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Memorandum

To:	Alexander Wilkinson
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From:	Bashar Dhahir, P. Eng., PMP, Mohammad Ramezani, P. Eng.
Date:	March 13, 2024
Reference:	Kent Street West and Angeline Street Intersection - Traffic Evaluation Angeline Street, Lindsay, City of Kawartha Lakes
Ainley File No.:	18545 - 2

1. BACKGROUND

Ainley Group has been retained to evaluate the performance of the Angeline Street and Kent Street West intersection with consideration to eliminating the right turn lane of the south approach (northbound movement). The intersection is located in the City of Kawartha Lakes, Ontario and is bounded by Ross Memorial Hospital from the northeast, Ambassador Apartments from the southeast, Dentistry on Kent from the northwest, and Angelina Apartments from the southwest as shown in **Figure 1**.

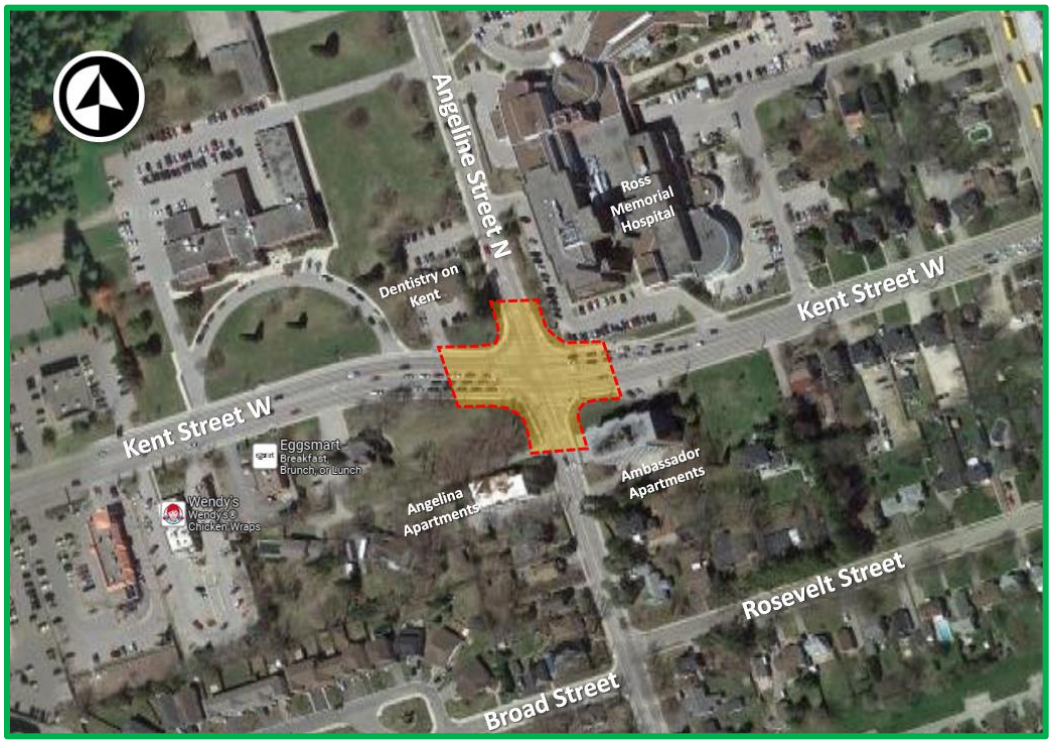

Figure 1: Intersection Location

2. EXISTING INTERSECTION CONFIGURATION

Angeline Street and Kent Street West intersection is a four-legged skewed (approximately 74°-85°) signalized intersection. Angeline Street is a two-lane north-south roadway that extends in a straight path through the intersection. The north and south approaches have a dedicated left-turn lane and a through-right shared lane. Kent Street is a four-lane east-west roadway and has a curved alignment through the intersection. The east and west approaches have a dedicated left-turn lane, through lane and through-right shared lane. **Figure 2** shows the existing configuration of the intersection.

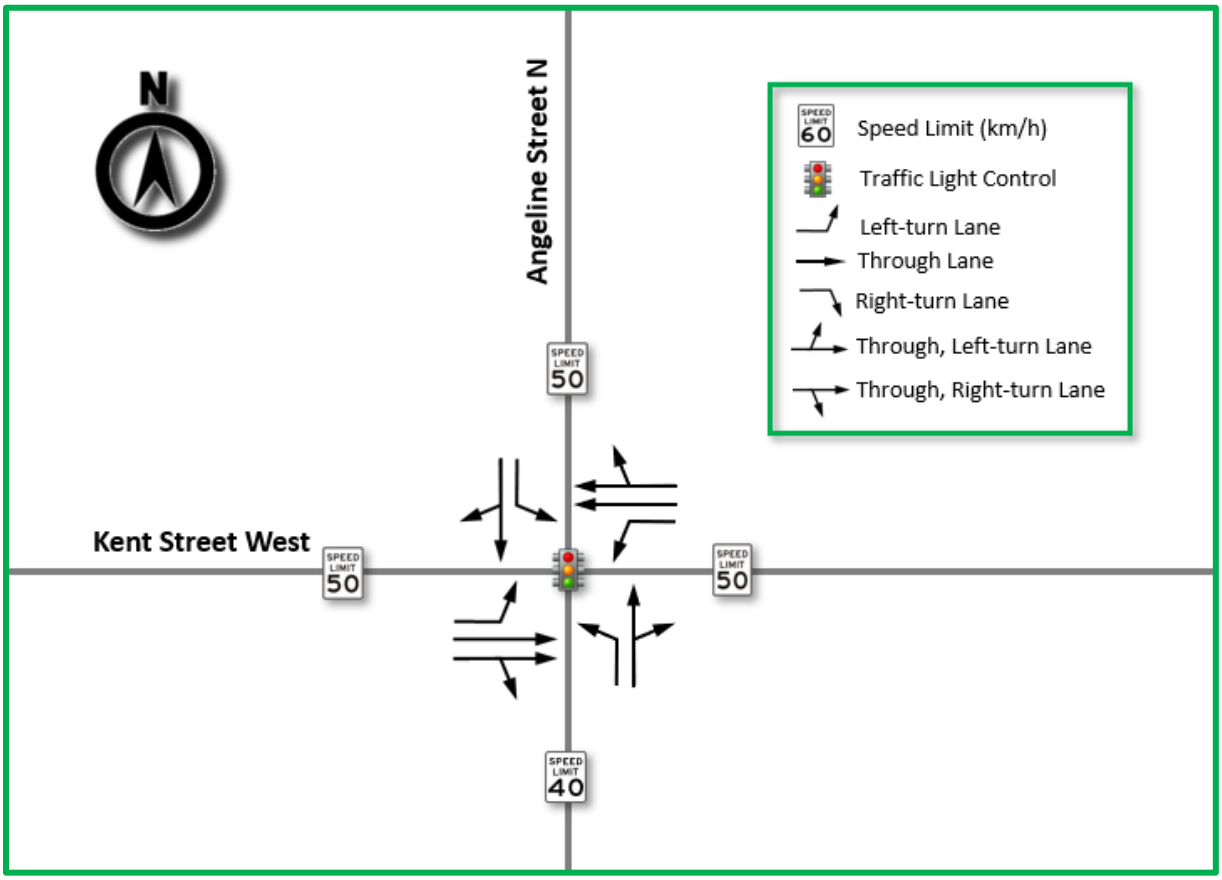

Figure 2: Intersection Configuration

3. PROPOSED INTERSECTION CONFIGURATION

The assessment of traffic conditions at the intersection was completed by HDR Corporation[1] in 2016 with a focus on 2031 as a horizon year. Through that study[1], alternatives were proposed to enhance the intersection's level of service, ultimately leading to the preferred alternative depicted in **Figure 3**. The proposed configuration includes the following:

- Kent Street West - East Approach: Consists of three lanes:
  - One left turn lane
  - One through lane
  - One through right shared lane
- Kent Street West - West Approach: Consists of four lanes:
  - One left turn lane
  - Two through lane
  - One right lane
- Angeline Street - North Approach: Consists of four lanes:
  - One left turn
  - Two through lanes
  - One right turn lane
- Angeline Street - South Approach: Consists of four lanes:
  - Two left turn lanes
  - One through lane
  - One through right shared lane

However, after further review, it has been determined that the proposed configuration for the right-turn lane on the south approach on Angeline Street cannot be applied due to its proximity to the underground parking facility of Ambassador Apartments. The location of this parking facility results in insufficient space to build four lanes for the northbound movements (two left-turn, one through-lane, and a through-right shared lane).

[1] City of Kawartha Lakes, Kent Street Schedule B Class Environmental Assessment and Corridor Study, Project File Report, November 2016

Consequently, there is a necessity to re-evaluate the operational conditions of the intersection with consideration to the removal of the right-turn lane.

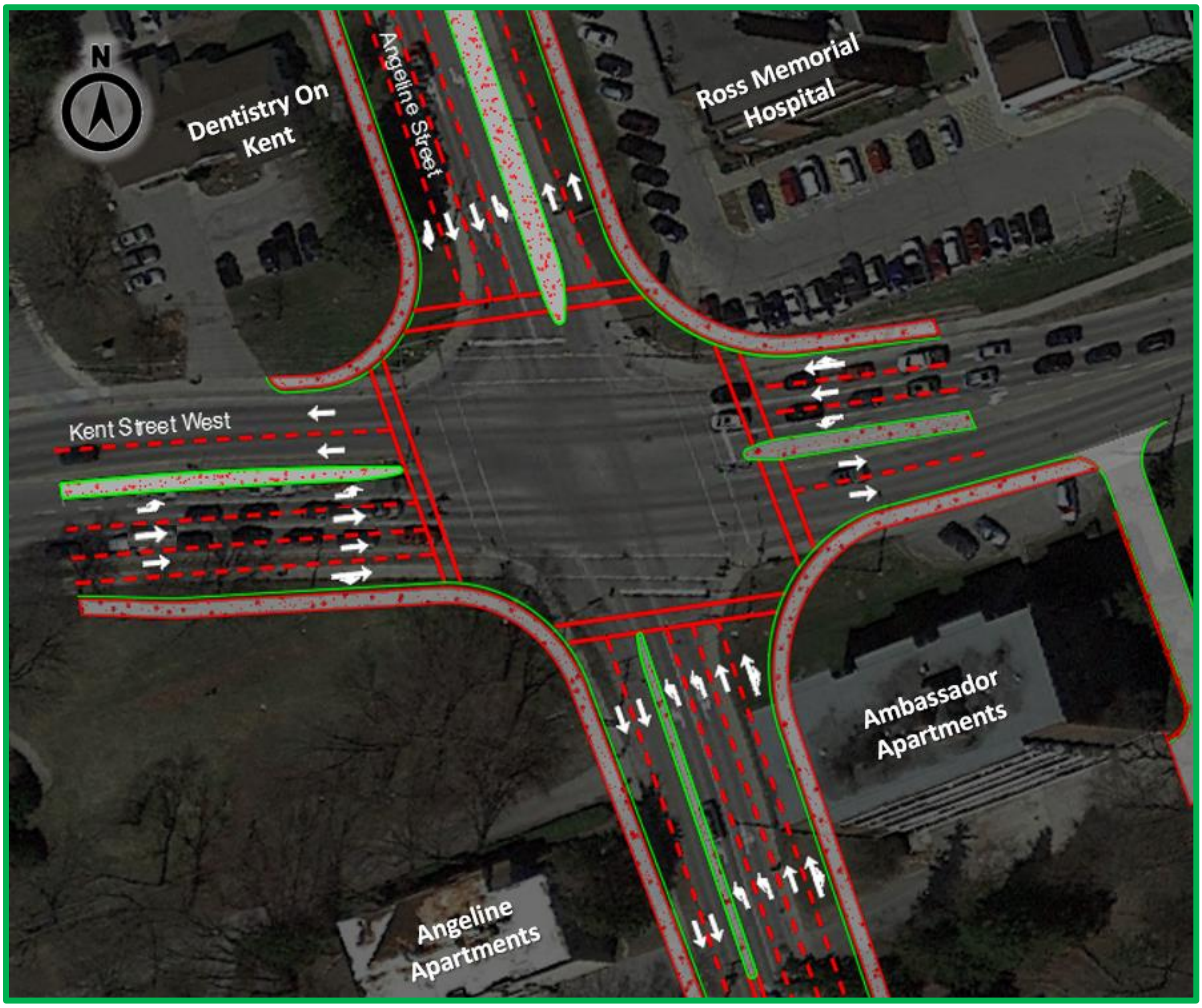

Figure 3: Preferable Alternative to Improve Traffic Operation in the Intersection

4. TRAFFIC VOLUMES

4.1. Existing Traffic Counts

To evaluate the traffic conditions at the intersection, traffic counts were collected on August 1, 2023. The summary of traffic data (for vehicular, bicycle, and pedestrian traffic) is provided in **Appendix A**. The resulting AM and PM peak-hour traffic volumes are

presented in **Figure 4**. As shown in the figure, traffic counts for the AM and PM peak hours have approximately the same distribution in the following flow patterns:

- Relatively high traffic volumes on the left-turn movement for the eastbound (238 veh/h) and northbound (210 veh/h)[2].
- Relatively high traffic volume on the right-turn movement for the eastbound (285 veh/h)[3] and southbound (238 veh/h)[4].
- Relatively high traffic volume of the through movement of the eastbound and westbound movement (571 veh/h and 654 veh/h, respectively).

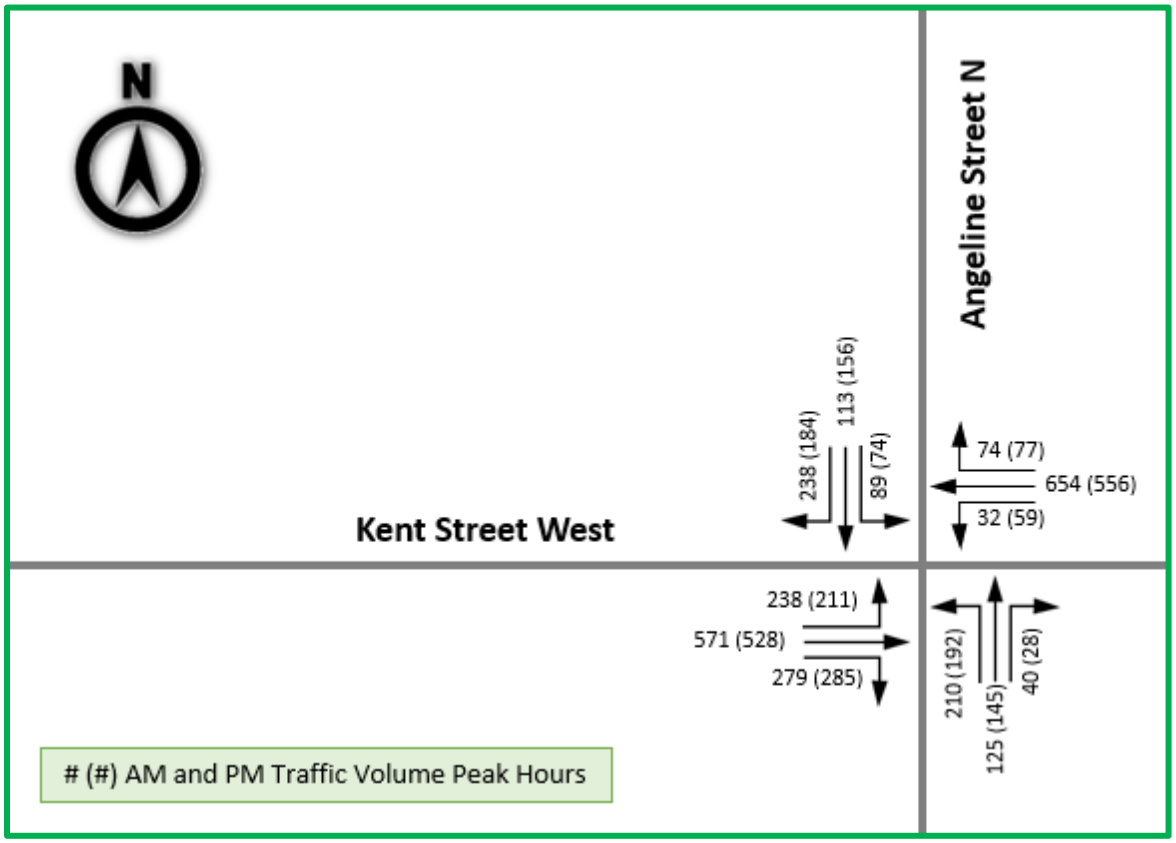

Figure 4: Exiting Traffic Volume AM and PM Peak Hours

[2] Double left-turn lanes are normally a design consideration when the peak left-turn volumes exceed 300 veh/h (Transportation Association of Canada – TAC, Geometric Design Guide for Canadian Roads, 2017.
[3] The right-turn volume is greater than 25% of the total approaching volume.
[4] The right-turn volume is greater than 44% of the total approaching volume.

4.2. Background Traffic Projections

In this study, the assessment of intersection traffic operations is contingent upon the assumption that the proposed improvement will be constructed in 2027. Consequently, an evaluation of traffic conditions for the years 2027, 2023 and 2051 is carried out. The underlying traffic data for these horizon years is extrapolated from the traffic counts recorded during the peak hours in 2023, factoring in a traffic growth rate of 1.6% as outlined in the Transportation Master Plan of the City of Kawartha Lakes from February 2012[5].

The resulting background traffic volumes for the morning (AM) and evening (PM) peak hours for the horizon years 2027, and 2037 are depicted in **Figure 5** and **Figure 6**.

