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March 31, 2025

Reference Number: 24216

Jaswinder Brar
Kingdom Team (2367408 Ontario Inc.)
13997 Kennedy Road,
Caledon, ON
L7C 2H3

Dear Jaswinder Brar,

RE: Transportation Impact Study (TIS) Update – March 2025
Proposed Mixed-Use Development
Highway 10 and King Street, Town of Caledon

LEA Consulting Ltd. (LEA) is pleased to present our findings of the Transportation Impact Study (TIS) Update for the proposed commercial development located in the northeast quadrant of the intersection of Highway 10 and King Street in the Town of Caledon (herein referred to as the “subject site”).

By way of background, a TIS has previously been completed by Crozier Consulting Engineers titled Traffic Impact Study Highway 10 and King Street Mixed-Use Development (November 2022) (herein referred to as the “Crozier Report”), which accompanied a Site Plan Application for the subject site. Since the November 2022 submission, comments have been received from the Ministry of Transportation (MTO) dated March 27, 2023. To address MTO’s comments, LEA has prepared TIS Update dated September 18, 2024. Subsequently, MTO’s comments were received on November 15, 2024.

The following letter has been prepared in support of the proposed development’s Site Plan Application (SPA) and will review the most recent site plan. This letter addresses the MTO comments received and provides an updated analysis based on the latest development proposal.

1 PROPOSED DEVELOPMENT

The subject site is currently vacant. The development proposal consists of a gas station with eight passenger car fueling positions and four heavy vehicle fueling positions. Additionally, four (4) single-storey buildings are proposed, consisting of one (1) single-storey convenience store with two fast-food restaurants with drive-thru, one (1) single-storey fast-food restaurant with a drive-thru, and two (2) single-storey restaurant buildings.

Access to the proposed development will be provided via two (2) new driveways consisting of a right-in/right-out on Highway 10 and a right-in/left-in/right-out access on King Street. The site statistics of the proposed development are presented in Table 1-1 and the proposed site plan is illustrated in Figure 1-1.



Table 1-1: Site Statistics

Building	Land Use	GFA/Site Content
Gas Station		8 Passenger Car Fueling Positions 4 Heavy Vehicle Fueling Positions
A	Restaurant with Drive-Thru	279 m ²
	Retail	269 m ²
B	Restaurant with Drive-Thru	298 m ²
C	Restaurant	335 m ²
D		335 m ²
Total		1,516 m²

Figure 1-1: Proposed Site Plan



Source: Antrix Architects Inc., October 2023

2 RESPONSE TO COMMENTS

Response to comments received from the Ministry of Transportation (MTO) dated November 15, 2024 and Peel Region dated October 8, 2024 are included in the comment matrix submitted along with this TIS Update.



3 EXISTING TRAFFIC CONDITIONS

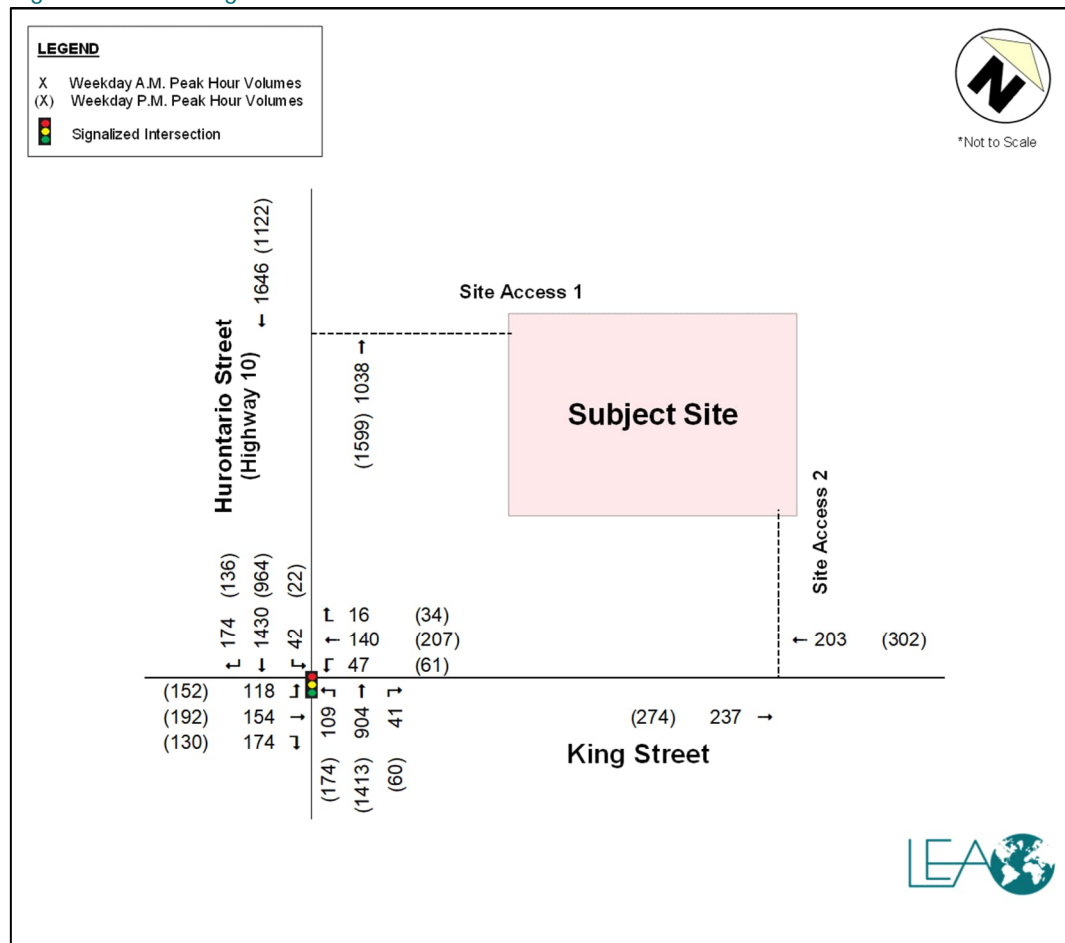
Turning movement counts (TMC) were used as the source of traffic data in the intersection capacity analysis. Traffic counts were collected by LEA Consulting on Wednesday November 15, 2023, between 7:00 AM – 9:00 AM and 4:00 PM-6:00 PM to capture the weekday AM and PM peak periods. Signal timing plans at the signalized intersections were obtained from the MTO.

A summary of TMC data collected is outlined in Table 3-1, with detailed traffic counts and signal timing plans provided in Exhibit A. The existing traffic volumes at the future site access locations were balanced based on the observed counts at the intersection of Highway 10 and King Street. The existing traffic volumes during the weekday AM and PM peak hours are illustrated in Figure 3-1.

Table 3-1: Traffic Data Collection Summary

Intersection	Collection Date	Source
Highway 10 & King Street	Wednesday, November 15, 2023	LEA Consulting

Figure 3-1: Existing Traffic Volumes





4 FUTURE BACKGROUND TRAFFIC CONDITIONS

For the analysis of future background traffic conditions, the assumptions of background development volumes (i.e. the DOST site) were carried over from the Crozier Report. The background development site traffic of the DOST site was extracted from TIS completed by Trans-Plan Transportation Engineering in May 2019 and were distributed to the road network based on the observed travel pattern. The relevant extracted pages provided in Exhibit B. Based on review on historical data, a high growth rate of about 5% was observed NB during AM peak and SB during PM peak at the Highway 10 and King Street intersection. Considering that the significant traffic growth from year 2019 to 2022 is directional, it is potentially development driven. The directional growth in NB and SB traffic volumes did not sustain in 2022 and 2023. To reasonably account for the traffic growth, a 2% was applied for all NB and SB movements under both AM and PM peak hours. For the EB and WB directions at Highway 10 and King Street, negative growth was observed with the exception of the WB during PM peak. A growth rate of 1.25% was applied to all WB movements during PM peak. The growth rates calculation are provided in Exhibit J.

The future background traffic volumes for the weekday AM and PM peak hours under the 2026, 2031 and 2036 horizon years are illustrated in Figure 4-1, Figure 4-2 and Figure 4-3, respectively.

Figure 4-1: 2026 Future Background Traffic Volumes

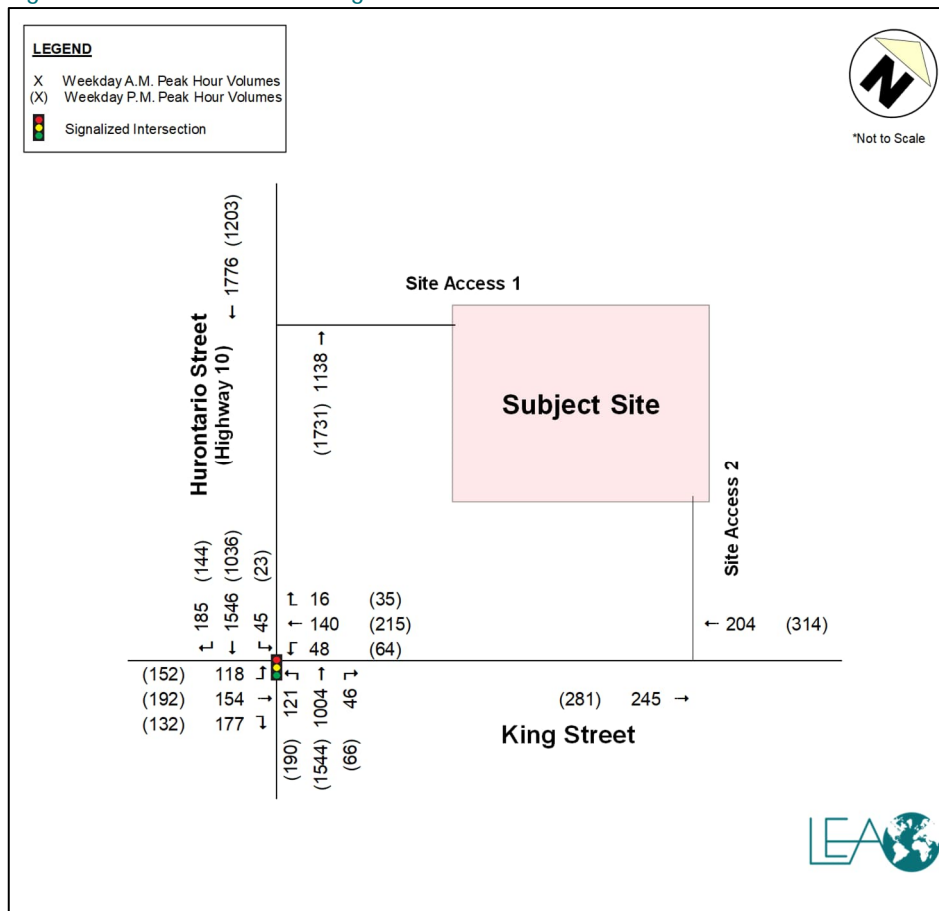
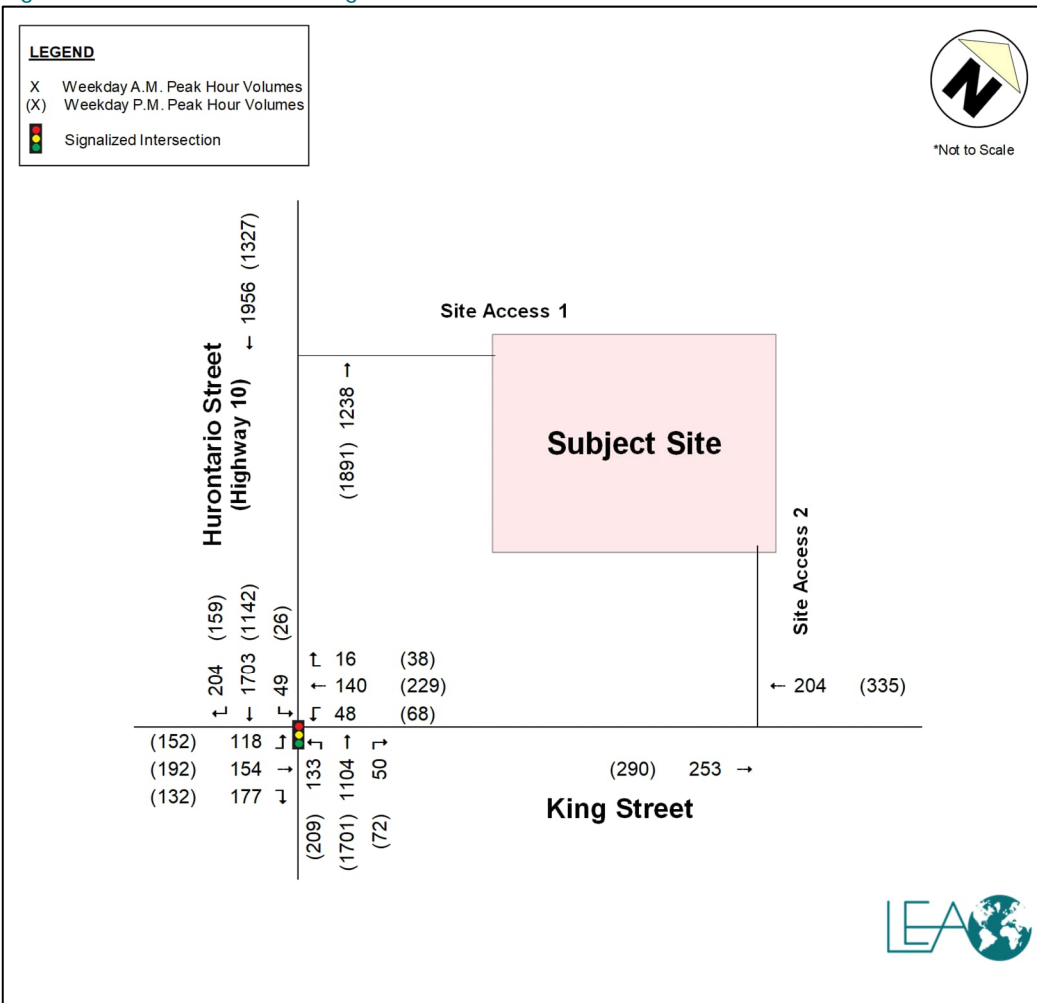




