1.00	1.00	0.85	1.00	0.97			0.94			0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1706	1902	1570	1789	1707			3210			3344	
Flt Permitted	0.64	1.00	1.00	0.53	1.00			0.72			0.88	
Satd. Flow (perm)	1149	1902	1570	1001	1707			2354			2948	
Peak-hour factor, PHF	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. Flow (vph)	27	314	172	138	150	37	92	101	117	46	285	80
RTOR Reduction (vph)	0	0	103	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	27	314	69	138	187	0	0	310	0	0	411	0
Heavy Vehicles (%)	7%	1%	4%	2%	10%	6%	3%	9%	5%	10%	5%	4%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0			28.0			28.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0			28.0			28.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40			0.40			0.40	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Lane Grp Cap (vph)	460	761	628	400	683			942			1179	
v/s Ratio Prot		c0.17			0.11							
v/s Ratio Perm	0.02		0.04	0.14				0.13			c0.14	
v/c Ratio	0.06	0.41	0.11	0.34	0.27			0.33			0.35	
Uniform Delay, d1	12.9	15.1	13.2	14.6	14.1			14.5			14.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	1.7	0.4	2.4	1.0			0.9			0.8	
Delay (s)	13.1	16.7	13.5	17.0	15.1			15.4			15.5	
Level of Service	B	B	B	B	B			B			B	
Approach Delay (s)		15.5			15.9			15.4			15.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	483	1	4	235	87	5	2	9	465	1	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.92			0.99	
Flt Protected		1.00			1.00	1.00		0.98			0.96	
Satd. Flow (prot)		1827			1865	1601		1748			1776	
Flt Permitted		0.99			0.99	1.00		0.88			0.74	
Satd. Flow (perm)		1804			1848	1601		1565			1369	
Peak-hour factor, PHF	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. Flow (vph)	15	483	1	4	235	87	5	2	9	465	1	56
RTOR Reduction (vph)	0	0	0	0	0	57	0	0	0	0	0	0
Lane Group Flow (vph)	0	499	0	0	239	30	0	16	0	0	522	0
Heavy Vehicles (%)	36%	4%	0%	0%	3%	2%	0%	0%	0%	1%	0%	11%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		24.0			24.0	24.0		32.0			32.0	
Effective Green, g (s)		24.0			24.0	24.0		32.0			32.0	
Actuated g/C Ratio		0.34			0.34	0.34		0.46			0.46	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		619			634	549		715			626	
v/s Ratio Prot												
v/s Ratio Perm		c0.28			0.13	0.02		0.01			c0.38	
v/c Ratio		0.81			0.38	0.05		0.02			0.83	
Uniform Delay, d1		20.9			17.4	15.4		10.4			16.7	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		11.7			1.7	0.2		0.1			13.8	
Delay (s)		32.6			19.1	15.6		10.5			30.5	
Level of Service		C			B	B		B			C	
Approach Delay (s)		32.6			18.1			10.5			30.5	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	40	233	54	50	289	235
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	40	233	54	50	289	235

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	273	104	524
Volume Left (vph)	40	54	0
Volume Right (vph)	233	0	235
Hadj (s)	-0.45	0.14	-0.24
Departure Headway (s)	4.9	5.4	4.5
Degree Utilization, x	0.37	0.16	0.66
Capacity (veh/h)	669	616	767
Control Delay (s)	10.9	9.4	16.2
Approach Delay (s)	10.9	9.4	16.2
Approach LOS	B	A	C

Intersection Summary			
Delay	13.8		
HCM Level of Service	B		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	427	50	50	275	50	50
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	427	50	50	275	50	50

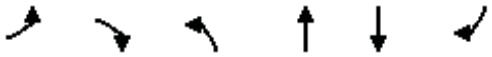
Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	427	50	325	100
Volume Left (vph)	0	0	50	50
Volume Right (vph)	0	50	0	50
Hadj (s)	0.03	-0.67	0.06	-0.17
Departure Headway (s)	5.1	4.4	4.9	5.6
Degree Utilization, x	0.61	0.06	0.44	0.15
Capacity (veh/h)	683	793	711	566
Control Delay (s)	14.7	6.5	11.8	9.6
Approach Delay (s)	13.9		11.8	9.6
Approach LOS	B		B	A

Intersection Summary			
Delay	12.7		
HCM Level of Service	B		
Intersection Capacity Utilization	55.5%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	1365	285	96	1314	116	95	392	98	215	929	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1601	1789	3318	1484	1772	3579	1526	1807	3544	1601
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.15	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	136	3380	1601	146	3318	1484	272	3579	1526	685	3544	1601
Peak-hour factor, PHF	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. Flow (vph)	83	1365	285	96	1314	116	95	392	98	215	929	158
RTOR Reduction (vph)	0	0	82	0	0	12	0	0	76	0	0	70
Lane Group Flow (vph)	83	1365	203	96	1314	104	95	392	22	215	929	88
Heavy Vehicles (%)	10%	8%	2%	2%	10%	10%	3%	2%	7%	1%	3%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	55.5	51.5	51.5	55.5	51.5	51.5	31.9	27.4	27.4	45.5	36.0	36.0
Effective Green, g (s)	55.5	51.5	51.5	55.5	51.5	51.5	31.9	27.4	27.4	45.5	36.0	36.0
Actuated g/C Ratio	0.46	0.43	0.43	0.46	0.43	0.43	0.27	0.23	0.23	0.38	0.30	0.30
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	114	1451	687	122	1424	637	129	817	348	382	1063	480
v/s Ratio Prot	0.02	c0.40		c0.03	0.40		0.03	0.11		c0.06	c0.26	
v/s Ratio Perm	0.31		0.13	0.34		0.07	0.17		0.01	0.15		0.05
v/c Ratio	0.73	0.94	0.30	0.79	0.92	0.16	0.74	0.48	0.06	0.56	0.87	0.18
Uniform Delay, d1	24.8	32.8	22.4	25.7	32.4	21.0	36.8	40.1	36.3	26.8	39.8	31.1
Progression Factor	2.13	1.65	2.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.5	9.4	0.1	32.7	12.1	0.1	21.7	2.0	0.4	1.9	11.2	0.8
Delay (s)	66.4	63.5	55.3	58.4	44.5	21.1	58.5	42.2	36.6	28.7	51.0	32.0
Level of Service	E	E	E	E	D	C	E	D	D	C	D	C
Approach Delay (s)		62.3			43.6			43.9			45.0	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	50.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	603	355	65	434	898	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1807	1570	1659	3411	3544	1601
Flt Permitted	0.95	1.00	0.21	1.00	1.00	1.00
Satd. Flow (perm)	1807	1570	365	3411	3544	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	603	355	65	434	898	262
RTOR Reduction (vph)	0	32	0	0	0	151
Lane Group Flow (vph)	603	323	65	434	898	111
Heavy Vehicles (%)	1%	4%	10%	7%	3%	2%
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	45.0	45.0	41.0	41.0	41.0	41.0
Effective Green, g (s)	45.0	45.0	41.0	41.0	41.0	41.0
Actuated g/C Ratio	0.45	0.45	0.41	0.41	0.41	0.41
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Grp Cap (vph)	813	707	150	1399	1453	656
v/s Ratio Prot	c0.33			0.13	c0.25	
v/s Ratio Perm		0.21	0.18			0.07
v/c Ratio	0.74	0.46	0.43	0.31	0.62	0.17
Uniform Delay, d1	22.7	19.0	21.2	19.9	23.3	18.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.3	2.1	9.1	0.6	2.0	0.6
Delay (s)	29.0	21.2	30.3	20.5	25.3	19.3
Level of Service	C	C	C	C	C	B
Approach Delay (s)	26.1			21.8	23.9	
Approach LOS	C			C	C	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	19	7	152	56	47	60	792	184	125	1002	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.96		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1851		1825	1790		1825	3579	1633	1772	3504	
Flt Permitted		1.00		0.74	1.00		0.26	1.00	1.00	0.34	1.00	
Satd. Flow (perm)		1851		1422	1790		501	3579	1633	642	3504	
Peak-hour factor, PHF	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. Flow (vph)	0	19	7	152	56	47	60	792	184	125	1002	14
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	57	0	0	0
Lane Group Flow (vph)	0	26	0	152	103	0	60	792	127	125	1016	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		14.8		14.8	14.8		62.6	62.6	62.6	62.6	62.6	
Effective Green, g (s)		14.8		14.8	14.8		62.6	62.6	62.6	62.6	62.6	
Actuated g/C Ratio		0.16		0.16	0.16		0.69	0.69	0.69	0.69	0.69	
Clearance Time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		303		233	293		347	2478	1131	445	2426	
v/s Ratio Prot		0.01			0.06			0.22			c0.29	
v/s Ratio Perm				c0.11			0.12		0.08	0.19		
v/c Ratio		0.09		0.65	0.35		0.17	0.32	0.11	0.28	0.42	
Uniform Delay, d1		32.1		35.4	33.5		4.9	5.5	4.6	5.3	6.0	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		6.6	0.7		1.1	0.3	0.2	1.6	0.5	
Delay (s)		32.2		42.0	34.3		5.9	5.8	4.8	6.9	6.6	
Level of Service		C		D	C		A	A	A	A	A	
Approach Delay (s)		32.2			38.9			5.7			6.6	
Approach LOS		C			D			A			A	

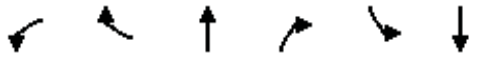
Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	60		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	265	1625	112	112	1376	254	41	48	56	182	64	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1825	3476	1633	1807	3411	1585	1772	1731			3344	
Flt Permitted	0.08	1.00	1.00	0.07	1.00	1.00	0.42	1.00			0.77	
Satd. Flow (perm)	147	3476	1633	130	3411	1585	784	1731			2647	
Peak-hour factor, PHF	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. Flow (vph)	265	1625	112	112	1376	254	41	48	56	182	64	139
RTOR Reduction (vph)	0	0	43	0	0	79	0	0	0	0	0	0
Lane Group Flow (vph)	265	1625	69	112	1376	175	41	104	0	0	385	0
Heavy Vehicles (%)	0%	5%	0%	1%	7%	3%	3%	2%	2%	0%	3%	1%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	78.6	66.4	66.4	66.9	58.7	58.7	28.4	28.4			28.4	
Effective Green, g (s)	78.6	66.4	66.4	66.9	58.7	58.7	28.4	28.4			28.4	
Actuated g/C Ratio	0.65	0.55	0.55	0.56	0.49	0.49	0.24	0.24			0.24	
Clearance Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	319	1923	904	187	1669	775	186	410			626	
v/s Ratio Prot	c0.11	c0.47		0.04	0.40			0.06				
v/s Ratio Perm	0.43		0.04	0.29		0.11	0.05				c0.15	
v/c Ratio	0.83	0.85	0.08	0.60	0.82	0.23	0.22	0.25			0.62	
Uniform Delay, d1	33.0	22.5	12.5	20.0	26.2	17.6	36.9	37.2			40.9	
Progression Factor	1.00	1.00	1.00	1.26	1.21	2.15	1.00	1.00			1.00	
Incremental Delay, d2	19.0	3.7	0.0	2.2	1.5	0.1	2.7	1.5			4.6	
Delay (s)	52.0	26.2	12.5	27.5	33.2	37.9	39.6	38.7			45.5	
Level of Service	D	C	B	C	C	D	D	D			D	
Approach Delay (s)		28.9			33.5			38.9			45.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	32.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group



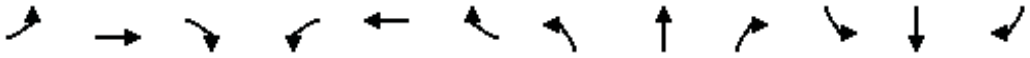
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	50	280	244	137	131	175
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	50	280	244	137	131	175

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	330	381	306
Volume Left (vph)	50	0	131
Volume Right (vph)	280	137	0
Hadj (s)	-0.44	-0.18	0.12
Departure Headway (s)	5.2	5.1	5.5
Degree Utilization, x	0.48	0.54	0.47
Capacity (veh/h)	640	665	621
Control Delay (s)	13.0	14.2	13.4
Approach Delay (s)	13.0	14.2	13.4
Approach LOS	B	B	B

Intersection Summary			
Delay	13.6		
HCM Level of Service	B		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	60		