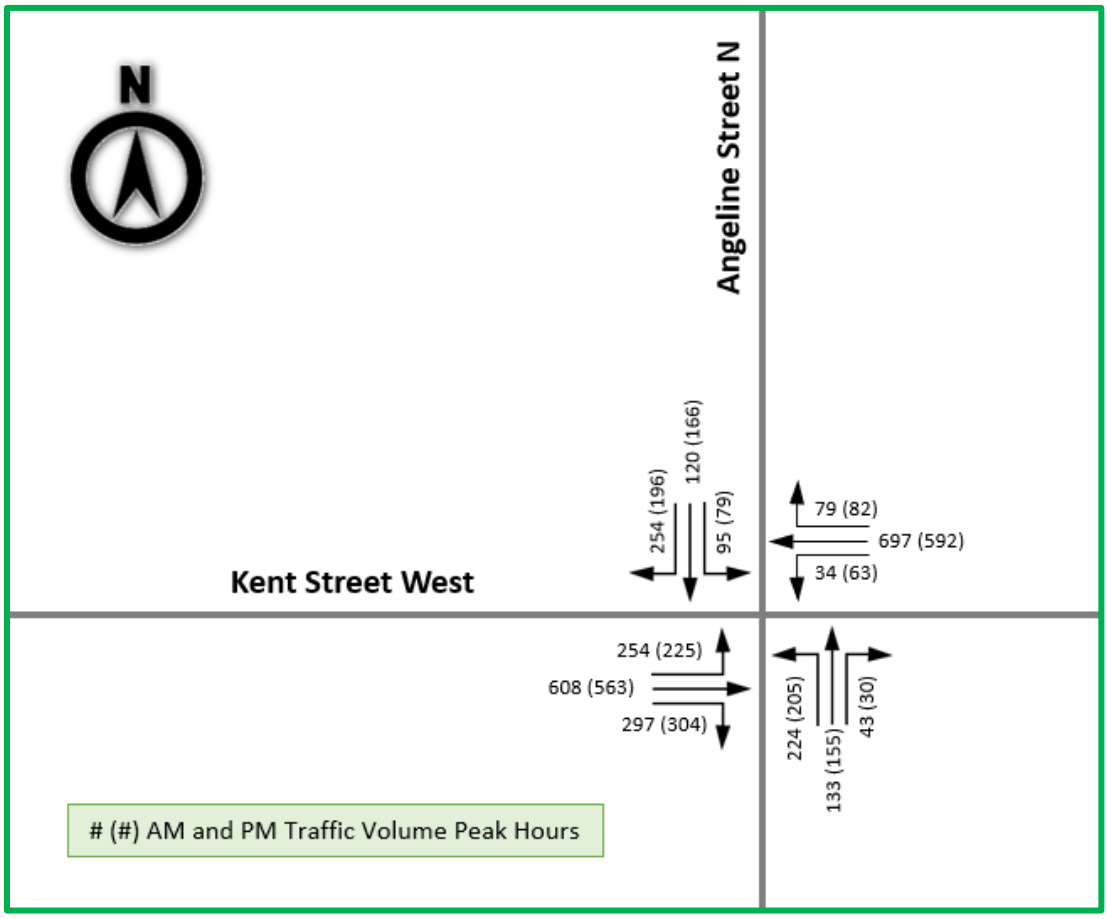

Figure 5: Background Traffic Counts AM and PM Peak Hours – 2027

[5] City of Kawartha Lakes, Growth Management Strategy and Municipal Master Plan Project, Transportation Master Plan, February 2012.

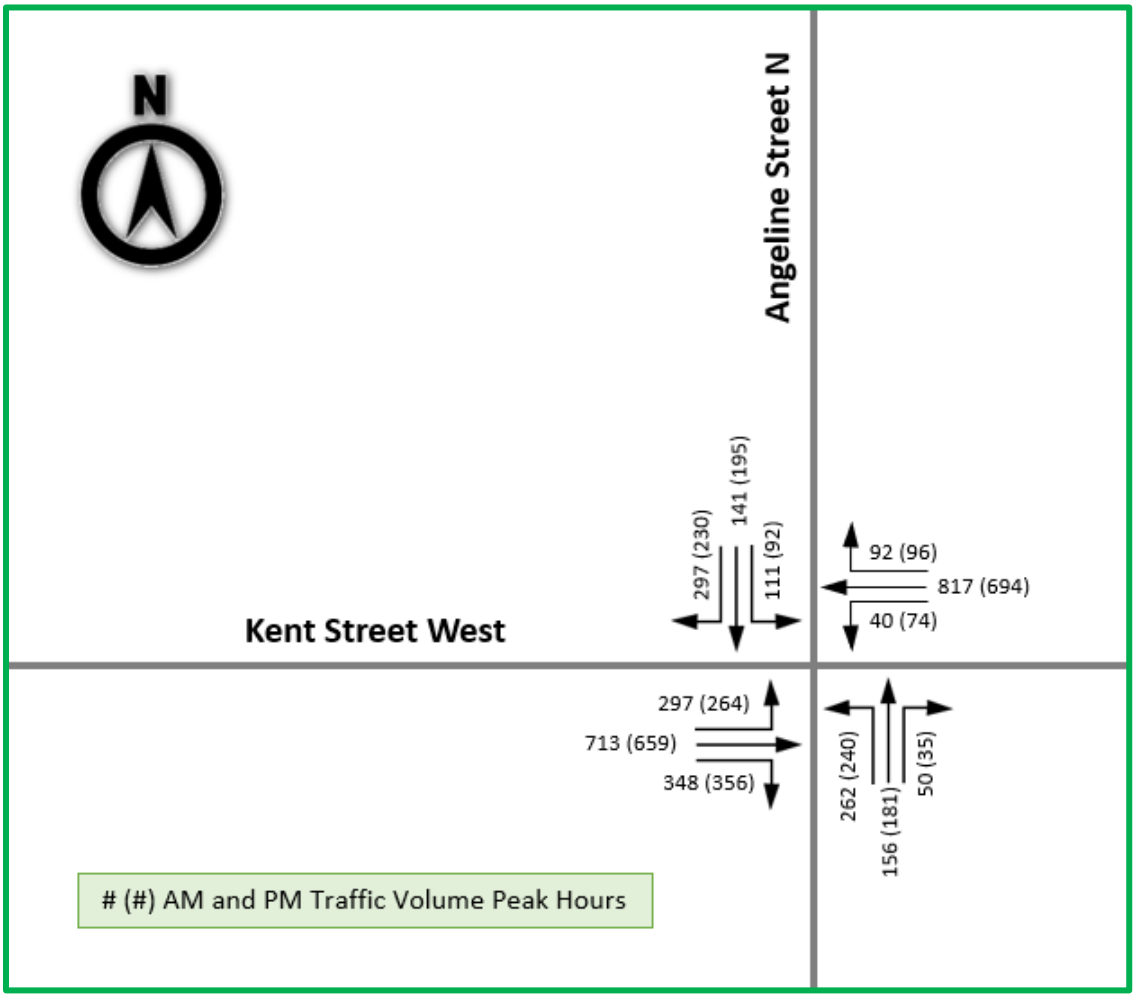

Figure 6: Background Traffic Counts AM and PM Peak Hours – 2037

5. TRAFFIC ANALYSIS

5.1. Traffic Capacity Analysis

The methodology employed to assess traffic conditions at the intersection in terms of level of service (LOS), delay, and volume-to-capacity ratio is based on the Highway Capacity Manual (HCM), which provides a systematic approach to evaluating transportation facilities and their performance. The HCM categorizes six levels of service (LOS) from A to F, representing a spectrum of operating conditions. LOS A indicates the most favourable conditions, while LOS F indicates the least desirable, reflecting congestion and poor traffic flow.

In the context of signalized intersections, the LOS is determined by two key factors: control delay and the volume-to-capacity ratio (v/c ratio). Control delay refers to the increase in travel time experienced by vehicles due to the influence of traffic signal control, while the v/c ratio measures the extent to which a lane group's capacity is utilized during a specific phase of operation. **Table 1** presents the specific thresholds established at a signalized intersection. It should be noted that the methodology of HCM 2000 was used in conducting the traffic analysis. The evaluation process incorporates the use of the Synchro 11 software program.

Table 1: LOS Thresholds for Signalized Intersections

Control Delay (sec/veh)	LOS by v/c Ratio	
	≤ 1.0	> 1.0
0 – 10	A	F
> 10 - 20	B	F
> 20 - 35	C	F
> 35 – 55	D	F
> 55 - 80	E	F
> 80	F	F

5.2. Existing Traffic Conditions 2023

The analysis is based on the 2023 traffic volumes and the existing intersection configuration and control. The signal timing of the intersection was provided by city staff. The analysis results for the AM peak hour for the intersection can be found in **Appendix B** and summarized in **Table 2**.

As shown in the table, the approaches of the intersection and the individual movements are operating at an acceptable LOS of D or better with a maximum delay of 53.2 s (Southbound through) and a maximum v/c ratio of 0.83 (Southbound through). The finding is consistent with the typical traffic flow conditions provided by Google Maps as shown in **Figure 7**.

SimTraffic, a traffic simulation application embedded in the Synchro application, was used (considering three runs of one hour each) to determine the queue length. The maximum 95th percentile queue length was noticed at the Southbound through lane (126.8m), which means that there is a probability of 95% that the queue length will not exceed this value.

Table 2: Operation Analysis for Existing Traffic Conditions - 2023

Approach	Movement	Existing 2023				
		LOS Approach	LOS Movement	Delay (s/veh)	v/c	95th Queue (m)
West	EBL	C	C	26.8	0.74	56.9
	EBT		C	27.5	0.62	73.1
	EBR					83.8
East	WBL	C	C	22.3	0.15	30
	WBT		C	32.7	0.63	84
	WBR					75.1
South	NBL	C	C	29.9	0.66	49.5
	NBT		C	31.2	0.32	46.7
	NBR					
North	SBL	D	C	28.7	0.23	57.8
	SBT		D	53.2	0.81	126.8
	SBR					

Figure 7: Typical Traffic Flow Condition at the Intersection

5.3. Capacity Analysis: No Geometric Improvement (Do Nothing)

The analysis for the Do-Nothing scenario is based on the background traffic volumes, the existing intersection configuration and control, and the current signal timing for the horizon years 2027 and 2037.

5.3.1. No Geometric Improvement (Do Nothing) - Background Conditions 2027

The analysis is based on the background traffic volumes in 2027, the existing intersection configuration and control, and the current signal timing. The results of the analysis for AM peak hour for the intersections are summarized in **Table 3** and Synchro analysis outputs are provided for reference in **Appendix B**. As shown in the table, the performance of the approaches of the intersection is similar to the observed for the existing traffic conditions. However, for the individual movement, the LOS is lower (E or better), v/c is higher (maximum of 0.85), and Delay is higher (maximum of 58.1s) compared to the observed for the existing traffic conditions.

Table 3: Operation Analysis for Background Traffic Conditions - 2027

Approach	Movement	BG 2027				
		LOS Approach	LOS Movement	Delay (s/veh)	v/c	95th Queue (m)
West	EBL	C	D	36.2	0.82	63.5
	EBT		C	29.3	0.66	89.1
	EBR					98.1
East	WBL	C	C	23.4	0.18	36
	WBT		D	35	0.68	90.4
	WBR					84.8
South	NBL	C	C	34.1	0.73	48.8
	NBT		C	31.5	0.34	48.8
	NBR					
North	SBL	D	C	28.9	0.24	67
	SBT		E	58.1	0.85	119.3
	SBR					

5.3.2. No Geometric Improvement (Do Nothing) - Background Conditions 2037

The analysis is based on the background traffic volumes in 2037, the existing intersection configuration and control, and the current signal timing. The results of the analysis for AM peak hour for the intersections are summarized in **Table 4** and Synchro analysis outputs

are provided for reference in **Appendix B**.

As shown in **Table 4**, both the west and north approaches of the intersection are rated as LOS E. Additionally, the individual movements, namely eastbound left and southbound through, are rated as LOS F. Also, the 95th queue length of the latter movement is 271.7 m, indicating a 95 percent probability that the queue will not exceed this length. It's important to highlight that the presence of new developments in the vicinity would likely lead to a decrease in the intersection's level of service and an increase in the delay duration and high v/c ratios. Accordingly, improvements are recommended for the intersection by this horizon year.

Table 4: Operation Analysis for Background Traffic Conditions - 2037

Approach	Movement	BG 2037				
		LOS Approach	LOS Movement	Delay (s/veh)	v/c	95th Queue (m)
West	EBL	E	F	146.7	1.18	71.1
	EBT		D	36.9	0.81	206.3
	EBR					191.4
East	WBL	D	C	26.7	0.29	56.7
	WBT		D	43	0.83	151.4
	WBR					144
South	NBL	D	D	45.4	0.83	60.7
	NBT		C	33	0.39	57.4
	NBR					
North	SBL	E	C	27.5	0.26	86.5
	SBT		F	82.7	0.98	271.7
	SBR					

5.3.3. No Geometric Improvement (Do Nothing) - Background Conditions 2051

Considering the Growth Management Strategy for the City of Kawartha Lakes for the year 2051, traffic capacity analysis has been conducted for the horizon year 2051. The analysis is based on the background traffic volumes in 2051, the existing intersection configuration and control, and the current signal timing. The results of the analysis for AM peak hour for the intersections are summarized in **Table 5** and Synchro analysis outputs are provided for reference in **Appendix B**.

As depicted in **Table 5**, LOS for the majority of intersection approaches and individual

movements is categorized as F. The 95th queue length for the eastbound and westbound is expected to be 279.2 m or higher. Consequently, the intersection is projected to operate at an extremely low LOS, resulting in lengthier delays for roadway users, estimated at approximately 274 seconds (for eastbound left movement). Again, the capacity analysis did not take into account the potential increase in traffic volumes due to new developments near the intersection. Therefore, it is imperative to implement improvements for this intersection by the specified horizon year.

Table 5: Operation Analysis for Background Traffic Conditions - 2051

Approach	Movement	BG 2051				
		LOS Approach	LOS Movement	Delay (s/veh)	v/c	95th Queue (m)
West	EBL	F	F	274	1.49	60.9
	EBT		F	92.4	1.09	311.7
	EBR					312.1
East	WBL	F	C	29.5	0.34	64.9
	WBT		F	88.5	1.07	279.2
	WBR					282.7
South	NBL	E	E	74.5	0.97	78.7
	NBT		C	34.3	0.49	61.9
	NBR					
North	SBL	F	C	27.5	0.33	89.1
	SBT		F	187.1	1.28	243.6
	SBR					

5.4. South Approach Modification

As mentioned in **Section 3**, the preferred option (having 4 lanes) cannot be implemented for the south approach due to the presence of the underground parking lot of the Ambassador Apartments property. Accordingly, the capacity analysis was conducted to evaluate the traffic operations after eliminating one of the lanes from the preferred option. In other words, the south approach will be limited to three lanes.

In order to assign the remaining three lanes to left turn, through and right lane, two options were considered in the analysis with the following configuration of the south approach:

- **Option 1**: Two left turns and one shared through / right turn lane (**Figure 8-a**).

- **Option 2**: One left turn lane, one through lane, and one shared through / right turn lane (**Figure 8-b**).

The capacity analysis was conducted for two horizon years: 2037 and 2051.

a. Option 1 b. Option 2

Figure 8: South Approach Configuration of Option 1 and Option 2

5.4.1. Option 1 – Horizon Year 2037

Similar to the "No Geometric Improvement (Do Nothing)" scenario for the horizon year 2037 mentioned in **Section 5.3.2**, the capacity analysis is based on the background traffic volumes in 2037, the proposed configuration of the intersection mentioned in **Sections 3** and **Section 5.4**, and the current signal timing. The results of the analysis for AM peak hour for the intersections are summarized in **Table 6** and Synchro analysis outputs are provided for reference in **Appendix B**.

As shown in **Table 6,** there is a significant improvement in the intersection traffic conditions. The LOS of all approaches is expected to be C and LOS for the individual movement is D or better except for eastbound left (LOS E). The maximum delay is expected to be 56.4s/veh with a maximum v/c ratio of 0.94. The 95th percentile queue length is projected to reach a maximum of 262.5 m in the westbound through lane, indicating a 95% probability that the queue length will not exceed this value. Nevertheless, the average queue length for this specific movement or lane stands at 155.3 m, reflecting

the typical queue length experienced during the majority of the time since the difference between the 95th queue and average queue length is significant (approximately 40%). It should be noted that the main intersection near Kent Street West and Angeline Street North, prone to queue impacts from the westbound through lane, is the Kent Street West and Adelaide Street South intersection, located approximately 260 m away. Consequently, there is no anticipation of traffic spillback occurring upstream of the Kent Street West and Adelaide Street South intersection. However, optimizing signal timing (optimizing cycle length to 100 s instead of 113 s) would reduce the 95th queue length to 152m and the average queue length to 78.4m as shown in **Table 7**.

Table 6: Option 1 - Operation Analysis for Background Traffic Conditions – 2037

Approach	Movement	Existing 2037					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	C	E	0.94	56.4	97.5	62.1
	EBT		C	0.47	20.5	104.6	63.6
	EBR		B	0.24	18.1	35.4	17.5
East	WBL	C	B	0.14	18.3	83.7	27.6
	WBT		C	0.73	31.1	262.5	155.3
	WBR					256.9	148.5
South	NBL	C	C	0.33	26.6	40.8	13.2
	NBT		D	0.61	40.4	53.7	34
	NBR					55.5	31.9
North	SBL	C	C	0.32	27.8	28.3	13.9
	SBT		D	0.23	35.2	30.4	16
	SBR		D	0.2	35.2	75	42.6

Table 7: Option 1 - Operation Analysis for Background Traffic Conditions – 2037 After Optimizing Cycle Length

Approach	Movement	Cycle Optimization 2037					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	C	E	0.99	66.3	103.3	65.4
	EBT		B	0.47	18.8	152.4	71.6
	EBR		B	0.23	16.6	41.3	17.9
East	WBL	C	B	0.13	15.7	47.9	12
	WBT		C	0.68	26.1	115.1	78.4
	WBR					103	70.6
South	NBL	C	C	0.36	26.8	42.2	13.7
	NBT		D	0.59	36.9	56.8	35.3
	NBR					47.7	28.5
North	SBL	C	C	0.35	27	29.7	13.9
	SBT		C	0.21	31.9	30.1	15.4
	SBR		C	0.46	34.5	60.2	35

5.4.2. Option 1 – Horizon Year 2051

The configuration and parameters of Option 1 used in the capacity analysis and simulation for the horizon year 2051 were the same as in 2037 except for the background traffic volumes (background traffic of 2051). The results of the analysis for AM peak hour for the intersections are summarized in **Table 8** and Synchro analysis outputs are provided for reference in **Appendix B**.

As per the capacity analysis, the intersection approaches are expected to operate at LOS of E or better. The individual movement is expected to operate at LOS D or better except for eastbound left (LOS F). This is expected because the traffic volume is 371 veh/h. As per Geometric Design Guide for Canadian Roads (GDGCR)[6], double left-turn lanes are normally would be considered when the peak left-turn volumes exceed 300 veh/h. Also, the 95th queue length and the average queue are high for eastbound and westbound movement. Accordingly, the Kent Street West and Adelaide Street South intersection is

[6] Transportation Association of Canada – TAC, Geometric Design Guide for Canadian Roads, 2017

prone to queue impacts from the westbound through lane. Optimizing signal timing (phase split optimization - see **Appendix B**) would mitigate the queue length as shown in **Table 9**; however, the Adelaide Street South intersection would be prone to queue impacts from the westbound through lane. Again, the capacity analysis was conducted considering only background traffic volume (additional trips generated by new developments within the vicinity of the intersection were not considered).