Figure 4-2: 2031 Future Background Traffic Volumes



*Not to Scale



Table 5-1: Vehicle Site Trip Generation

Land Use	Description	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Retail (Convenience Store) <i>ITE LUC 945 – Convenience Store / Gas Station – VFP (9-15)</i> 3,000 ft ²	ITE Auto Trip Rate (/1,000 ft ²)	28.26	28.26	56.52	27.26	27.26	54.52
	Retail Auto Trips	85	85	170	82	82	164
	Site Interaction	-7	-11	-18	-41	-24	-65
	External Auto Trips	78	74	152	41	58	99
	Pass-By	-59	-56	-115	-31	-44	-75
	Primary Auto Trips	19	18	37	10	14	24
Restaurant (No Drive-Thru) <i>ITE LUC 932 – High-Turnover (Sit-Down) Restaurant</i> 8,000 ft ²	ITE Auto Trip Rate (/1,000 ft ²)	5.26	4.31	9.57	5.52	3.53	9.05
	Retail Auto Trips	42	35	77	44	28	72
	Site Interaction	-2	-1	-3	-6	-8	-14
	External Auto Trips	40	34	74	38	20	58
	Pass-By	-9	-7	-16	-16	-9	-25
	Primary Auto Trips	31	27	58	22	11	33
Restaurant (Drive-Thru) <i>ITE LUC 934 – Fast-Food Restaurant with Drive-Through Window</i> 7,000 ft ²	ITE Auto Trip Rate (/1,000 ft ²)	22.75	21.86	44.61	17.18	15.85	33.03
	Retail Auto Trips	159	153	312	120	111	231
	Site Interaction	-9	-6	-15	-18	-33	-51
	External Auto Trips	150	147	297	102	78	180
	Pass-By	-75	-74	-149	-56	-43	-99
	Primary Auto Trips	75	73	148	46	35	81
Total External Auto Trips (including pass-by trips)		268	255	523	181	156	337
Total Pass-By Trips		-143	-137	-280	-103	-96	-199
Total Primary Auto Trips		125	118	243	78	60	138

The proposed development is anticipated to generate 243 two-way vehicle trips (125 inbound, 118 outbound) during the weekday AM peak hour and 138 two-way vehicle trips (78 inbound, 60 outbound) during the weekday PM peak hour.

5.2 MODAL SPLIT

The local mode split, as shown in Table 5-2, was determined based on Transportation Tomorrow Survey (TTS) 2016 data of zones of household surrounding the study area. Detailed calculations are available in Exhibit C.

Table 5-2: Local Mode Split

Description	Retail– Weekday AM/PM Peak Hour
Auto Driver Trips	80%
Auto Passenger Trips	18%
Transit Trips	1%
Pedestrian Trips	0%
Cycling Trips	1%
Total	100%

The local mode split and primary auto trips were then used to calculate the external person trips to determine the multi-modal trip generation volumes, which is summarized in Table 5-3. This calculation has been made



in consideration of primary auto trips only as pass-by trips are made due to convenience and do not contribute to new trips being generated in the study area.

Table 5-3: Multi-Modal Primary Site Trip Generation

Land Use	Description	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
All	External Person Trips	157	148	305	98	76	174
	Auto Driver Trips	125	118	243	78	60	138
	Auto Passenger Trips	29	28	57	17	14	31
	Transit Trips	1	1	2	1	1	2
	Pedestrian trips	0	0	0	0	0	0
	Cycling Trips	2	1	3	2	1	3

The proposed development is expected to generate 305 total new person trips to the network (157 inbound, 148 outbound) during the weekday AM peak hour and 174 total person trips (98 inbound, 76 outbound) during the weekday PM peak hour.

5.3 TRIP DISTRIBUTION AND ASSIGNMENT

Assumptions for site trip distribution were carried over from the Crozier Report. These assumptions are summarized in Table 5-4. Of note, all inbound trips from the east were assumed to depart northbound due to the site access configuration not allowing for a direct eastbound exit movement.

Table 5-4: Subject Site Vehicle Trip Distribution

To/From	Expected Route	Weekday AM/PM	
		In	Out
North	Highway 10	15%	30%
South	Highway 10	55%	55%
East	King Street	15%	0%
West	King Street	15%	15%
Total		100%	100%

Figure 5-1 and Figure 5-2 illustrates the primary and pass-by site traffic, respectively, and Figure 5-3 illustrates the total site-generated vehicle traffic to the surrounding road network.



Figure 5-1: Primary Site Traffic Volumes

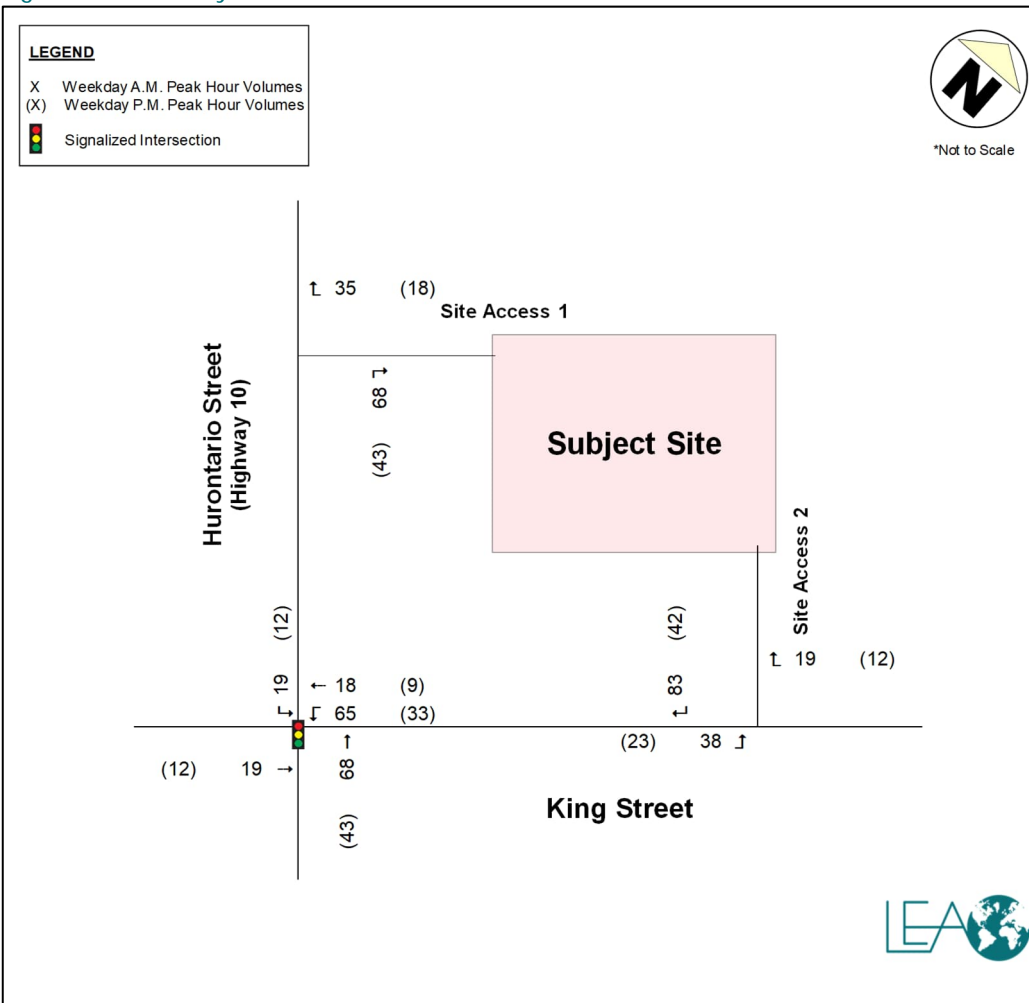




Figure 5-2: Pass-By Traffic Volumes

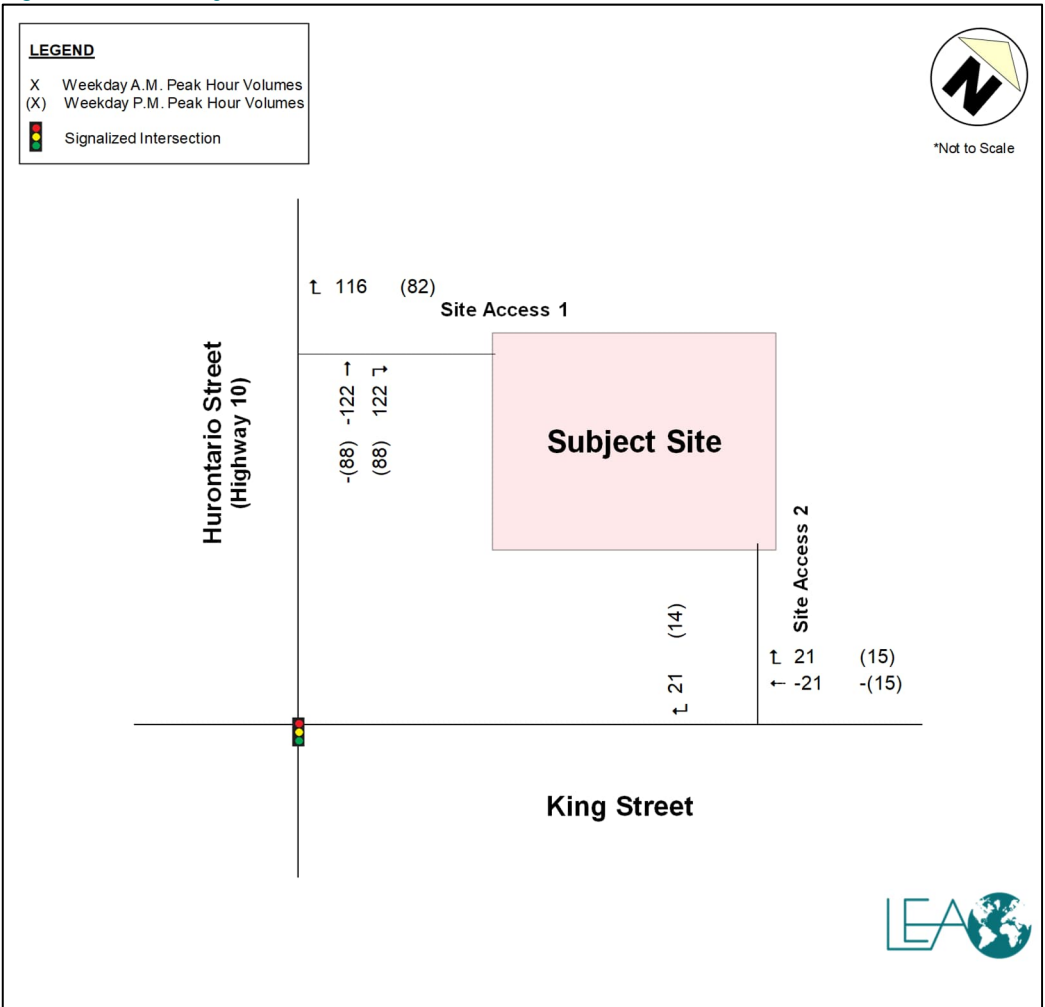
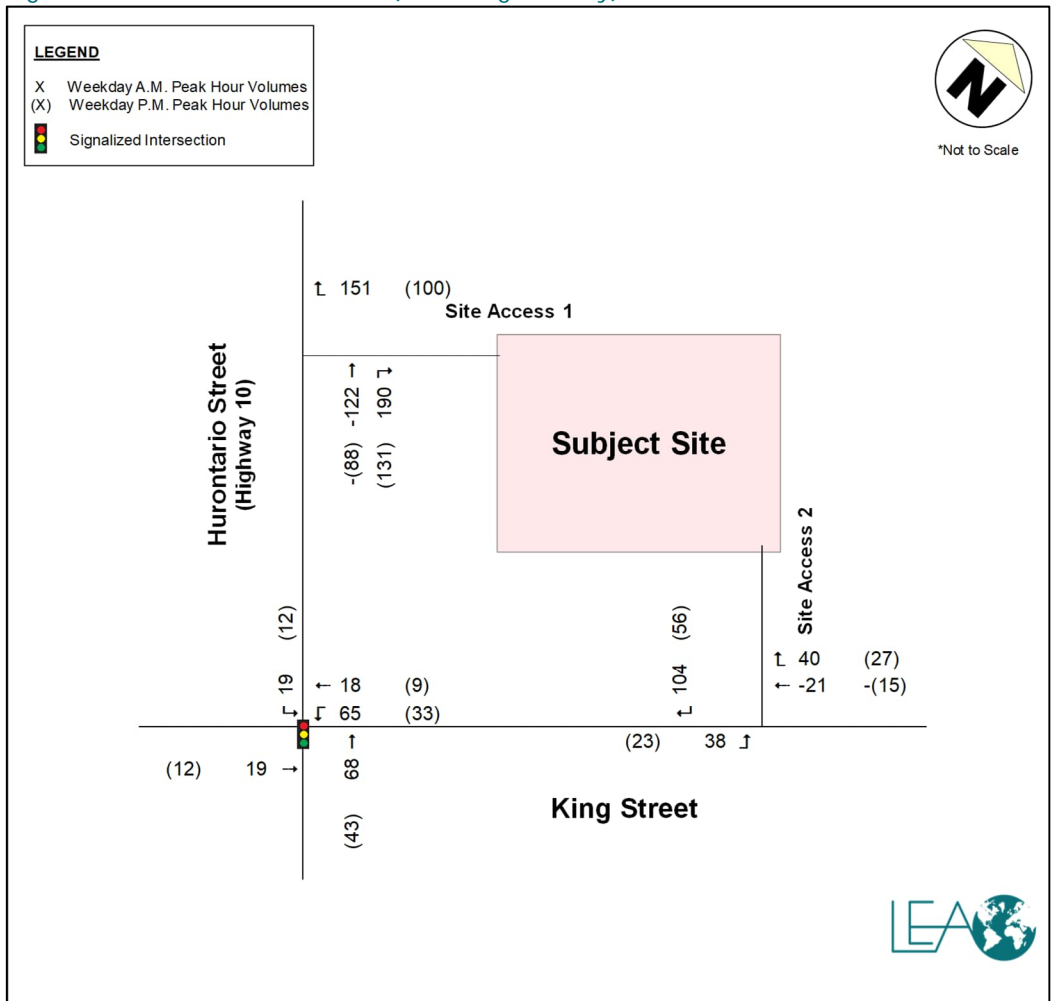




Figure 5-3: Site Traffic Volumes (Including Pass-By)





6 FUTURE TOTAL TRAFFIC CONDITIONS

Future total traffic conditions include the addition of site trips to the future background volumes. Future total traffic volumes for the weekday AM and PM peak hours under the 2026, 2031 and 2036 horizons are illustrated in Figure 6-1, Figure 6-2 and Figure 6-3, respectively.