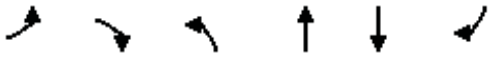
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	74	236	74	149	354	60	154	228	164	45	162	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			0.95			0.95	
Frt	1.00	1.00	0.85	1.00	0.98			0.95			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1825	1902	1633	1789	1837			3394			3421	
Flt Permitted	0.42	1.00	1.00	0.61	1.00			0.78			0.79	
Satd. Flow (perm)	801	1902	1633	1152	1837			2688			2730	
Peak-hour factor, PHF	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. Flow (vph)	74	236	74	149	354	60	154	228	164	45	162	30
RTOR Reduction (vph)	0	0	44	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	74	236	30	149	414	0	0	546	0	0	237	0
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	2%	1%	1%	5%	4%	0%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.0	28.0	28.0	28.0	28.0			28.0			28.0	
Effective Green, g (s)	28.0	28.0	28.0	28.0	28.0			28.0			28.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40			0.40			0.40	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0			7.0			7.0	
Lane Grp Cap (vph)	320	761	653	461	735			1075			1092	
v/s Ratio Prot		0.12			c0.23							
v/s Ratio Perm	0.09		0.02	0.13				c0.20			0.09	
v/c Ratio	0.23	0.31	0.05	0.32	0.56			0.51			0.22	
Uniform Delay, d1	13.9	14.4	12.8	14.5	16.3			15.8			13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.7	1.1	0.1	1.9	3.1			1.7			0.5	
Delay (s)	15.6	15.4	13.0	16.3	19.4			17.5			14.3	
Level of Service	B	B	B	B	B			B			B	
Approach Delay (s)		15.0			18.6			17.5			14.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	417	5	6	648	523	5	1	5	135	1	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.94			0.96	
Flt Protected		0.99			1.00	1.00		0.98			0.97	
Satd. Flow (prot)		1884			1901	1633		1763			1737	
Flt Permitted		0.63			1.00	1.00		0.85			0.79	
Satd. Flow (perm)		1191			1893	1633		1541			1422	
Peak-hour factor, PHF	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. Flow (vph)	85	417	5	6	648	523	5	1	5	135	1	65
RTOR Reduction (vph)	0	0	0	0	0	262	0	0	0	0	0	0
Lane Group Flow (vph)	0	507	0	0	654	262	0	11	0	0	201	0
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	0%	0%	2%	1%	3%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		30.0			30.0	30.0		16.0			16.0	
Effective Green, g (s)		30.0			30.0	30.0		16.0			16.0	
Actuated g/C Ratio		0.50			0.50	0.50		0.27			0.27	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		596			947	817		411			379	
v/s Ratio Prot												
v/s Ratio Perm		c0.43			0.35	0.16		0.01			c0.14	
v/c Ratio		0.85			0.69	0.32		0.03			0.53	
Uniform Delay, d1		13.1			11.5	8.9		16.2			18.8	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		16.2			4.2	1.0		0.1			5.3	
Delay (s)		29.3			15.7	10.0		16.4			24.1	
Level of Service		C			B	A		B			C	
Approach Delay (s)		29.3			13.1			16.4			24.1	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	216	52	250	359	150	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	216	52	250	359	150	80

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	268	609	230
Volume Left (vph)	216	250	0
Volume Right (vph)	52	0	80
Hadj (s)	0.08	0.12	-0.17
Departure Headway (s)	6.2	5.3	5.5
Degree Utilization, x	0.46	0.89	0.35
Capacity (veh/h)	558	675	621
Control Delay (s)	14.3	44.8	11.5
Approach Delay (s)	14.3	44.8	11.5
Approach LOS	B	E	B

Intersection Summary			
Delay	30.5		
HCM Level of Service	D		
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	395	50	50	512	50	50
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	395	50	50	512	50	50

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	395	50	562	100
Volume Left (vph)	0	0	50	50
Volume Right (vph)	0	50	0	50
Hadj (s)	0.03	-0.67	0.05	-0.17
Departure Headway (s)	5.4	4.7	4.9	6.1
Degree Utilization, x	0.59	0.06	0.77	0.17
Capacity (veh/h)	650	749	722	540
Control Delay (s)	14.8	6.8	23.7	10.3
Approach Delay (s)	13.9		23.7	10.3
Approach LOS	B		C	B

Intersection Summary			
Delay	18.5		
HCM Level of Service	C		
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	1526	181	129	1512	238	145	765	61	152	551	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3510	1617	1807	3476	1617	1825	3614	1541	1807	3510	1585
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.27	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	132	3510	1617	141	3476	1617	512	3614	1541	272	3510	1585
Peak-hour factor, PHF	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. Flow (vph)	155	1526	181	129	1512	238	145	765	61	152	551	85
RTOR Reduction (vph)	0	0	60	0	0	21	0	0	26	0	0	65
Lane Group Flow (vph)	155	1526	121	129	1512	217	145	765	35	152	551	20
Heavy Vehicles (%)	0%	4%	1%	1%	5%	1%	0%	1%	6%	1%	4%	3%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	65.0	58.0	58.0	60.0	54.0	54.0	37.0	29.0	29.0	35.0	28.0	28.0
Effective Green, g (s)	65.0	58.0	58.0	60.0	54.0	54.0	37.0	29.0	29.0	35.0	28.0	28.0
Actuated g/C Ratio	0.54	0.48	0.48	0.50	0.45	0.45	0.31	0.24	0.24	0.29	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0	4.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	1697	782	154	1564	728	245	873	372	169	819	370
v/s Ratio Prot	c0.05	0.43		0.04	0.43		0.04	c0.21		c0.05	0.16	
v/s Ratio Perm	c0.44		0.07	0.38		0.13	0.14		0.02	0.21		0.01
v/c Ratio	0.91	0.90	0.15	0.84	0.97	0.30	0.59	0.88	0.09	0.90	0.67	0.05
Uniform Delay, d1	29.6	28.3	17.3	26.1	32.1	21.0	31.9	43.8	35.3	36.3	41.8	35.7
Progression Factor	1.56	1.29	2.22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	44.3	4.6	0.1	38.8	22.7	0.2	3.9	13.8	0.5	59.1	4.5	0.3
Delay (s)	90.5	41.1	38.4	64.9	54.8	21.2	35.7	57.5	35.8	95.4	46.3	36.0
Level of Service	F	D	D	E	D	C	D	E	D	F	D	D
Approach Delay (s)		44.9			51.3			52.9			54.7	
Approach LOS		D			D			D			D	

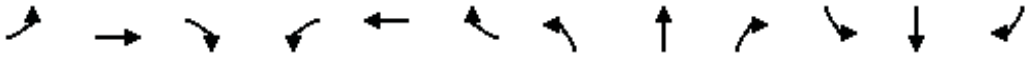
Intersection Summary			
HCM Average Control Delay	49.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	376	182	510	765	720	667
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1772	1601	1789	3544	3510	1617
Flt Permitted	0.95	1.00	0.25	1.00	1.00	1.00
Satd. Flow (perm)	1772	1601	463	3544	3510	1617
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	376	182	510	765	720	667
RTOR Reduction (vph)	0	138	0	0	0	391
Lane Group Flow (vph)	376	44	510	765	720	276
Heavy Vehicles (%)	3%	2%	2%	3%	4%	1%
Turn Type		custom	pm+pt			Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	24.1	24.1	62.9	62.9	37.8	37.8
Effective Green, g (s)	24.1	24.1	62.9	62.9	37.8	37.8
Actuated g/C Ratio	0.24	0.24	0.63	0.63	0.38	0.38
Clearance Time (s)	7.0	7.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	427	386	571	2229	1327	611
v/s Ratio Prot			c0.19	0.22	0.21	
v/s Ratio Perm	c0.21	0.03	c0.37			0.17
v/c Ratio	0.88	0.11	0.89	0.34	0.54	0.45
Uniform Delay, d1	36.6	29.6	15.2	8.8	24.3	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.21	4.19
Incremental Delay, d2	22.7	0.1	19.7	0.4	1.2	1.9
Delay (s)	59.3	29.7	34.9	9.2	30.8	99.5
Level of Service	E	C	C	A	C	F
Approach Delay (s)	49.6			19.5	63.8	
Approach LOS	D			B	E	

Intersection Summary			
HCM Average Control Delay	43.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	33	34	418	50	206	34	872	235	86	934	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0	6.0	6.0	4.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.94		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1762		1789	1656		1789	3579	1601	1789	3574	
Flt Permitted		0.93		0.70	1.00		0.24	1.00	1.00	0.14	1.00	
Satd. Flow (perm)		1653		1324	1656		450	3579	1601	266	3574	
Peak-hour factor, PHF	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. Flow (vph)	16	33	34	418	50	206	34	872	235	86	934	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	91	0	0	0
Lane Group Flow (vph)	0	83	0	418	256	0	34	872	144	86	942	0
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		46.0		46.0	46.0		33.0	33.0	33.0	42.0	42.0	
Effective Green, g (s)		46.0		46.0	46.0		33.0	33.0	33.0	42.0	42.0	
Actuated g/C Ratio		0.46		0.46	0.46		0.33	0.33	0.33	0.42	0.42	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)		760		609	762		149	1181	528	188	1501	
v/s Ratio Prot					0.15			c0.24		0.02	c0.26	
v/s Ratio Perm		0.05		c0.32			0.08		0.09	0.17		
v/c Ratio		0.11		0.69	0.34		0.23	0.74	0.27	0.46	0.63	
Uniform Delay, d1		15.4		21.3	17.2		24.3	29.7	24.7	20.2	22.8	
Progression Factor		1.00		1.00	1.00		0.69	0.70	0.43	1.00	1.00	
Incremental Delay, d2		0.3		6.4	1.2		3.1	3.8	1.1	8.0	2.0	
Delay (s)		15.6		27.7	18.4		19.8	24.4	11.7	28.2	24.9	
Level of Service		B		C	B		B	C	B	C	C	
Approach Delay (s)		15.6			24.2			21.7			25.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Appendix III

Multi-Use Trip Calculation

PM Peak Hour

Multi-Use Trip Generation Calculation (based on the ITE Trip Generation Handbook, Chapter 5)

City of Vaughan - Woodbridge Core Focus Area

Please be noted that trips presented below are auto trips only (i.e. 20% non-auto modal split factor was applied)

Retail Land Use
ITE Land Use Code 820
Size 131,320 sf

	Total	Internal	External
Enter	299	27	272
Exit	312	37	275
Total	611	**64**	547
%	100%	10.5%	89.5%

Exit to External 275 ← / → 272 Enter from External

Demand 9% 27 ← / → 12% 37 Demand
Balanced 27 / 37 Balanced
Demand 53% 36 ← / → 31% 43 Demand

Residential Land Use
ITE Land Use Code 230
Size 589 Units

	Total	Internal	External
Enter	138	37	101
Exit	68	27	41
Total	206	**64**	142
%	100%	31.1%	68.9%

Enter from External 101 ← / → 41 Exit to External

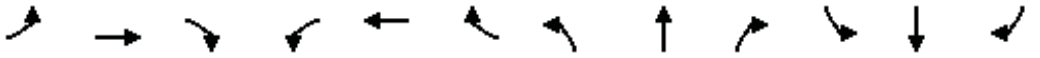
Net External Trips for Multi-Use Development

	Retail Land Use	Residential Land Use	Total
Enter	272	101	373
Exit	275	41	316
Total	547	142	689
Single-Use Trip Generation Estimate	611	206	817
Interaction Trips Reduction	-64	-64	-128

Appendix IV

Intersection Capacity Analysis

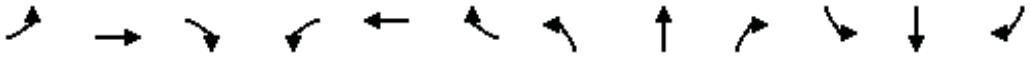
(Future 2031 Condition)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	1469	50	48	1781	132	45	54	49	463	55	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1690	3380	1512	1789	3380	1526	1755	1751			3207	
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.13	1.00			0.77	
Satd. Flow (perm)	121	3380	1512	131	3380	1526	237	1751			2515	
Peak-hour factor, PHF	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. Flow (vph)	122	1469	50	48	1781	132	45	54	49	463	55	425
RTOR Reduction (vph)	0	0	19	0	0	31	0	0	0	0	0	0
Lane Group Flow (vph)	122	1469	31	48	1781	101	45	103	0	0	943	0
Heavy Vehicles (%)	8%	8%	8%	2%	8%	7%	4%	0%	4%	2%	6%	5%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	63.6	58.6	58.6	61.6	57.6	57.6	41.4	41.4			41.4	
Effective Green, g (s)	63.6	58.6	58.6	61.6	57.6	57.6	41.4	41.4			41.4	
Actuated g/C Ratio	0.53	0.49	0.49	0.51	0.48	0.48	0.34	0.34			0.34	
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	130	1651	738	123	1622	732	82	604			868	
v/s Ratio Prot	c0.04	0.43		0.01	c0.53			0.06				
v/s Ratio Perm	0.46		0.02	0.19		0.07	0.19				c0.37	
v/c Ratio	0.94	0.89	0.04	0.39	1.10	0.14	0.55	0.17			1.09	
Uniform Delay, d1	59.4	27.8	16.0	21.5	31.2	17.4	31.8	27.4			39.3	
Progression Factor	1.00	1.00	1.00	1.33	0.67	0.99	1.00	1.00			1.00	
Incremental Delay, d2	99.0	6.9	0.0	1.5	185.0	0.1	25.9	0.6			178.3	
Delay (s)	158.4	34.6	16.1	30.2	206.0	17.2	57.6	28.0			217.6	
Level of Service	F	C	B	C	F	B	E	C			F	
Approach Delay (s)		43.3			189.0			37.0			217.6	
Approach LOS		D			F			D			F	

Intersection Summary			
HCM Average Control Delay	139.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	60		

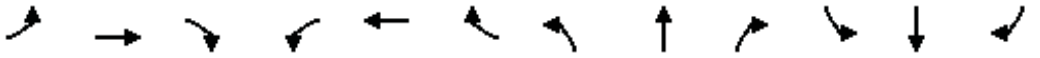
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	36	36	109	14	252	13	202	76	246	387	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.95			0.91			0.96			1.00	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1768			1688			1813			1843	
Flt Permitted		0.81			0.87			0.97			0.77	
Satd. Flow (perm)		1447			1482			1755			1441	
Peak-hour factor, PHF	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. Flow (vph)	31	36	36	109	14	252	13	202	76	246	387	15
RTOR Reduction (vph)	0	26	0	0	105	0	0	18	0	0	1	0
Lane Group Flow (vph)	0	77	0	0	270	0	0	273	0	0	647	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.8			19.8			36.2			36.2	
Effective Green, g (s)		19.8			19.8			36.2			36.2	
Actuated g/C Ratio		0.28			0.28			0.52			0.52	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Lane Grp Cap (vph)		409			419			908			745	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.18			0.16			c0.45	
v/c Ratio		0.19			0.64			0.30			0.87	
Uniform Delay, d1		19.0			22.0			9.7			14.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			7.7			0.9			14.9	
Delay (s)		20.0			29.7			10.5			29.7	
Level of Service		C			C			B			C	
Approach Delay (s)		20.0			29.7			10.5			29.7	
Approach LOS		C			C			B			C	