Table 8: Option 1 - Operation Analysis for Background Traffic Conditions - 2051

Approach	Movement	Existing 2051					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	E	F	1.34	204.1	104.8	94.9
	EBT		C	0.62	25.9	376.5	275.6
	EBR		C	0.37	22.8	64.9	28.4
East	WBL	D	B	0.21	19.8	86.9	28.4
	WBT		D	0.95	49.6	265.2	260.8
	WBR					264.1	260.5
South	NBL	C	C	0.38	25.6	56.3	23.6
	NBT		D	0.7	43.6	64.3	43.1
	NBR					71.1	43.8
North	SBL	D	C	0.41	27.7	39.3	19.2
	SBT		D	0.26	35.3	260.4	140.8
	SBR		D	0.51	38.3	149.2	100

Table 9: Option 1 - Operation Analysis for Background Traffic Conditions – 2051 After Split Optimization

Approach	Movement	Split Optimization					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	C	E	0.98	74.7	113.1	74
	EBT		C	0.52	20.2	304.9	139.3
	EBR		B	0.29	17.6	47.4	22.8
East	WBL	D	C	0.18	20.3	82.5	26.9
	WBT		D	0.93	46.7	276.7	258.6
	WBR					279.7	257.3
South	NBL	D	C	0.49	33.1	71.5	38.2
	NBT		D	0.75	49.8	82.3	55.3
	NBR					73.1	43.4
North	SBL	D	D	0.57	35.7	41.2	20.3
	SBT		D	0.27	37.4	310	129.9
	SBR		D	0.5	40.4	153.1	95.9

5.4.3. Option 2 – Horizon Year 2037

As previously indicated in **Section 5.4**, Option 2 shares the same setup as Option 1 with the exception of the southern approach, where there is one left turn lane, one through lane, and one shared through-right turn lane. The capacity analysis for Option 2 is based on the background traffic volumes in 2037 and the current signal timing. The results of the analysis for AM peak hour for the intersections are summarized in **Table 10** and Synchro analysis outputs are provided for reference in **Appendix B**.

As shown in **Table 10**, there is an improvement in the intersection traffic conditions. The LOS of all approaches and individual movements is expected to be D or better, except for the eastbound left (LOS E). The maximum delay is expected to be 70.6s with a maximum v/c ratio of 0.98. The 95th percentile queue length is projected to reach a maximum of 136.8 m in the westbound through lane, indicating a 95% probability that the queue length will not exceed this value. Nevertheless, the average queue length for this specific movement or lane stands at 90.8 m, reflecting the typical queue length experienced during the majority of the time since the difference between the 95th queue

and average queue length is significant (approximately 33%). Consequently, there is no anticipation of traffic spillback occurring upstream of the Kent Street West and Adelaide Street South intersection.

However, optimizing signal timing (see **Appendix B**) would reduce the 95th queue length to 100.6m and the average queue length to 68.2 m as shown in **Table 11**.

Table 10: Option 2 - Operation Analysis for Background Traffic Conditions – 2037

Approach	Movement	Existing 2037					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	C	E	0.98	70.6	78.6	48.9
	EBT		C	0.47	21.8	84.4	50.7
	EBR		B	0.23	19.2	35.1	14.7
East	WBL	C	B	0.14	19.5	58.6	16
	WBT		C	0.74	33.1	136.8	90.8
	WBR					130.7	84.3
South	NBL	C	C	0.57	26.6	63.9	38.1
	NBT		C	0.26	34	27.6	14.8
	NBR					29.1	15
North	SBL	D	C	0.31	30.4	30.1	13.9
	SBT		D	0.26	38.1	30.5	17.3
	SBR		D	0.2	37.9	55.7	30.9

Table 11: Option 2 - Operation Analysis for Background Traffic Conditions – 2037 After Split Optimization

Approach	Movement	Split Optimization					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	B	C	0.75	22.7	63.3	38.1
	EBT		B	0.4	15.8	60.6	38.8
	EBR		B	0.23	14.5	27.2	12.7
East	WBL	C	B	0.13	17.3	35.6	9
	WBT		C	0.67	28.3	100.6	68.2
	WBR					94.4	62.5
South	NBL	D	D	0.81	49.6	74	43.7
	NBT		D	0.34	38.3	46.2	19.6
	NBR					35.6	18.2
North	SBL	D	C	0.35	32.5	32.1	15.6
	SBT		D	0.26	37.7	31.4	16.3
	SBR		D	0.2	37.5	47.5	27.9

5.4.4. Option 2 – Horizon Year 2051

The configuration and parameters of Option 2 used in the capacity analysis and simulation for the horizon year 2051 were the same as in 2037 except for the background traffic volumes (background traffic of 2051). The results of the analysis for AM peak hour for the intersections are summarized in **Table 12** and Synchro analysis outputs are provided for reference in **Appendix B**.

As per the capacity analysis, the intersection approaches and individual movements are expected to operate at LOS of E or better (except for the eastbound through movement which has LOS of F). It is expected since the traffic volume for this single left turn lane is greater than 300 veh/h. Similar to Option 1, the 95th queue length and the average queue are high for eastbound and westbound movements. Accordingly, the Kent Street West and Adelaide Street South intersection is prone to queue impacts from the westbound through lane. Optimizing signal timing (phase split optimization) would mitigate the queue

length as shown in **Table 13**. However, it is anticipated that the upstream of the Kent Street West and Adelaide Street South intersection could be impacted. In other words, the queue at the intersection of Kent Street West and Angeline Street may overflow to the adjacent intersection (Kent Street West and Adelaide Street South), resulting in delays and potential congestion. Again, the capacity analysis was conducted considering only background traffic volume (additional trips generated by new developments within the vicinity of the intersection were not considered).

Table 12: Option 2 - Operation Analysis for Background Traffic Conditions - 2051

Approach	Movement	Existing 2051					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	E	F	1.37	219.6	102.3	95
	EBT		C	0.64	27.9	378.8	276.7
	EBR		C	0.38	24.3	76.9	31.1
East	WBL	E	C	0.23	21.1	99.5	38.7
	WBT		E	0.98	56.6	263.3	259
	WBR					265.9	258.2
South	NBL	C	C	0.67	28.3	81.9	50.8
	NBT		C	0.31	33.9	67.4	27.2
	NBR					39.1	21.5
North	SBL	D	C	0.36	29.6	35.7	17.4
	SBT		D	0.29	37.8	37.3	22.6
	SBR		D	0.57	42.3	67.9	41.2

Table 13: Option 2 - Operation Analysis for Background Traffic Conditions – 2051 After Split Optimization

Approach	Movement	Split Optimization					
		LOS Approach	LOS Movement	v/c	Delay s/veh	95th Queue (m)	Average Queue (m)
West	EBL	C	E	0.96	67.9	103.9	68.8
	EBT		B	0.51	19.1	130.4	72.5
	EBR		B	0.29	16.7	45.9	21.5
East	WBL	D	B	0.18	19.4	87.5	29.3
	WBT		D	0.91	43.3	291.8	234.9
	WBR					295.3	229.1
South	NBL	E	F	0.99	84.7	111.3	89.9
	NBT		D	0.4	39.1	250.7	142.5
	NBR					182.2	79.6
North	SBL	D	C	0.46	33.7	35.8	17.7
	SBT		D	0.29	38.1	39.3	21.9
	SBR		D	0.53	41.5	75.3	44.5

It should be noted that the length of the storage areas of the left and right turns used in the capacity analysis and simulation were as follows:

- Eastbound left and right: 60 m each
- Westbound left: 45 m
- Northbound left and right: 60 m each
- Southbound left: 50 m
- Southbound right: 70 m

It should be further noted that the capacity analysis and simulation were carried out, taking into account solely the background traffic volume, and it did not account for any additional trips generated by new developments in the vicinity of the intersection.

6. SWEPT PATH ANALYSIS

Swept path analysis was carried out for both options, taking into account the WB-19 vehicle type. As illustrated in **Figure 9** and **Figure 10**, the layout of these options is capable of accommodating the turning maneuvers required for this specific vehicle. The Swept path analysis shows all movements for both presented options could be properly accommodated and eliminating the right turn lane of the south approach (northbound movement) won't affect vehicle turning maneuvers.

It should be noted that the northbound travel lane is situated near the property line of the Ambassador Apartments. Therefore, it is strongly advised to conduct a structural review to assess the safety of the underground parking lot.

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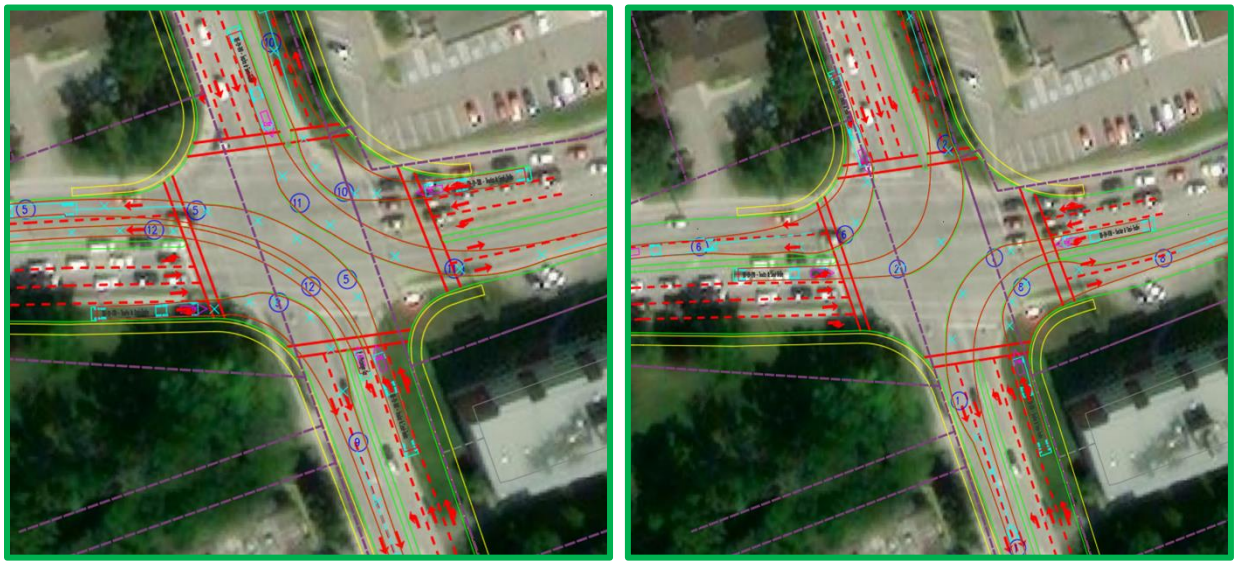


Figure 9: Swept Path Analysis for Option 1

Figure 10: Swept Path Analysis for Option 2

7. COMPARISON OF THE DIFFERENT SCENARIOS

- The results of the analyses can be outlined as follows: Horizon year 2037:
  - **No Geometric Improvement (Do Nothing) Option**: The intersection approaches are anticipated to function with a LOS of E or better, while the individual movements are projected to achieve a LOS of D or better, except for the eastbound left and southbound through movements, which are predicted to experience a LOS of F. Additionally, it is anticipated that the 95th percentile queue length will be significant for the eastbound and westbound movements, as well as for the southbound through movement. Accordingly, improvements for the intersection are recommended by this horizon year. Since one lane of the south approach is located above the underground parking lot of Ambassador Apartments property, therefore, reduction at least one lane is mandatory. Accordingly, “No Geometric Improvement (Do Nothing)” Option is not a selected choice.
  - **Option 1**: The intersection approaches are anticipated to function with a LOS of C or better, while the individual movements are projected to achieve a LOS of D or better, except for the eastbound left movement (LOS E). Furthermore, there is an expectation that the 95th percentile queue length will be notably elevated for the eastbound and westbound movements. Nevertheless, it is not anticipated that the queue length will have an impact on the intersections upstream.

Implementing optimizations to the current signal timing can help alleviate these queue lengths and prevent any overflow from affecting the upstream intersection.

- **Option 2**: The intersection approaches and individual movements are anticipated to function with a LOS of D or better, except for eastbound left movement (LOS E). Furthermore, there is an expectation that the 95th percentile queue length will be notably elevated for the eastbound and westbound movements. However, it is not anticipated that the queue length will have an impact on the intersections upstream. Implementing optimizations to the current signal timing can help alleviate these queue lengths and prevent any overflow from affecting the upstream intersection.
- Given the information provided above, Option 1 and Option 2 can be regarded as viable choices for enhancing the operational conditions of the intersection.

- Horizon year 2051:
  - **Option 1**: The intersection approaches are expected to operate at LOS E or better while individual movements are projected to operate at a LOS of D or better, except for the eastbound movement (LOS F). However, it is anticipated that both the 95th percentile and average queue length will be significantly high for the eastbound, westbound, and southbound movements. Signal timing optimizations could help reduce queue lengths. , it is expected that the upstream of the Kent Street West and Adelaide Street South intersection will be affected.
  - **Option 2**: The intersection approaches and individual movements are anticipated to function with a LOS of E or better, except for the eastbound through movement which is expected to operate at a LOS of F. Furthermore, there is an expectation that the 95th percentile queue length will be notably elevated for the eastbound and westbound movements. The implementation of signal timing optimizations can effectively mitigate these queue lengths for the majority of the time.
  - Given the information provided above, both Option 1 and Option 2 appear to be feasible options for eliminating the right turn lane from the south approach of preferred alternative 2 (which consists of two left turn lanes, one through lane, and one shared through-right lane). However, it is anticipated that operational challenges may arise for eastbound and westbound movements. This is expected because of the high traffic volume at the eastbound left turn lane (greater than 300 veh/h) and westbound through lane.

- Considering all the above, both Option 1 and Option 2 can be regarded as viable choices for enhancing the operational conditions of the intersection. The owner may decide to implement either of these options at any time. Having said that, Option 2 has been chosen as the preferred option (**Figure 11**) for its consistency, traffic flow, queue length, continuity, and safety. In this selection, the preference was also given to allocate two lanes for through-lane traffic.

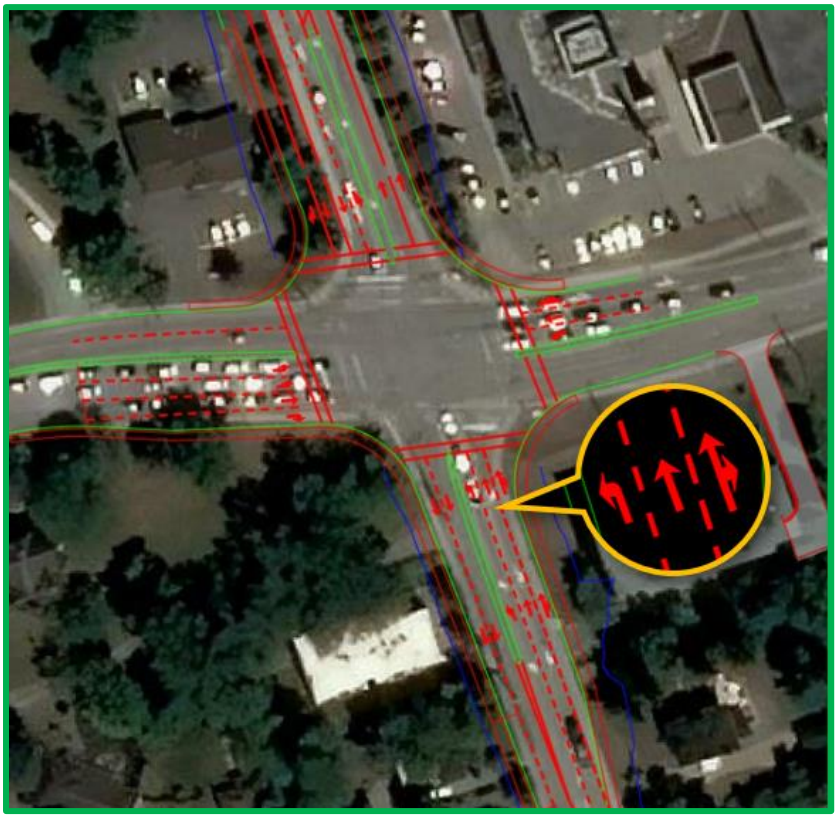


Figure 11: South Approach Configuration of the Preferred Option

8. CONCLUSION

This report has been provided to document the assessment of the traffic conditions associated with the previously suggested preferred alternative, which is grounded in a capacity analysis performed by HDR Corporation. The analysis takes into account the need for the elimination of one lane, specifically the northbound right turn lane, from the south approach due to the presence of the underground parking lot.

- To achieve the objective of this report,
  - Traffic counts were collected for the intersection from 7:00 to 16:00.
  - Capacity analysis was conducted for the 2027, 2037, and 2051 horizon years.
  - Background traffic volumes for the horizon years were determined based on a growth rate of 1.6%. The analysis did not take into account the trips generated by future new developments in the vicinity of the intersection.
  - Multiple scenarios were considered in the analysis for the south approach lane configuration as described in detail in **Section 5**.
  - Simulation for traffic flow was conducted to determine the 95th and average queue length.
  - Capacity analysis and simulation considered the existing signal timing and also an optimized one.
- Based on the capacity analysis, in regards to the "No Geometric Improvement (Do Nothing)" option and the maintenance of only two lanes for the northbound (south approach), due to the expected LOS of E & F observed and the expected significant 95th percentile queue length, improvements for the intersection are recommended before the horizon years of 2037 and 2051.
- Since one lane of the south approach in the presented preferred option is situated above the underground parking lot of Ambassador Apartment property, the reduction of at least one lane is mandatory. Consequently, for the horizon years 2037 and 2051, both options presented in Section 5.4 (South Approach Modification) can be considered viable choices for enhancing the operational conditions of the intersection. The owner may choose to implement either of these options at any time. That being said, Option 2 has been designated as the preferred option due to its slightly better consistency, traffic flow, queue length, continuity, and safety.

9. ADDITIONAL FINDINGS AND RECOMMENDATIONS

During the study, which primarily focused on evaluating the consequences of removing one lane from the south approach (northbound movement) of the Kent Street West and Angeline Street Intersection situated above the Ambassador Apartments from the southeast, the examination and synchro model review provided additional insights. These

findings, considered as added value, have prompted recommendations deemed crucial for enhancing the overall operational conditions of the site. Therefore, supplementary recommendations are presented for consideration and potential implementation. Supplemental studies are necessary to assess each recommendation and address associated concerns. These studies will help gauge the potential consequences should the choice be to implement any or all of these suggestions.

9.1. East Approach:

9.1.1. Extend Storage Area

Extend the storage area for the westbound left turn to minimum of 45 meters to mitigate queue length, reduce delays, and enhance Level of Service (**Figure 12**). Implementation of this extension can be incorporated during the detailed design stage. Considering the volume of Westbound through traffic, extending the storage area for westbound left turn could assist with better through movements. Without the aforementioned storage expansion, the 95th percentile queue length for westbound traffic is anticipated to reach 279.2 meters or more. As a consequence, the intersection is projected to operate at a low LOS, leading to extended delays for roadway users. further details can be found in **Table 5**.

Figure 12: East Approach Configuration of the Preferred Option

9.2. West Approach:

9.2.1. Extend Storage Area

Recommendation: Extend the storage area for both eastbound left and right turns to minimum of 60 meters each to alleviate queue length, reduce delays, and enhance Level of Service (**Figure 13**). This extension can be integrated during the detailed design stage. Without the specified storage expansions, the intersection is projected to operate at an exceptionally low LOS, leading to prolonged delays for roadway users. The estimated delay for the eastbound left movement is approximately 274 seconds. Additional details can be found in **Table 5**.