Figure 6-1: 2026 Future Total Traffic Volumes

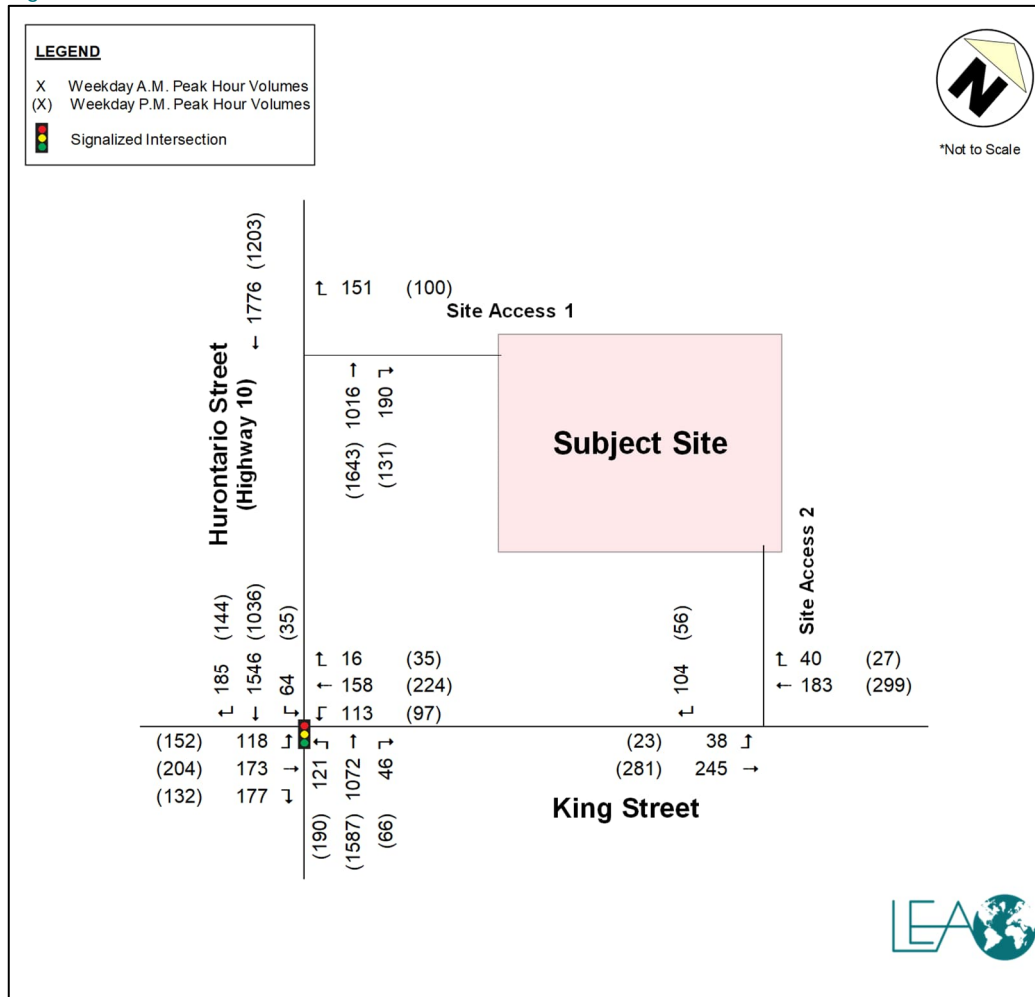




Figure 6-2: 2031 Future Total Traffic Volumes

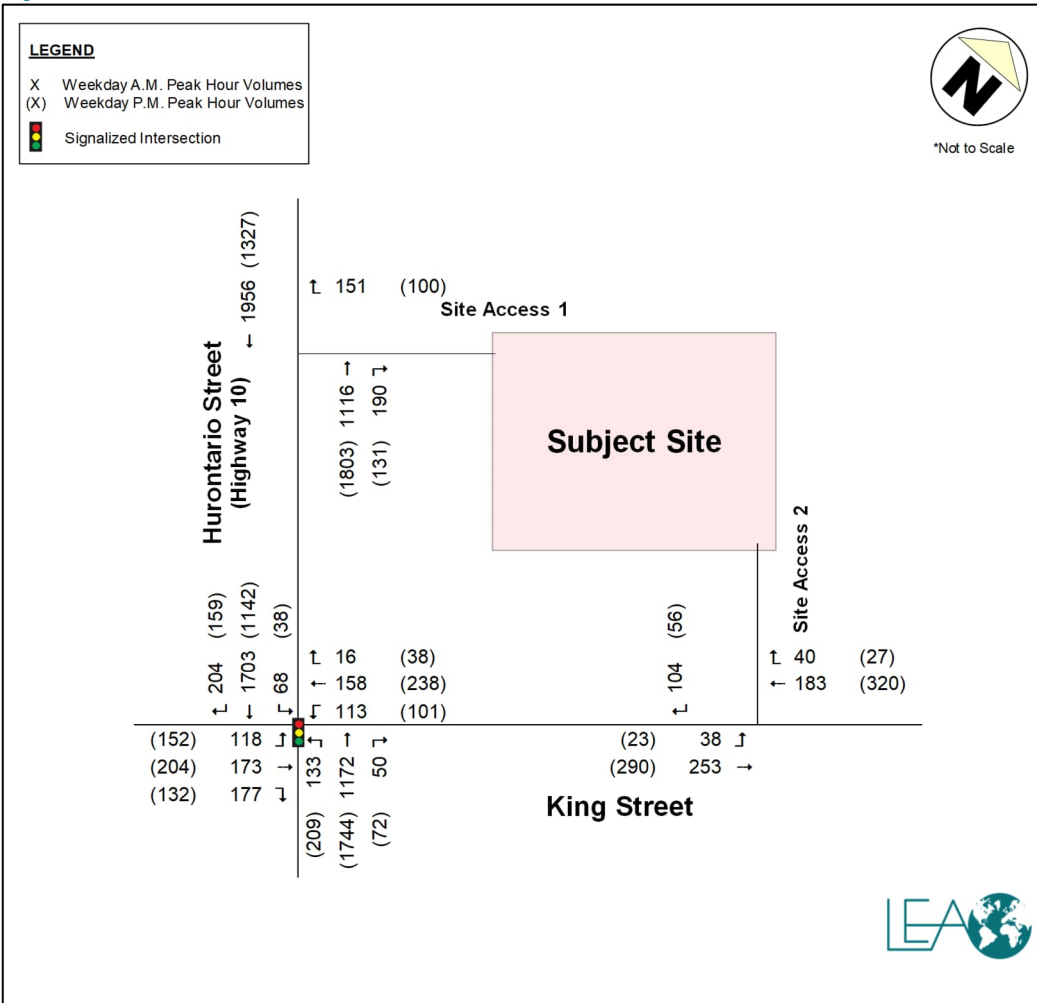
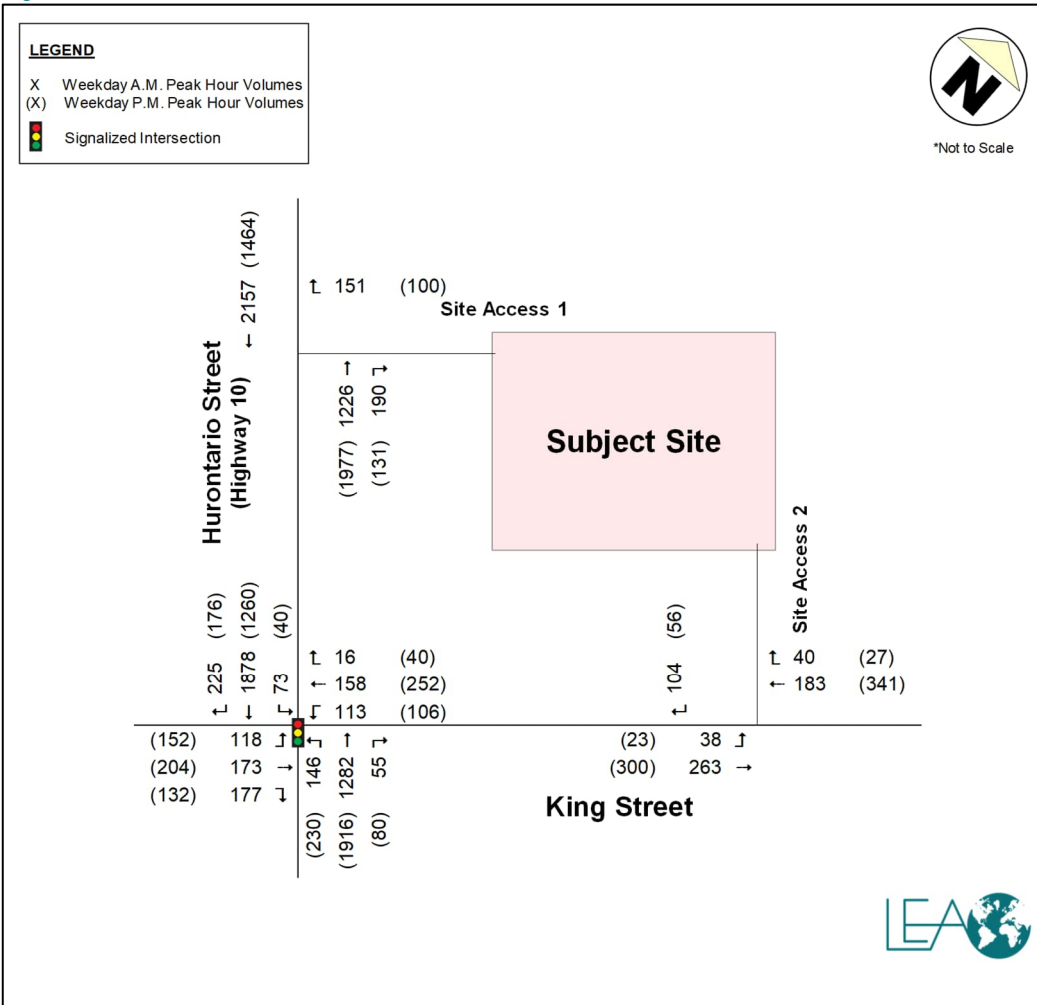




Figure 6-3: 2036 Future Total Traffic Volumes





7 INTERSECTION CAPACITY ANALYSIS

The intersection capacity analysis was undertaken using Synchro 11.0, which is based on the Highway Capacity Manual (HCM) (2000) and adheres to the Town of Caledon's *Transportation Impact Studies Terms of Reference and Guidelines* dated March 2017. HCM 2000 and 6 results are presented for signalized and unsignalized study intersections, respectively. As per the MTO and Town of Caledon TIS guidelines, critical movements of interest for signalized intersections were identified as those with a volume-to-capacity (v/c) ratio greater than 0.85. For unsignalized intersections, critical movements were those with a level-of-service (LOS) 'E' or greater.

The following sections outline a comparison of the capacity analysis results under existing, future background (2026, 2031, 2036) and future total (2026, 2031, 2036) conditions. For each intersection, only critical movements were shown. Detailed capacity analysis results are provided in the following exhibits:

- ▶ Exhibit D: Existing Intersection Capacity Analysis;
- ▶ Exhibit E: 2026, 2031 and 2036 Future Background Intersection Capacity Analysis; and
- ▶ Exhibit F: 2026, 2031 and 2036 Future Total Intersection Capacity Analysis.

7.1 SIGNALIZED INTERSECTION

The results for the signalized intersection under each traffic scenario during the weekday AM and PM peak hours are summarized in the sections below.

7.1.1 Highway 10 & King Street

Intersection capacity results for the Highway 10 & King Street intersection under the 2026, 2031, and 2036 future conditions are summarized in Table 7-1, Table 7-2 and Table 7-3, respectively.

Table 7-1: Intersection Capacity Analysis – Highway 10 & King Street (2026 Horizon)

Mvmt	Existing Conditions (2023)				Future Background (2026)				Future Total (2026)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak Hour												
Overall	-	-	C (28)	-/-	-	-	D (37)	-/-	-	-	D (43)	-/-
WBL	47	0.42	C (34)	8/18	48	0.43	C (35)	8/18	113	0.99	F (117)	21/52
SBTR	1604	0.95	C (34)	142/229	1731	1.03	D (53)	183/259	1731	1.05	E (60)	192/259
PM Peak Hour												
Overall	-	-	C (26)	-/-	-	-	C (23)	-/-	-	-	C (25)	-/-
WBL	61	0.30	C (33)	9/20	64	0.57	D (40)	10/24	97	0.89	F (86)	17/42



Existing Conditions: Under existing weekday AM and PM peak hour conditions, all movements operate within capacity. The southbound right/through movement during the AM peak hour is identified as a critical movement, but is deemed acceptable with a v/c ratio below 1.00 and LOS C. All existing 95th percentile queues can be accommodated by their available storage lanes.

Future Background: Under future background conditions, both the AM and PM peak hours are expected to continue operating within capacity except for the southbound right/through movement during the AM peak hour. This can be attributed to the corridor growth and background development volumes, as the southbound through/right movement increases by about 125 vehicles between existing conditions and the 2026 horizon. That said, although the v/c ratio for the movement is projected to exceed 1.0, the delays are not anticipated to exceed the cycle length at LOS D.