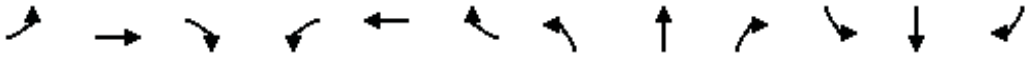
Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group



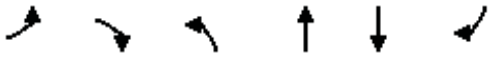
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	324	186	201	166	87	102	178	147	110	506	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1706	1779		1789	1677		1772	1671		1659	1777	
Flt Permitted	0.58	1.00		0.31	1.00		0.19	1.00		0.50	1.00	
Satd. Flow (perm)	1039	1779		576	1677		346	1671		869	1777	
Peak-hour factor, PHF	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. Flow (vph)	56	324	186	201	166	87	102	178	147	110	506	129
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	56	487	0	201	253	0	102	325	0	110	635	0
Heavy Vehicles (%)	7%	1%	4%	2%	10%	6%	3%	9%	5%	10%	5%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	38.0	38.0		38.0	38.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.42	0.42		0.42	0.42	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Grp Cap (vph)	439	751		243	708		146	706		367	750	
v/s Ratio Prot		0.27			0.15			0.19			c0.36	
v/s Ratio Perm	0.05			c0.35			0.29			0.13		
v/c Ratio	0.13	0.65		0.83	0.36		0.70	0.46		0.30	0.85	
Uniform Delay, d1	15.9	20.7		23.1	17.7		21.3	18.6		17.2	23.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	4.4		32.1	1.4		27.2	2.2		2.1	12.7	
Delay (s)	16.5	25.1		55.2	19.1		48.5	20.8		19.3	36.1	
Level of Service	B	C		E	B		D	C		B	D	
Approach Delay (s)		24.2			35.1			27.4			33.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	597	1	4	298	90	5	2	9	466	1	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.92			0.98	
Flt Protected		1.00			1.00	1.00		0.98			0.96	
Satd. Flow (prot)		1823			1865	1601		1748			1772	
Flt Permitted		0.98			0.99	1.00		0.88			0.74	
Satd. Flow (perm)		1787			1849	1601		1555			1369	
Peak-hour factor, PHF	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. Flow (vph)	23	597	1	4	298	90	5	2	9	466	1	63
RTOR Reduction (vph)	0	0	0	0	0	57	0	0	0	0	0	0
Lane Group Flow (vph)	0	621	0	0	302	33	0	16	0	0	530	0
Heavy Vehicles (%)	36%	4%	0%	0%	3%	2%	0%	0%	0%	1%	0%	11%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		26.0			26.0	26.0		30.0			30.0	
Effective Green, g (s)		26.0			26.0	26.0		30.0			30.0	
Actuated g/C Ratio		0.37			0.37	0.37		0.43			0.43	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		664			687	595		666			587	
v/s Ratio Prot												
v/s Ratio Perm		c0.35			0.16	0.02		0.01			c0.39	
v/c Ratio		0.94			0.44	0.06		0.02			0.90	
Uniform Delay, d1		21.2			16.5	14.1		11.5			18.6	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		30.9			2.1	0.2		0.1			25.0	
Delay (s)		52.1			18.6	14.3		11.6			43.6	
Level of Service		D			B	B		B			D	
Approach Delay (s)		52.1			17.6			11.6			43.6	
Approach LOS		D			B			B			D	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	40	233	54	60	297	235
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	40	233	54	60	297	235

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	273	114	532
Volume Left (vph)	40	54	0
Volume Right (vph)	233	0	235
Hadj (s)	-0.45	0.13	-0.23
Departure Headway (s)	5.0	5.4	4.6
Degree Utilization, x	0.38	0.17	0.68
Capacity (veh/h)	662	615	763
Control Delay (s)	11.0	9.6	17.0
Approach Delay (s)	11.0	9.6	17.0
Approach LOS	B	A	C

Intersection Summary			
Delay	14.3		
HCM Level of Service	B		
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	427	53	52	275	52	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	427	53	52	275	52	51

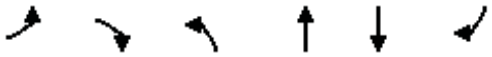
Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	427	53	327	103
Volume Left (vph)	0	0	52	52
Volume Right (vph)	0	53	0	51
Hadj (s)	0.03	-0.67	0.07	-0.16
Departure Headway (s)	5.1	4.4	4.9	5.6
Degree Utilization, x	0.61	0.07	0.45	0.16
Capacity (veh/h)	681	791	709	565
Control Delay (s)	14.8	6.5	11.9	9.6
Approach Delay (s)	13.9		11.9	9.6
Approach LOS	B		B	A

Intersection Summary			
Delay	12.7		
HCM Level of Service	B		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	1386	285	96	1322	144	95	403	98	312	967	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1601	1789	3318	1484	1772	3579	1526	1807	3544	1601
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.17	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	135	3380	1601	146	3318	1484	322	3579	1526	600	3544	1601
Peak-hour factor, PHF	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. Flow (vph)	88	1386	285	96	1322	144	95	403	98	312	967	168
RTOR Reduction (vph)	0	0	80	0	0	14	0	0	77	0	0	70
Lane Group Flow (vph)	88	1386	205	96	1322	130	95	403	21	312	967	98
Heavy Vehicles (%)	10%	8%	2%	2%	10%	10%	3%	2%	7%	1%	3%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	55.6	51.6	51.6	55.6	51.6	51.6	27.6	23.2	23.2	45.4	36.0	36.0
Effective Green, g (s)	55.6	51.6	51.6	55.6	51.6	51.6	27.6	23.2	23.2	45.4	36.0	36.0
Actuated g/C Ratio	0.46	0.43	0.43	0.46	0.43	0.43	0.23	0.19	0.19	0.38	0.30	0.30
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	113	1453	688	122	1427	638	127	692	295	400	1063	480
v/s Ratio Prot	0.03	c0.41		c0.03	0.40		0.03	0.11		c0.11	c0.27	
v/s Ratio Perm	0.33		0.13	0.34		0.09	0.14		0.01	0.18		0.06
v/c Ratio	0.78	0.95	0.30	0.79	0.93	0.20	0.75	0.58	0.07	0.78	0.91	0.20
Uniform Delay, d1	25.0	33.1	22.4	26.0	32.4	21.4	40.4	44.0	39.6	28.8	40.4	31.3
Progression Factor	1.71	1.41	1.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.4	8.3	0.1	32.7	12.6	0.2	23.8	3.6	0.5	10.1	15.6	1.0
Delay (s)	56.2	54.8	43.5	58.7	45.0	21.5	64.2	47.6	40.1	38.9	56.0	32.3
Level of Service	E	D	D	E	D	C	E	D	D	D	E	C
Approach Delay (s)		53.0			43.7			49.0			49.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group



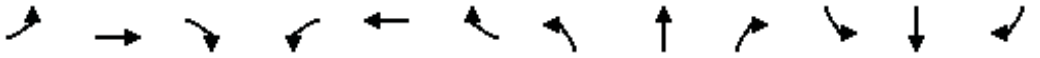
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	663	430	91	450	970	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1807	1570	1659	3411	3544	1601
Flt Permitted	0.95	1.00	0.19	1.00	1.00	1.00
Satd. Flow (perm)	1807	1570	338	3411	3544	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	663	430	91	450	970	313
RTOR Reduction (vph)	0	33	0	0	0	167
Lane Group Flow (vph)	663	397	91	450	970	146
Heavy Vehicles (%)	1%	4%	10%	7%	3%	2%
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	42.0	42.0	44.0	44.0	44.0	44.0
Effective Green, g (s)	42.0	42.0	44.0	44.0	44.0	44.0
Actuated g/C Ratio	0.42	0.42	0.44	0.44	0.44	0.44
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Grp Cap (vph)	759	659	149	1501	1559	704
v/s Ratio Prot	c0.37			0.13	c0.27	
v/s Ratio Perm		0.25	0.27			0.09
v/c Ratio	0.87	0.60	0.61	0.30	0.62	0.21
Uniform Delay, d1	26.6	22.5	21.4	18.1	21.6	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.3	4.1	18.5	0.5	1.9	0.7
Delay (s)	41.9	26.6	39.9	18.6	23.5	17.9
Level of Service	D	C	D	B	C	B
Approach Delay (s)	35.9			22.2	22.1	
Approach LOS	D			C	C	

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	19	7	156	56	50	60	863	190	132	1120	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.96		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1851		1825	1785		1825	3579	1633	1772	3505	
Flt Permitted		1.00		0.74	1.00		0.22	1.00	1.00	0.31	1.00	
Satd. Flow (perm)		1851		1422	1785		429	3579	1633	587	3505	
Peak-hour factor, PHF	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. Flow (vph)	0	19	7	156	56	50	60	863	190	132	1120	14
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	58	0	0	0
Lane Group Flow (vph)	0	26	0	156	106	0	60	863	132	132	1134	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.6		15.6	15.6		65.2	65.2	65.2	65.2	65.2	
Effective Green, g (s)		15.6		15.6	15.6		65.2	65.2	65.2	65.2	65.2	
Actuated g/C Ratio		0.17		0.17	0.17		0.70	0.70	0.70	0.70	0.70	
Clearance Time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		308		236	297		298	2488	1135	408	2436	
v/s Ratio Prot		0.01			0.06			0.24			c0.32	
v/s Ratio Perm				c0.11			0.14		0.08	0.22		
v/c Ratio		0.08		0.66	0.36		0.20	0.35	0.12	0.32	0.47	
Uniform Delay, d1		33.1		36.6	34.7		5.1	5.7	4.7	5.6	6.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		7.0	0.7		1.5	0.4	0.2	2.1	0.6	
Delay (s)		33.2		43.6	35.4		6.6	6.1	5.0	7.7	7.1	
Level of Service		C		D	D		A	A	A	A	A	
Approach Delay (s)		33.2			40.3			6.0			7.2	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	93.8	Sum of lost time (s)	13.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	60		

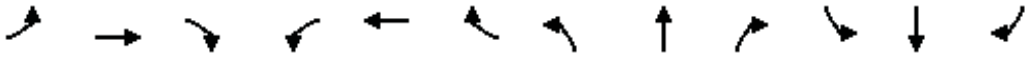
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	392	2024	104	119	1494	383	40	102	66	254	110	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1825	3476	1633	1807	3411	1585	1772	1772			3333	
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.23	1.00			0.72	
Satd. Flow (perm)	135	3476	1633	141	3411	1585	432	1772			2448	
Peak-hour factor, PHF	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. Flow (vph)	392	2024	104	119	1494	383	40	102	66	254	110	233
RTOR Reduction (vph)	0	0	30	0	0	109	0	0	0	0	0	0
Lane Group Flow (vph)	392	2024	74	119	1494	274	40	168	0	0	597	0
Heavy Vehicles (%)	0%	5%	0%	1%	7%	3%	3%	2%	2%	0%	3%	1%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	78.0	70.0	70.0	59.0	54.0	54.0	29.0	29.0			29.0	
Effective Green, g (s)	78.0	70.0	70.0	59.0	54.0	54.0	29.0	29.0			29.0	
Actuated g/C Ratio	0.65	0.58	0.58	0.49	0.45	0.45	0.24	0.24			0.24	
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	384	2028	953	139	1535	713	104	428			592	
v/s Ratio Prot	c0.18	0.58		0.04	0.44			0.09				
v/s Ratio Perm	c0.49		0.05	0.39		0.17	0.09				c0.24	
v/c Ratio	1.02	1.00	0.08	0.86	0.97	0.38	0.38	0.39			1.01	
Uniform Delay, d1	39.9	24.9	10.9	27.6	32.3	21.9	38.0	38.1			45.5	
Progression Factor	1.00	1.00	1.00	1.21	1.04	1.57	1.00	1.00			1.00	
Incremental Delay, d2	113.4	37.9	0.0	31.2	17.8	0.2	10.7	2.7			82.3	
Delay (s)	153.4	62.8	10.9	64.6	51.4	34.6	48.8	40.8			127.8	
Level of Service	F	E	B	E	D	C	D	D			F	
Approach Delay (s)		74.8			49.0			42.4			127.8	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM Average Control Delay	69.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	60		

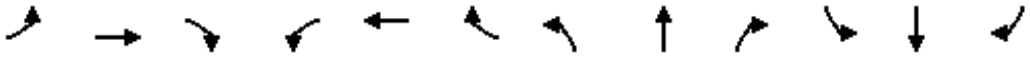
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	22	20	97	34	292	29	392	195	154	294	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.91			0.96			0.99	
Flt Protected		0.98			0.99			1.00			0.98	
Satd. Flow (prot)		1774			1689			1799			1837	
Flt Permitted		0.80			0.90			0.96			0.62	
Satd. Flow (perm)		1442			1541			1738			1159	
Peak-hour factor, PHF	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. Flow (vph)	22	22	20	97	34	292	29	392	195	154	294	31
RTOR Reduction (vph)	0	14	0	0	89	0	0	19	0	0	3	0
Lane Group Flow (vph)	0	50	0	0	334	0	0	597	0	0	476	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			49.0			49.0	
Effective Green, g (s)		27.0			27.0			49.0			49.0	
Actuated g/C Ratio		0.30			0.30			0.54			0.54	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Lane Grp Cap (vph)		433			462			946			631	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.22			0.34			c0.41	
v/c Ratio		0.12			0.72			0.63			0.75	
Uniform Delay, d1		22.8			28.2			14.2			15.9	
Progression Factor		1.00			1.00			0.90			1.00	
Incremental Delay, d2		0.5			10.0			1.2			8.6	
Delay (s)		23.4			38.1			14.0			24.5	
Level of Service		C			D			B			C	
Approach Delay (s)		23.4			38.1			14.0			24.5	
Approach LOS		C			D			B			C	