Figure 13: Extend Storage Area of the West Approach

9.2.2. Considering Two (2) Left-turn Lanes

Preliminary studies conducted as part of this investigation indicate that the intersection could derive advantages from improved LOS, shorter queue lengths, and reduced delays for eastbound roadway users when two lanes are allocated to left turns (as opposed to the currently depicted one lane). Opting for double left turns for the eastbound movement (**Figure 14**) aligns with the recommendation of the GDGCR, especially given that the

traffic volume exceeds 300 vehicles per hour. Capacity analyses for this configuration are yet to be conducted to assess its impact on the operational performance of the intersection. Further traffic analysis is recommended to validate the findings, thoroughly examine their advantages and disadvantages and delve into the specific details of the proposed adjustments.

Figure 14: West Approach with Two left-turn Lanes

9.3. South Approach:

9.3.1. Structural Review:

While this report confirms the feasibility of reducing one lane from the south approach to avoid positioning a lane over the underground parking lot of Ambassador Apartment property, it is recommended to conduct a structural review. This review should assess the safety of the underground parking lot of the Ambassador Apartment property, taking into account its proximity to the nearest traffic lane and the potential impact of passing heavy trucks.

9.3.2. Encroachment and Landownership Concerns.

Even with the elimination of one lane above the underground parking lot of Ambassador Apartment Property, the pedestrian walkway remains within that property at the southeast

corner (**Figure 15**). A similar issue persists on the southwest corner of the intersection, particularly for No. 3 and 7 Angeline St S. A thorough review is essential to ascertain that the preferred option can be executed without encountering conflicts over property rights and legal ownership. This may necessitate the removal of one more lane from the south-north corridor. Further examination is advised to validate the aforementioned points, evaluate their advantages and disadvantages, and delve into the specifics of the proposed adjustments.

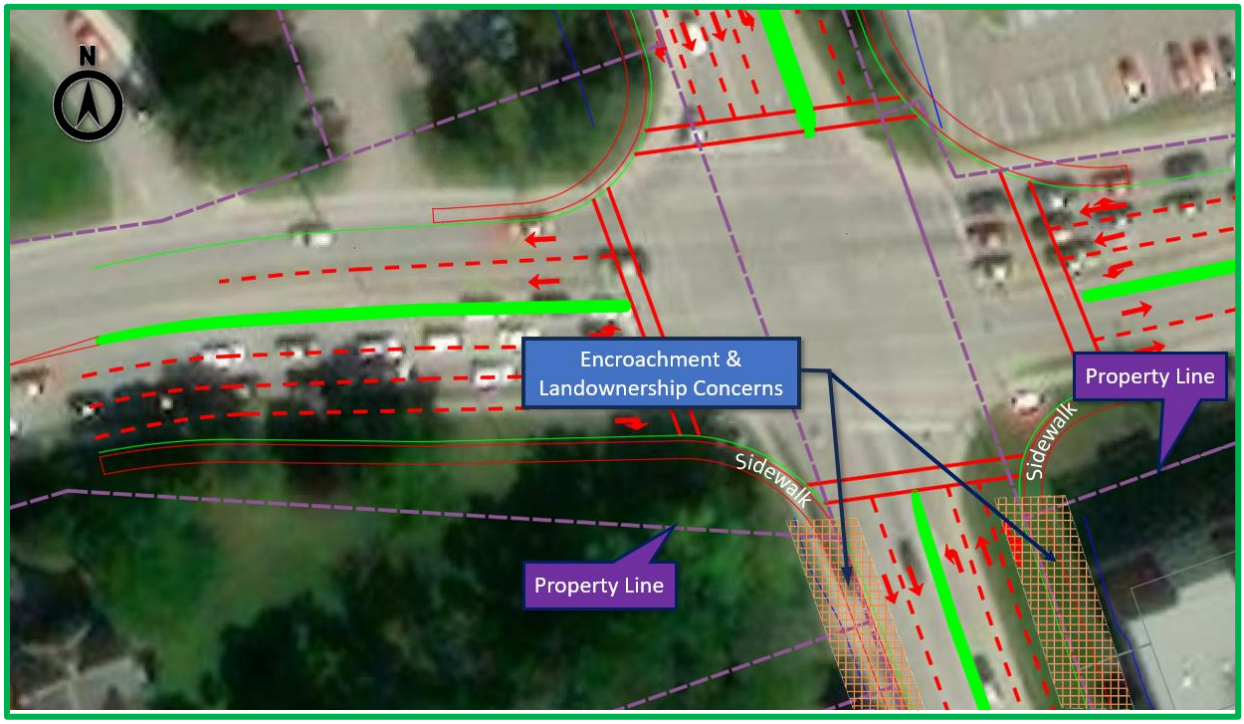


Figure 15: South Approach - Encroachment and Landownership Concerns.

9.4. North Approach:

9.4.1. Reducing Another Lane from North and South Approaches

Subject to the results of the additional studies suggested for the south approach—specifically, the recommended Structural Review and review of Encroachment and Landownership concerns—if the reduction of one more lane becomes necessary from the south approach, it will undoubtedly impact the geometric design of the north approach. On the one hand, this adjustment might aid in addressing space constraints currently faced by the design team between Memorial Hospital and the Dentist office situated on the opposite side of Angeline Street North. On the other hand, there are concerns about

the potential reduction in LOS and increased delays for road users, considering both existing and future traffic volumes. To validate these considerations, further traffic analysis is recommended. This will allow for a comprehensive exploration of the advantages and disadvantages associated with the proposed changes, along with a detailed examination of the specifics involved.

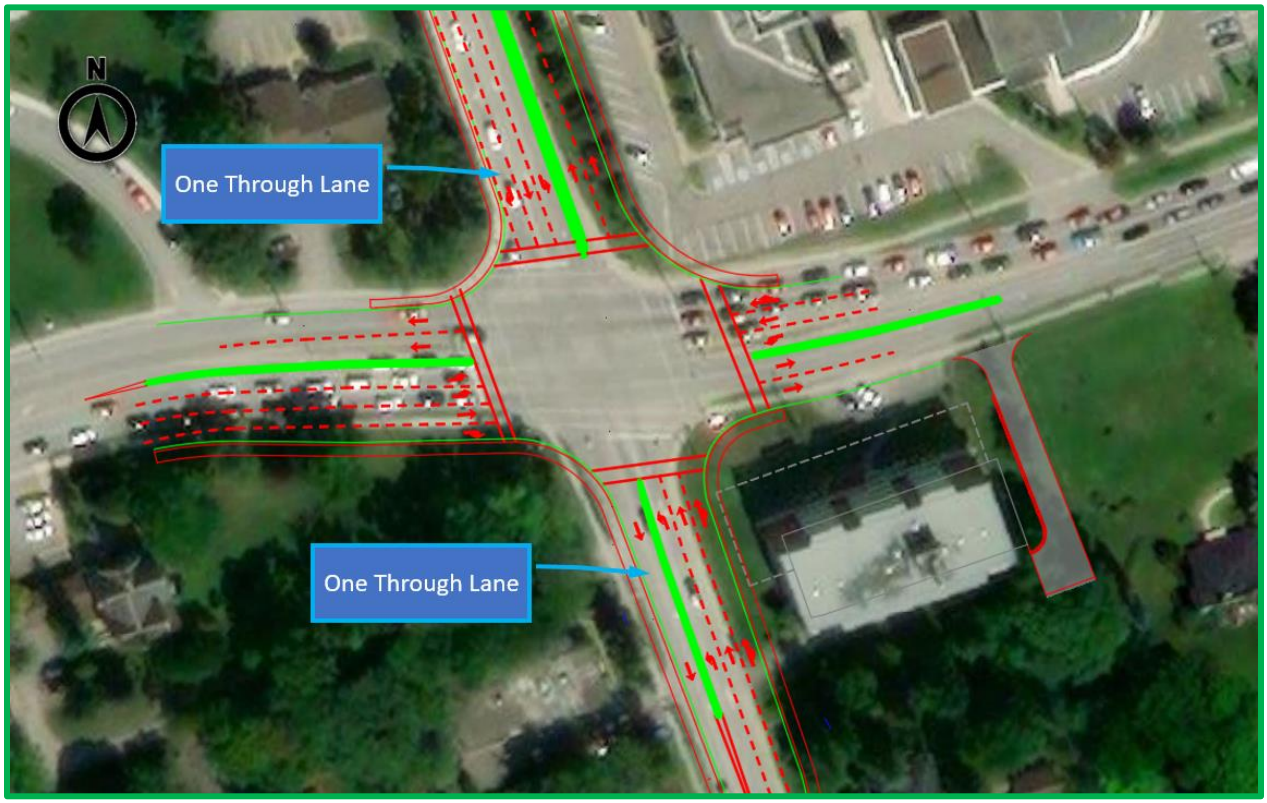


Figure 16: Reducing Another Lane from North and South Approaches

9.5. Extend storage area as follows:

The intersection can benefit from adjusting the storage areas on all approaches. The following suggesting are provided for consideration during the Detail Design phase:

- Eastbound left and right: 60 m each
- Westbound left: 45 m
- Northbound left and right: 60 m each
- Southbound left: 50 m
- Southbound right: 70 m

9.6. Optimize signal timing of the intersection.

Preliminary studies carried out as part of this investigation suggest that the intersection could experience benefits from enhanced LOS, shorter queue lengths, and reduced delays through the optimization of signal timing and phase split. Examples of these potential improvements are detailed in this report, specifically in **Table 7** under "Operation Analysis for Background Traffic Conditions – 2037 After Optimizing Cycle Length."

Traffic Counts

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 10:00:00

One Hour Peak
From: 9:00:00
To: 10:00:00

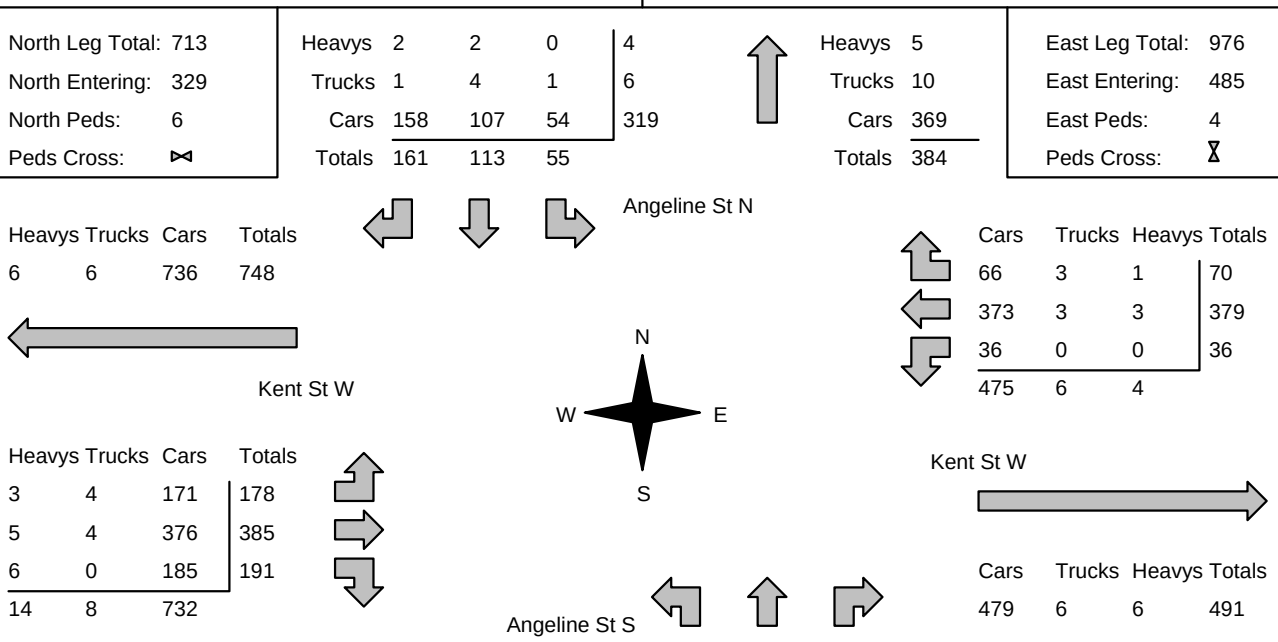
Municipality: Lindsay
Site #: 2318400001
Intersection: Kent St W & Angeline St S
TFR File #: 1
Count date: 1-Aug-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Kent St W runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 11:30:00
To: 12:30:00

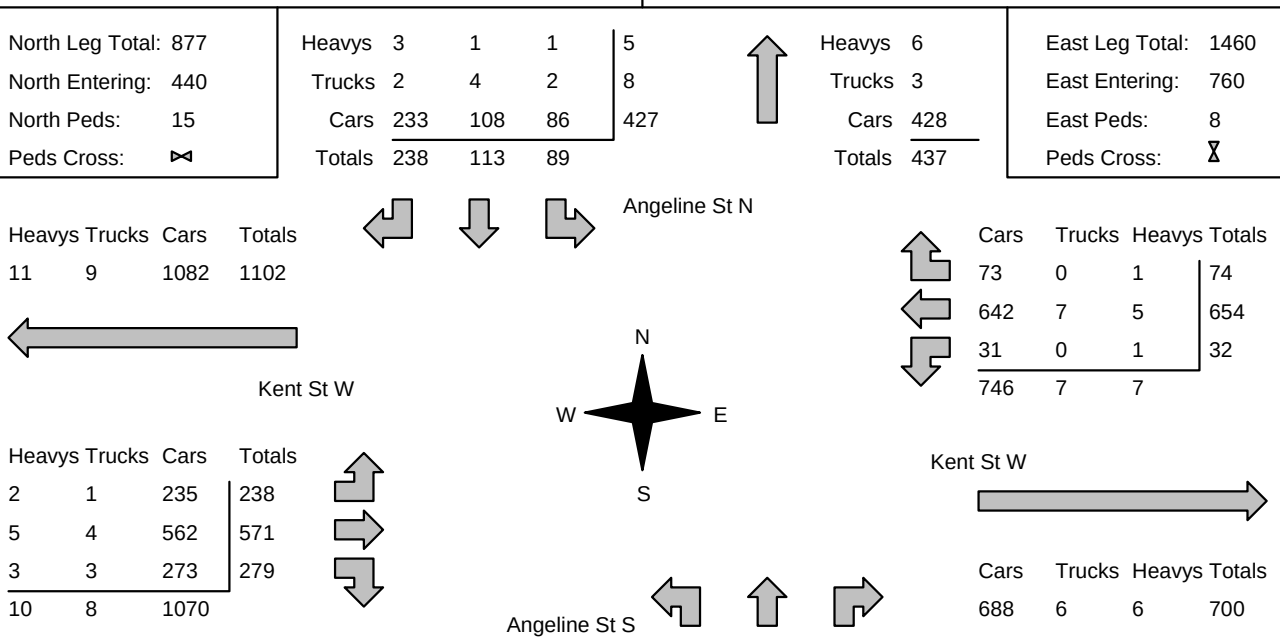
Municipality: Lindsay
Site #: 2318400001
Intersection: Kent St W & Angeline St S
TFR File #: 1
Count date: 1-Aug-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Kent St W runs W/E



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Lindsay
Site #: 2318400001
Intersection: Kent St W & Angeline St S
TFR File #: 1
Count date: 1-Aug-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

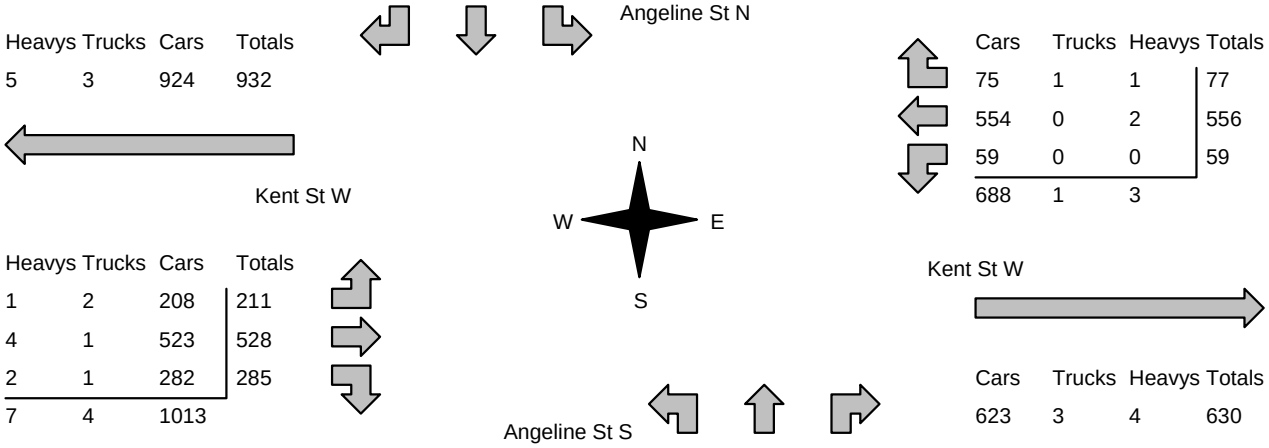
Major Road: Kent St W runs W/E

North Leg Total: 847
North Entering: 414
North Peds: 8
Peds Cross: ⋈

Heavys	2	1	0	3
Trucks	0	1	2	3
Cars	182	154	72	408
Totals	184	156	74	

Heavys	2
Trucks	4
Cars	427
Totals	433

East Leg Total: 1322
East Entering: 692
East Peds: 4
Peds Cross: ⧖



Heavys	Trucks	Cars	Totals
5	3	924	932

Cars	Trucks	Heavys	Totals
75	1	1	77
554	0	2	556
59	0	0	59
688	1	3	

Heavys	Trucks	Cars	Totals
1	2	208	211
4	1	523	528
2	1	282	285
7	4	1013	

Cars	Trucks	Heavys	Totals
623	3	4	630

Peds Cross: ⧖
West Peds: 11
West Entering: 1024
West Leg Total: 1956

Cars	495			
Trucks	2			
Heavys	3			
Totals	500			

Cars	188	144	28	360
Trucks	3	1	0	4
Heavys	1	0	0	1
Totals	192	145	28	

Peds Cross: ⋈
South Peds: 34
South Entering: 365
South Leg Total: 865

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Total Count Diagram

Municipality: Lindsay
Site #: 2318400001
Intersection: Kent St W & Angeline St S
TFR File #: 1
Count date: 1-Aug-23

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Kent St W runs W/E

North Leg Total:	5930
North Entering:	2846
North Peds:	101
Peds Cross:	⋈

Heavys	21	12	5	38
Trucks	9	16	5	30
Cars	1303	960	515	2778
Totals	1333	988	525	

Heavys	41
Trucks	32
Cars	3011
Totals	3084

East Leg Total:	8781
East Entering:	4411
East Peds:	49
Peds Cross:	⧖

Angeline St N

Heavys	Trucks	Cars	Totals
62	44	6346	6452

Cars	Trucks	Heavys	Totals
513	5	12	530
3560	25	23	3608
270	1	2	273
4343	31	37	

Kent St W

N
W E
S

Heavys	Trucks	Cars	Totals
13	15	1474	1502
27	25	3478	3530
32	10	1718	1760
72	50	6670	