Future Total: Under future total conditions, the PM peak hour is expected to continue operating within capacity. In the AM peak hour, the congestion issues previous noted from the future background are again present. It should be noted that no new traffic volumes are being added to the SBTR movement from the proposed development. Overall, the addition of site traffic is not expected to have a noticeable impact on intersection operations.

Table 7-2: Intersection Capacity Analysis – Highway 10 & King Street (2031 Horizon)

AM Mvmt	Future Background (2031)				Future Total (2031)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
Overall	-	-	E (57)	-/-	-	-	E (63)	-/-
WBL	48	0.43	C (35)	8/18	113	0.99	F (117)	21/52
SBTR	1907	1.13	F (91)	220/299	1907	1.16	F (102)	229/299
PM Mvmt	Future Background (2031)				Future Total (2031)			
	Vol	V/C	Delay (s)	LOS	Vol	V/C	Delay (s)	LOS
Overall	-	-	C (27)	-/-	-	-	C (30)	-/-
WBL	68	0.61	D (43)	11/25	101	0.92	F (97)	18/44
NBL	209	0.97	E (71)	18/67	209	0.99	E (77)	18/68
NBTR	1773	0.85	B (19)	127/223	1816	0.88	C (21)	137/233

Future Background: Under future background conditions for the 2031 horizon, the northbound left is expected to see increased v/c ratios and delay times during the PM peak hour due to increased volumes in the northbound left and in conflicting movements such as the southbound through/right. However, the v/c ratio is expected to remain below 1.0. The southbound through/right movement is expected to continue operating beyond capacity in the AM peak hour.

Future Total: Under future total conditions for the 2031 horizon, the constraints identified in the future background continue to be present. The southbound through/right movement in the AM peak hour is expected to continue operating over capacity. The site traffic does not add any volumes to either the southbound through/right or northbound left movements, which are the most congested in the future background.



The delay for westbound left turning vehicles increases in both the AM and PM peak hour, but the movement remains within capacity and there is sufficient storage lane space for the associated queue. Overall, the addition of site traffic is not expected to have a large negative impact on intersection operations.

Table 7-3: Intersection Capacity Analysis – Highway 10 & King Street (2036 Horizon)

AM	Future Background (2036)				Future Total (2036)			
Mvmt	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
Overall	-	-	F (83)	-/-	-	-	F (89)	-/-
WBL	48	0.43	C (35)	8/18	113	0.99	F (117)	21/52
NBL	146	0.85	D (55)	13/51	146	0.87	E (59)	14/51
SBTR	2103	1.25	F (141)	261/344	2103	1.27	F (153)	271/344
PM	Future Background (2036)				Future Total (2036)			
Mvmt	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
Overall	-	-	D (36)	-/-	-	-	D (40)	-/-
WBL	73	0.66	D (47)	12/27	106	0.95	F (104)	19/47
NBL	230	1.21	F (157)	35/89	230	1.22	F (164)	36/89
NBTR	1953	0.94	C (26)	157/263	1996	0.97	C (32)	171/273
SBTR	1436	0.86	C (25)	114/188	1436	0.87	C (27)	116/188

Future Background: Under future background conditions for the 2036 horizon, the northbound left movement is found to operate over capacity in the PM peak hour. However, queues for the movement are not expected to impede on other movements at the intersection or adjacent intersections in the study area. The southbound through/right movement is expected to continue operating beyond capacity in the AM peak hour, as discussed in previous horizons.

Future Total: Under future total conditions for the 2036 horizon, the constraints identified in the future background continue to be present. The southbound through/right movement in the AM peak hour, and the northbound left movement in the PM peak hour, are both expected to continue operating over capacity. However, it should be noted that all of the increase in traffic is due to corridor growth and background developments contribute.

The delay for westbound left turning vehicles increases in both the AM and PM peak hour, but the movement remains within capacity and there is sufficient storage lane space for the associated queue. Overall, the addition of site traffic is not expected to have a noticeable impact on intersection operations.

The queuing analysis is summarized in Table 7-4 for the existing and 2026 horizon and Table 7-5.

Table 7-4: Queueing Analysis – Highway 10 & King Street (Existing and 2026 Horizons)

AM	Existing Conditions (2023)			Future Background (2026)		Future Total (2026)		
Mvmt	Available Storage	Queue (m)		Queue (m)		Available Storage	Queue (m)	
		50 th	95 th	50 th	95 th		50 th	95 th
EBL	135	19	34	19	34	135	19	35
WBL	113	8	18	8	18	195 ⁽¹⁾	21	52
WBR	65	0	0	0	0	58 ⁽²⁾	0	0



NBL	55	7	31	8	38	55	9	38
SBL	45	4	12	4	13	60 ⁽²⁾	7	19
PM	Existing Conditions (2023)			Future Background (2026)		Future Total (2026)		
Mvmt	Available Storage	Queue (m)		Queue (m)		Available Storage	Queue (m)	
		50th	95th	50th	95th		50th	95th
EBL	135	24	42	25	45	135	25	45
WBL	113	9	20	10	24	195 ⁽¹⁾	17	42
WBR	65	0	1	0	1	58 ⁽²⁾	0	1
NBL	55	14	25	12	38	55	12	38
SBL	45	3	9	2	11	60 ⁽²⁾	4	21

Note: (1) - Based on latest road design (refer to Exhibit H), WBL has an effective storage lane length of 30m plus the length between Highway 10 & King Street intersection and King Street & Site Access 2 intersection (i.e. ~195m).
 (2) - Based on latest road design (Refer to Exhibit H)

Table 7-5: Queuing Analysis - Highway 10 & King Street (2031 and 2036 Horizons)

AM	Future Background (2031)			Future Total (2031)			Future Background (2036)			Future Total (2036)		
	Available Storage	Queue (m)		Available Storage	Queue (m)		Available Storage	Queue (m)		Available Storage	Queue (m)	
Mvmt		50 th	95 th		50 th	95 th		50 th	95 th		50 th	95 th
EBL	135	19	34	135	19	35	135	19	34	135	19	35
WBL	113	8	18	195 ⁽¹⁾	21	52	113	8	18	195 ⁽¹⁾	21	52
WBR	65	0	0	87 ⁽²⁾	0	0	65	0	0	58 ⁽²⁾	0	0
NBL	55	10	44	55	11	44	55	13	51	55	14	51
SBL	45	5	15	60 ⁽²⁾	8	23	45	6	18	60 ⁽²⁾	9	33
PM	Future Background (2031)			Future Total (2031)			Future Background (2036)			Future Total (2036)		
	Available Storage	Queue (m)		Available Storage	Queue (m)		Available Storage	Queue (m)		Available Storage	Queue (m)	
Mvmt		50 th	95 th		50 th	95 th		50 th	95 th		50 th	95 th
EBL	135	26	46	135	26	46	135	26	47	135	26	47
WBL	113	11	25	195 ⁽¹⁾	18	44	113	12	27	195 ⁽¹⁾	19	47
WBR	65	0	2	87 ⁽²⁾	0	2	65	0	3	58 ⁽²⁾	0	3
NBL	55	18	67	55	18	68	55	35	89	55	36	89
SBL	45	3	15	60 ⁽²⁾	5	24	45	3	16	60 ⁽²⁾	5	25

Note: (1) - Based on latest road design (refer to Exhibit H), WBL has an effective storage lane length of 30m plus the length between Highway 10 & King Street intersection and King Street & Site Access 2 intersection (i.e. ~195m).
 (2) - Based on latest road design (Refer to Exhibit H)

Under existing conditions, vehicle queue lengths for all movements are contained within the available storage. Queue lengths during all horizons are mostly expected to remain within the available space except for the northbound left movement's 95th queue lengths during the PM peak hour in both the 2031 and 2036 horizons. However, this movement does not pertain to traffic volumes generated by the subject site, is not impacted by traffic associated with the proposed development and is therefore considered outside the scope of this study.

Of note, the center westbound through lane at King Street & Site Access 2 intersection is an extension of the westbound left lane at Highway 10 & King Street with 30 m storage and 85 m taper. As such, the westbound left lane at Highway 10 & King Street has an effective storage lane length of 30 m plus the length between Highway 10 & King Street intersection and King Street & Site Access 2 intersection.



7.2 UNSIGNALIZED INTERSECTIONS

The results of the intersection capacity analysis for the unsignalized intersections are summarized in the sections below. All values for queues in these tables are measured in vehicles. As site access intersections were not accounted for under existing and future background conditions, intersection capacity results for those intersections show future total conditions for all horizon years in a consolidated table where applicable.

7.2.1 Highway 10 & Site Access 1

Intersection capacity results for the Highway 10 & Site Access 1 intersection for 2026, 2031 and 2036 future conditions are summarized in Table 7-6.

Table 7-6: Intersection Capacity Analysis – Highway 10 & Site Access 1 (All Future Horizons)

AM	Future Total Traffic (2026)				Future Total Traffic (2031)				Future Total Traffic (2036)			
Mvmt	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)
Overall	-	-	- (1)	-/-	-	-	- (1)	-/-	-	-	- (1)	-/-
WBR	151	0.32	C (16)	-/1	151	0.35	C (17)	-/2	151	0.38	C (19)	-/2
PM	Future Total Traffic (2026)				Future Total Traffic (2031)				Future Total Traffic (2036)			
Mvmt	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)
Overall	-	-	- (1)	-/-	-	-	- (1)	-/-	-	-	- (1)	-/-
WBR	100	0.35	C (23)	-/2	100	0.40	D (27)	-/2	100	0.46	D (33)	-/2

Future Total: The Highway 10 & Site Access 1 is expected to operate within capacity and with no significant delay during AM and PM peak hours in all horizons. No critical movements have been identified.



7.2.2 King Street & Site Access 2

Intersection capacity results for the Highway 10 & Site Access 2 intersection for 2026, 2031 and 2036 future conditions are summarized in Table 7-7.

Table 7-7: Intersection Capacity Analysis – King Street & Site Access 2 (All Future Horizons)

AM	Future Total Traffic (2026)				Future Total Traffic (2031)				Future Total Traffic (2036)			
Mvmt	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)
Overall	-	-	- (2)	-/-	-	-	- (2)	-/-	-	-	- (2)	-/-
EBL	38	0.03	A (8)	-/0	38	0.03	A (8)	-/0	38	0.03	A (8)	-/0
SBR	104	0.12	A (9)	-/0	104	0.12	A (9)	-/0	104	0.12	A (9)	-/0
PM	Future Total Traffic (2026)				Future Total Traffic (2031)				Future Total Traffic (2036)			
Mvmt	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)	Vol	V/C	LOS (Delay)	Queues (50/95) (veh)
Overall	-	-	- (1)	-/-	-	-	- (1)	-/-	-	-	- (1)	-/-
EBL	23	0.02	A (8)	-/0	23	0.02	A (8)	-/0	23	0.02	A (8)	-/0
SBR	56	0.07	A (10)	-/0	56	0.07	A (10)	-/0	56	0.07	A (10)	-/0

Future Total: The King Street & Site Access 2 is expected to operate within capacity and with no significant delay during AM and PM peak hours in all horizons. No critical movements have been identified.

Left Turn Warrant Analysis at King Street & Site Access 2

To determine the necessity of an eastbound left-turn storage lane for the intersection, a left turn warrant analysis was conducted based on Appendix 9A of the *MTO Design Supplement for TAC Geometric Design Guide (GDG) for Canadian Roads*. Based on the methodology, it was found that weekday AM and PM peak hour traffic volumes meet the warranted requirements to justify a left turn storage lane. As such, a left turn storage lane with a minimum length of 15 m is recommended to facilitate the eastbound left turn movement for the intersection. Detailed information is available in Exhibit G. Based on the latest road design drawing (Exhibit H), a 30m left turn storage lane is proposed which could satisfy the minimum requirements.



8 CONCLUSION

This letter has been prepared in support of the proposed development's Site Plan Application and addresses the MTO comments received, dated November 15, 2024 via email. An updated analysis has been provided and concludes that under the 2026, 2031 and 2036 horizon years, the proposed development is expected to have an acceptable impact on the surrounding traffic network. The addition of site traffic is not expected to have a noticeable impact on the surrounding intersection operations. In addition, the proposed site accesses are expected to operate within capacity and with no significant delay. An eastbound left-turn storage lane is warranted and a storage lane with a minimum length of 15 m is recommended to facilitate the eastbound left turns at King Street & Site Access 2 intersection. Based on the latest road design drawing, a 30m left turn storage lane is proposed which could satisfy the minimum requirements.

Should you have any questions or comments regarding the presented information, please do not hesitate to contact the undersigned below.

Yours truly,
LEA CONSULTING LTD.