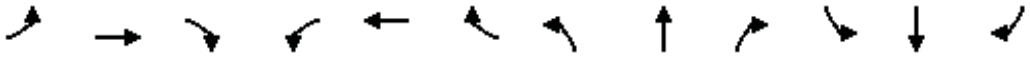
Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	106.9%	ICU Level of Service	G
Analysis Period (min)	60		

c Critical Lane Group



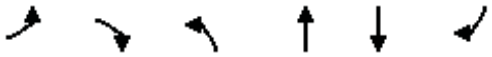
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	127	251	96	220	368	148	178	439	253	127	308	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1828		1789	1792		1789	1798		1738	1807	
Flt Permitted	0.22	1.00		0.23	1.00		0.42	1.00		0.11	1.00	
Satd. Flow (perm)	415	1828		428	1792		795	1798		203	1807	
Peak-hour factor, PHF	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. Flow (vph)	127	251	96	220	368	148	178	439	253	127	308	75
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	127	332	0	220	516	0	178	692	0	127	383	0
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	2%	1%	1%	5%	4%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.0	19.0		33.0	27.0		40.0	36.0		40.0	36.0	
Effective Green, g (s)	22.0	19.0		33.0	27.0		40.0	36.0		40.0	36.0	
Actuated g/C Ratio	0.24	0.21		0.37	0.30		0.44	0.40		0.44	0.40	
Clearance Time (s)	3.0	7.0		3.0	7.0		3.0	7.0		3.0	7.0	
Lane Grp Cap (vph)	148	386		323	538		398	719		158	723	
v/s Ratio Prot	c0.03	0.18		0.08	c0.29		0.02	c0.38		c0.04	0.21	
v/s Ratio Perm	0.18			0.17			0.18			0.32		
v/c Ratio	0.86	0.86		0.68	0.96		0.45	0.96		0.80	0.53	
Uniform Delay, d1	32.4	34.2		21.8	31.0		17.3	26.3		19.7	20.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.87	0.92	
Incremental Delay, d2	59.6	26.0		11.7	47.6		3.6	40.2		34.6	2.3	
Delay (s)	92.0	60.2		33.4	78.6		21.0	66.6		51.8	21.1	
Level of Service	F	E		C	E		C	E		D	C	
Approach Delay (s)		68.7			65.1			57.2			28.8	
Approach LOS		E			E			E			C	

Intersection Summary			
HCM Average Control Delay	56.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	525	5	6	741	555	5	1	5	140	1	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.94			0.95	
Flt Protected		0.99			1.00	1.00		0.98			0.97	
Satd. Flow (prot)		1885			1901	1633		1763			1735	
Flt Permitted		0.64			1.00	1.00		0.85			0.79	
Satd. Flow (perm)		1214			1894	1633		1538			1424	
Peak-hour factor, PHF	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. Flow (vph)	105	525	5	6	741	555	5	1	5	140	1	71
RTOR Reduction (vph)	0	0	0	0	0	197	0	0	0	0	0	0
Lane Group Flow (vph)	0	635	0	0	747	358	0	11	0	0	212	0
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	0%	0%	2%	1%	3%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		58.0			58.0	58.0		18.0			18.0	
Effective Green, g (s)		58.0			58.0	58.0		18.0			18.0	
Actuated g/C Ratio		0.64			0.64	0.64		0.20			0.20	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		782			1221	1052		308			285	
v/s Ratio Prot												
v/s Ratio Perm		c0.52			0.39	0.22		0.01			c0.15	
v/c Ratio		0.81			0.61	0.34		0.04			0.74	
Uniform Delay, d1		11.9			9.4	7.3		29.0			33.8	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		9.7			2.3	0.9		0.2			17.7	
Delay (s)		21.6			11.7	8.2		29.2			51.5	
Level of Service		C			B	A		C			D	
Approach Delay (s)		21.6			10.2			29.2			51.5	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	216	52	250	382	222	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	216	52	250	382	222	80

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	268	632	302
Volume Left (vph)	216	250	0
Volume Right (vph)	52	0	80
Hadj (s)	0.08	0.11	-0.12
Departure Headway (s)	6.4	5.4	5.7
Degree Utilization, x	0.48	0.95	0.48
Capacity (veh/h)	545	655	619
Control Delay (s)	15.3	72.0	13.8
Approach Delay (s)	15.3	72.0	13.8
Approach LOS	C	F	B

Intersection Summary			
Delay	44.7		
HCM Level of Service	E		
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	395	60	53	512	63	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	395	60	53	512	63	55

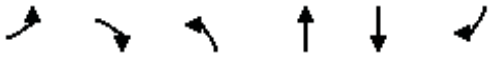
Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	395	60	565	118
Volume Left (vph)	0	0	53	63
Volume Right (vph)	0	60	0	55
Hadj (s)	0.03	-0.67	0.05	-0.14
Departure Headway (s)	5.5	4.8	5.0	6.1
Degree Utilization, x	0.60	0.08	0.79	0.20
Capacity (veh/h)	639	733	709	538
Control Delay (s)	15.3	7.0	25.7	10.7
Approach Delay (s)	14.2		25.7	10.7
Approach LOS	B		D	B

Intersection Summary			
Delay	19.6		
HCM Level of Service	C		
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	1539	181	129	1527	262	145	787	61	174	572	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3510	1617	1807	3476	1617	1825	3614	1541	1807	3510	1585
Flt Permitted	0.07	1.00	1.00	0.07	1.00	1.00	0.27	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	135	3510	1617	139	3476	1617	516	3614	1541	255	3510	1585
Peak-hour factor, PHF	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. Flow (vph)	174	1539	181	129	1527	262	145	787	61	174	572	98
RTOR Reduction (vph)	0	0	60	0	0	23	0	0	24	0	0	73
Lane Group Flow (vph)	174	1539	121	129	1527	239	145	787	37	174	572	25
Heavy Vehicles (%)	0%	4%	1%	1%	5%	1%	0%	1%	6%	1%	4%	3%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	63.9	56.9	56.9	59.9	54.9	54.9	39.0	31.0	31.0	37.2	30.1	30.1
Effective Green, g (s)	63.9	56.9	56.9	59.9	54.9	54.9	39.0	31.0	31.0	37.2	30.1	30.1
Actuated g/C Ratio	0.53	0.47	0.47	0.50	0.46	0.46	0.32	0.26	0.26	0.31	0.25	0.25
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	1664	767	139	1590	740	255	934	398	171	880	398
v/s Ratio Prot	c0.06	0.44		0.04	0.44		c0.04	0.22		c0.06	0.16	
v/s Ratio Perm	c0.48		0.07	0.43		0.15	0.15		0.02	c0.26		0.02
v/c Ratio	1.02	0.92	0.16	0.93	0.96	0.32	0.57	0.84	0.09	1.02	0.65	0.06
Uniform Delay, d1	32.3	29.5	17.9	25.8	31.5	20.7	30.4	42.2	33.8	36.8	40.2	34.2
Progression Factor	1.42	1.30	2.06	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	95.4	2.9	0.0	87.1	20.0	0.3	2.9	10.0	0.5	155.5	3.8	0.3
Delay (s)	141.1	41.5	36.9	112.9	51.5	21.0	33.3	52.2	34.3	192.4	44.0	34.5
Level of Service	F	D	D	F	D	C	C	D	C	F	D	C
Approach Delay (s)		50.2			51.5			48.3			73.5	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	53.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	60		

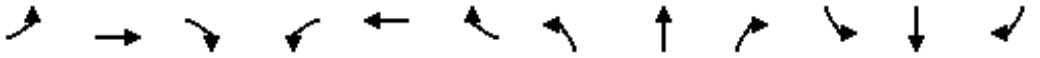
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	479	211	540	800	750	747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	3.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1772	1601	1789	3544	3510	1617
Flt Permitted	0.95	1.00	0.19	1.00	1.00	1.00
Satd. Flow (perm)	1772	1601	349	3544	3510	1617
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	479	211	540	800	750	747
RTOR Reduction (vph)	0	150	0	0	0	446
Lane Group Flow (vph)	479	61	540	800	750	301
Heavy Vehicles (%)	3%	2%	2%	3%	4%	1%
Turn Type		custom	pm+pt			Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	29.0	29.0	58.0	58.0	30.4	30.4
Effective Green, g (s)	29.0	29.0	58.0	58.0	30.4	30.4
Actuated g/C Ratio	0.29	0.29	0.58	0.58	0.30	0.30
Clearance Time (s)	7.0	7.0	3.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	514	464	557	2056	1067	492
v/s Ratio Prot			c0.24	0.23	0.21	
v/s Ratio Perm	c0.27	0.04	c0.32			0.19
v/c Ratio	0.93	0.13	0.97	0.39	0.70	0.61
Uniform Delay, d1	34.5	26.2	23.8	11.4	30.8	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.12	3.01
Incremental Delay, d2	33.4	0.1	50.2	0.6	2.9	4.2
Delay (s)	68.0	26.3	74.0	11.9	37.3	93.9
Level of Service	E	C	E	B	D	F
Approach Delay (s)	55.2			37.0	65.5	
Approach LOS	E			D	E	

Intersection Summary			
HCM Average Control Delay	52.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	33	34	443	50	220	34	990	255	95	1019	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0	6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.94		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1762		1789	1653		1789	3579	1601	1789	3574	
Flt Permitted		0.93		0.70	1.00		0.20	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		1648		1324	1653		379	3579	1601	223	3574	
Peak-hour factor, PHF	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. Flow (vph)	16	33	34	443	50	220	34	990	255	95	1019	8
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	87	0	0	0
Lane Group Flow (vph)	0	83	0	443	270	0	34	990	168	95	1027	0
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		44.0		44.0	44.0		36.0	36.0	36.0	44.0	44.0	
Effective Green, g (s)		44.0		44.0	44.0		36.0	36.0	36.0	44.0	44.0	
Actuated g/C Ratio		0.44		0.44	0.44		0.36	0.36	0.36	0.44	0.44	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)		725		583	727		136	1288	576	176	1573	
v/s Ratio Prot					0.16			c0.28		0.03	c0.29	
v/s Ratio Perm		0.05		c0.33			0.09		0.10	0.21		
v/c Ratio		0.11		0.76	0.37		0.25	0.77	0.29	0.54	0.65	
Uniform Delay, d1		16.5		23.6	18.7		22.5	28.3	22.9	19.8	22.0	
Progression Factor		1.00		1.00	1.00		0.66	0.67	0.42	1.00	1.00	
Incremental Delay, d2		0.3		9.6	1.5		3.6	3.8	1.1	11.8	2.1	
Delay (s)		16.8		33.1	20.2		18.4	22.8	10.7	31.6	24.1	
Level of Service		B		C	C		B	C	B	C	C	
Approach Delay (s)		16.8			28.2			20.3			24.8	
Approach LOS		B			C			C			C	

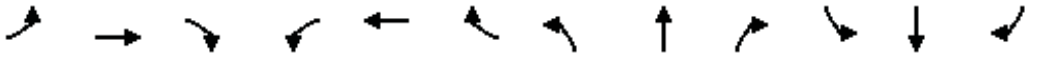
Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

Appendix V

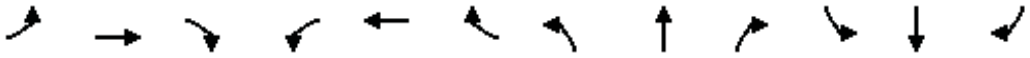
Intersection Capacity Analysis

(Future 2031 Condition – 30% Non-Auto Modal Split)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	1469	50	48	1781	132	45	54	49	463	55	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1690	3380	1512	1789	3380	1526	1755	1752			3207	
Flt Permitted	0.07	1.00	1.00	0.10	1.00	1.00	0.17	1.00			0.77	
Satd. Flow (perm)	119	3380	1512	190	3380	1526	306	1752			2530	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	110	1322	45	43	1603	119	40	49	44	417	50	382
RTOR Reduction (vph)	0	0	20	0	0	31	0	0	0	0	0	0
Lane Group Flow (vph)	110	1322	25	43	1603	88	40	93	0	0	849	0
Heavy Vehicles (%)	8%	8%	8%	2%	8%	7%	4%	0%	4%	2%	6%	5%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	64.6	59.6	59.6	62.6	58.6	58.6	40.4	40.4			40.4	
Effective Green, g (s)	64.6	59.6	59.6	62.6	58.6	58.6	40.4	40.4			40.4	
Actuated g/C Ratio	0.54	0.50	0.50	0.52	0.49	0.49	0.34	0.34			0.34	
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	130	1679	751	152	1651	745	103	590			852	
v/s Ratio Prot	c0.04	0.39		0.01	c0.47			0.05				
v/s Ratio Perm	0.42		0.02	0.14		0.06	0.13				c0.34	
v/c Ratio	0.85	0.79	0.03	0.28	0.97	0.12	0.39	0.16			1.00	
Uniform Delay, d1	25.4	25.0	15.5	18.3	29.9	16.7	30.4	27.9			39.7	
Progression Factor	1.00	1.00	1.00	0.89	0.62	0.90	1.00	1.00			1.00	
Incremental Delay, d2	48.3	2.6	0.0	0.8	19.8	0.1	11.0	0.6			58.5	
Delay (s)	73.7	27.5	15.5	17.1	38.4	15.0	41.4	28.5			98.2	
Level of Service	E	C	B	B	D	B	D	C			F	
Approach Delay (s)		30.6			36.3			32.3			98.2	
Approach LOS		C			D			C			F	