Kent St W

Cars	Trucks	Heavys	Totals
4302	35	33	4370

Angeline St S

Peds Cross:	⧖
West Peds:	81
West Entering:	6792
West Leg Total:	13244

Cars	2948
Trucks	27
Heavys	46
Totals	3021

Cars	1483	1024	309	2816
Trucks	10	12	5	27
Heavys	18	16	1	35
Totals	1511	1052	315	

Peds Cross:	⋈
South Peds:	157
South Entering:	2878
South Leg Total:	5899

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Traffic Count Summary

Intersection: Kent St W & Angeline St S | **Count Date:** 1-Aug-23 | **Municipality:** Lindsay

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0
8:00:00	26	97	83	206	5
9:00:00	56	113	127	296	9
10:00:00	55	113	161	329	6
11:00:00	0	0	0	0	0
12:00:00	94	122	207	423	15
13:00:00	75	105	220	400	14
15:00:00	0	0	0	0	0
16:00:00	61	154	184	399	28
17:00:00	95	161	185	441	13
18:00:00	63	123	166	352	11
Totals:	525	988	1333	2846	101

North/South Total Approaches: 5724

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0
8:00:00	153	95	26	274	3
9:00:00	183	150	37	370	12
10:00:00	208	136	51	395	15
11:00:00	0	0	0	0	0
12:00:00	209	119	52	380	17
13:00:00	214	138	42	394	23
15:00:00	0	0	0	0	0
16:00:00	175	130	41	346	21
17:00:00	186	146	33	365	36
18:00:00	183	138	33	354	30
S Totals:	1511	1052	315	2878	157

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0
8:00:00	25	170	32	227	2
9:00:00	24	297	48	369	7
10:00:00	36	379	70	485	4
11:00:00	0	0	0	0	0
12:00:00	32	588	79	699	12
13:00:00	34	652	77	763	5
15:00:00	0	0	0	0	0
16:00:00	35	495	75	605	8
17:00:00	51	542	76	669	7
18:00:00	36	485	73	594	4
Totals:	273	3608	530	4411	49

East/West Total Approaches: 11203

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0
8:00:00	88	197	133	418	5
9:00:00	141	328	154	623	16
10:00:00	178	385	191	754	5
11:00:00	0	0	0	0	0
12:00:00	239	515	275	1029	8
13:00:00	240	584	272	1096	13
15:00:00	0	0	0	0	0
16:00:00	231	522	229	982	18
17:00:00	206	534	247	987	8
18:00:00	179	465	259	903	8
W Totals:	1502	3530	1760	6792	81

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	10:00	12:00	13:00	16:00	17:00	18:00
Crossing Values:	283	412	408	445	445	416	457	396

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 1-Aug-23 Site #: 2318400001

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	8	8	29	29	21	21	0	0	0	0	0	0	0	0	0	0	1	1	2	2
7:30:00	12	4	47	18	36	15	0	0	0	0	0	0	0	0	0	0	4	3	3	1
7:45:00	17	5	67	20	58	22	0	0	0	0	1	1	0	0	0	0	4	0	4	1
8:00:00	26	9	97	30	78	20	0	0	0	0	1	0	0	0	0	0	4	0	5	1
8:15:00	35	9	116	19	106	28	0	0	0	0	1	0	0	0	0	0	4	0	7	2
8:30:00	43	8	147	31	140	34	0	0	0	0	1	0	2	2	2	2	6	2	9	2
8:45:00	55	12	177	30	166	26	0	0	0	0	2	1	2	0	2	0	7	1	12	3
9:00:00	80	25	207	30	201	35	0	0	0	0	2	0	2	0	3	1	7	0	14	2
9:15:00	94	14	237	30	237	36	0	0	1	1	2	0	2	0	4	1	7	0	16	2
9:30:00	101	7	263	26	272	35	0	0	3	2	3	1	2	0	4	0	9	2	17	1
9:45:00	120	19	292	29	314	42	1	1	3	0	3	0	2	0	5	1	9	0	19	2
10:00:00	134	14	314	22	359	45	1	0	4	1	3	0	2	0	5	0	9	0	20	1
10:15:00	134	0	314	0	359	0	1	0	4	0	3	0	2	0	5	0	9	0	20	0
11:00:00	134	0	314	0	359	0	1	0	4	0	3	0	2	0	5	0	9	0	20	0
11:15:00	155	21	343	29	401	42	1	0	4	0	4	1	2	0	6	1	9	0	21	1
11:30:00	175	20	371	28	445	44	1	0	6	2	4	0	2	0	7	1	11	2	26	5
11:45:00	202	27	399	28	507	62	1	0	7	1	4	0	2	0	7	0	11	0	31	5
12:00:00	226	24	430	31	562	55	3	2	8	1	5	1	2	0	7	0	11	0	35	4
12:15:00	244	18	453	23	622	60	3	0	10	2	6	1	3	1	8	1	11	0	37	2
12:30:00	261	17	479	26	678	56	3	0	10	0	6	0	3	0	8	0	14	3	41	4
12:45:00	275	14	506	27	729	51	3	0	11	1	6	0	3	0	8	0	14	0	43	2
13:00:00	300	25	531	25	778	49	3	0	11	0	6	0	3	0	8	0	14	0	49	6
13:15:00	300	0	531	0	778	0	3	0	11	0	6	0	3	0	8	0	14	0	49	0
15:00:00	300	0	531	0	778	0	3	0	11	0	6	0	3	0	8	0	14	0	49	0
15:15:00	315	15	560	29	831	53	3	0	12	1	6	0	3	0	8	0	15	1	60	11
15:30:00	330	15	605	45	874	43	3	0	13	1	7	1	4	1	8	0	17	2	63	3
15:45:00	346	16	636	31	910	36	3	0	14	1	8	1	4	0	9	1	17	0	71	8
16:00:00	359	13	680	44	956	46	3	0	14	0	9	1	5	1	10	1	17	0	77	6
16:15:00	386	27	720	40	996	40	3	0	14	0	9	0	5	0	11	1	17	0	77	0
16:30:00	410	24	760	40	1049	53	3	0	14	0	9	0	5	0	11	0	19	2	85	8
16:45:00	436	26	799	39	1088	39	4	1	15	1	9	0	5	0	11	0	19	0	86	1
17:00:00	453	17	839	40	1139	51	4	0	15	0	9	0	5	0	11	0	19	0	90	4
17:15:00	470	17	882	43	1195	56	5	1	15	0	9	0	5	0	11	0	19	0	90	0
17:30:00	482	12	914	32	1231	36	5	0	15	0	9	0	5	0	12	1	21	2	93	3
17:45:00	501	19	934	20	1264	33	5	0	16	1	9	0	5	0	12	0	21	0	99	6
18:00:00	515	14	960	26	1303	39	5	0	16	0	9	0	5	0	12	0	21	0	101	2
18:15:00	515	0	960	0	1303	0	5	0	16	0	9	0	5	0	12	0	21	0	101	0
18:15:15	515	0	960	0	1303	0	5	0	16	0	9	0	5	0	12	0	21	0	101	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 1-Aug-23 Site #: 2318400001

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	10	10	35	35	7	7	0	0	0	0	0	0	0	0	0	0	1	1	0	0
7:30:00	19	9	76	41	15	8	0	0	0	0	0	0	1	1	1	1	1	0	0	0
7:45:00	21	2	122	46	23	8	0	0	2	2	0	0	1	0	1	0	1	0	2	2
8:00:00	24	3	166	44	31	8	0	0	2	0	0	0	1	0	2	1	1	0	2	0
8:15:00	28	4	230	64	43	12	0	0	2	0	0	0	1	0	5	3	3	2	5	3
8:30:00	32	4	301	71	54	11	0	0	2	0	1	1	1	0	7	2	3	0	7	2
8:45:00	40	8	369	68	67	13	0	0	2	0	1	0	1	0	7	0	3	0	9	2
9:00:00	48	8	455	86	76	9	0	0	3	1	1	0	1	0	9	2	3	0	9	0
9:15:00	53	5	545	90	94	18	0	0	3	0	1	0	1	0	9	0	4	1	10	1
9:30:00	62	9	640	95	112	18	0	0	4	1	2	1	1	0	11	2	4	0	11	1
9:45:00	70	8	735	95	123	11	0	0	5	1	4	2	1	0	11	0	4	0	11	0
10:00:00	84	14	828	93	142	19	0	0	6	1	4	0	1	0	12	1	4	0	13	2
10:15:00	84	0	828	0	142	0	0	0	6	0	4	0	1	0	12	0	4	0	13	0
11:00:00	84	0	828	0	142	0	0	0	6	0	4	0	1	0	12	0	4	0	13	0
11:15:00	89	5	981	153	166	24	0	0	9	3	4	0	1	0	12	0	6	2	16	3
11:30:00	103	14	1124	143	186	20	0	0	10	1	4	0	1	0	13	1	6	0	21	5
11:45:00	108	5	1275	151	201	15	0	0	11	1	4	0	1	0	13	0	6	0	22	1
12:00:00	116	8	1405	130	219	18	0	0	14	3	4	0	1	0	15	2	6	0	25	3
12:15:00	125	9	1602	197	235	16	0	0	14	0	4	0	1	0	17	2	7	1	26	1
12:30:00	134	9	1766	164	259	24	0	0	17	3	4	0	2	1	18	1	7	0	29	3
12:45:00	141	7	1919	153	275	16	0	0	19	2	4	0	2	0	18	0	7	0	29	0
13:00:00	149	8	2048	129	293	18	0	0	19	0	4	0	2	0	19	1	9	2	30	1
13:15:00	149	0	2048	0	293	0	0	0	19	0	4	0	2	0	19	0	9	0	30	0
15:00:00	149	0	2048	0	293	0	0	0	19	0	4	0	2	0	19	0	9	0	30	0
15:15:00	159	10	2162	114	318	25	0	0	19	0	4	0	2	0	19	0	10	1	30	0
15:30:00	164	5	2261	99	327	9	0	0	19	0	4	0	2	0	19	0	10	0	32	2
15:45:00	171	7	2401	140	353	26	1	1	22	3	4	0	2	0	19	0	10	0	38	6
16:00:00	183	12	2537	136	367	14	1	0	24	2	4	0	2	0	20	1	10	0	38	0
16:15:00	194	11	2685	148	391	24	1	0	24	0	4	0	2	0	20	0	11	1	40	2
16:30:00	205	11	2815	130	406	15	1	0	25	1	4	0	2	0	20	0	11	0	44	4
16:45:00	220	15	2949	134	424	18	1	0	25	0	4	0	2	0	20	0	11	0	45	1
17:00:00	234	14	3076	127	442	18	1	0	25	0	4	0	2	0	22	2	11	0	45	0
17:15:00	253	19	3207	131	457	15	1	0	25	0	4	0	2	0	22	0	12	1	47	2
17:30:00	264	11	3369	162	481	24	1	0	25	0	5	1	2	0	22	0	12	0	48	1
17:45:00	268	4	3468	99	498	17	1	0	25	0	5	0	2	0	22	0	12	0	48	0
18:00:00	270	2	3560	92	513	15	1	0	25	0	5	0	2	0	23	1	12	0	49	1
18:15:00	270	0	3560	0	513	0	1	0	25	0	5	0	2	0	23	0	12	0	49	0
18:15:15	270	0	3560	0	513	0	1	0	25	0	5	0	2	0	23	0	12	0	49	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 1-Aug-23 Site #: 2318400001

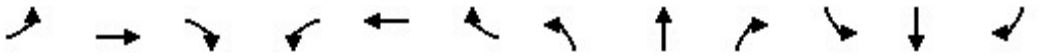
Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	26	26	13	13	7	7	1	1	0	0	0	0	2	2	3	3	0	0	0	0
7:30:00	54	28	31	18	14	7	1	0	0	0	0	0	4	2	3	0	0	0	0	0
7:45:00	101	47	53	22	20	6	1	0	1	1	0	0	5	1	5	2	0	0	1	1
8:00:00	145	44	87	34	26	6	2	1	2	1	0	0	6	1	6	1	0	0	3	2
8:15:00	189	44	129	42	30	4	3	1	3	1	0	0	7	1	6	0	0	0	5	2
8:30:00	226	37	167	38	39	9	3	0	3	0	0	0	8	1	6	0	0	0	7	2
8:45:00	273	47	191	24	49	10	3	0	3	0	0	0	8	0	7	1	0	0	12	5
9:00:00	324	51	235	44	63	14	3	0	3	0	0	0	9	1	7	0	0	0	15	3
9:15:00	373	49	264	29	72	9	3	0	4	1	0	0	9	0	7	0	0	0	18	3
9:30:00	427	54	307	43	80	8	3	0	4	0	0	0	10	1	7	0	1	1	21	3
9:45:00	475	48	331	24	94	14	4	1	6	2	0	0	10	0	8	1	1	0	25	4
10:00:00	529	54	367	36	112	18	5	1	6	0	1	1	10	0	8	0	1	0	30	5
10:15:00	529	0	367	0	112	0	5	0	6	0	1	0	10	0	8	0	1	0	30	0
11:00:00	529	0	367	0	112	0	5	0	6	0	1	0	10	0	8	0	1	0	30	0
11:15:00	574	45	391	24	122	10	5	0	6	0	1	0	10	0	9	1	1	0	33	3
11:30:00	625	51	428	37	141	19	5	0	6	0	1	0	11	1	9	0	1	0	39	6
11:45:00	677	52	455	27	149	8	5	0	8	2	1	0	11	0	10	1	1	0	43	4
12:00:00	736	59	482	27	164	15	5	0	8	0	1	0	12	1	10	0	1	0	47	4
12:15:00	791	55	516	34	172	8	5	0	8	0	1	0	13	1	12	2	1	0	51	4
12:30:00	832	41	548	32	181	9	5	0	8	0	1	0	14	1	12	0	1	0	62	11
12:45:00	891	59	590	42	193	12	6	1	8	0	2	1	15	1	13	1	1	0	66	4
13:00:00	946	55	617	27	204	11	6	0	8	0	3	1	15	0	13	0	1	0	70	4
13:15:00	946	0	617	0	204	0	6	0	8	0	3	0	15	0	13	0	1	0	70	0
15:00:00	946	0	617	0	204	0	6	0	8	0	3	0	15	0	13	0	1	0	70	0
15:15:00	988	42	640	23	210	6	6	0	8	0	4	1	15	0	13	0	1	0	79	9
15:30:00	1032	44	679	39	223	13	6	0	8	0	4	0	16	1	15	2	1	0	85	6
15:45:00	1073	41	711	32	234	11	6	0	9	1	4	0	16	0	15	0	1	0	87	2
16:00:00	1120	47	744	33	243	9	6	0	9	0	5	1	16	0	15	0	1	0	91	4
16:15:00	1165	45	775	31	251	8	6	0	9	0	5	0	16	0	15	0	1	0	101	10
16:30:00	1211	46	814	39	265	14	7	1	9	0	5	0	17	1	16	1	1	0	115	14
16:45:00	1256	45	856	42	270	5	8	1	10	1	5	0	17	0	16	0	1	0	122	7
17:00:00	1302	46	888	32	276	6	9	1	10	0	5	0	17	0	16	0	1	0	127	5
17:15:00	1359	57	927	39	283	7	10	1	10	0	5	0	17	0	16	0	1	0	139	12
17:30:00	1399	40	958	31	293	10	10	0	10	0	5	0	18	1	16	0	1	0	149	10
17:45:00	1440	41	996	38	303	10	10	0	11	1	5	0	18	0	16	0	1	0	154	5
18:00:00	1483	43	1024	28	309	6	10	0	12	1	5	0	18	0	16	0	1	0	157	3
18:15:00	1483	0	1024	0	309	0	10	0	12	0	5	0	18	0	16	0	1	0	157	0
18:15:15	1483	0	1024	0	309	0	10	0	12	0	5	0	18	0	16	0	1	0	157	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Count Date: 1-Aug-23 Site #: 2318400001

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	16	16	37	37	19	19	0	0	1	1	0	0	0	0	0	0	0	0	2	2
7:30:00	39	23	78	41	48	29	0	0	1	0	0	0	0	0	1	1	0	0	4	2
7:45:00	61	22	118	40	87	39	0	0	4	3	0	0	1	1	2	1	2	2	4	0
8:00:00	86	25	186	68	128	41	0	0	6	2	0	0	2	1	5	3	5	3	5	1
8:15:00	116	30	248	62	161	33	1	1	6	0	0	0	2	0	5	0	6	1	8	3
8:30:00	142	26	327	79	196	35	2	1	6	0	0	0	3	1	6	1	7	1	10	2
8:45:00	189	47	416	89	235	39	3	1	7	1	0	0	4	1	7	1	9	2	18	8
9:00:00	221	32	510	94	277	42	4	1	7	0	0	0	4	0	8	1	10	1	21	3
9:15:00	262	41	592	82	313	36	5	1	8	1	0	0	5	1	8	0	12	2	21	0
9:30:00	304	42	678	86	348	35	5	0	10	2	0	0	5	0	9	1	12	0	24	3
9:45:00	354	50	779	101	401	53	6	1	10	0	0	0	6	1	9	0	14	2	26	2
10:00:00	392	38	886	107	462	61	8	2	11	1	0	0	7	1	13	4	16	2	26	0
10:15:00	392	0	886	0	462	0	8	0	11	0	0	0	7	0	13	0	16	0	26	0
11:00:00	392	0	886	0	462	0	8	0	11	0	0	0	7	0	13	0	16	0	26	0
11:15:00	464	72	989	103	524	62	8	0	14	3	0	0	7	0	13	0	18	2	27	1
11:30:00	515	51	1122	133	595	71	8	0	14	0	1	1	7	0	13	0	18	0	32	5
11:45:00	566	51	1255	133	678	83	9	1	14	0	1	0	8	1	14	1	19	1	34	2
12:00:00	628	62	1394	139	730	52	9	0	15	1	2	1	9	1	16	2	21	2	34	0
12:15:00	691	63	1527	133	812	82	9	0	17	2	3	1	9	0	16	0	21	0	35	1
12:30:00	750	59	1684	157	868	56	9	0	18	1	4	1	9	0	18	2	21	0	42	7
12:45:00	807	57	1808	124	945	77	9	0	18	0	5	1	10	1	18	0	22	1	46	4
13:00:00	867	60	1969	161	995	50	9	0	19	1	6	1	10	0	21	3	24	2	47	1
13:15:00	867	0	1969	0	995	0	9	0	19	0	6	0	10	0	21	0	24	0	47	0
15:00:00	867	0	1969	0	995	0	9	0	19	0	6	0	10	0	21	0	24	0	47	0
15:15:00	923	56	2107	138	1052	57	9	0	20	1	8	2	10	0	21	0	25	1	48	1
15:30:00	976	53	2231	124	1102	50	10	1	21	1	8	0	10	0	21	0	25	0	53	5
15:45:00	1048	72	2345	114	1163	61	12	2	22	1	8	0	11	1	21	0	27	2	57	4
16:00:00	1094	46	2486	141	1218	55	12	0	23	1	8	0	11	0	22	1	28	1	65	8
16:15:00	1149	55	2615	129	1280	62	12	0	24	1	9	1	11	0	22	0	28	0	68	3
16:30:00	1190	41	2738	123	1328	48	13	1	24	0	9	0	11	0	22	0	28	0	69	1
16:45:00	1241	51	2885	147	1401	73	14	1	25	1	9	0	12	1	23	1	29	1	72	3
17:00:00	1296	55	3016	131	1462	61	15	1	25	0	9	0	12	0	24	1	30	1	73	1
17:15:00	1348	52	3130	114	1528	66	15	0	25	0	10	1	12	0	25	1	30	0	75	2
17:30:00	1398	50	3261	131	1610	82	15	0	25	0	10	0	12	0	26	1	30	0	80	5
17:45:00	1439	41	3370	109	1668	58	15	0	25	0	10	0	13	1	26	0	31	1	81	1
18:00:00	1474	35	3478	108	1718	50	15	0	25	0	10	0	13	0	27	1	32	1	81	0
18:15:00	1474	0	3478	0	1718	0	15	0	25	0	10	0	13	0	27	0	32	0	81	0
18:15:15	1474	0	3478	0	1718	0	15	0	25	0	10	0	13	0	27	0	32	0	81	0