Kenneth Chan, P. Eng., PTOE, PMP
Senior Vice President, Transportation Planning &
Engineering



Timothy Chin, M.Sc.(Eng), P. Eng.
Project Manager, Transportation
Engineering

- Encl:
- Exhibit A: Existing TMC Counts and Signal Timing Plan
 - Exhibit B: Background Development Trip Generation (from Trans-Plan TIS Report)
 - Exhibit C: Detailed TTS Data
 - Exhibit D: Existing Intersection Capacity Analysis;
 - Exhibit E: 2026, 2031 and 2036 Future Background Intersection Capacity Analysis
 - Exhibit F: 2026, 2031 and 2036 Future Total Intersection Capacity Analysis
 - Exhibit G: Left-Turn Warrant Analysis
 - Exhibit H: Road Design Drawings for Highway 10 and King Street
 - Exhibit I: ITE Trip Generation
 - Exhibit J: Growth Rates Calculation



EXHIBIT A

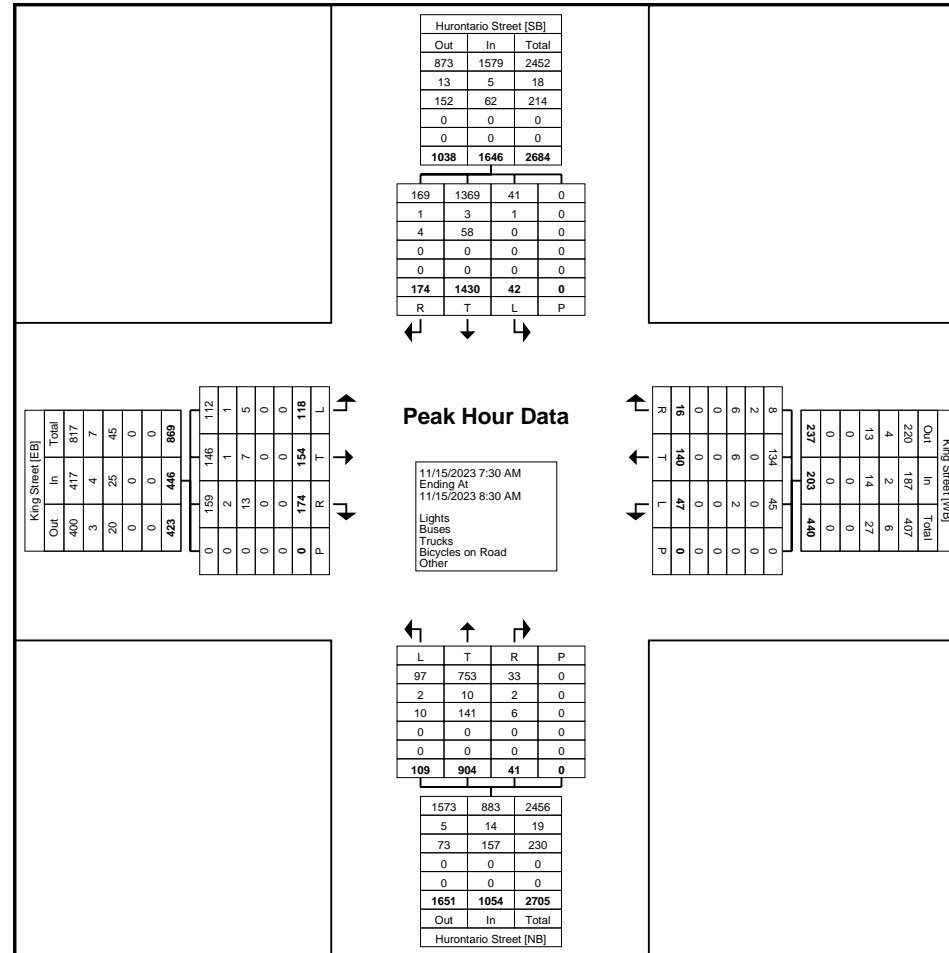
Existing TMC Counts and Signal Timing Plan



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Count Name: 24216_Hwy 10 & King St-AM
Site Code: 24216
Start Date: 11/15/2023
Page No: 4



Turning Movement Peak Hour Data Plot (7:30 AM)



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Count Name: 24216_Hwy 10 & King St-PM
Site Code: 24216
Start Date: 11/15/2023
Page No: 1

Turning Movement Data

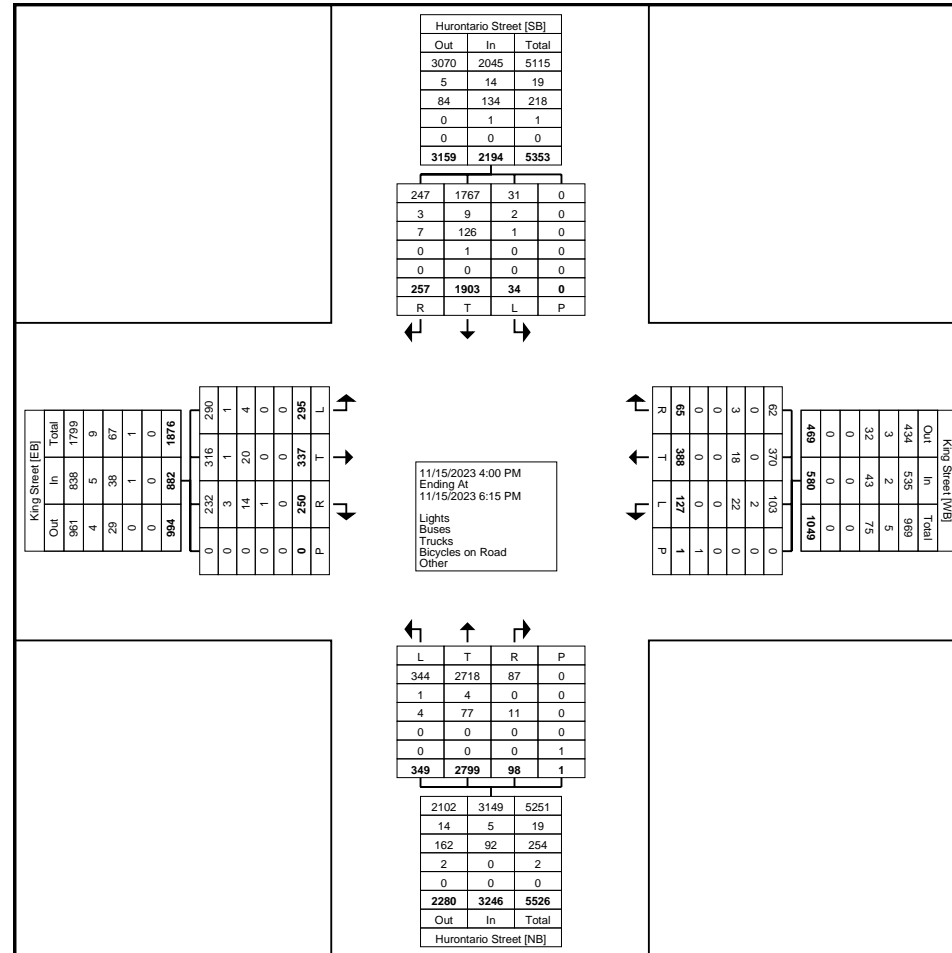
Start Time	Huronario Street Southbound					King Street Westbound					Huronario Street Northbound					King Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:00 PM	5	237	32	0	274	15	29	12	0	56	54	407	8	0	469	40	37	28	0	105	904
4:15 PM	3	223	32	0	258	18	51	4	0	73	54	379	9	0	442	35	38	22	0	95	868
4:30 PM	6	227	33	0	266	13	45	6	0	64	51	390	10	1	451	42	54	36	0	132	913
4:45 PM	5	236	32	0	273	8	58	4	0	70	50	339	18	0	407	29	35	25	0	89	839
Hourly Total	19	923	129	0	1071	54	183	26	0	263	209	1515	45	1	1769	146	164	111	0	421	3524
5:00 PM	5	266	35	0	306	17	50	16	1	83	34	344	23	0	401	38	60	34	0	132	922
5:15 PM	6	235	36	0	277	23	54	8	0	85	39	340	9	0	388	43	43	35	0	121	871
5:30 PM	2	233	29	0	264	20	53	9	0	82	31	326	10	0	367	39	39	35	0	113	826
5:45 PM	2	246	28	0	276	13	48	6	0	67	36	274	11	0	321	29	31	35	0	95	759
Hourly Total	15	980	128	0	1123	73	205	39	1	317	140	1284	53	0	1477	149	173	139	0	461	3378
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	34	1903	257	0	2194	127	388	65	1	580	349	2799	98	1	3246	295	337	250	0	882	6902
Approach %	1.5	86.7	11.7	-	-	21.9	66.9	11.2	-	-	10.8	86.2	3.0	-	-	33.4	38.2	28.3	-	-	-
Total %	0.5	27.6	3.7	-	31.8	1.8	5.6	0.9	-	8.4	5.1	40.6	1.4	-	47.0	4.3	4.9	3.6	-	12.8	-
Lights	31	1767	247	-	2045	103	370	62	-	535	344	2718	87	-	3149	290	316	232	-	838	6567
% Lights	91.2	92.9	96.1	-	93.2	81.1	95.4	95.4	-	92.2	98.6	97.1	88.8	-	97.0	98.3	93.8	92.8	-	95.0	95.1
Buses	2	9	3	-	14	2	0	0	-	2	1	4	0	-	5	1	1	3	-	5	26
% Buses	5.9	0.5	1.2	-	0.6	1.6	0.0	0.0	-	0.3	0.3	0.1	0.0	-	0.2	0.3	0.3	1.2	-	0.6	0.4
Trucks	1	126	7	-	134	22	18	3	-	43	4	77	11	-	92	4	20	14	-	38	307
% Trucks	2.9	6.6	2.7	-	6.1	17.3	4.6	4.6	-	7.4	1.1	2.8	11.2	-	2.8	1.4	5.9	5.6	-	4.3	4.4
Bicycles on Road	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	0	0	1	-	1	2
% Bicycles on Road	0.0	0.1	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.4	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-



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Count Name: 24216_Hwy 10 & King St-PM
Site Code: 24216
Start Date: 11/15/2023
Page No: 2



Turning Movement Data Plot



LEA Consulting Ltd.
625 Cochrane Drive

Markam, Ontario, Canada L3R 9R9
905-470-0015 x240 idinsmore@lea.ca

Count Name: 24216_Hwy 10 & King St-PM
Site Code: 24216
Start Date: 11/15/2023
Page No: 3

Turning Movement Peak Hour Data (4:30 PM)

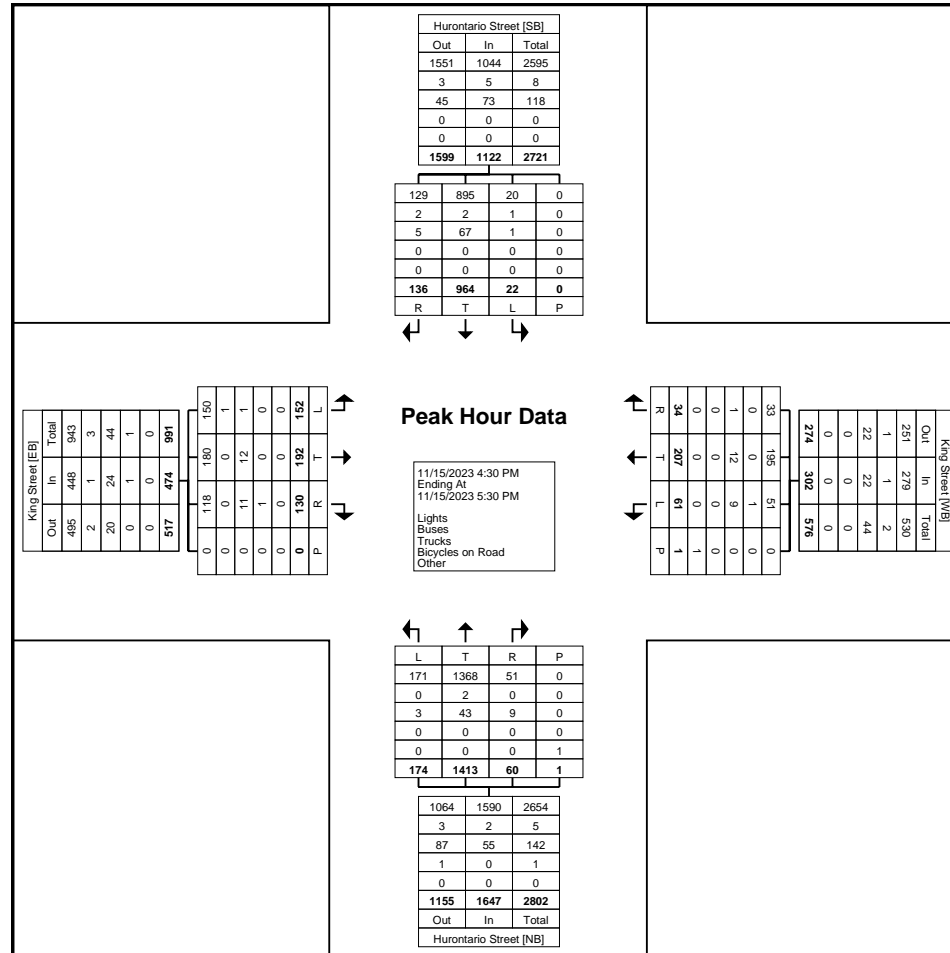
Start Time	Huronario Street Southbound					King Street Westbound					Huronario Street Northbound					King Street Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
4:30 PM	6	227	33	0	266	13	45	6	0	64	51	390	10	1	451	42	54	36	0	132	913
4:45 PM	5	236	32	0	273	8	58	4	0	70	50	339	18	0	407	29	35	25	0	89	839
5:00 PM	5	266	35	0	306	17	50	16	1	83	34	344	23	0	401	38	60	34	0	132	922
5:15 PM	6	235	36	0	277	23	54	8	0	85	39	340	9	0	388	43	43	35	0	121	871
Total	22	964	136	0	1122	61	207	34	1	302	174	1413	60	1	1647	152	192	130	0	474	3545
Approach %	2.0	85.9	12.1	-	-	20.2	68.5	11.3	-	-	10.6	85.8	3.6	-	-	32.1	40.5	27.4	-	-	-
Total %	0.6	27.2	3.8	-	31.7	1.7	5.8	1.0	-	8.5	4.9	39.9	1.7	-	46.5	4.3	5.4	3.7	-	13.4	-
PHF	0.917	0.906	0.944	-	0.917	0.663	0.892	0.531	-	0.888	0.853	0.906	0.652	-	0.913	0.884	0.800	0.903	-	0.898	0.961
Lights	20	895	129	-	1044	51	195	33	-	279	171	1368	51	-	1590	150	180	118	-	448	3361
% Lights	90.9	92.8	94.9	-	93.0	83.6	94.2	97.1	-	92.4	98.3	96.8	85.0	-	96.5	98.7	93.8	90.8	-	94.5	94.8
Buses	1	2	2	-	5	1	0	0	-	1	0	2	0	-	2	1	0	0	-	1	9
% Buses	4.5	0.2	1.5	-	0.4	1.6	0.0	0.0	-	0.3	0.0	0.1	0.0	-	0.1	0.7	0.0	0.0	-	0.2	0.3
Trucks	1	67	5	-	73	9	12	1	-	22	3	43	9	-	55	1	12	11	-	24	174
% Trucks	4.5	7.0	3.7	-	6.5	14.8	5.8	2.9	-	7.3	1.7	3.0	15.0	-	3.3	0.7	6.3	8.5	-	5.1	4.9
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	0	1	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.8	-	0.2	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-