Intersection Summary			
HCM Average Control Delay	46.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			



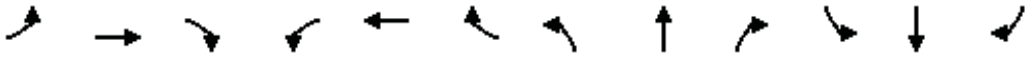
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	36	36	109	14	252	13	202	76	246	387	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.95			0.91			0.96			1.00	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1768			1688			1813			1842	
Flt Permitted		0.83			0.87			0.97			0.78	
Satd. Flow (perm)		1497			1489			1761			1459	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	28	32	32	98	13	227	12	182	68	221	348	14
RTOR Reduction (vph)	0	23	0	0	105	0	0	18	0	0	1	0
Lane Group Flow (vph)	0	69	0	0	233	0	0	244	0	0	582	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.8			19.8			36.2			36.2	
Effective Green, g (s)		19.8			19.8			36.2			36.2	
Actuated g/C Ratio		0.28			0.28			0.52			0.52	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Lane Grp Cap (vph)		423			421			911			755	
v/s Ratio Prot												
v/s Ratio Perm		0.05			c0.16			0.14			c0.40	
v/c Ratio		0.16			0.55			0.27			0.77	
Uniform Delay, d1		18.9			21.3			9.5			13.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.8			5.2			0.7			7.8	
Delay (s)		19.7			26.6			10.2			21.4	
Level of Service		B			C			B			C	
Approach Delay (s)		19.7			26.6			10.2			21.4	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	324	186	201	166	87	102	178	147	110	506	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1706	1779		1789	1677		1772	1671		1659	1777	
Flt Permitted	0.61	1.00		0.36	1.00		0.25	1.00		0.53	1.00	
Satd. Flow (perm)	1093	1779		672	1677		460	1671		933	1777	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	50	292	167	181	149	78	92	160	132	99	455	116
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	50	436	0	181	227	0	92	292	0	99	571	0
Heavy Vehicles (%)	7%	1%	4%	2%	10%	6%	3%	9%	5%	10%	5%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		38.0	38.0		38.0	38.0	
Effective Green, g (s)	38.0	38.0		38.0	38.0		38.0	38.0		38.0	38.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.42	0.42		0.42	0.42	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Grp Cap (vph)	461	751		284	708		194	706		394	750	
v/s Ratio Prot		0.25			0.14			0.17			c0.32	
v/s Ratio Perm	0.05			c0.27			0.20			0.11		
v/c Ratio	0.11	0.58		0.64	0.32		0.47	0.41		0.25	0.76	
Uniform Delay, d1	15.7	19.9		20.6	17.4		18.8	18.2		16.8	22.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.3		11.0	1.2		8.3	1.8		1.5	7.5	
Delay (s)	16.2	23.2		31.5	18.6		27.1	20.0		18.3	29.7	
Level of Service	B	C		C	B		C	B		B	C	
Approach Delay (s)		22.5			24.3			21.7			28.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	60		

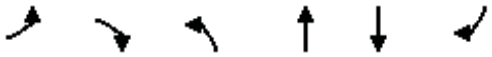
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	597	1	4	298	90	5	2	9	466	1	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.92			0.98	
Flt Protected		1.00			1.00	1.00		0.99			0.96	
Satd. Flow (prot)		1822			1865	1601		1748			1772	
Flt Permitted		0.98			0.99	1.00		0.90			0.74	
Satd. Flow (perm)		1790			1849	1601		1590			1372	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	21	537	1	4	268	81	4	2	8	419	1	57
RTOR Reduction (vph)	0	0	0	0	0	51	0	0	0	0	0	0
Lane Group Flow (vph)	0	559	0	0	272	30	0	14	0	0	477	0
Heavy Vehicles (%)	36%	4%	0%	0%	3%	2%	0%	0%	0%	1%	0%	11%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		26.0			26.0	26.0		30.0			30.0	
Effective Green, g (s)		26.0			26.0	26.0		30.0			30.0	
Actuated g/C Ratio		0.37			0.37	0.37		0.43			0.43	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		665			687	595		681			588	
v/s Ratio Prot												
v/s Ratio Perm		c0.31			0.15	0.02		0.01			c0.35	
v/c Ratio		0.84			0.40	0.05		0.02			0.81	
Uniform Delay, d1		20.1			16.2	14.1		11.5			17.5	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		13.6			1.7	0.2		0.1			12.7	
Delay (s)		33.7			17.9	14.3		11.6			30.2	
Level of Service		C			B	B		B			C	
Approach Delay (s)		33.7			17.1			11.6			30.2	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	40	233	54	60	297	235
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	36	210	49	54	267	212

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	246	103	479
Volume Left (vph)	36	49	0
Volume Right (vph)	210	0	212
Hadj (s)	-0.45	0.13	-0.23
Departure Headway (s)	4.8	5.2	4.4
Degree Utilization, x	0.33	0.15	0.59
Capacity (veh/h)	686	640	780
Control Delay (s)	10.1	9.1	13.8
Approach Delay (s)	10.1	9.1	13.8
Approach LOS	B	A	B

Intersection Summary			
Delay	12.1		
HCM Level of Service	B		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	427	53	52	275	52	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	384	48	47	248	47	46

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	384	48	294	93
Volume Left (vph)	0	0	47	47
Volume Right (vph)	0	48	0	46
Hadj (s)	0.03	-0.67	0.07	-0.16
Departure Headway (s)	5.1	4.3	4.8	5.4
Degree Utilization, x	0.54	0.06	0.39	0.14
Capacity (veh/h)	692	805	723	586
Control Delay (s)	12.7	6.4	11.0	9.3
Approach Delay (s)	12.0		11.0	9.3
Approach LOS	B		B	A

Intersection Summary			
Delay	11.3		
HCM Level of Service	B		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	60		

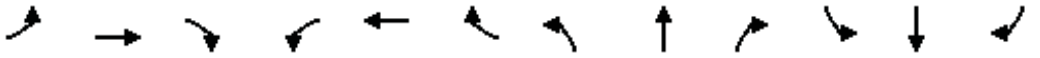
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	1386	285	96	1322	144	95	403	98	312	967	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1601	1789	3318	1484	1772	3579	1526	1807	3544	1601
Flt Permitted	0.10	1.00	1.00	0.08	1.00	1.00	0.21	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	172	3380	1601	149	3318	1484	396	3579	1526	696	3544	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	79	1247	256	86	1190	130	86	363	88	281	870	151
RTOR Reduction (vph)	0	0	105	0	0	14	0	0	70	0	0	80
Lane Group Flow (vph)	79	1247	151	86	1190	116	86	363	18	281	870	71
Heavy Vehicles (%)	10%	8%	2%	2%	10%	10%	3%	2%	7%	1%	3%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	53.6	49.6	49.6	55.6	50.6	50.6	28.7	24.5	24.5	46.4	37.2	37.2
Effective Green, g (s)	53.6	49.6	49.6	55.6	50.6	50.6	28.7	24.5	24.5	46.4	37.2	37.2
Actuated g/C Ratio	0.45	0.41	0.41	0.46	0.42	0.42	0.24	0.20	0.20	0.39	0.31	0.31
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	126	1397	662	137	1399	626	143	731	312	426	1099	496
v/s Ratio Prot	0.02	c0.37		c0.03	0.36		0.02	0.10		c0.09	c0.25	
v/s Ratio Perm	0.26		0.09	0.26		0.08	0.12		0.01	0.16		0.04
v/c Ratio	0.63	0.89	0.23	0.63	0.85	0.18	0.60	0.50	0.06	0.66	0.79	0.14
Uniform Delay, d1	23.6	32.7	22.8	24.2	31.3	21.8	37.6	42.3	38.5	27.2	37.9	29.9
Progression Factor	1.65	1.40	2.52	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	4.7	0.1	9.0	5.5	0.1	7.1	2.4	0.4	3.7	6.1	0.6
Delay (s)	44.4	50.5	57.6	33.2	36.7	21.9	44.8	44.7	38.8	31.0	44.0	30.5
Level of Service	D	D	E	C	D	C	D	D	D	C	D	C
Approach Delay (s)		51.4			35.2			43.8			39.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	663	430	91	450	970	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1807	1570	1659	3411	3544	1601
Flt Permitted	0.95	1.00	0.23	1.00	1.00	1.00
Satd. Flow (perm)	1807	1570	394	3411	3544	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	597	387	82	405	873	282
RTOR Reduction (vph)	0	38	0	0	0	164
Lane Group Flow (vph)	597	349	82	405	873	118
Heavy Vehicles (%)	1%	4%	10%	7%	3%	2%
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	44.0	44.0	42.0	42.0	42.0	42.0
Effective Green, g (s)	44.0	44.0	42.0	42.0	42.0	42.0
Actuated g/C Ratio	0.44	0.44	0.42	0.42	0.42	0.42
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Grp Cap (vph)	795	691	165	1433	1488	672
v/s Ratio Prot	c0.33			0.12	c0.25	
v/s Ratio Perm		0.22	0.21			0.07
v/c Ratio	0.75	0.50	0.50	0.28	0.59	0.18
Uniform Delay, d1	23.4	20.2	21.3	19.1	22.3	18.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.7	2.6	10.7	0.5	1.7	0.6
Delay (s)	30.1	22.8	31.9	19.6	24.0	18.7
Level of Service	C	C	C	B	C	B
Approach Delay (s)	27.3			21.7	22.7	
Approach LOS	C			C	C	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	60		

c Critical Lane Group

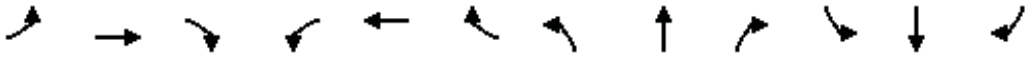


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	19	7	156	56	50	60	863	190	132	1120	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.96		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1853		1825	1785		1825	3579	1633	1772	3505	
Flt Permitted		1.00		0.74	1.00		0.26	1.00	1.00	0.35	1.00	
Satd. Flow (perm)		1853		1426	1785		501	3579	1633	656	3505	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	0	17	6	140	50	45	54	777	171	119	1008	13
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	51	0	0	0
Lane Group Flow (vph)	0	23	0	140	95	0	54	777	120	119	1021	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		14.2		14.2	14.2		63.8	63.8	63.8	63.8	63.8	
Effective Green, g (s)		14.2		14.2	14.2		63.8	63.8	63.8	63.8	63.8	
Actuated g/C Ratio		0.16		0.16	0.16		0.70	0.70	0.70	0.70	0.70	
Clearance Time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		289		223	279		351	2509	1145	460	2457	
v/s Ratio Prot		0.01			0.05			0.22			c0.29	
v/s Ratio Perm				c0.10			0.11		0.07	0.18		
v/c Ratio		0.08		0.63	0.34		0.15	0.31	0.10	0.26	0.42	
Uniform Delay, d1		32.8		35.9	34.2		4.6	5.2	4.4	5.0	5.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		5.6	0.7		0.9	0.3	0.2	1.4	0.5	
Delay (s)		32.9		41.5	35.0		5.5	5.5	4.6	6.3	6.3	
Level of Service		C		D	C		A	A	A	A	A	
Approach Delay (s)		32.9			38.9			5.4			6.3	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	60		
c Critical Lane Group			

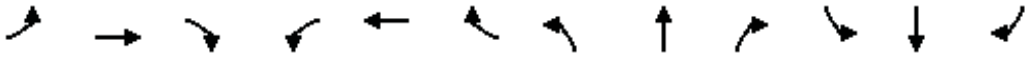
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	392	2024	104	119	1494	383	40	102	66	254	110	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1825	3476	1633	1807	3411	1585	1772	1773			3333	
Flt Permitted	0.07	1.00	1.00	0.08	1.00	1.00	0.29	1.00			0.74	
Satd. Flow (perm)	138	3476	1633	144	3411	1585	544	1773			2519	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	353	1822	94	107	1345	345	36	92	59	229	99	210
RTOR Reduction (vph)	0	0	31	0	0	108	0	0	0	0	0	0
Lane Group Flow (vph)	353	1822	63	107	1345	237	36	151	0	0	538	0
Heavy Vehicles (%)	0%	5%	0%	1%	7%	3%	3%	2%	2%	0%	3%	1%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	76.7	67.7	67.7	58.8	52.8	52.8	30.3	30.3			30.3	
Effective Green, g (s)	76.7	67.7	67.7	58.8	52.8	52.8	30.3	30.3			30.3	
Actuated g/C Ratio	0.64	0.56	0.56	0.49	0.44	0.44	0.25	0.25			0.25	
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	382	1961	921	154	1501	697	137	448			636	
v/s Ratio Prot	c0.16	c0.52		0.03	0.39			0.09				
v/s Ratio Perm	0.43		0.04	0.31		0.15	0.07				c0.21	
v/c Ratio	0.92	0.93	0.07	0.69	0.90	0.34	0.26	0.34			0.85	
Uniform Delay, d1	37.6	24.0	11.9	24.1	31.1	22.1	35.9	36.6			42.6	
Progression Factor	1.00	1.00	1.00	1.23	1.04	1.58	1.00	1.00			1.00	
Incremental Delay, d2	38.9	9.7	0.0	9.3	5.6	0.2	4.7	2.0			14.8	
Delay (s)	76.5	33.7	11.9	38.9	37.9	35.2	40.6	38.7			57.4	
Level of Service	E	C	B	D	D	D	D	D			E	
Approach Delay (s)		39.5			37.4			39.0			57.4	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	100.5%	ICU Level of Service	G
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	22	20	97	34	292	29	392	195	154	294	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.91			0.96			0.99	
Flt Protected		0.98			0.99			1.00			0.98	
Satd. Flow (prot)		1774			1689			1799			1837	
Flt Permitted		0.84			0.90			0.97			0.65	
Satd. Flow (perm)		1514			1545			1745			1217	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	20	20	18	87	31	263	26	353	176	139	265	28
RTOR Reduction (vph)	0	12	0	0	89	0	0	19	0	0	3	0
Lane Group Flow (vph)	0	46	0	0	292	0	0	536	0	0	429	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0			48.0			48.0	
Effective Green, g (s)		28.0			28.0			48.0			48.0	
Actuated g/C Ratio		0.31			0.31			0.53			0.53	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Lane Grp Cap (vph)		471			481			931			649	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.19			0.31			c0.35	
v/c Ratio		0.10			0.61			0.58			0.66	
Uniform Delay, d1		22.0			26.3			14.1			15.1	
Progression Factor		1.00			1.00			0.89			1.00	
Incremental Delay, d2		0.4			5.7			1.4			5.4	
Delay (s)		22.4			32.1			14.0			20.5	
Level of Service		C			C			B			C	
Approach Delay (s)		22.4			32.1			14.0			20.5	
Approach LOS		C			C			B			C	