Existing Traffic Conditions 2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	571	279	32	654	74	210	125	40	89	113	238
Future Volume (vph)	238	571	279	32	654	74	210	125	40	89	113	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1769	3287		1785	3505		1787	1800		1776	1617	
Flt Permitted	0.20	1.00		0.25	1.00		0.17	1.00		0.65	1.00	
Satd. Flow (perm)	373	3287		477	3505		317	1800		1215	1617	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	243	583	285	33	667	76	214	128	41	91	115	243
RTOR Reduction (vph)	0	45	0	0	7	0	0	9	0	0	69	0
Lane Group Flow (vph)	243	823	0	33	736	0	214	160	0	91	289	0
Confl. Peds. (#/hr)	6		15	15		6	5		4	4		5
Confl. Bikes (#/hr)			9			2			3			6
Heavy Vehicles (%)	2%	2%	4%	1%	1%	2%	1%	1%	2%	1%	3%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	52.8	44.0		40.1	36.3		43.3	30.2		31.9	23.8	
Effective Green, g (s)	52.8	44.0		40.1	36.3		43.3	30.2		31.9	23.8	
Actuated g/C Ratio	0.49	0.41		0.37	0.34		0.40	0.28		0.30	0.22	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	2.5	0.2		2.5	0.2		4.0	3.0		4.0	3.0	
Lane Grp Cap (vph)	330	1337		222	1176		324	502		400	356	
v/s Ratio Prot	c0.08	0.25		0.01	0.21		c0.09	0.09		0.02	c0.18	
v/s Ratio Perm	c0.28			0.05			0.18			0.05		
v/c Ratio	0.74	0.62		0.15	0.63		0.66	0.32		0.23	0.81	
Uniform Delay, d1	19.0	25.4		22.1	30.2		24.4	30.8		28.3	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.8	2.1		0.2	2.5		5.5	0.4		0.4	13.2	
Delay (s)	26.8	27.5		22.3	32.7		29.9	31.2		28.7	53.2	
Level of Service	C	C		C	C		C	C		C	D	
Approach Delay (s)		27.3			32.3			30.4			48.3	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	108.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

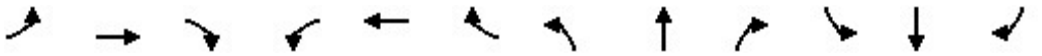
Intersection: 3:

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	60.7	88.0	98.6	45.9	95.6	87.4	60.0	54.8	55.3	135.6
Average Queue (m)	33.1	44.9	50.5	7.2	57.1	46.5	26.5	25.7	23.1	64.1
95th Queue (m)	56.9	73.1	83.8	30.0	84.0	75.1	49.5	46.7	57.8	126.8
Link Distance (m)		302.2	302.2		257.3	257.3		191.4		233.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	41.0			25.0			58.0		45.0	
Storage Blk Time (%)	5	7			39		1	0		26
Queuing Penalty (veh)	15	16			13		1	0		23

Network Summary

Network wide Queuing Penalty: 67

Background Conditions 2027



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	254	608	297	34	697	79	224	133	43	95	120	254
Future Volume (vph)	254	608	297	34	697	79	224	133	43	95	120	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1786	3321		1733	3500		1769	1776		1753	1635	
Flt Permitted	0.17	1.00		0.22	1.00		0.14	1.00		0.64	1.00	
Satd. Flow (perm)	323	3321		403	3500		261	1776		1188	1635	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	259	620	303	35	711	81	229	136	44	97	122	259
RTOR Reduction (vph)	0	45	0	0	7	0	0	10	0	0	69	0
Lane Group Flow (vph)	259	878	0	35	785	0	229	170	0	97	312	0
Confl. Peds. (#/hr)	16		25	25		16	11		9	9		11
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	53.3	44.3		40.4	36.4		44.8	31.4		33.1	24.7	
Effective Green, g (s)	53.3	44.3		40.4	36.4		44.8	31.4		33.1	24.7	
Actuated g/C Ratio	0.48	0.40		0.37	0.33		0.41	0.29		0.30	0.22	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	2.5	0.2		2.5	0.2		4.0	3.0		4.0	3.0	
Lane Grp Cap (vph)	314	1336		196	1157		313	506		400	366	
v/s Ratio Prot	c0.09	0.26		0.01	0.22		c0.10	0.10		0.02	c0.19	
v/s Ratio Perm	c0.31			0.06			0.20			0.05		
v/c Ratio	0.82	0.66		0.18	0.68		0.73	0.34		0.24	0.85	
Uniform Delay, d1	20.5	26.7		23.0	31.8		25.1	31.1		28.5	41.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.7	2.5		0.3	3.2		9.1	0.4		0.4	17.2	
Delay (s)	36.2	29.3		23.4	35.0		34.1	31.5		28.9	58.1	
Level of Service	D	C		C	D		C	C		C	E	
Approach Delay (s)		30.8			34.5			33.0			52.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	110.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

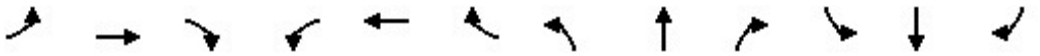
Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	60.8	107.2	113.3	62.8	99.0	94.0	56.7	60.2	63.8	132.1
Average Queue (m)	38.5	53.3	59.5	9.9	64.6	55.5	29.5	26.6	27.6	70.0
95th Queue (m)	63.5	89.1	98.1	36.0	90.4	84.8	48.8	48.8	67.0	119.3
Link Distance (m)		302.2	302.2		257.3	257.3		191.4		233.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	41.0			25.0			58.0		45.0	
Storage Blk Time (%)	4	12		0	46		1	0	0	32
Queuing Penalty (veh)	13	30		0	16		1	1	2	30

Network Summary

Network wide Queuing Penalty: 92

Background Conditions 2037



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3313		1734	3498		1770	1775		1752	1634	
Flt Permitted	0.10	1.00		0.13	1.00		0.12	1.00		0.63	1.00	
Satd. Flow (perm)	186	3313		233	3498		233	1775		1156	1634	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	728	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	46	0	0	8	0	0	9	0	0	67	0
Lane Group Flow (vph)	303	1037	0	41	920	0	267	201	0	113	380	0
Confl. Peds. (#/hr)	19		29	29		19	12		10	10		12
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	53.1	43.8		40.4	36.1		48.5	32.7		37.8	27.0	
Effective Green, g (s)	53.1	43.8		40.4	36.1		48.5	32.7		37.8	27.0	
Actuated g/C Ratio	0.47	0.39		0.36	0.32		0.43	0.29		0.33	0.24	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	2.5	0.2		2.5	0.2		4.0	3.0		4.0	3.0	
Lane Grp Cap (vph)	256	1277		139	1111		322	510		441	388	
v/s Ratio Prot	c0.13	0.31		0.01	0.26		c0.12	0.11		0.02	c0.23	
v/s Ratio Perm	c0.43			0.09			0.23			0.06		
v/c Ratio	1.18	0.81		0.29	0.83		0.83	0.39		0.26	0.98	
Uniform Delay, d1	31.5	31.2		25.8	35.9		28.7	32.5		27.0	43.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	115.1	5.7		0.9	7.2		16.7	0.5		0.4	39.7	
Delay (s)	146.7	36.9		26.7	43.0		45.4	33.0		27.5	82.7	
Level of Service	F	D		C	D		D	C		C	F	
Approach Delay (s)		60.9			42.4			39.9			71.5	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	54.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	113.6	Sum of lost time (s)	22.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

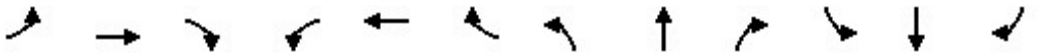
Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	60.9	196.8	194.3	62.8	159.1	146.8	72.0	63.6	63.9	241.8
Average Queue (m)	55.2	118.6	115.2	18.2	95.3	87.1	35.6	32.8	46.2	165.9
95th Queue (m)	71.1	206.3	191.4	56.7	151.4	144.0	60.7	57.4	86.5	271.7
Link Distance (m)		302.2	302.2		257.3	257.3		191.4		233.4
Upstream Blk Time (%)										25
Queuing Penalty (veh)										0
Storage Bay Dist (m)	41.0			25.0			58.0		45.0	
Storage Blk Time (%)	45	22		1	57		2	1	0	71
Queuing Penalty (veh)	160	65		2	23		4	3	2	79

Network Summary

Network wide Queuing Penalty: 338

Background Conditions
2051



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.96		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3299		1736	3496		1770	1775		1753	1628	
Flt Permitted	0.10	1.00		0.11	1.00		0.12	1.00		0.56	1.00	
Satd. Flow (perm)	188	3299		209	3496		233	1775		1029	1628	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	48	0	0	8	0	0	9	0	0	67	0
Lane Group Flow (vph)	379	1305	0	51	1150	0	335	253	0	142	492	0
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	52.0	41.2		40.8	35.0		50.0	33.0		39.0	27.0	
Effective Green, g (s)	52.0	41.2		40.8	35.0		50.0	33.0		39.0	27.0	
Actuated g/C Ratio	0.46	0.36		0.36	0.31		0.44	0.29		0.34	0.24	
Clearance Time (s)	5.0	6.0		5.0	6.0		5.0	6.0		5.0	6.0	
Vehicle Extension (s)	2.5	0.2		2.5	0.2		4.0	3.0		4.0	3.0	
Lane Grp Cap (vph)	254	1192		152	1073		344	513		428	385	
v/s Ratio Prot	c0.16	0.40		0.02	0.33		c0.15	0.14		0.03	c0.30	
v/s Ratio Perm	c0.52			0.10			0.27			0.08		
v/c Ratio	1.49	1.09		0.34	1.07		0.97	0.49		0.33	1.28	
Uniform Delay, d1	32.8	36.4		28.5	39.5		33.1	33.6		26.9	43.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	241.2	56.0		1.0	49.0		41.4	0.7		0.6	143.6	
Delay (s)	274.0	92.4		29.5	88.5		74.5	34.3		27.5	187.1	
Level of Service	F	F		C	F		E	C		C	F	
Approach Delay (s)		132.1			86.0			56.8			154.8	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	112.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	114.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	122.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

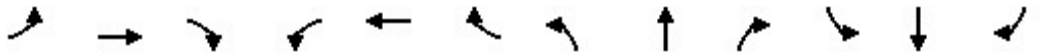
Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	60.9	315.5	318.9	62.9	270.1	271.2	84.1	71.5	63.9	246.1
Average Queue (m)	60.8	307.8	307.7	22.0	259.6	259.1	49.5	37.4	48.3	239.4
95th Queue (m)	60.9	311.7	312.1	64.9	279.2	282.7	78.7	61.9	89.1	243.6
Link Distance (m)		302.2	302.2		257.3	257.3		191.4		233.4
Upstream Blk Time (%)		77	65		71	79				90
Queuing Penalty (veh)		0	0		0	0				0
Storage Bay Dist (m)	41.0			25.0			58.0		45.0	
Storage Blk Time (%)	86	21		2	72		5	1	2	83
Queuing Penalty (veh)	381	80		11	36		14	4	9	116

Network Summary

Network wide Queuing Penalty: 649

Option 1
2037



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	731	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	731	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574	1515	1729	3498		3383	1775		1755	3560	1523
Flt Permitted	0.14	1.00	1.00	0.35	1.00		0.64	1.00		0.48	1.00	1.00
Satd. Flow (perm)	261	3574	1515	643	3498		2263	1775		896	3560	1523
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	746	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	0	195	0	7	0	0	11	0	0	0	249
Lane Group Flow (vph)	303	746	160	41	921	0	267	199	0	113	144	54
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	53.2	44.2	44.2	40.2	36.2		30.2	18.5		28.8	17.8	17.8
Effective Green, g (s)	53.2	44.2	44.2	40.2	36.2		30.2	18.5		28.8	17.8	17.8
Actuated g/C Ratio	0.53	0.44	0.44	0.40	0.36		0.30	0.19		0.29	0.18	0.18
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	322	1584	671	302	1270		816	329		353	635	271
v/s Ratio Prot	c0.11	0.21		0.01	0.26		c0.04	c0.11		0.04	0.04	
v/s Ratio Perm	c0.39		0.11	0.05			0.06			0.06		0.04
v/c Ratio	0.94	0.47	0.24	0.14	0.73		0.33	0.61		0.32	0.23	0.20
Uniform Delay, d1	21.5	19.5	17.3	18.2	27.4		26.3	37.3		27.0	35.1	34.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	34.8	1.0	0.8	0.1	3.6		0.3	3.1		0.7	0.2	0.4
Delay (s)	56.4	20.5	18.1	18.3	31.1		26.6	40.4		27.8	35.2	35.2
Level of Service	E	C	B	B	C		C	D		C	D	D
Approach Delay (s)		27.7			30.5			32.7			33.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	99.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	17	40	23	33	17	40	23	33
Maximum Split (%)	15.0%	35.4%	20.4%	29.2%	15.0%	35.4%	20.4%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	17	57	80	0	17	57	80
End Time (s)	17	57	80	0	17	57	80	0
Yield/Force Off (s)	12	51	75	107	12	51	75	107
Yield/Force Off 170(s)	12	39	75	107	12	39	75	107
Local Start Time (s)	96	0	40	63	96	0	40	63
Local Yield (s)	108	34	58	90	108	34	58	90
Local Yield 170(s)	108	22	58	90	108	22	58	90

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

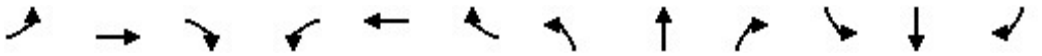
Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	TR	L	T
Maximum Queue (m)	93.1	125.4	103.3	48.1	80.8	218.3	216.8	50.9	60.4	62.2	30.6	36.5
Average Queue (m)	62.1	63.6	48.8	17.5	27.6	155.3	148.5	13.2	34.0	31.9	13.9	16.0
95th Queue (m)	97.5	104.6	79.4	35.4	83.7	262.5	256.9	40.8	53.7	55.5	28.3	30.4
Link Distance (m)		293.0	293.0			255.2	255.2		191.0	191.0		231.2
Upstream Blk Time (%)						8	6					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	23	5	3			66		0	0			
Queuing Penalty (veh)	84	16	10			26		0	0			

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	65.3	94.3
Average Queue (m)	9.1	42.6
95th Queue (m)	30.0	75.0
Link Distance (m)	231.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)	0	3
Queuing Penalty (veh)	1	2

Network Summary

Network wide Queuing Penalty: 139



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	731	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	731	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574	1519	1730	3498		3383	1775		1756	3560	1525
Flt Permitted	0.16	1.00	1.00	0.34	1.00		0.66	1.00		0.49	1.00	1.00
Satd. Flow (perm)	297	3574	1519	618	3498		2353	1775		898	3560	1525
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	746	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	0	196	0	8	0	0	13	0	0	0	170
Lane Group Flow (vph)	303	746	159	41	920	0	267	197	0	113	144	133
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	50.1	41.5	41.5	39.7	36.1		25.5	17.5		25.5	17.5	17.5
Effective Green, g (s)	50.1	41.5	41.5	39.7	36.1		25.5	17.5		25.5	17.5	17.5
Actuated g/C Ratio	0.54	0.45	0.45	0.43	0.39		0.28	0.19		0.28	0.19	0.19
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	305	1601	680	308	1363		736	335		321	672	288
v/s Ratio Prot	c0.10	0.21		0.01	0.26		c0.03	c0.11		0.03	0.04	
v/s Ratio Perm	c0.44		0.10	0.05			0.07			0.07		0.09
v/c Ratio	0.99	0.47	0.23	0.13	0.68		0.36	0.59		0.35	0.21	0.46
Uniform Delay, d1	16.8	17.8	15.8	15.5	23.4		26.4	34.3		26.1	31.7	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	49.5	1.0	0.8	0.1	2.7		0.4	2.6		0.9	0.2	1.2
Delay (s)	66.3	18.8	16.6	15.7	26.1		26.8	36.9		27.0	31.9	34.5
Level of Service	E	B	B	B	C		C	D		C	C	C
Approach Delay (s)		28.5			25.6			31.3			32.3	
Approach LOS		C			C			C			C	

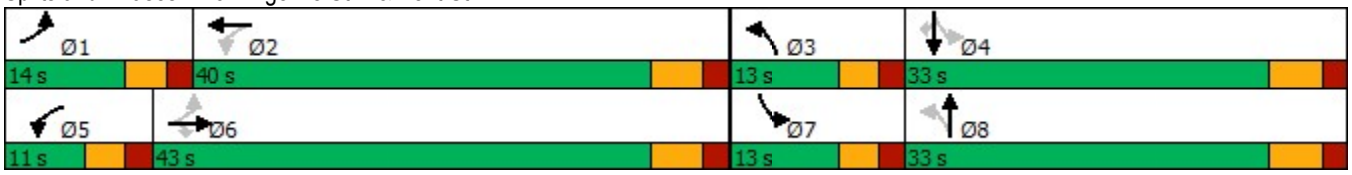
Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	22.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	14	40	13	33	11	43	13	33
Maximum Split (%)	14.0%	40.0%	13.0%	33.0%	11.0%	43.0%	13.0%	33.0%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	14	54	67	0	11	54	67
End Time (s)	14	54	67	0	11	54	67	0
Yield/Force Off (s)	9	48	62	94	6	48	62	94
Yield/Force Off 170(s)	9	36	62	94	6	36	62	94
Local Start Time (s)	86	0	40	53	86	97	40	53
Local Yield (s)	95	34	48	80	92	34	48	80
Local Yield 170(s)	95	22	48	80	92	22	48	80

Intersection Summary	
Cycle Length	100
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Angeline St N & Kent St W