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Count Name: 24216_Hwy 10 & King St-PM
Site Code: 24216
Start Date: 11/15/2023
Page No: 4



Turning Movement Peak Hour Data Plot (4:30 PM)

GENERIC SIGNAL TIMING SHEET

ACTUATED PRE-TIMED SIGNAL TO BE MAINTAINED BY MTO

LOCATION: Highway 10 at King Street (RR9) SIGNAL TO BE OPERATED BY: MTO

MAINSTREET (HWY): Highway 10 TIMING DEVELOPED BY: MTO

DATE TIMING DEVELOPED : 2021-09-01 revised 2024/07/10

GENERIC TIMING IDENTIFIED HERE SHALL BE TRANSCRIBED ONTO "OFFICIAL" TIMING SHEETS FOR THE TRAFFIC SIGNAL CONTROLLER BEING USED AT THIS SIGNALIZED INTERSECTION. A COPY OF THE "OFFICIAL" LOCAL TIMING SHEETS AND COORDINATION SHEETS IF USED, SHALL BE ATTACHED TO THIS FORM AND FILED IN THE MTO REGIONAL TRAFFIC OFFICE

- OPERATIONAL NOTES:**
- 1 All Prot/Perm left turn movements shall be followed by parent through movements without exception
 - 2 If serving F2 and F6 the signal must cycle to F4 and/or F8 prior to serving a call for F1 and/or F5 if these left turn movements are protected/permissive.
 - 3 If serving F4 and F8, the signal must cycle to F2 and/or F6 prior to serving a call for F3 and /or F7 if these left turn movements are protected/permissive.
 - 4 Through Movements shall lag left turn movements unless otherwise specified.
 - 5 80 km/h operating speed used for Highway 10 calculations, 80 km/h for RR9.

FUNCTION/OPERATION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PERMITTED MOVEMENTS	X	X		X		X		X
RED LOCK								
AMBER LOCK								
VEHICLE RECALL								
PEDESTRIAN RECALL		X				X		
VEHICLE MAX RECALL								
OVERLAP A								
OVERLAP B								
PROT/PERM LEFT TURN ARROW	X							
PROT/PERM FAST FLASH ADVANCE GREEN								
FULLY PROTECTED LEFT TURN								
DISPLAY AMBER ON STARTUP		X				X		
PLACE PED CALLS ON STARTUP		X		X		X		X
PLACE VEHICLE CALLS ON STARTUP	X	X		X		X		X
REST IN WALK								
MOVEMENTS MUST GAP OUT SIMULTANEOUSLY		X		X		X		X
DOUBLE ENTRY		X		X		X		X
EXCLUSIVE (SEPERATE) PHASING BY APPORACH								

INTERVAL TIMES	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
WALK		15		7		15		7
FLASHING DON'T WALK		32		25		32		25
MINIMUM GREEN	7.0	50.0		10.0		50.0		10.0
VEHICLE EXTENSION (PASSAGE TIME)	3.0	4.2		3.0		4.2		3.0
MAXIMUM GREEN (INCLUDES MIN GREEN)	10.0	56.0		28.0		56.0		28.0
MAXIMUM GREEN 2 (ALTERNATE MAX GREEN)								
AMBER CLEARANCE	3.0	5.4		5.4		5.4		5.4
ALL RED CLEARANCE		2.1		1.7		2.1		1.7
MAX GAP (VEH. EXTENSION)	3.0	4.2		3.0		4.2		3.0
MIN GAP (VEH. EXTENSION)	3.0	4.2		3.0		4.2		3.0
REDUCE GAP BY								
REDUCE GAP EVERY								
MAX INITIAL GREEN TIME (VARIABLE INIT)		25				25		
TIME ADDED/VEHICLE (VARIABLE INIT)		1				1		

DETECTOR SETUP	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
DELAY TIME ON PRESENCE DETECTION	5.0			10.0				10.0
DELAY ON LONG DISTANCE DETECTION								
CARRY-OVER ON PRESENCE DETECTION								
CARRY-OVER ON LONG DISTANCE DETECTION								

PRE-EMPTION	MOVEMENT (FAZE)							
	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
1ST EMERG. PRE-EMPT MOVEMENTS								
1ST EMERG. PRE-EMPT DELAY TIME								
1ST EMERG. PRE-EMPT CLEARANCE TIME								
2ND EMERG. PRE-EMPT MOVEMENTS								
2ND EMERG. PRE-EMPT DELAY TIME								
2ND EMERG. PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT TRACK CLEARANCE MOVEMENTS								
RR PRE-EMPT CLEARANCE TIME								
RR PRE-EMPT DELAY TIME								
RR PRE-EMPT LIMITED SERVICE MOVEMENTS								

TIME OF DAY OPERATIONS	TIME OF DAY		DAY OF WEEK							MOVEMENT (FAZE)							
	START	END	S	M	T	W	T	F	S	NB LEFT	NB THRU	WB LEFT	WB THRU	SB LEFT	SB THRU	EB LEFT	EB THRU
PHASE OMIT																	
MAX RECALL																	
PED RECALL																	
MIN RECALL																	
MAX GREEN 2																	
MAX GREEN 2																	
REST IN WALK																	
AMBER LOCK																	
RED LOCK																	

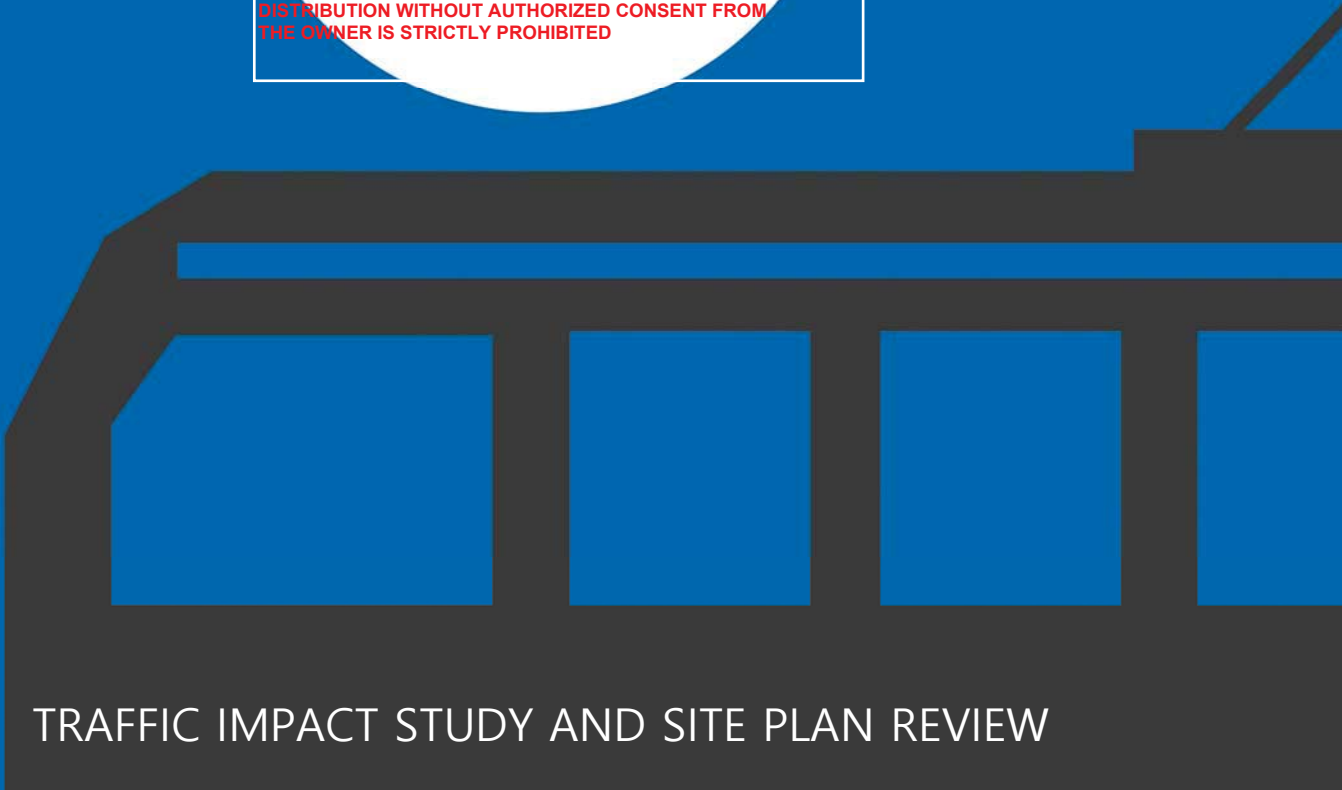


EXHIBIT B

**Background Development Trip Generation (from
Trans-Plan TIS Report)**



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TRAFFIC IMPACT STUDY AND SITE PLAN REVIEW

Proposed Gas Station Redevelopment
13823 Hurontario Street
Caledon, Ontario

Prepared for blueprint2build Consulting Engineers

May 2019



- 5-year after full build-out, horizon year 2025;
- 10-year after full build-out, horizon year 2030;

6.2 Background Growth Rate

A review of AADT data provided by the MTO’s 1988-2016 Traffic Volumes Publication along Highway 10 at King Road was completed to estimate the background growth rate of the study area intersections. Analyzing years 2014 through 2016, the results yielded a growth rate of approximately 2 percent per annum. As a result, a growth rate of 2.0 percent per annum was applied to the study area roadways.

6.3 Planned Background Developments

The Town of Caledon Development Map was reviewed to determine current planning applications in the surrounding area. There are three notable developments nearby the study area:

Table 2 – Background Developments

No.	Location	Development Details
1	12701 Hurontario Street, Caledon; (3.4km south of subject site)	Detached Housing: 408 units Semi-Detached Housing: 226 units Residential Townhouse: 45 units
2	12290 Hutchinson Farm Lane, Caledon; (4.2km south of subject site)	Detached Housing: 197 units Residential Townhouse: 312 units
3	12197, 12211, 12231, and 12233 Hurontario Street, Caledon; (4.8 km south of subject site)	Supermarket: 4,738 sq.m. GFA Shopping Center: 4,552 sq.m. GFA

Trip generation and assignment for the background developments is provided in Appendix B. Transportation Tomorrow Survey (TTS) data was incorporated into the traffic distribution of the background developments trips.

The future background traffic volumes, including background growth and future developments, for the weekday AM and PM peak hours at build-out year 2020, and horizon years 2025 and 2030, are shown in Figure 5, Figure 6, and Figure 7, respectively.

6.4 Planned Roadway Improvements

As per discussions with MTO staff and a review of their Southern Highways Program, there are no intersection and roadway improvements planned in the study area within our study horizon.

7. SITE TRAFFIC

Based on comments received from the MTO, a proxy survey should be completed at a gas station with a Tim Hortons food partner to determine a suitable trip rate for the proposed development. However, correspondence with the client indicated that the proposed food partner is not expected to be a Tim Hortons restaurant. At the request of the MTO, a proxy survey at a gas station / Tim Hortons restaurant was still conducted to determine the trip rate for the proposed development (to be conservative).

7.1 Proxy Site Selection

The MTO specifically requested the Shell gas station / Tim Hortons restaurant located at 5960 Highway 9, Mono (northwest quadrant of Highway 9 and Airport Road) to be used as the proxy site. A comparison of the subject site and proxy site statistics are shown in Table 3.

Table 3 – Gas Station and Tim Hortons Proxy Site, Site Statistics Comparison

Location	Size (sq.m. of GFA)	Seating	Area Context
<u>Subject Site:</u>			
Gas Station & Food Partner	9 fueling positions; 262 sq.m. of GFA	No seating	Located adjacent to Highway 10 (MTO)
<u>Proxy Site:</u>			
Shell Gas Station & Tim Hortons	8 fueling positions; 259 sq.m. of GFA (Convenience Store and Tim Hortons combined)	Seating	Located adjacent to Highway 9 (MTO)

Similar to the subject site, the proxy site contains a gas station and Tim Hortons restaurant with drive-thru and shares two site accesses along a MTO regulated roadway. However, the proxy Tim Hortons is contained within a stand-alone building (separate from the convenience store) thus provides seats for customers, whereas no seating is provided at the proposed development.

7.2 Survey Methodology

The proxy site survey was conducted on Tuesday February 26, 2019 and captured the peak times of operations, between the hours of 7:00am to 9:30am and from 4:00pm to 6:30pm on a typical weekday. The number of vehicles (volumes of autos and commercial traffic) entering and exiting the site driveways were recorded in 15-minute intervals during the peak periods. General observations of site operations, vehicles circulation, and pedestrian and parking activities were made.

7.3 Proxy Site Survey Results

The proxy survey results for the weekday AM and PM peak hours are summarized in Table 4. Details of the proxy survey results are shown in Appendix C.

Table 4 – Weekday Proxy Site Trip Generation

Proxy Location	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
5960 Highway 9, Mono	164	170	334	114	121	235

The gas station / Tim Hortons proxy site was observed to have an average of 334 two-way trips in the weekday AM peak hour and 235 two-way trips in the weekday PM peak hour.

7.4 Trip Generation

Site trips for the proposed gas station and food partner were generated based on the proxy site survey results. Based on Trans-Plan’s past experience with Tim Hortons proxy sites, there is no obvious correlation between building GFA and traffic generated by a Tim Hortons restaurant. As such, the surveyed trip generation of the proxy site is assumed to be equivalent to the trip generation of the subject site.