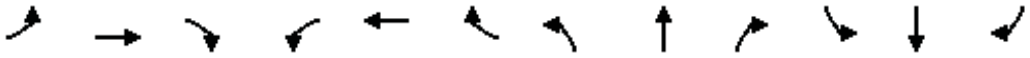
Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	97.9%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	127	251	96	220	368	148	178	439	253	127	308	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1828		1789	1792		1789	1798		1738	1806	
Flt Permitted	0.23	1.00		0.35	1.00		0.45	1.00		0.18	1.00	
Satd. Flow (perm)	447	1828		660	1792		839	1798		323	1806	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	114	226	86	198	331	133	160	395	228	114	277	68
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	114	297	0	198	464	0	160	623	0	114	345	0
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	2%	1%	1%	5%	4%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	26.0	23.0		32.0	26.0		42.0	36.0		40.0	35.0	
Effective Green, g (s)	26.0	23.0		32.0	26.0		42.0	36.0		40.0	35.0	
Actuated g/C Ratio	0.29	0.26		0.36	0.29		0.47	0.40		0.44	0.39	
Clearance Time (s)	3.0	7.0		3.0	7.0		3.0	7.0		3.0	7.0	
Lane Grp Cap (vph)	175	467		310	518		455	719		222	702	
v/s Ratio Prot	0.02	0.16		c0.04	c0.26		c0.02	c0.35		c0.03	0.19	
v/s Ratio Perm	0.17			0.18			0.14			0.20		
v/c Ratio	0.65	0.64		0.64	0.90		0.35	0.87		0.51	0.49	
Uniform Delay, d1	28.3	29.8		23.1	30.7		14.4	24.8		17.6	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.81	0.92	
Incremental Delay, d2	18.7	6.7		10.1	26.2		2.1	15.3		7.4	2.1	
Delay (s)	46.9	36.5		33.2	56.9		16.5	40.1		21.6	21.3	
Level of Service	D	D		C	E		B	D		C	C	
Approach Delay (s)		39.3			49.8			35.3			21.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	60		

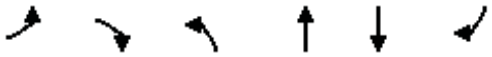
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	525	5	6	741	555	5	1	5	140	1	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.94			0.95	
Flt Protected		0.99			1.00	1.00		0.98			0.97	
Satd. Flow (prot)		1885			1902	1633		1767			1735	
Flt Permitted		0.68			1.00	1.00		0.88			0.80	
Satd. Flow (perm)		1302			1895	1633		1589			1427	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	94	472	4	5	667	500	4	1	4	126	1	64
RTOR Reduction (vph)	0	0	0	0	0	194	0	0	0	0	0	0
Lane Group Flow (vph)	0	570	0	0	672	306	0	9	0	0	191	0
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	0%	0%	2%	1%	3%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		55.0			55.0	55.0		21.0			21.0	
Effective Green, g (s)		55.0			55.0	55.0		21.0			21.0	
Actuated g/C Ratio		0.61			0.61	0.61		0.23			0.23	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		796			1158	998		371			333	
v/s Ratio Prot												
v/s Ratio Perm		c0.44			0.35	0.19		0.01			c0.13	
v/c Ratio		0.72			0.58	0.31		0.02			0.57	
Uniform Delay, d1		12.1			10.5	8.4		26.6			30.5	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		5.6			2.1	0.8		0.1			7.2	
Delay (s)		17.7			12.7	9.2		26.7			37.7	
Level of Service		B			B	A		C			D	
Approach Delay (s)		17.7			11.2			26.7			37.7	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	99.7%	ICU Level of Service	F
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	216	52	250	382	222	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	194	47	225	344	200	72

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	241	569	272
Volume Left (vph)	194	225	0
Volume Right (vph)	47	0	72
Hadj (s)	0.08	0.11	-0.12
Departure Headway (s)	6.1	5.2	5.4
Degree Utilization, x	0.41	0.83	0.41
Capacity (veh/h)	549	677	631
Control Delay (s)	13.4	31.2	12.1
Approach Delay (s)	13.4	31.2	12.1
Approach LOS	B	D	B

Intersection Summary			
Delay	22.4		
HCM Level of Service	C		
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	395	60	53	512	63	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	356	54	48	461	57	50

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	356	54	509	106
Volume Left (vph)	0	0	48	57
Volume Right (vph)	0	54	0	50
Hadj (s)	0.03	-0.67	0.05	-0.14
Departure Headway (s)	5.3	4.6	4.9	5.9
Degree Utilization, x	0.53	0.07	0.69	0.17
Capacity (veh/h)	653	753	724	534
Control Delay (s)	13.0	6.8	18.6	10.1
Approach Delay (s)	12.2		18.6	10.1
Approach LOS	B		C	B

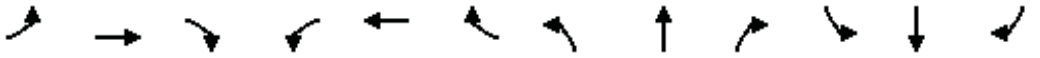
Intersection Summary			
Delay	15.1		
HCM Level of Service	C		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	1539	181	129	1527	262	145	787	61	174	572	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3510	1617	1807	3476	1617	1825	3614	1541	1807	3510	1585
Flt Permitted	0.07	1.00	1.00	0.08	1.00	1.00	0.33	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	143	3510	1617	147	3476	1617	629	3614	1541	371	3510	1585
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	157	1385	163	116	1374	236	130	708	55	157	515	88
RTOR Reduction (vph)	0	0	61	0	0	23	0	0	24	0	0	65
Lane Group Flow (vph)	157	1385	102	116	1374	213	130	708	31	157	515	23
Heavy Vehicles (%)	0%	4%	1%	1%	5%	1%	0%	1%	6%	1%	4%	3%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	61.8	53.8	53.8	57.8	51.8	51.8	40.8	32.0	32.0	39.6	31.4	31.4
Effective Green, g (s)	61.8	53.8	53.8	57.8	51.8	51.8	40.8	32.0	32.0	39.6	31.4	31.4
Actuated g/C Ratio	0.52	0.45	0.45	0.48	0.43	0.43	0.34	0.27	0.27	0.33	0.26	0.26
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	186	1574	725	154	1500	698	302	964	411	221	918	415
v/s Ratio Prot	c0.06	0.39		0.04	c0.40		c0.03	c0.20		c0.05	0.15	
v/s Ratio Perm	0.38		0.06	0.33		0.13	0.11		0.02	0.19		0.01
v/c Ratio	0.84	0.88	0.14	0.75	0.92	0.30	0.43	0.73	0.07	0.71	0.56	0.06
Uniform Delay, d1	27.4	30.2	19.5	24.4	32.1	22.3	28.6	40.1	32.9	30.8	38.3	33.2
Progression Factor	1.47	1.39	2.28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.3	2.7	0.0	20.8	10.5	0.2	1.0	5.1	0.4	10.8	2.5	0.3
Delay (s)	55.7	44.7	44.5	45.1	42.5	22.6	29.6	45.2	33.3	41.6	40.8	33.4
Level of Service	E	D	D	D	D	C	C	D	C	D	D	C
Approach Delay (s)		45.7			40.0			42.2			40.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	479	211	540	800	750	747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	3.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1772	1601	1789	3544	3510	1617
Flt Permitted	0.95	1.00	0.27	1.00	1.00	1.00
Satd. Flow (perm)	1772	1601	506	3544	3510	1617
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	431	190	486	720	675	672
RTOR Reduction (vph)	0	138	0	0	0	427
Lane Group Flow (vph)	431	52	486	720	675	245
Heavy Vehicles (%)	3%	2%	2%	3%	4%	1%
Turn Type		custom	pm+pt			Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	27.6	27.6	59.4	59.4	36.5	36.5
Effective Green, g (s)	27.6	27.6	59.4	59.4	36.5	36.5
Actuated g/C Ratio	0.28	0.28	0.59	0.59	0.36	0.36
Clearance Time (s)	7.0	7.0	3.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	489	442	556	2105	1281	590
v/s Ratio Prot			c0.17	0.20	0.19	
v/s Ratio Perm	c0.24	0.03	c0.35			0.15
v/c Ratio	0.88	0.12	0.87	0.34	0.53	0.42
Uniform Delay, d1	34.6	27.1	13.6	10.3	25.0	23.8
Progression Factor	1.00	1.00	1.00	1.00	1.19	5.36
Incremental Delay, d2	20.2	0.1	16.6	0.4	1.2	1.7
Delay (s)	54.8	27.2	30.2	10.8	30.8	129.0
Level of Service	D	C	C	B	C	F
Approach Delay (s)	46.4			18.6	79.8	
Approach LOS	D			B	E	

Intersection Summary			
HCM Average Control Delay	50.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	33	34	443	50	220	34	990	255	95	1019	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0	6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.94		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1762		1789	1653		1789	3579	1601	1789	3574	
Flt Permitted		0.93		0.71	1.00		0.26	1.00	1.00	0.15	1.00	
Satd. Flow (perm)		1663		1334	1653		487	3579	1601	286	3574	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Adj. Flow (vph)	14	30	31	399	45	198	31	891	230	86	917	7
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	87	0	0	0
Lane Group Flow (vph)	0	75	0	399	243	0	31	891	143	86	924	0
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		44.0		44.0	44.0		35.0	35.0	35.0	44.0	44.0	
Effective Green, g (s)		44.0		44.0	44.0		35.0	35.0	35.0	44.0	44.0	
Actuated g/C Ratio		0.44		0.44	0.44		0.35	0.35	0.35	0.44	0.44	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)		732		587	727		170	1253	560	216	1573	
v/s Ratio Prot					0.15			c0.25		0.02	c0.26	
v/s Ratio Perm		0.05		c0.30			0.06		0.09	0.15		
v/c Ratio		0.10		0.68	0.33		0.18	0.71	0.26	0.40	0.59	
Uniform Delay, d1		16.4		22.4	18.4		22.6	28.1	23.2	18.8	21.1	
Progression Factor		1.00		1.00	1.00		0.65	0.67	0.39	1.00	1.00	
Incremental Delay, d2		0.3		6.4	1.2		2.0	3.0	1.0	5.5	1.6	
Delay (s)		16.7		28.8	19.6		16.7	21.9	10.0	24.3	22.8	
Level of Service		B		C	B		B	C	A	C	C	
Approach Delay (s)		16.7			25.3			19.4			22.9	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	60		
c Critical Lane Group			

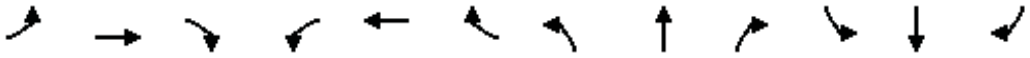
Appendix VI

Intersection Capacity Analysis

(Future 2031 Condition – 40% Non-Auto Modal Split)