Intersection: 3: Angeline St N & Kent St W

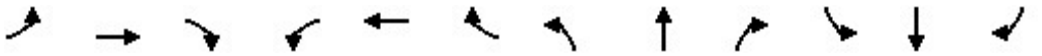
Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	TR	L	T
Maximum Queue (m)	95.9	196.0	187.7	62.3	80.7	118.9	106.5	55.4	65.3	52.3	38.6	37.4
Average Queue (m)	65.4	71.6	57.1	17.9	12.0	78.4	70.6	13.7	35.3	28.5	13.9	15.4
95th Queue (m)	103.3	152.4	132.1	41.3	47.9	115.1	103.0	42.2	56.8	47.7	29.7	30.1
Link Distance (m)		293.0	293.0			255.2	255.2		191.0	191.0		231.2
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	33	4	2	0		36		0	1		0	
Queuing Penalty (veh)	121	10	7	0		14		0	1		0	

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	18.0	69.5
Average Queue (m)	7.6	35.0
95th Queue (m)	17.0	60.2
Link Distance (m)	231.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		1
Queuing Penalty (veh)		0

Network Summary

Network wide Queuing Penalty: 154



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	731	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	731	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.98	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574	1513	1729	3497		3378	1775		1756	3560	1522
Flt Permitted	0.15	1.00	1.00	0.37	1.00		0.66	1.00		0.45	1.00	1.00
Satd. Flow (perm)	274	3574	1513	670	3497		2349	1775		828	3560	1522
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	746	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	0	178	0	7	0	0	11	0	0	0	249
Lane Group Flow (vph)	303	746	177	41	921	0	267	199	0	113	144	54
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	59.9	51.5	51.5	42.1	38.7		26.3	18.3		26.3	18.3	18.3
Effective Green, g (s)	59.9	51.5	51.5	42.1	38.7		26.3	18.3		26.3	18.3	18.3
Actuated g/C Ratio	0.58	0.50	0.50	0.41	0.38		0.25	0.18		0.25	0.18	0.18
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	396	1783	755	308	1311		678	314		282	631	269
v/s Ratio Prot	c0.12	0.21		0.00	0.26		0.03	c0.11		c0.03	0.04	
v/s Ratio Perm	c0.32		0.12	0.05			0.07			0.07		0.04
v/c Ratio	0.77	0.42	0.23	0.13	0.70		0.39	0.63		0.40	0.23	0.20
Uniform Delay, d1	18.4	16.4	14.7	18.5	27.4		31.1	39.4		30.8	36.4	36.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.2	0.7	0.7	0.1	3.2		0.5	4.2		1.3	0.2	0.4
Delay (s)	26.6	17.1	15.4	18.7	30.5		31.6	43.5		32.0	36.6	36.6
Level of Service	C	B	B	B	C		C	D		C	D	D
Approach Delay (s)		18.7			30.0			36.9			35.7	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	22.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Timing Report, Sorted By Phase
3: Angeline St N & Kent St W

02-27-2024

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	25	42	13	33	11	56	13	33
Maximum Split (%)	22.1%	37.2%	11.5%	29.2%	9.7%	49.6%	11.5%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25	67	80	0	11	67	80
End Time (s)	25	67	80	0	11	67	80	0
Yield/Force Off (s)	20	61	75	107	6	61	75	107
Yield/Force Off 170(s)	20	49	75	107	6	49	75	107
Local Start Time (s)	88	0	42	55	88	99	42	55
Local Yield (s)	108	36	50	82	94	36	50	82
Local Yield 170(s)	108	24	50	82	94	24	50	82

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	TR	L	T
Maximum Queue (m)	72.3	78.1	66.9	37.1	80.8	134.4	120.4	56.1	64.7	75.4	37.8	41.8
Average Queue (m)	39.2	42.7	34.8	14.5	11.6	79.7	69.3	19.1	36.3	33.8	14.3	17.0
95th Queue (m)	63.1	66.6	58.7	29.6	45.5	128.3	117.2	49.6	57.4	59.7	28.0	33.5
Link Distance (m)		293.0	293.0			255.2	255.2		191.0	191.0		231.2
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	2	1	0			32		0	0			0
Queuing Penalty (veh)	6	2	1			13		0	1			0

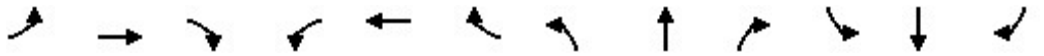
Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	33.6	84.9
Average Queue (m)	7.5	36.0
95th Queue (m)	21.5	64.4
Link Distance (m)	231.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		2
Queuing Penalty (veh)		1

Network Summary

Network wide Queuing Penalty: 24

Option 1
2051



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1514	1733	3497		3387	1776		1757	3560	1522
Flt Permitted	0.10	1.00	1.00	0.23	1.00		0.60	1.00		0.39	1.00	1.00
Satd. Flow (perm)	187	3574	1514	421	3497		2155	1776		725	3560	1522
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	0	213	0	7	0	0	10	0	0	0	230
Lane Group Flow (vph)	379	909	231	51	1151	0	335	252	0	142	180	149
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	52.2	41.7	41.7	40.7	35.2		33.9	20.7		31.7	19.6	19.6
Effective Green, g (s)	52.2	41.7	41.7	40.7	35.2		33.9	20.7		31.7	19.6	19.6
Actuated g/C Ratio	0.51	0.41	0.41	0.40	0.35		0.33	0.20		0.31	0.19	0.19
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	283	1461	618	238	1206		875	360		347	684	292
v/s Ratio Prot	c0.16	0.25		0.01	0.33		c0.05	c0.14		0.05	0.05	
v/s Ratio Perm	c0.53		0.15	0.07			0.08			0.08		0.10
v/c Ratio	1.34	0.62	0.37	0.21	0.95		0.38	0.70		0.41	0.26	0.51
Uniform Delay, d1	29.5	23.9	21.0	19.4	32.6		25.2	37.8		26.6	35.1	36.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	174.6	2.0	1.7	0.3	17.0		0.4	5.8		1.1	0.2	1.4
Delay (s)	204.1	25.9	22.8	19.8	49.6		25.6	43.6		27.7	35.3	38.3
Level of Service	F	C	C	B	D		C	D		C	D	D
Approach Delay (s)		64.1			48.4			33.5			35.4	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	50.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	102.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	17	40	23	33	17	40	23	33
Maximum Split (%)	15.0%	35.4%	20.4%	29.2%	15.0%	35.4%	20.4%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	17	57	80	0	17	57	80
End Time (s)	17	57	80	0	17	57	80	0
Yield/Force Off (s)	12	51	75	107	12	51	75	107
Yield/Force Off 170(s)	12	39	75	107	12	39	75	107
Local Start Time (s)	96	0	40	63	96	0	40	63
Local Yield (s)	108	34	58	90	108	34	58	90
Local Yield 170(s)	108	22	58	90	108	22	58	90

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

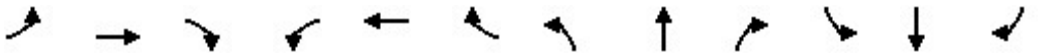
Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	TR	L	T
Maximum Queue (m)	96.0	303.3	306.0	94.6	80.9	270.4	269.3	58.7	66.8	76.2	44.6	170.0
Average Queue (m)	94.9	275.6	265.9	28.4	28.4	260.8	260.5	23.6	43.1	43.8	19.2	101.7
95th Queue (m)	104.8	368.4	376.5	64.9	86.9	265.2	264.1	56.3	64.3	71.1	39.3	260.4
Link Distance (m)		293.0	293.0			255.2	255.2		191.0	191.0		231.2
Upstream Blk Time (%)		62	30			90	82					4
Queuing Penalty (veh)		0	0			0	0					0
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	88	2	8	0		74		0	2		1	0
Queuing Penalty (veh)	392	8	34	0		37		0	3		1	0

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	188.8	114.4
Average Queue (m)	140.8	100.0
95th Queue (m)	310.7	149.2
Link Distance (m)	231.2	
Upstream Blk Time (%)	37	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		70.0
Storage Blk Time (%)	0	69
Queuing Penalty (veh)	1	61

Network Summary

Network wide Queuing Penalty: 536



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1513	1731	3497		3382	1775		1758	3560	1522
Flt Permitted	0.09	1.00	1.00	0.30	1.00		0.64	1.00		0.35	1.00	1.00
Satd. Flow (perm)	178	3574	1513	545	3497		2272	1775		649	3560	1522
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	0	234	0	8	0	0	11	0	0	0	215
Lane Group Flow (vph)	379	909	210	51	1150	0	335	251	0	142	180	164
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	59.2	49.4	49.4	42.0	37.2		28.2	20.2		28.2	20.2	20.2
Effective Green, g (s)	59.2	49.4	49.4	42.0	37.2		28.2	20.2		28.2	20.2	20.2
Actuated g/C Ratio	0.57	0.47	0.47	0.40	0.36		0.27	0.19		0.27	0.19	0.19
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	362	1691	715	273	1246		698	343		260	688	294
v/s Ratio Prot	c0.17	0.25		0.01	0.33		0.04	c0.14		c0.04	0.05	
v/s Ratio Perm	c0.42		0.14	0.07			0.09			0.11		0.11
v/c Ratio	1.05	0.54	0.29	0.19	0.92		0.48	0.73		0.55	0.26	0.56
Uniform Delay, d1	32.1	19.4	16.8	19.2	32.2		30.9	39.5		30.6	35.8	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	60.1	1.2	1.0	0.2	12.7		0.7	7.8		2.9	0.2	2.3
Delay (s)	92.2	20.7	17.9	19.5	44.9		31.6	47.3		33.6	36.0	40.4
Level of Service	F	C	B	B	D		C	D		C	D	D
Approach Delay (s)		35.6			43.9			38.5			37.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	104.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	22	42	13	33	11	53	13	33
Maximum Split (%)	20.0%	38.2%	11.8%	30.0%	10.0%	48.2%	11.8%	30.0%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	22	64	77	0	11	64	77
End Time (s)	22	64	77	0	11	64	77	0
Yield/Force Off (s)	17	58	72	104	6	58	72	104
Yield/Force Off 170(s)	17	46	72	104	6	46	72	104
Local Start Time (s)	88	0	42	55	88	99	42	55
Local Yield (s)	105	36	50	82	94	36	50	82
Local Yield 170(s)	105	24	50	82	94	24	50	82

Intersection Summary	
Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	TR	L	T
Maximum Queue (m)	96.0	224.5	199.2	78.8	80.9	268.0	265.6	65.1	77.8	83.7	43.2	93.0
Average Queue (m)	79.2	110.3	93.2	21.0	36.1	253.6	250.1	33.7	49.2	43.0	17.3	27.5
95th Queue (m)	112.4	224.3	203.3	47.6	97.7	287.8	293.6	62.3	71.6	74.0	34.7	79.0
Link Distance (m)		293.0	293.0			255.2	255.2		191.0	191.0		231.2
Upstream Blk Time (%)						74	63					
Queuing Penalty (veh)						0	0					
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	48	3	4	0		72		0	3		1	0
Queuing Penalty (veh)	214	13	19	1		36		0	6		0	0

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	160.7	120.0
Average Queue (m)	33.4	84.7
95th Queue (m)	119.1	130.2
Link Distance (m)	231.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)	0	46
Queuing Penalty (veh)	1	40

Network Summary

Network wide Queuing Penalty: 330

HCM Signalized Intersection Capacity Analysis
3: Angeline St N & Kent St W

02-27-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	1.00		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	0.99		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.98	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1511	1731	3497		3380	1775		1758	3560	1521
Flt Permitted	0.09	1.00	1.00	0.31	1.00		0.64	1.00		0.34	1.00	1.00
Satd. Flow (perm)	174	3574	1511	572	3497		2271	1775		628	3560	1521
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	0	228	0	7	0	0	11	0	0	0	233
Lane Group Flow (vph)	379	909	216	51	1151	0	335	251	0	142	180	146
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	62.2	52.4	52.4	43.0	38.2		28.5	20.5		28.5	20.5	20.5
Effective Green, g (s)	62.2	52.4	52.4	43.0	38.2		28.5	20.5		28.5	20.5	20.5
Actuated g/C Ratio	0.58	0.49	0.49	0.40	0.35		0.26	0.19		0.26	0.19	0.19
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	385	1738	735	280	1240		683	337		250	677	289
v/s Ratio Prot	c0.17	0.25		0.01	0.33		0.04	c0.14		c0.04	0.05	
v/s Ratio Perm	c0.39		0.14	0.06			0.09			0.11		0.10
v/c Ratio	0.98	0.52	0.29	0.18	0.93		0.49	0.75		0.57	0.27	0.50
Uniform Delay, d1	33.3	19.0	16.6	20.0	33.4		32.3	41.1		32.1	37.2	39.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	41.4	1.1	1.0	0.2	13.3		0.8	8.7		3.6	0.2	1.4
Delay (s)	74.7	20.2	17.6	20.3	46.7		33.1	49.8		35.7	37.4	40.4
Level of Service	E	C	B	C	D		C	D		D	D	D
Approach Delay (s)		31.4			45.6			40.4			38.7	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	107.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	97.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Timing Report, Sorted By Phase
3: Angeline St N & Kent St W

02-27-2024

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	24	43	13	33	11	56	13	33
Maximum Split (%)	21.2%	38.1%	11.5%	29.2%	9.7%	49.6%	11.5%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	24	67	80	0	11	67	80
End Time (s)	24	67	80	0	11	67	80	0
Yield/Force Off (s)	19	61	75	107	6	61	75	107
Yield/Force Off 170(s)	19	49	75	107	6	49	75	107
Local Start Time (s)	89	0	43	56	89	100	43	56
Local Yield (s)	108	37	51	83	95	37	51	83
Local Yield 170(s)	108	25	51	83	95	25	51	83

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	L	TR	L	T
Maximum Queue (m)	95.9	233.2	221.2	69.1	80.9	268.0	268.0	72.8	85.7	77.3	53.3	169.9
Average Queue (m)	74.0	139.3	128.3	22.8	26.9	258.6	257.3	38.2	55.3	43.4	20.3	84.2
95th Queue (m)	113.1	304.9	296.1	47.4	82.5	276.7	279.7	71.5	82.3	73.1	41.2	240.3
Link Distance (m)		293.0	293.0			255.2	255.2		191.0	191.0		231.2
Upstream Blk Time (%)		10	7			77	66					3
Queuing Penalty (veh)		0	0			0	0					0
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	42	4	4	0		69		0	7		1	0
Queuing Penalty (veh)	187	13	18	0		35		1	12		1	0

Intersection: 3: Angeline St N & Kent St W

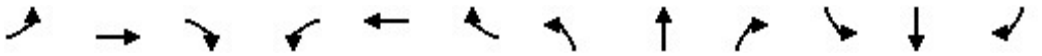
Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	172.3	111.3
Average Queue (m)	129.9	95.9
95th Queue (m)	310.0	153.1
Link Distance (m)	231.2	
Upstream Blk Time (%)	44	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		70.0
Storage Blk Time (%)	1	67
Queuing Penalty (veh)	2	59

Network Summary

Network wide Queuing Penalty: 328

Option 2

2037



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1514	1729	3505		1758	3372		1752	3560	1522
Flt Permitted	0.13	1.00	1.00	0.36	1.00		0.50	1.00		0.62	1.00	1.00
Satd. Flow (perm)	246	3574	1514	650	3505		932	3372		1144	3560	1522
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	728	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	0	202	0	7	0	0	28	0	0	0	256
Lane Group Flow (vph)	303	728	153	41	921	0	267	182	0	113	144	47
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	53.1	44.1	44.1	40.1	36.1		37.1	21.3		26.8	16.0	16.0
Effective Green, g (s)	53.1	44.1	44.1	40.1	36.1		37.1	21.3		26.8	16.0	16.0
Actuated g/C Ratio	0.52	0.43	0.43	0.39	0.35		0.36	0.21		0.26	0.16	0.16
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	308	1542	653	297	1238		468	702		364	557	238
v/s Ratio Prot	c0.12	0.20		0.01	0.26		c0.09	0.05		0.03	0.04	
v/s Ratio Perm	c0.39		0.10	0.05			c0.12			0.05		0.03
v/c Ratio	0.98	0.47	0.23	0.14	0.74		0.57	0.26		0.31	0.26	0.20
Uniform Delay, d1	24.1	20.7	18.4	19.3	29.0		24.6	33.8		29.7	37.9	37.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	46.5	1.0	0.8	0.2	4.1		2.0	0.2		0.7	0.2	0.4
Delay (s)	70.6	21.8	19.2	19.5	33.1		26.6	34.0		30.4	38.1	37.9
Level of Service	E	C	B	B	C		C	C		C	D	D
Approach Delay (s)		31.8			32.5			29.9			36.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	102.2	Sum of lost time (s)	22.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	17	40	23	33	17	40	23	33
Maximum Split (%)	15.0%	35.4%	20.4%	29.2%	15.0%	35.4%	20.4%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	17	57	80	0	17	57	80
End Time (s)	17	57	80	0	17	57	80	0
Yield/Force Off (s)	12	51	75	107	12	51	75	107
Yield/Force Off 170(s)	12	39	75	107	12	39	75	107
Local Start Time (s)	96	0	40	63	96	0	40	63
Local Yield (s)	108	34	58	90	108	34	58	90
Local Yield 170(s)	108	22	58	90	108	22	58	90

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

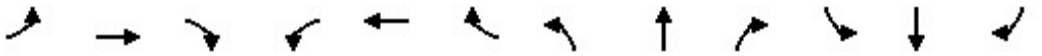
Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (m)	86.3	105.8	96.8	56.5	80.8	148.0	139.8	81.7	34.2	36.2	38.6	32.1
Average Queue (m)	48.9	50.7	41.9	14.7	16.0	90.8	84.3	38.1	14.8	15.0	13.9	17.3
95th Queue (m)	78.6	84.4	71.7	35.1	58.6	136.8	130.7	63.9	27.6	29.1	30.1	30.5
Link Distance (m)		294.8	294.8			253.5	253.5		190.4	190.4		231.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	7	3	1			46		1			0	
Queuing Penalty (veh)	23	10	5			19		1			0	

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	24.8	66.7
Average Queue (m)	8.1	30.9
95th Queue (m)	20.1	55.7
Link Distance (m)	231.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Network Summary