A portion of site trips are expected to be pass-by trips due to the nature of the development (as a gas station with food partner). Pass-by trips arise from existing traffic on the roadway network that enters the proposed development as an intermediate stop on the way to another ultimate destination along the same travel route. Pass-by trip rates were based from the ITE Trip Generation Manuals, for the appropriate land uses. A pass-by rate of 50 percent was used for the proposed gas station and food partner. The results are shown in Table 5.

Table 5 – Site Trip Generation

Land Use		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Gas Station & Food Partner	Distribution	49%	51%	100%	49%	51%	100%
	Trips	164	170	334	114	121	235
Pass-By (50% AM, 50% PM)		83	83	166	59	59	118
New Trips		81	87	168	55	62	117

The subject site is expected to generate 168 two-way new trips and 166 two-way pass-by trips in the weekday AM peak hour; and 117 two-way new trips and 118 two-way pass-by trips in the weekday PM peak hour.

7.5 Trip Distribution and Assignment

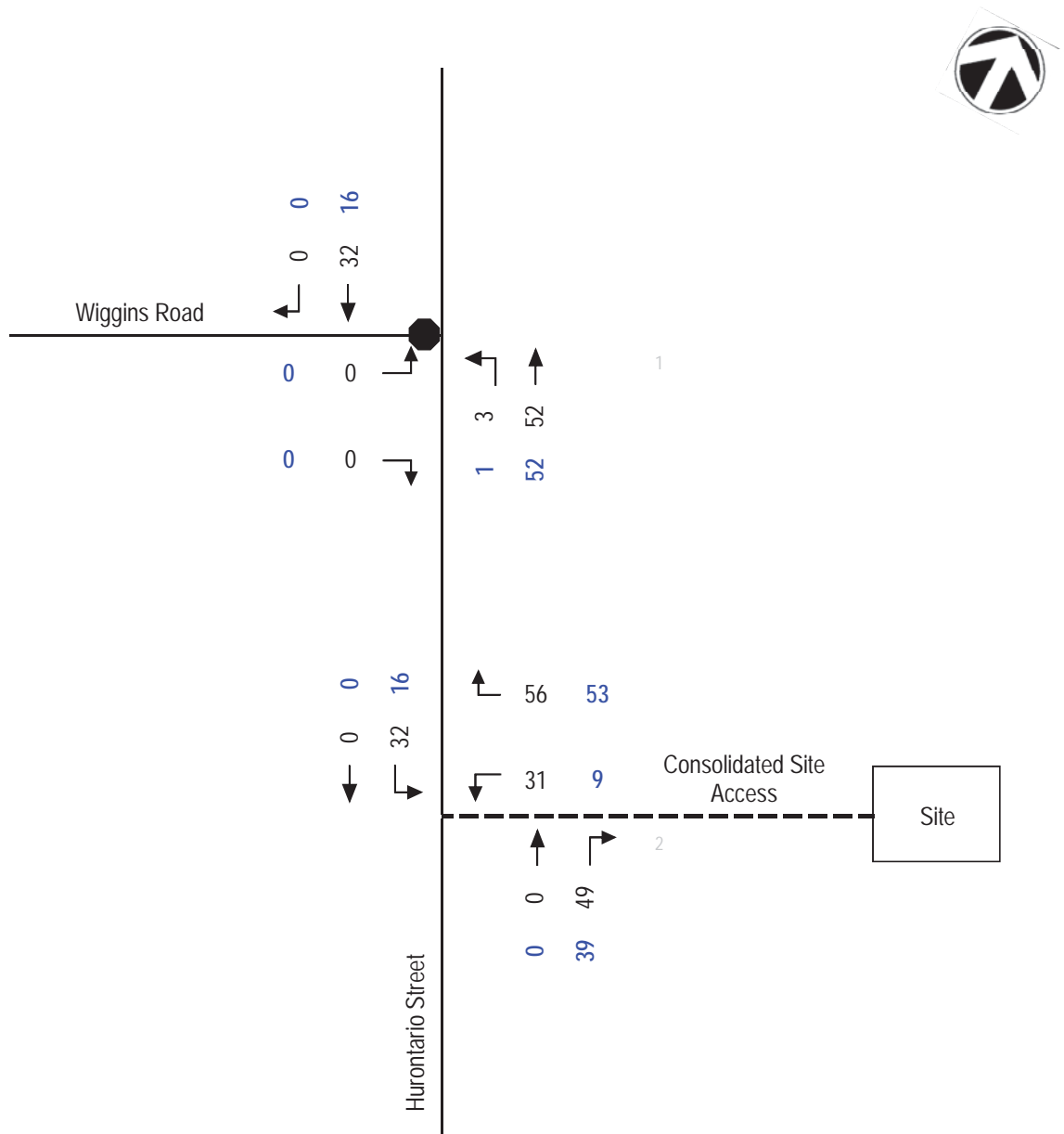
Because of the similarity between the existing gas station and the proposed redevelopment, site trips for the proposed gas station were distributed to / from the subject site and the boundary roadways based on the existing travel patterns along Hurontario Street and the site traffic of the existing Dost Petroleum.

The existing traffic distribution along Hurontario Street is approximately 25 percent northbound / 75 percent southbound in the weekday AM peak hour. In the weekday PM peak hour, the existing traffic distribution is approximately 60 percent northbound / 40 percent southbound.


It was observed that most site traffic at Dost Petroleum originated from the south and very few originated from the north along Hurontario Street. It is likely that the higher inbound traffic from the south is due to the location of the Dost Petroleum in relation to the Highway 410 off-ramp, located approximately 4.5km south of the site along Hurontario Street. The Dost Petroleum is one of the first few gas stations that northbound traffic pass-by along Hurontario Street. There are existing gas stations north of the site that are likely to accommodate traffic travelling southbound along Hurontario Street.

Utilizing the existing roadway traffic distribution and the existing site traffic distribution of Dost Petroleum as a basis, the majority of the proposed site traffic originated from the south for both the weekday AM and PM peak hours. The estimated site traffic assignment is shown in Figure 8. The pass-by trip adjustments are shown in Figure 9.

Figure 8: Site Traffic Assignment, Weekday AM and PM Peak Hours



LEGEND

 Stop Sign
 xx xx AM / PM Peak Hour

Schematic; Not To Scale



EXHIBIT C

Detailed TTS Data

Wed Nov 15 2023 13:56:15 GMT-0500 (Eastern Standard Time) - Run Time: 3875ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Type of dwelling unit - dwell_type

Column: Primary travel mode of trip - mode_prime

Filters:

(2006 GTA zone of household - gta06_hhld In 3151, 3196, 3188, 3004, 3005, 3146, 3009, 3012, 3014, 3102, 3108, 3152
and

Trip purpose - trip_purp In 3)

Trip 2016

Table:

	Cycle	Auto driver	Auto passenger	Taxi passenger
House	59	5147	1197	13
Townhouse	0	59	0	0
TOTAL	59	5206	1197	13

Retail			
Mode	Trips	%	% rounded
Auto	5206	80.4%	80%
Passenger	1197	18.5%	18%
Transit	13	0.2%	1% <i>*balanced</i>
Ped	0	0.0%	0%
Cycle	59	0.9%	1%
TOTAL	6475	100%	100%



EXHIBIT D

Existing Intersection Capacity Analysis

Queues
1: Highway 10 & King St

Existing Traffic
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	118	154	47	140	16	109	904	42	1430
Future Volume (vph)	118	154	47	140	16	109	904	42	1430
Lane Group Flow (vph)	126	349	50	149	17	116	1006	45	1706
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.46	0.82	0.42	0.35	0.06	0.62	0.53	0.17	0.95
Control Delay	37.3	45.9	42.4	33.0	0.4	28.8	12.8	17.0	37.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	45.9	42.4	33.0	0.4	28.8	12.8	17.0	37.1
Queue Length 50th (m)	19.0	49.5	7.5	21.8	0.0	6.6	47.7	4.0	141.9
Queue Length 95th (m)	34.3	78.1	17.7	36.9	0.0	#30.7	80.1	12.1	#229.1
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	398	590	173	620	408	188	1914	270	1790
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.59	0.29	0.24	0.04	0.62	0.53	0.17	0.95

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 98.4

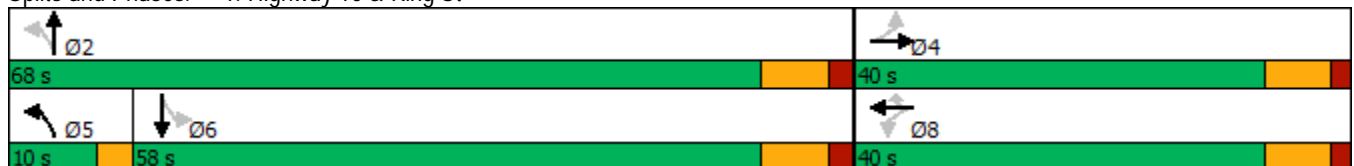
Natural Cycle: 110

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Existing Traffic
Weekday AM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	154	174	47	140	16	109	904	41	42	1430	174
Future Volume (vph)	118	154	174	47	140	16	109	904	41	42	1430	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1700	1651		1716	1847	1065	1608	3096		1750	3456	
Flt Permitted	0.66	1.00		0.29	1.00	1.00	0.07	1.00		0.28	1.00	
Satd. Flow (perm)	1185	1651		516	1847	1065	126	3096		525	3456	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	126	164	185	50	149	17	116	962	44	45	1521	185
RTOR Reduction (vph)	0	41	0	0	0	13	0	3	0	0	8	0
Lane Group Flow (vph)	126	308	0	50	149	4	116	1003	0	45	1698	0
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	22.9	22.9		22.9	22.9	22.9	60.8	60.8		50.8	50.8	
Effective Green, g (s)	22.9	22.9		22.9	22.9	22.9	60.8	60.8		50.8	50.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.52	0.52	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.2		4.2	4.2	
Lane Grp Cap (vph)	276	384		120	430	248	183	1914		271	1786	
v/s Ratio Prot		c0.19			0.08		c0.05	0.32			c0.49	
v/s Ratio Perm	0.11			0.10		0.00	0.35			0.09		
v/c Ratio	0.46	0.80		0.42	0.35	0.02	0.63	0.52		0.17	0.95	
Uniform Delay, d1	32.4	35.6		32.0	31.5	29.0	19.2	10.6		12.6	22.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	11.4		2.3	0.5	0.0	7.0	0.4		0.4	11.9	
Delay (s)	33.6	46.9		34.4	31.9	29.1	26.2	11.0		13.0	34.4	
Level of Service	C	D		C	C	C	C	B		B	C	
Approach Delay (s)		43.4			32.3			12.5			33.9	
Approach LOS		D			C			B			C	
Intersection Summary												
HCM 2000 Control Delay			28.3									C
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			98.3								17.6	
Intersection Capacity Utilization			134.8%									H
Analysis Period (min)			15									

c Critical Lane Group

Queues
1: Highway 10 & King St

Existing Traffic
Weekday PM PH

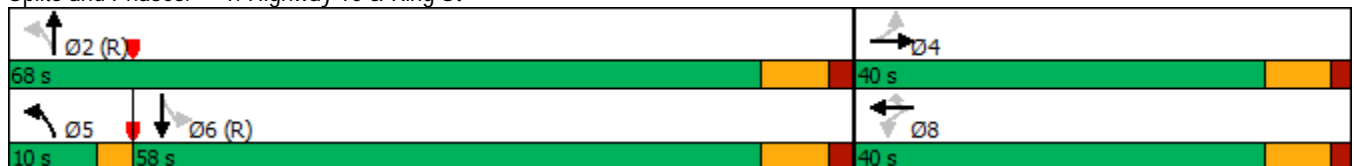


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↶	↷	↶	↷	↶	↶	↷	↶	↷
Traffic Volume (vph)	152	192	61	207	34	174	1413	22	964
Future Volume (vph)	152	192	61	207	34	174	1413	22	964
Lane Group Flow (vph)	152	322	61	207	34	174	1473	22	1100
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
v/c Ratio	0.47	0.60	0.30	0.38	0.07	0.67	0.75	0.24	0.70
Control Delay	36.1	34.2	34.0	31.9	0.4	23.4	21.0	25.8	25.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	34.2	34.0	31.9	0.4	23.4	21.0	25.8	25.2
Queue Length 50th (m)	23.8	47.8	9.0	31.4	0.0	13.9	107.5	2.5	84.6
Queue Length 95th (m)	42.0	74.5	20.1	50.3	0.6	#24.7	132.6	8.7	106.5
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	326	534	200	551	518	260	1964	91	1578
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.60	0.30	0.38	0.07	0.67	0.75	0.24	0.70

Intersection Summary

Cycle Length: 108
 Actuated Cycle Length: 108
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Pretimed
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis

1: Highway 10 & King St

Existing Traffic
Weekday PM PH
























														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	152	192	130	61	207	34	174	1413	60	22	964	136		
Future Volume (vph)	152	192	130	61	207	34	174	1413	60	22	964	136		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5		
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5			
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95			
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00			
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00			
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98			
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00			
Satd. Flow (prot)	1767	1681		1539	1812	1530	1750	3502		1638	3356			
Flt Permitted	0.58	1.00		0.41	1.00	1.00	0.15	1.00		0.11	1.00			
Satd. Flow (perm)	1074	1681		658	1812	1530	275	3502		195	3356			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Adj. Flow (vph)	152	192	130	61	207	34	174	1413	60	22	964	136		
RTOR Reduction (vph)	0	22	0	0	0	24	0	3	0	0	10	0		
Lane Group Flow (vph)	152	300	0	61	207	10	174	1470	0	22	1090	0		
Confl. Peds. (#/hr)						1			1					
Confl. Bikes (#/hr)			1											
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%		
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA			
Protected Phases		4			8		5	2			6			
Permitted Phases	4			8		8	2			6				
Actuated Green, G (s)	32.9	32.9		32.9	32.9	32.9	60.5	60.5		50.5	50.5			
Effective Green, g (s)	32.9	32.9		32.9	32.9	32.9	60.5	60.5		50.5	50.5			
Actuated g/C Ratio	0.30	0.30		0.30	0.30	0.30	0.56	0.56		0.47	0.47			
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5			
Lane Grp Cap (vph)	327	512		200	551	466	249	1961		91	1569			
v/s Ratio Prot		c0.18			0.11		0.05	c0.42			0.32			
v/s Ratio Perm	0.14			0.09		0.01	0.35			0.11				
v/c Ratio	0.46	0.59		0.30	0.38	0.02	0.70	0.75		0.24	0.69			
Uniform Delay, d1	30.4	31.8		28.8	29.5	26.3	15.4	18.0		17.3	22.7			
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00			
Incremental Delay, d2	4.7	4.8		3.9	2.0	0.1	15.1	2.7		6.2	2.6			
Delay (s)	35.1	36.6		32.7	31.4	26.4	30.5	20.7		23.5	25.2			
Level of Service	D	D		C	C	C	C	C		C	C			
Approach Delay (s)		36.1			31.1			21.7			25.2			
Approach LOS		D			C			C			C			
Intersection Summary														
HCM 2000 Control Delay			25.6									HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio			0.71											
Actuated Cycle Length (s)			108.0								17.6			
Intersection Capacity Utilization			142.8%										ICU Level of Service	H
Analysis Period (min)			15											
c	Critical Lane Group													



EXHIBIT E

**2026, 2031 and 2036 Future Background
Intersection Capacity Analysis**

The background features several thick, overlapping, curved lines in a light grey color. These lines sweep across the page from the top and bottom edges, creating a sense of movement and depth. The lines intersect and overlap, with some appearing in front of others, creating a layered effect. The overall aesthetic is clean, modern, and minimalist.