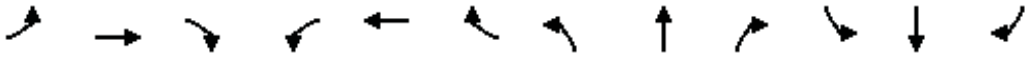
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	1469	50	48	1781	132	45	54	49	463	55	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93			0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1690	3380	1512	1789	3380	1526	1755	1751			3207	
Flt Permitted	0.07	1.00	1.00	0.15	1.00	1.00	0.22	1.00			0.77	
Satd. Flow (perm)	120	3380	1512	290	3380	1526	403	1751			2545	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	98	1175	40	38	1425	106	36	43	39	370	44	340
RTOR Reduction (vph)	0	0	19	0	0	31	0	0	0	0	0	0
Lane Group Flow (vph)	98	1175	21	38	1425	75	36	82	0	0	754	0
Heavy Vehicles (%)	8%	8%	8%	2%	8%	7%	4%	0%	4%	2%	6%	5%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	66.3	60.3	60.3	59.3	56.3	56.3	40.7	40.7			40.7	
Effective Green, g (s)	66.3	60.3	60.3	59.3	56.3	56.3	40.7	40.7			40.7	
Actuated g/C Ratio	0.55	0.50	0.50	0.49	0.47	0.47	0.34	0.34			0.34	
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	158	1698	760	181	1586	716	137	594			863	
v/s Ratio Prot	c0.04	0.35		0.01	c0.42			0.05				
v/s Ratio Perm	0.31		0.01	0.10		0.05	0.09				c0.30	
v/c Ratio	0.62	0.69	0.03	0.21	0.90	0.10	0.26	0.14			0.87	
Uniform Delay, d1	22.3	22.8	15.1	17.5	29.2	17.8	28.8	27.5			37.2	
Progression Factor	1.00	1.00	1.00	1.00	0.69	1.10	1.00	1.00			1.00	
Incremental Delay, d2	7.6	1.2	0.0	0.5	6.6	0.1	4.7	0.5			13.6	
Delay (s)	29.8	24.0	15.1	18.1	26.9	19.6	33.4	28.0			50.8	
Level of Service	C	C	B	B	C	B	C	C			D	
Approach Delay (s)		24.2			26.2			29.6			50.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	36	36	109	14	252	13	202	76	246	387	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.95			0.91			0.96			1.00	
Flt Protected		0.99			0.99			1.00			0.98	
Satd. Flow (prot)		1768			1688			1813			1843	
Flt Permitted		0.86			0.87			0.98			0.78	
Satd. Flow (perm)		1541			1494			1772			1467	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	25	29	29	87	11	202	10	162	61	197	310	12
RTOR Reduction (vph)	0	21	0	0	106	0	0	18	0	0	1	0
Lane Group Flow (vph)	0	62	0	0	194	0	0	215	0	0	518	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.8			19.8			36.2			36.2	
Effective Green, g (s)		19.8			19.8			36.2			36.2	
Actuated g/C Ratio		0.28			0.28			0.52			0.52	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Lane Grp Cap (vph)		436			423			916			759	
v/s Ratio Prot												
v/s Ratio Perm		0.04			c0.13			0.12			c0.35	
v/c Ratio		0.14			0.46			0.23			0.68	
Uniform Delay, d1		18.8			20.7			9.3			12.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.7			3.6			0.6			5.0	
Delay (s)		19.4			24.3			9.9			17.6	
Level of Service		B			C			A			B	
Approach Delay (s)		19.4			24.3			9.9			17.6	
Approach LOS		B			C			A			B	

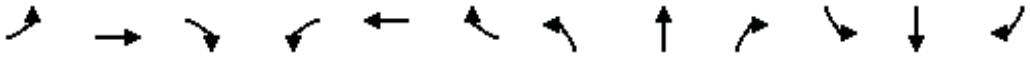
Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	56	324	186	201	166	87	102	178	147	110	506	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1706	1779		1789	1677		1772	1670		1659	1777	
Flt Permitted	0.63	1.00		0.39	1.00		0.33	1.00		0.58	1.00	
Satd. Flow (perm)	1132	1779		728	1677		623	1670		1013	1777	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	45	259	149	161	133	70	82	142	118	88	405	103
RTOR Reduction (vph)	0	23	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	45	385	0	161	203	0	82	260	0	88	508	0
Heavy Vehicles (%)	7%	1%	4%	2%	10%	6%	3%	9%	5%	10%	5%	4%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0		35.0	35.0		41.0	41.0		41.0	41.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0		41.0	41.0		41.0	41.0	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.46	0.46		0.46	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Lane Grp Cap (vph)	440	692		283	652		284	761		461	810	
v/s Ratio Prot		0.22			0.12			0.16			c0.29	
v/s Ratio Perm	0.04			c0.22			0.13			0.09		
v/c Ratio	0.10	0.56		0.57	0.31		0.29	0.34		0.19	0.63	
Uniform Delay, d1	17.5	21.4		21.6	19.1		15.4	15.8		14.6	18.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.2		8.3	1.2		2.6	1.2		0.9	3.7	
Delay (s)	18.0	24.7		29.9	20.4		17.9	17.0		15.5	22.4	
Level of Service	B	C		C	C		B	B		B	C	
Approach Delay (s)		24.0			24.6			17.2			21.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	60		

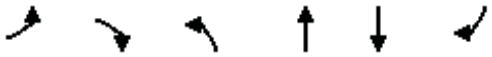
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	597	1	4	298	90	5	2	9	466	1	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.93			0.98	
Flt Protected		1.00			1.00	1.00		0.98			0.96	
Satd. Flow (prot)		1823			1865	1601		1754			1772	
Flt Permitted		0.98			0.99	1.00		0.90			0.74	
Satd. Flow (perm)		1795			1854	1601		1601			1374	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	18	478	1	3	238	72	4	2	7	373	1	50
RTOR Reduction (vph)	0	0	0	0	0	45	0	0	0	0	0	0
Lane Group Flow (vph)	0	497	0	0	241	27	0	13	0	0	424	0
Heavy Vehicles (%)	36%	4%	0%	0%	3%	2%	0%	0%	0%	1%	0%	11%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		26.0			26.0	26.0		30.0			30.0	
Effective Green, g (s)		26.0			26.0	26.0		30.0			30.0	
Actuated g/C Ratio		0.37			0.37	0.37		0.43			0.43	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		667			689	595		686			589	
v/s Ratio Prot												
v/s Ratio Perm		c0.28			0.13	0.02		0.01			c0.31	
v/c Ratio		0.75			0.35	0.04		0.02			0.72	
Uniform Delay, d1		19.1			15.9	14.1		11.5			16.5	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		7.8			1.4	0.1		0.1			7.7	
Delay (s)		26.9			17.3	14.2		11.6			24.3	
Level of Service		C			B	B		B			C	
Approach Delay (s)		26.9			16.6			11.6			24.3	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	40	233	54	60	297	235
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	32	186	43	48	238	188

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	218	91	426
Volume Left (vph)	32	43	0
Volume Right (vph)	186	0	188
Hadj (s)	-0.45	0.13	-0.23
Departure Headway (s)	4.6	5.1	4.3
Degree Utilization, x	0.28	0.13	0.51
Capacity (veh/h)	714	665	799
Control Delay (s)	9.4	8.8	11.9
Approach Delay (s)	9.4	8.8	11.9
Approach LOS	A	A	B

Intersection Summary			
Delay	10.8		
HCM Level of Service	B		
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	60		

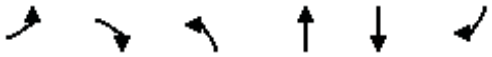
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	427	53	52	275	52	51
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	342	42	42	220	42	41

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	342	42	262	82
Volume Left (vph)	0	0	42	42
Volume Right (vph)	0	42	0	41
Hadj (s)	0.03	-0.67	0.07	-0.16
Departure Headway (s)	5.0	4.3	4.7	5.2
Degree Utilization, x	0.47	0.05	0.34	0.12
Capacity (veh/h)	711	818	738	611
Control Delay (s)	11.2	6.3	10.2	8.9
Approach Delay (s)	10.7		10.2	8.9
Approach LOS	B		B	A

Intersection Summary			
Delay	10.3		
HCM Level of Service	B		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	1386	285	96	1322	144	95	403	98	312	967	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1659	3380	1601	1789	3318	1484	1772	3579	1526	1807	3544	1601
Flt Permitted	0.11	1.00	1.00	0.10	1.00	1.00	0.28	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	187	3380	1601	181	3318	1484	528	3579	1526	859	3544	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	70	1109	228	77	1058	115	76	322	78	250	774	134
RTOR Reduction (vph)	0	0	109	0	0	15	0	0	57	0	0	77
Lane Group Flow (vph)	70	1109	119	77	1058	100	76	322	21	250	774	57
Heavy Vehicles (%)	10%	8%	2%	2%	10%	10%	3%	2%	7%	1%	3%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	50.3	45.5	45.5	48.7	44.7	44.7	37.4	32.5	32.5	51.5	41.6	41.6
Effective Green, g (s)	50.3	45.5	45.5	48.7	44.7	44.7	37.4	32.5	32.5	51.5	41.6	41.6
Actuated g/C Ratio	0.42	0.38	0.38	0.41	0.37	0.37	0.31	0.27	0.27	0.43	0.35	0.35
Clearance Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	1282	607	127	1236	553	215	969	413	479	1229	555
v/s Ratio Prot	c0.02	c0.33		0.02	0.32		0.01	0.09		c0.06	c0.22	
v/s Ratio Perm	0.19		0.07	0.23		0.07	0.10		0.01	0.16		0.04
v/c Ratio	0.51	0.87	0.20	0.61	0.86	0.18	0.35	0.33	0.05	0.52	0.63	0.10
Uniform Delay, d1	24.8	34.4	25.0	26.0	34.7	25.3	29.9	35.1	32.3	23.0	32.8	26.6
Progression Factor	1.76	1.49	3.15	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	4.7	0.1	8.2	6.4	0.2	1.0	0.9	0.2	1.0	2.5	0.4
Delay (s)	46.0	55.8	78.7	34.2	41.1	25.5	30.9	36.0	32.6	24.0	35.2	26.9
Level of Service	D	E	E	C	D	C	C	D	C	C	D	C
Approach Delay (s)		59.0			39.2			34.6			31.9	
Approach LOS		E			D			C			C	

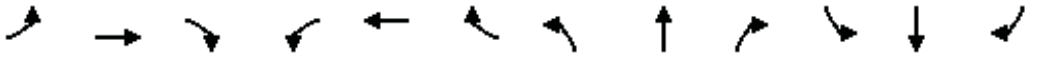
Intersection Summary			
HCM Average Control Delay	43.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	663	430	91	450	970	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1807	1570	1659	3411	3544	1601
Flt Permitted	0.95	1.00	0.26	1.00	1.00	1.00
Satd. Flow (perm)	1807	1570	459	3411	3544	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	530	344	73	360	776	250
RTOR Reduction (vph)	0	45	0	0	0	150
Lane Group Flow (vph)	530	299	73	360	776	100
Heavy Vehicles (%)	1%	4%	10%	7%	3%	2%
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	46.0	46.0	40.0	40.0	40.0	40.0
Effective Green, g (s)	46.0	46.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.46	0.46	0.40	0.40	0.40	0.40
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Grp Cap (vph)	831	722	184	1364	1418	640
v/s Ratio Prot	c0.29			0.11	c0.22	
v/s Ratio Perm		0.19	0.16			0.06
v/c Ratio	0.64	0.41	0.40	0.26	0.55	0.16
Uniform Delay, d1	20.6	18.0	21.4	20.1	23.0	19.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	1.8	6.4	0.5	1.5	0.5
Delay (s)	24.4	19.8	27.8	20.6	24.6	19.7
Level of Service	C	B	C	C	C	B
Approach Delay (s)	22.6			21.8	23.4	
Approach LOS	C			C	C	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	60		

c Critical Lane Group

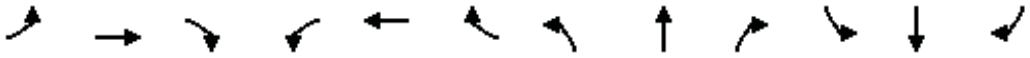


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	19	7	156	56	50	60	863	190	132	1120	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.96		1.00	0.93		1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1847		1825	1786		1825	3579	1633	1772	3505	
Flt Permitted		1.00		0.74	1.00		0.30	1.00	1.00	0.39	1.00	
Satd. Flow (perm)		1847		1429	1786		581	3579	1633	726	3505	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	0	15	6	125	45	40	48	690	152	106	896	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	43	0	0	0
Lane Group Flow (vph)	0	21	0	125	85	0	48	690	109	106	907	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	3%	4%	0%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		13.5		13.5	13.5		67.2	67.2	67.2	67.2	67.2	
Effective Green, g (s)		13.5		13.5	13.5		67.2	67.2	67.2	67.2	67.2	
Actuated g/C Ratio		0.14		0.14	0.14		0.72	0.72	0.72	0.72	0.72	
Clearance Time (s)		6.0		6.0	6.0		7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		266		206	257		417	2567	1171	521	2514	
v/s Ratio Prot		0.01			0.05			0.19			c0.26	
v/s Ratio Perm				c0.09			0.08		0.07	0.15		
v/c Ratio		0.08		0.61	0.33		0.12	0.27	0.09	0.20	0.36	
Uniform Delay, d1		34.7		37.6	36.0		4.1	4.6	4.0	4.4	5.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.1		5.1	0.8		0.6	0.3	0.2	0.9	0.4	
Delay (s)		34.8		42.7	36.8		4.6	4.9	4.2	5.3	5.5	
Level of Service		C		D	D		A	A	A	A	A	
Approach Delay (s)		34.8			40.3			4.8			5.4	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	93.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	60		
c Critical Lane Group			