Network wide Queuing Penalty: 58



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574	1519	1730	3506		1754	3373		1753	3560	1525
Flt Permitted	0.16	1.00	1.00	0.35	1.00		0.66	1.00		0.62	1.00	1.00
Satd. Flow (perm)	298	3574	1519	639	3506		1220	3373		1144	3560	1525
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	728	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	0	195	0	8	0	0	34	0	0	0	172
Lane Group Flow (vph)	303	728	160	41	920	0	267	176	0	113	144	131
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	50.1	41.5	41.5	39.7	36.1		25.2	17.2		25.2	17.2	17.2
Effective Green, g (s)	50.1	41.5	41.5	39.7	36.1		25.2	17.2		25.2	17.2	17.2
Actuated g/C Ratio	0.54	0.45	0.45	0.43	0.39		0.27	0.19		0.27	0.19	0.19
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	306	1606	682	317	1371		379	628		365	663	284
v/s Ratio Prot	c0.10	0.20		0.01	0.26		c0.06	0.05		0.03	0.04	
v/s Ratio Perm	c0.44		0.11	0.05			c0.13			0.06		0.09
v/c Ratio	0.99	0.45	0.23	0.13	0.67		0.70	0.28		0.31	0.22	0.46
Uniform Delay, d1	16.5	17.6	15.6	15.4	23.2		29.0	32.2		26.1	31.8	33.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	48.6	0.9	0.8	0.1	2.6		6.3	0.2		0.7	0.2	1.2
Delay (s)	65.1	18.5	16.4	15.5	25.8		35.3	32.5		26.7	32.0	34.6
Level of Service	E	B	B	B	C		D	C		C	C	C
Approach Delay (s)		28.2			25.4			34.1			32.4	
Approach LOS		C			C			C			C	

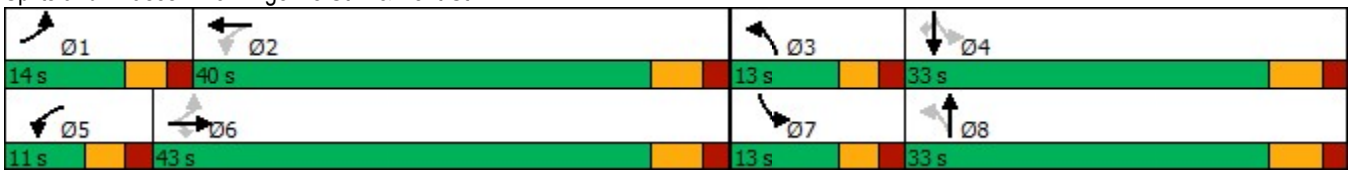
Intersection Summary			
HCM 2000 Control Delay	28.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	92.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	14	40	13	33	11	43	13	33
Maximum Split (%)	14.0%	40.0%	13.0%	33.0%	11.0%	43.0%	13.0%	33.0%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	14	54	67	0	11	54	67
End Time (s)	14	54	67	0	11	54	67	0
Yield/Force Off (s)	9	48	62	94	6	48	62	94
Yield/Force Off 170(s)	9	36	62	94	6	36	62	94
Local Start Time (s)	86	0	40	53	86	97	40	53
Local Yield (s)	95	34	48	80	92	34	48	80
Local Yield 170(s)	95	22	48	80	92	22	48	80

Intersection Summary	
Cycle Length	100
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Angeline St N & Kent St W



Intersection: 3: Angeline St N & Kent St W

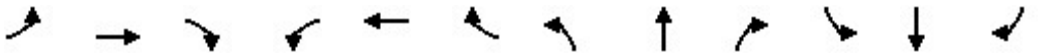
Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (m)	88.3	112.6	85.6	30.7	80.8	128.4	122.0	87.1	72.8	36.4	39.6	31.7
Average Queue (m)	53.0	51.8	39.0	15.1	13.0	75.2	65.6	42.6	20.6	16.6	15.3	15.6
95th Queue (m)	88.2	97.7	74.6	27.2	49.2	115.9	109.0	71.8	43.8	32.2	29.6	29.5
Link Distance (m)		294.8	294.8			253.5	253.5		190.4	190.4		231.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	13	2	1			30		5	0			
Queuing Penalty (veh)	46	7	4			12		4	0			

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	20.7	78.4
Average Queue (m)	6.9	32.5
95th Queue (m)	17.3	57.8
Link Distance (m)	231.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		1
Queuing Penalty (veh)		1

Network Summary

Network wide Queuing Penalty: 74



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Future Volume (vph)	297	713	348	40	817	92	262	156	50	111	141	297
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1786	3574	1514	1729	3505		1753	3372		1752	3560	1522
Flt Permitted	0.16	1.00	1.00	0.38	1.00		0.66	1.00		0.62	1.00	1.00
Satd. Flow (perm)	292	3574	1514	682	3505		1219	3372		1144	3560	1522
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	303	728	355	41	834	94	267	159	51	113	144	303
RTOR Reduction (vph)	0	0	173	0	7	0	0	30	0	0	0	255
Lane Group Flow (vph)	303	728	182	41	921	0	267	180	0	113	144	48
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	60.3	51.8	51.8	43.0	39.5		24.0	16.0		24.0	16.0	16.0
Effective Green, g (s)	60.3	51.8	51.8	43.0	39.5		24.0	16.0		24.0	16.0	16.0
Actuated g/C Ratio	0.60	0.51	0.51	0.42	0.39		0.24	0.16		0.24	0.16	0.16
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	406	1827	774	325	1366		330	532		319	562	240
v/s Ratio Prot	c0.12	0.20		0.00	0.26		c0.06	0.05		0.03	0.04	
v/s Ratio Perm	c0.33		0.12	0.05			c0.13			0.06		0.03
v/c Ratio	0.75	0.40	0.23	0.13	0.67		0.81	0.34		0.35	0.26	0.20
Uniform Delay, d1	15.8	15.2	13.7	17.2	25.6		35.3	37.9		31.5	37.4	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.9	0.7	0.7	0.1	2.7		14.3	0.4		0.9	0.2	0.4
Delay (s)	22.7	15.8	14.5	17.3	28.3		49.6	38.3		32.5	37.7	37.5
Level of Service	C	B	B	B	C		D	D		C	D	D
Approach Delay (s)		17.0			27.8			44.6			36.5	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	101.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	94.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	24	43	13	33	11	56	13	33
Maximum Split (%)	21.2%	38.1%	11.5%	29.2%	9.7%	49.6%	11.5%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	24	67	80	0	11	67	80
End Time (s)	24	67	80	0	11	67	80	0
Yield/Force Off (s)	19	61	75	107	6	61	75	107
Yield/Force Off 170(s)	19	49	75	107	6	49	75	107
Local Start Time (s)	89	0	43	56	89	100	43	56
Local Yield (s)	108	37	51	83	95	37	51	83
Local Yield 170(s)	108	25	51	83	95	25	51	83

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	100

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (m)	70.2	73.5	61.3	41.6	80.7	112.3	102.0	85.9	85.3	46.5	42.3	37.9
Average Queue (m)	38.1	38.8	30.3	12.7	9.0	68.2	62.5	43.7	19.6	18.2	15.6	16.3
95th Queue (m)	63.3	60.6	52.5	27.2	35.6	100.6	94.4	74.0	46.2	35.6	32.1	31.4
Link Distance (m)		294.8	294.8			253.5	253.5		190.4	190.4		231.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	1	0	0			24		6	0		0	0
Queuing Penalty (veh)	5	1	0			9		4	0		0	0

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	28.9	55.4
Average Queue (m)	7.7	27.9
95th Queue (m)	19.3	47.5
Link Distance (m)	231.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Network Summary

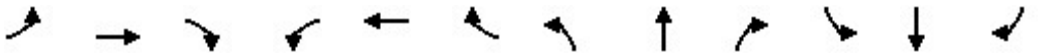
Network wide Queuing Penalty: 20

Option 2

2051

HCM Signalized Intersection Capacity Analysis
3: Angeline St N & Kent St W

02-27-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1513	1733	3505		1759	3373		1753	3560	1521
Flt Permitted	0.10	1.00	1.00	0.22	1.00		0.50	1.00		0.59	1.00	1.00
Satd. Flow (perm)	188	3574	1513	401	3505		929	3373		1088	3560	1521
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	0	217	0	7	0	0	27	0	0	0	228
Lane Group Flow (vph)	379	909	227	51	1151	0	335	235	0	142	180	151
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	52.1	41.5	41.5	40.7	35.1		40.7	23.8		30.3	18.4	18.4
Effective Green, g (s)	52.1	41.5	41.5	40.7	35.1		40.7	23.8		30.3	18.4	18.4
Actuated g/C Ratio	0.50	0.40	0.40	0.39	0.33		0.39	0.23		0.29	0.18	0.18
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	276	1415	599	226	1173		497	766		390	625	267
v/s Ratio Prot	c0.16	0.25		0.01	0.33		c0.11	0.07		0.04	0.05	
v/s Ratio Perm	c0.53		0.15	0.08			c0.15			0.06		0.10
v/c Ratio	1.37	0.64	0.38	0.23	0.98		0.67	0.31		0.36	0.29	0.57
Uniform Delay, d1	30.4	25.6	22.5	20.8	34.5		24.4	33.6		28.8	37.5	39.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	189.2	2.3	1.8	0.4	22.1		3.9	0.2		0.8	0.3	2.8
Delay (s)	219.6	27.9	24.3	21.1	56.6		28.3	33.9		29.6	37.8	42.3
Level of Service	F	C	C	C	E		C	C		C	D	D
Approach Delay (s)		68.9			55.1			30.8			38.6	
Approach LOS		E			E			C			D	

Intersection Summary			
HCM 2000 Control Delay	54.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	17	40	23	33	17	40	23	33
Maximum Split (%)	15.0%	35.4%	20.4%	29.2%	15.0%	35.4%	20.4%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	17	57	80	0	17	57	80
End Time (s)	17	57	80	0	17	57	80	0
Yield/Force Off (s)	12	51	75	107	12	51	75	107
Yield/Force Off 170(s)	12	39	75	107	12	39	75	107
Local Start Time (s)	96	0	40	63	96	0	40	63
Local Yield (s)	108	34	58	90	108	34	58	90
Local Yield 170(s)	108	22	58	90	108	22	58	90

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (m)	96.0	307.5	310.4	95.4	81.0	268.6	267.6	89.3	104.9	44.6	49.6	38.5
Average Queue (m)	95.0	276.7	270.5	31.1	38.7	259.0	258.2	50.8	27.2	21.5	17.4	22.6
95th Queue (m)	102.3	371.3	378.8	76.9	99.5	263.3	265.9	81.9	67.4	39.1	35.7	37.3
Link Distance (m)		294.8	294.8			253.5	253.5		190.4	190.4		231.5
Upstream Blk Time (%)		60	31			87	80					
Queuing Penalty (veh)		0	0			0	0					
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	88	3	9	0	0	74		7	0		0	
Queuing Penalty (veh)	393	11	40	2	2	37		7	0		0	

Intersection: 3: Angeline St N & Kent St W

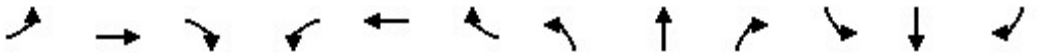
Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	30.7	74.2
Average Queue (m)	10.5	41.2
95th Queue (m)	23.0	67.9
Link Distance (m)	231.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		1
Queuing Penalty (veh)		1

Network Summary

Network wide Queuing Penalty: 493

HCM Signalized Intersection Capacity Analysis
3: Angeline St N & Kent St W

02-27-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1514	1731	3505		1754	3374		1754	3560	1522
Flt Permitted	0.10	1.00	1.00	0.30	1.00		0.64	1.00		0.56	1.00	1.00
Satd. Flow (perm)	179	3574	1514	554	3505		1178	3374		1032	3560	1522
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	0	231	0	8	0	0	29	0	0	0	218
Lane Group Flow (vph)	379	909	213	51	1150	0	335	233	0	142	180	161
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	59.1	49.3	49.3	41.9	37.1		26.7	18.7		26.7	18.7	18.7
Effective Green, g (s)	59.1	49.3	49.3	41.9	37.1		26.7	18.7		26.7	18.7	18.7
Actuated g/C Ratio	0.57	0.48	0.48	0.41	0.36		0.26	0.18		0.26	0.18	0.18
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	368	1713	726	280	1264		350	613		324	647	276
v/s Ratio Prot	c0.17	0.25		0.01	0.33		c0.07	0.07		0.03	0.05	
v/s Ratio Perm	c0.42		0.14	0.07			c0.17			0.08		0.11
v/c Ratio	1.03	0.53	0.29	0.18	0.91		0.96	0.38		0.44	0.28	0.58
Uniform Delay, d1	31.6	18.7	16.2	18.6	31.3		36.2	37.0		30.7	36.2	38.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	54.8	1.2	1.0	0.2	11.3		36.8	0.4		1.3	0.2	3.1
Delay (s)	86.4	19.9	17.2	18.8	42.5		73.0	37.3		31.9	36.5	41.6
Level of Service	F	B	B	B	D		E	D		C	D	D
Approach Delay (s)		33.7			41.5			57.3			38.3	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	102.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	22	42	13	33	11	53	13	33
Maximum Split (%)	20.0%	38.2%	11.8%	30.0%	10.0%	48.2%	11.8%	30.0%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	22	64	77	0	11	64	77
End Time (s)	22	64	77	0	11	64	77	0
Yield/Force Off (s)	17	58	72	104	6	58	72	104
Yield/Force Off 170(s)	17	46	72	104	6	46	72	104
Local Start Time (s)	88	0	42	55	88	99	42	55
Local Yield (s)	105	36	50	82	94	36	50	82
Local Yield 170(s)	105	24	50	82	94	24	50	82

Intersection Summary	
Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

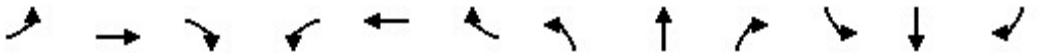
Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (m)	96.0	233.4	228.1	79.2	80.8	267.6	262.5	95.7	165.2	152.8	47.8	42.6
Average Queue (m)	84.4	127.9	104.0	21.6	31.4	254.0	251.4	84.0	139.2	72.9	19.0	20.7
95th Queue (m)	114.0	227.1	206.0	50.5	89.5	282.8	284.6	116.6	266.4	181.7	39.1	36.2
Link Distance (m)		294.8	294.8			253.5	253.5		190.4	190.4		231.5
Upstream Blk Time (%)						76	65		52	0		
Queuing Penalty (veh)						0	0		0	0		
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	56	4	4			71		71	0		0	0
Queuing Penalty (veh)	251	14	18			36		69	0		0	0

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	32.2	83.9
Average Queue (m)	8.7	44.2
95th Queue (m)	20.5	75.3
Link Distance (m)	231.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		2
Queuing Penalty (veh)		2

Network Summary

Network wide Queuing Penalty: 390



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Future Volume (vph)	371	891	435	50	1020	115	328	195	62	139	176	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00		1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3574	1512	1731	3505		1754	3373		1754	3560	1521
Flt Permitted	0.09	1.00	1.00	0.31	1.00		0.64	1.00		0.55	1.00	1.00
Satd. Flow (perm)	175	3574	1512	572	3505		1178	3373		1016	3560	1521
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	379	909	444	51	1041	117	335	199	63	142	180	379
RTOR Reduction (vph)	0	0	224	0	7	0	0	29	0	0	0	239
Lane Group Flow (vph)	379	909	220	51	1151	0	335	233	0	142	180	140
Confl. Peds. (#/hr)	23		36	36		23	16		12	12		16
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	1%	1%	2%	4%	1%	2%	2%	3%	1%	2%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	1	2	2
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6		6	2			8			4		4
Actuated Green, G (s)	62.1	52.3	52.3	42.9	38.1		26.4	18.4		26.4	18.4	18.4
Effective Green, g (s)	62.1	52.3	52.3	42.9	38.1		26.4	18.4		26.4	18.4	18.4
Actuated g/C Ratio	0.59	0.50	0.50	0.41	0.36		0.25	0.17		0.25	0.17	0.17
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0		5.0	6.0		5.0	6.0	6.0
Vehicle Extension (s)	2.5	0.2	0.2	2.5	0.2		4.0	3.0		4.0	3.0	3.0
Lane Grp Cap (vph)	393	1771	749	285	1265		338	588		310	620	265
v/s Ratio Prot	c0.17	0.25		0.01	0.33		c0.08	0.07		0.03	0.05	
v/s Ratio Perm	c0.39		0.15	0.06			c0.17			0.08		0.09
v/c Ratio	0.96	0.51	0.29	0.18	0.91		0.99	0.40		0.46	0.29	0.53
Uniform Delay, d1	32.1	18.0	15.7	19.1	32.1		38.2	38.6		32.3	37.9	39.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	35.9	1.1	1.0	0.2	11.2		46.4	0.4		1.5	0.3	1.9
Delay (s)	67.9	19.1	16.7	19.4	43.3		84.7	39.1		33.7	38.1	41.5
Level of Service	E	B	B	B	D		F	D		C	D	D
Approach Delay (s)		29.1			42.3			64.6			39.1	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	105.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	EBL	WBTL	NBL	SBTL	WBL	EBTL	SBL	NBTL
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	Min	None	Max	None	Min
Maximum Split (s)	24	43	13	33	11	56	13	33
Maximum Split (%)	21.2%	38.1%	11.5%	29.2%	9.7%	49.6%	11.5%	29.2%
Minimum Split (s)	11	40	13	33	11	40	13	33
Yellow Time (s)	3	4	3	4	3	4	3	4
All-Red Time (s)	2	2	2	2	2	2	2	2
Minimum Initial (s)	6	34	8	16	6	34	8	16
Vehicle Extension (s)	2.5	0.2	4	3	2.5	0.2	4	3
Minimum Gap (s)	2.5	0.2	3	3	2.5	0.2	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		22		17		22		17
Flash Dont Walk (s)		12		10		12		10
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	24	67	80	0	11	67	80
End Time (s)	24	67	80	0	11	67	80	0
Yield/Force Off (s)	19	61	75	107	6	61	75	107
Yield/Force Off 170(s)	19	49	75	107	6	49	75	107
Local Start Time (s)	89	0	43	56	89	100	43	56
Local Yield (s)	108	37	51	83	95	37	51	83
Local Yield 170(s)	108	25	51	83	95	25	51	83

Intersection Summary	
Cycle Length	113
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 3: Angeline St N & Kent St W

Intersection: 3: Angeline St N & Kent St W

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	T	TR	L	T
Maximum Queue (m)	95.8	153.9	145.5	72.4	80.9	262.0	262.5	96.0	194.3	172.5	45.2	53.0
Average Queue (m)	68.8	72.5	58.1	21.5	29.3	234.9	229.1	89.9	142.5	79.6	17.7	21.9
95th Queue (m)	103.9	130.4	108.6	45.9	87.5	291.8	295.3	111.3	250.7	182.2	35.8	39.3
Link Distance (m)		294.8	294.8			253.5	253.5		190.4	190.4		231.5
Upstream Blk Time (%)						41	34		36			
Queuing Penalty (veh)						0	0		0			
Storage Bay Dist (m)	60.0			60.0	45.0			60.0			50.0	
Storage Blk Time (%)	26	4	3	0		69		82	0		0	0
Queuing Penalty (veh)	116	14	12	0		35		79	0		0	0

Intersection: 3: Angeline St N & Kent St W

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	70.8	99.8
Average Queue (m)	11.2	44.5
95th Queue (m)	37.9	75.3
Link Distance (m)	231.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		70.0
Storage Blk Time (%)		4
Queuing Penalty (veh)		3

Network Summary

Network wide Queuing Penalty: 261