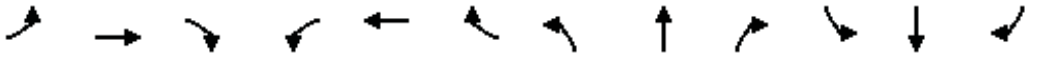
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	392	2024	104	119	1494	383	40	102	66	254	110	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00			0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94			0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			0.98	
Satd. Flow (prot)	1825	3476	1633	1807	3411	1585	1772	1773			3334	
Flt Permitted	0.10	1.00	1.00	0.08	1.00	1.00	0.36	1.00			0.76	
Satd. Flow (perm)	197	3476	1633	143	3411	1585	672	1773			2586	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	314	1619	83	95	1195	306	32	82	53	203	88	186
RTOR Reduction (vph)	0	0	31	0	0	105	0	0	0	0	0	0
Lane Group Flow (vph)	314	1619	52	95	1195	201	32	135	0	0	477	0
Heavy Vehicles (%)	0%	5%	0%	1%	7%	3%	3%	2%	2%	0%	3%	1%
Turn Type	pm+pt		Perm	pm+pt		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	74.2	64.3	64.3	60.2	53.3	53.3	32.8	32.8			32.8	
Effective Green, g (s)	74.2	64.3	64.3	60.2	53.3	53.3	32.8	32.8			32.8	
Actuated g/C Ratio	0.62	0.54	0.54	0.50	0.44	0.44	0.27	0.27			0.27	
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	6.0	6.0			6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)	365	1863	875	167	1515	704	184	485			707	
v/s Ratio Prot	c0.13	c0.47		0.03	0.35			0.08				
v/s Ratio Perm	0.40		0.03	0.25		0.13	0.05				c0.18	
v/c Ratio	0.86	0.87	0.06	0.57	0.79	0.29	0.17	0.28			0.67	
Uniform Delay, d1	30.2	24.2	13.4	21.6	28.5	21.2	33.3	34.3			38.8	
Progression Factor	1.00	1.00	1.00	1.33	1.15	1.87	1.00	1.00			1.00	
Incremental Delay, d2	21.7	4.9	0.0	3.3	2.1	0.2	2.1	1.4			5.2	
Delay (s)	51.9	29.1	13.4	32.0	34.9	39.9	35.3	35.7			44.1	
Level of Service	D	C	B	C	C	D	D	D			D	
Approach Delay (s)		32.0			35.7			35.6			44.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	22	20	97	34	292	29	392	195	154	294	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0			7.0			7.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.96			0.91			0.96			0.99	
Flt Protected		0.98			0.99			1.00			0.98	
Satd. Flow (prot)		1774			1689			1799			1837	
Flt Permitted		0.84			0.91			0.97			0.70	
Satd. Flow (perm)		1514			1551			1752			1298	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	18	18	16	78	27	234	23	314	156	123	235	25
RTOR Reduction (vph)	0	11	0	0	89	0	0	19	0	0	3	0
Lane Group Flow (vph)	0	41	0	0	250	0	0	474	0	0	380	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		29.0			29.0			47.0			47.0	
Effective Green, g (s)		29.0			29.0			47.0			47.0	
Actuated g/C Ratio		0.32			0.32			0.52			0.52	
Clearance Time (s)		7.0			7.0			7.0			7.0	
Lane Grp Cap (vph)		488			500			915			678	
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.16			0.27			c0.29	
v/c Ratio		0.08			0.50			0.52			0.56	
Uniform Delay, d1		21.2			24.6			14.1			14.5	
Progression Factor		1.00			1.00			0.86			1.00	
Incremental Delay, d2		0.3			3.6			1.5			3.4	
Delay (s)		21.6			28.2			13.6			17.9	
Level of Service		C			C			B			B	
Approach Delay (s)		21.6			28.2			13.6			17.9	
Approach LOS		C			C			B			B	

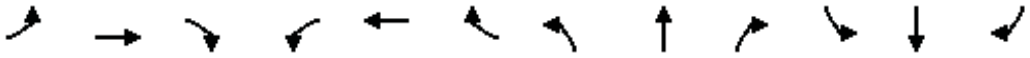
Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	127	251	96	220	368	148	178	439	253	127	308	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0		3.0	7.0		3.0	7.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.96		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	1828		1789	1792		1789	1798		1738	1807	
Flt Permitted	0.35	1.00		0.38	1.00		0.51	1.00		0.24	1.00	
Satd. Flow (perm)	667	1828		711	1792		959	1798		443	1807	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	102	201	77	176	294	118	142	351	202	102	246	60
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	102	263	0	176	412	0	142	553	0	102	306	0
Heavy Vehicles (%)	0%	1%	0%	2%	2%	4%	2%	1%	1%	5%	4%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	21.0		32.0	26.0		41.0	36.0		41.0	36.0	
Effective Green, g (s)	24.0	21.0		32.0	26.0		41.0	36.0		41.0	36.0	
Actuated g/C Ratio	0.27	0.23		0.36	0.29		0.46	0.40		0.46	0.40	
Clearance Time (s)	3.0	7.0		3.0	7.0		3.0	7.0		3.0	7.0	
Lane Grp Cap (vph)	216	427		349	518		483	719		274	723	
v/s Ratio Prot	0.02	0.14		c0.04	c0.23		0.02	c0.31		c0.02	0.17	
v/s Ratio Perm	0.11			0.13			0.12			0.15		
v/c Ratio	0.47	0.62		0.50	0.80		0.29	0.77		0.37	0.42	
Uniform Delay, d1	27.3	30.9		21.2	29.5		14.6	23.4		16.0	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.81	0.92	
Incremental Delay, d2	7.4	6.7		5.2	13.0		1.5	8.2		3.6	1.7	
Delay (s)	34.7	37.6		26.4	42.6		16.1	31.6		16.4	19.7	
Level of Service	C	D		C	D		B	C		B	B	
Approach Delay (s)		36.8			37.8			28.4			18.9	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	60		

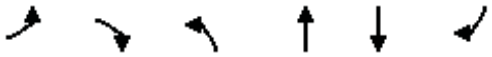
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	105	525	5	6	741	555	5	1	5	140	1	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			1.00	
Frt		1.00			1.00	0.85		0.94			0.95	
Flt Protected		0.99			1.00	1.00		0.98			0.97	
Satd. Flow (prot)		1885			1901	1633		1767			1735	
Flt Permitted		0.75			1.00	1.00		0.89			0.80	
Satd. Flow (perm)		1421			1895	1633		1609			1427	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	84	420	4	5	593	444	4	1	4	112	1	57
RTOR Reduction (vph)	0	0	0	0	0	183	0	0	0	0	0	0
Lane Group Flow (vph)	0	508	0	0	598	261	0	9	0	0	170	0
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	0%	0%	0%	2%	1%	3%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		53.0			53.0	53.0		23.0			23.0	
Effective Green, g (s)		53.0			53.0	53.0		23.0			23.0	
Actuated g/C Ratio		0.59			0.59	0.59		0.26			0.26	
Clearance Time (s)		7.0			7.0	7.0		7.0			7.0	
Lane Grp Cap (vph)		837			1116	962		411			365	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.32	0.16		0.01			c0.12	
v/c Ratio		0.61			0.54	0.27		0.02			0.47	
Uniform Delay, d1		11.8			11.1	9.1		25.1			28.3	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		3.3			1.9	0.7		0.1			4.3	
Delay (s)		15.1			13.0	9.8		25.2			32.6	
Level of Service		B			B	A		C			C	
Approach Delay (s)		15.1			11.6			25.2			32.6	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	60		

c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	216	52	250	382	222	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	173	42	200	306	178	64

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	214	506	242
Volume Left (vph)	173	200	0
Volume Right (vph)	42	0	64
Hadj (s)	0.08	0.11	-0.12
Departure Headway (s)	5.8	5.0	5.1
Degree Utilization, x	0.35	0.71	0.35
Capacity (veh/h)	564	695	664
Control Delay (s)	11.9	19.9	10.8
Approach Delay (s)	11.9	19.9	10.8
Approach LOS	B	C	B

Intersection Summary			
Delay	15.8		
HCM Level of Service	C		
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	395	60	53	512	63	55
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	316	48	42	410	50	44

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total (vph)	316	48	452	94
Volume Left (vph)	0	0	42	50
Volume Right (vph)	0	48	0	44
Hadj (s)	0.03	-0.67	0.05	-0.14
Departure Headway (s)	5.2	4.5	4.8	5.6
Degree Utilization, x	0.46	0.06	0.60	0.15
Capacity (veh/h)	667	773	739	559
Control Delay (s)	11.3	6.6	14.8	9.6
Approach Delay (s)	10.7		14.8	9.6
Approach LOS	B		B	A

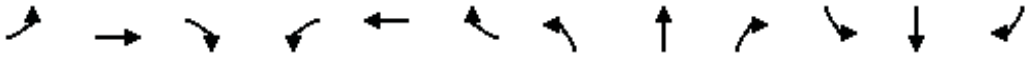
Intersection Summary			
Delay	12.6		
HCM Level of Service	B		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	60		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	174	1539	181	129	1527	262	145	787	61	174	572	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	3510	1617	1807	3476	1617	1825	3614	1541	1807	3510	1585
Flt Permitted	0.08	1.00	1.00	0.08	1.00	1.00	0.42	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	154	3510	1617	158	3476	1617	812	3614	1541	477	3510	1585
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	139	1231	145	103	1222	210	116	630	49	139	458	78
RTOR Reduction (vph)	0	0	63	0	0	23	0	0	24	0	0	55
Lane Group Flow (vph)	139	1231	82	103	1222	187	116	630	25	139	458	23
Heavy Vehicles (%)	0%	4%	1%	1%	5%	1%	0%	1%	6%	1%	4%	3%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	59.2	49.9	49.9	56.0	48.3	48.3	40.9	34.0	34.0	43.9	35.5	35.5
Effective Green, g (s)	59.2	49.9	49.9	56.0	48.3	48.3	40.9	34.0	34.0	43.9	35.5	35.5
Actuated g/C Ratio	0.49	0.42	0.42	0.47	0.40	0.40	0.34	0.28	0.28	0.37	0.30	0.30
Clearance Time (s)	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	205	1460	672	180	1399	651	335	1024	437	268	1038	469
v/s Ratio Prot	c0.05	0.35		0.04	c0.35		0.02	c0.17		c0.04	0.13	
v/s Ratio Perm	0.28		0.05	0.23		0.12	0.10		0.02	0.15		0.01
v/c Ratio	0.68	0.84	0.12	0.57	0.87	0.29	0.35	0.62	0.06	0.52	0.44	0.05
Uniform Delay, d1	23.5	31.5	21.6	23.3	33.0	24.2	27.9	37.3	31.3	27.1	34.2	30.2
Progression Factor	1.60	1.47	2.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	2.7	0.0	4.4	6.8	0.2	0.6	2.8	0.3	1.7	1.4	0.2
Delay (s)	42.8	49.2	56.6	27.7	39.9	24.5	28.6	40.1	31.6	28.8	35.6	30.4
Level of Service	D	D	E	C	D	C	C	D	C	C	D	C
Approach Delay (s)		49.3			36.9			37.9			33.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	60		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	479	211	540	800	750	747
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	3.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1772	1601	1789	3544	3510	1617
Flt Permitted	0.95	1.00	0.33	1.00	1.00	1.00
Satd. Flow (perm)	1772	1601	628	3544	3510	1617
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	383	169	432	640	600	598
RTOR Reduction (vph)	0	126	0	0	0	352
Lane Group Flow (vph)	383	43	432	640	600	246
Heavy Vehicles (%)	3%	2%	2%	3%	4%	1%
Turn Type		custom	pm+pt			Perm
Protected Phases			5	2	6	
Permitted Phases	4	4	2			6
Actuated Green, G (s)	25.7	25.7	61.3	61.3	41.2	41.2
Effective Green, g (s)	25.7	25.7	61.3	61.3	41.2	41.2
Actuated g/C Ratio	0.26	0.26	0.61	0.61	0.41	0.41
Clearance Time (s)	7.0	7.0	3.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	455	411	583	2172	1446	666
v/s Ratio Prot			c0.13	0.18	0.17	
v/s Ratio Perm	c0.22	0.03	c0.33			0.15
v/c Ratio	0.84	0.11	0.74	0.29	0.41	0.37
Uniform Delay, d1	35.2	28.4	10.9	9.1	20.9	20.4
Progression Factor	1.00	1.00	1.00	1.00	1.23	5.41
Incremental Delay, d2	14.9	0.1	5.2	0.3	0.8	1.4
Delay (s)	50.1	28.5	16.1	9.5	26.4	111.7
Level of Service	D	C	B	A	C	F
Approach Delay (s)	43.5			12.1	68.9	
Approach LOS	D			B	E	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	60		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	33	34	443	50	220	34	990	255	95	1019	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0		6.0	6.0	6.0	3.0	6.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.94		1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1762		1789	1653		1789	3579	1601	1789	3575	
Flt Permitted		0.94		0.71	1.00		0.32	1.00	1.00	0.20	1.00	
Satd. Flow (perm)		1668		1345	1653		595	3579	1601	374	3575	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (vph)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Adj. Flow (vph)	13	26	27	354	40	176	27	792	204	76	815	6
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	87	0	0	0
Lane Group Flow (vph)	0	66	0	354	216	0	27	792	117	76	821	0
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		44.0		44.0	44.0		35.0	35.0	35.0	44.0	44.0	
Effective Green, g (s)		44.0		44.0	44.0		35.0	35.0	35.0	44.0	44.0	
Actuated g/C Ratio		0.44		0.44	0.44		0.35	0.35	0.35	0.44	0.44	
Clearance Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	3.0	6.0	
Lane Grp Cap (vph)		734		592	727		208	1253	560	249	1573	
v/s Ratio Prot					0.13			c0.22		0.02	c0.23	
v/s Ratio Perm		0.04		c0.26			0.05		0.07	0.12		
v/c Ratio		0.09		0.60	0.30		0.13	0.63	0.21	0.31	0.52	
Uniform Delay, d1		16.3		21.3	18.0		22.1	27.1	22.8	17.9	20.4	
Progression Factor		1.00		1.00	1.00		0.66	0.68	0.37	1.00	1.00	
Incremental Delay, d2		0.2		4.5	1.0		1.2	2.2	0.8	3.2	1.2	
Delay (s)		16.6		25.8	19.1		15.8	20.7	9.3	21.1	21.6	
Level of Service		B		C	B		B	C	A	C	C	
Approach Delay (s)		16.6			23.2			18.3			21.6	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	60		
c Critical Lane Group			