2026 Future Background

Queues
1: Highway 10 & King St

Future Background Traffic (2026)
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	118	154	48	140	16	121	1004	45	1546
Future Volume (vph)	118	154	48	140	16	121	1004	45	1546
Lane Group Flow (vph)	126	352	51	149	17	129	1117	48	1842
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.45	0.82	0.43	0.34	0.06	0.69	0.58	0.20	1.03
Control Delay	37.2	46.1	43.2	33.0	0.3	34.8	13.8	18.0	54.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	46.1	43.2	33.0	0.3	34.8	13.8	18.0	54.8
Queue Length 50th (m)	19.0	49.9	7.6	21.8	0.0	7.9	56.4	4.4	~182.9
Queue Length 95th (m)	34.3	78.9	18.2	36.9	0.0	#37.7	93.5	13.3	#258.8
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	397	589	170	619	408	188	1911	238	1788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.60	0.30	0.24	0.04	0.69	0.58	0.20	1.03

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 98.5

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

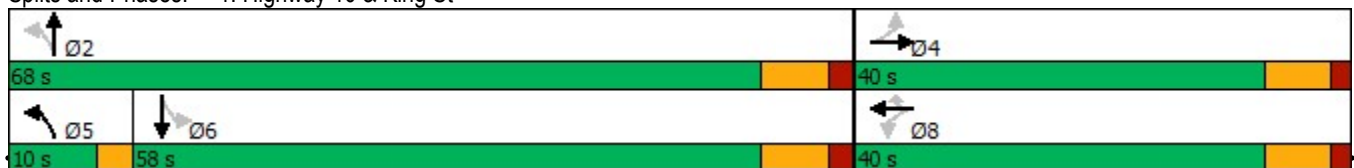
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Background Traffic (2026)
Weekday AM PH

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	118	154	177	48	140	16	121	1004	46	45	1546	185	
Future Volume (vph)	118	154	177	48	140	16	121	1004	46	45	1546	185	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1700	1649		1716	1847	1065	1608	3096		1750	3457		
Flt Permitted	0.66	1.00		0.28	1.00	1.00	0.07	1.00		0.25	1.00		
Satd. Flow (perm)	1185	1649		509	1847	1065	126	3096		463	3457		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	126	164	188	51	149	17	129	1068	49	48	1645	197	
RTOR Reduction (vph)	0	42	0	0	0	13	0	3	0	0	8	0	
Lane Group Flow (vph)	126	310	0	51	149	4	129	1114	0	48	1834	0	
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA		
Protected Phases		4			8		5	2			6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8		
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8		
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.52	0.52		
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.2		4.2	4.2		
Lane Grp Cap (vph)	276	385		118	431	248	183	1912		239	1784		
v/s Ratio Prot		c0.19			0.08		c0.05	0.36			c0.53		
v/s Ratio Perm	0.11			0.10		0.00	0.39			0.10			
v/c Ratio	0.46	0.80		0.43	0.35	0.02	0.70	0.58		0.20	1.03		
Uniform Delay, d1	32.3	35.6		32.1	31.4	29.0	22.0	11.2		12.8	23.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.2	11.6		2.5	0.5	0.0	11.7	0.6		0.6	28.9		
Delay (s)	33.5	47.2		34.7	31.9	29.0	33.7	11.8		13.5	52.7		
Level of Service	C	D		C	C	C	C	B		B	D		
Approach Delay (s)		43.6			32.3			14.1			51.7		
Approach LOS		D			C			B			D		
Intersection Summary													
HCM 2000 Control Delay			37.3									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.94										
Actuated Cycle Length (s)			98.4									Sum of lost time (s)	17.6
Intersection Capacity Utilization			134.9%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

Queues
1: Highway 10 & King St

Future Background Traffic (2026)
Weekday PM PH

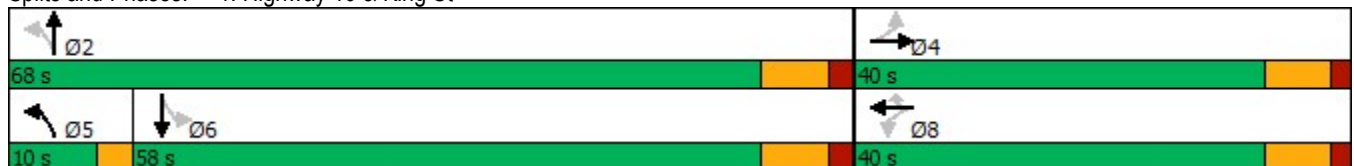


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	152	192	64	215	35	190	1544	23	1036
Future Volume (vph)	152	192	64	215	35	190	1544	23	1036
Lane Group Flow (vph)	158	338	67	224	36	198	1677	24	1229
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.69	0.81	0.57	0.53	0.09	0.73	0.78	0.30	0.71
Control Delay	50.4	46.9	52.7	37.0	1.0	26.6	18.3	29.0	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	46.9	52.7	37.0	1.0	26.6	18.3	29.0	21.9
Queue Length 50th (m)	25.2	50.5	10.3	34.1	0.0	11.8	103.6	2.3	81.0
Queue Length 95th (m)	45.0	79.0	23.9	54.0	1.1	#37.7	167.7	10.8	125.5
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	328	588	168	610	566	270	2173	81	1746
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.57	0.40	0.37	0.06	0.73	0.77	0.30	0.70

Intersection Summary
























Cycle Length: 108
 Actuated Cycle Length: 98
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Background Traffic (2026)
Weekday PM PH

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	152	192	132	64	215	35	190	1544	66	23	1036	144	
Future Volume (vph)	152	192	132	64	215	35	190	1544	66	23	1036	144	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1767	1679		1539	1812	1531	1750	3502		1638	3357		
Flt Permitted	0.52	1.00		0.31	1.00	1.00	0.13	1.00		0.09	1.00		
Satd. Flow (perm)	973	1679		501	1812	1531	245	3502		157	3357		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	158	200	138	67	224	36	198	1608	69	24	1079	150	
RTOR Reduction (vph)	0	25	0	0	0	28	0	2	0	0	9	0	
Lane Group Flow (vph)	158	313	0	67	224	8	198	1675	0	24	1220	0	
Confl. Peds. (#/hr)						1			1				
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA		
Protected Phases		4			8		5	2			6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	60.4	60.4		50.4	50.4		
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	60.4	60.4		50.4	50.4		
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.51	0.51		
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	228	394		117	425	359	258	2158		80	1726		
v/s Ratio Prot		c0.19			0.12		0.05	c0.48			0.36		
v/s Ratio Perm	0.16			0.13		0.01	0.42			0.15			
v/c Ratio	0.69	0.79		0.57	0.53	0.02	0.77	0.78		0.30	0.71		
Uniform Delay, d1	34.3	35.3		33.2	32.8	28.9	12.9	13.8		13.7	18.2		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	8.8	10.5		6.6	1.2	0.0	12.8	1.8		2.1	1.3		
Delay (s)	43.1	45.8		39.8	33.9	28.9	25.7	15.6		15.8	19.5		
Level of Service	D	D		D	C	C	C	B		B	B		
Approach Delay (s)		44.9			34.6			16.7			19.4		
Approach LOS		D			C			B			B		
Intersection Summary													
HCM 2000 Control Delay			22.6		HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.81										
Actuated Cycle Length (s)			98.0		Sum of lost time (s)				17.6				
Intersection Capacity Utilization			137.3%		ICU Level of Service				H				
Analysis Period (min)			15										

c Critical Lane Group

The background of the page features several thick, overlapping, light grey curved lines that sweep across the frame from the top and right towards the bottom and left, creating a sense of motion and depth. The lines vary in thickness and overlap in a way that suggests a three-dimensional or layered structure.

2031 Future Background

Queues
1: Highway 10 & King St

Future Background Traffic (2031)
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	118	154	48	140	16	133	1104	49	1703
Future Volume (vph)	118	154	48	140	16	133	1104	49	1703
Lane Group Flow (vph)	126	352	51	149	17	141	1227	52	2029
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.45	0.82	0.43	0.34	0.06	0.75	0.64	0.26	1.13
Control Delay	37.2	46.1	43.2	33.0	0.3	41.9	14.9	20.1	93.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	46.1	43.2	33.0	0.3	41.9	14.9	20.1	93.3
Queue Length 50th (m)	19.0	49.9	7.6	21.8	0.0	10.2	65.7	4.9	~219.7
Queue Length 95th (m)	34.3	78.9	18.2	36.9	0.0	#44.3	108.5	14.9	#299.2
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	397	589	170	619	408	188	1914	201	1788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.60	0.30	0.24	0.04	0.75	0.64	0.26	1.13

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 98.5

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

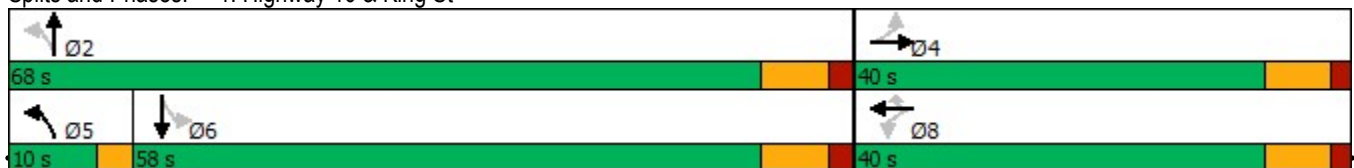
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Background Traffic (2031)
Weekday AM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	154	177	48	140	16	133	1104	50	49	1703	204
Future Volume (vph)	118	154	177	48	140	16	133	1104	50	49	1703	204
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1700	1649		1716	1847	1065	1608	3096		1750	3457	
Flt Permitted	0.66	1.00		0.28	1.00	1.00	0.07	1.00		0.21	1.00	
Satd. Flow (perm)	1185	1649		509	1847	1065	126	3096		391	3457	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	126	164	188	51	149	17	141	1174	53	52	1812	217
RTOR Reduction (vph)	0	42	0	0	0	13	0	3	0	0	8	0
Lane Group Flow (vph)	126	310	0	51	149	4	141	1224	0	52	2021	0
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.52	0.52	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.2		4.2	4.2	
Lane Grp Cap (vph)	276	385		118	431	248	183	1912		201	1784	
v/s Ratio Prot		c0.19			0.08		c0.05	0.40			c0.58	
v/s Ratio Perm	0.11			0.10		0.00	0.42			0.13		
v/c Ratio	0.46	0.80		0.43	0.35	0.02	0.77	0.64		0.26	1.13	
Uniform Delay, d1	32.3	35.6		32.1	31.4	29.0	24.0	11.9		13.3	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	11.6		2.5	0.5	0.0	17.9	0.9		1.0	67.5	
Delay (s)	33.5	47.2		34.7	31.9	29.0	42.0	12.7		14.3	91.3	
Level of Service	C	D		C	C	C	D	B		B	F	
Approach Delay (s)		43.6			32.3			15.8			89.3	
Approach LOS		D			C			B			F	
Intersection Summary												
HCM 2000 Control Delay	56.8			HCM 2000 Level of Service				E				
HCM 2000 Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	98.4			Sum of lost time (s)				17.6				
Intersection Capacity Utilization	134.9%			ICU Level of Service				H				
Analysis Period (min)	15											

c Critical Lane Group

Queues
1: Highway 10 & King St

Future Background Traffic (2031)
Weekday PM PH

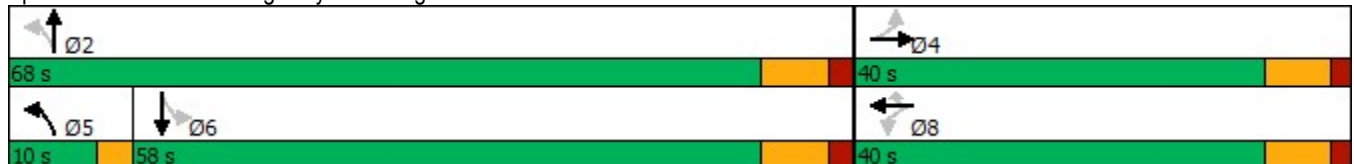


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↗
Traffic Volume (vph)	152	192	68	229	38	209	1701	26	1142
Future Volume (vph)	152	192	68	229	38	209	1701	26	1142
Lane Group Flow (vph)	158	338	71	239	40	218	1847	27	1356
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.74	0.81	0.61	0.56	0.10	0.93	0.85	0.39	0.78
Control Delay	55.1	47.1	55.8	38.1	1.9	62.3	21.7	38.0	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	47.1	55.8	38.1	1.9	62.3	21.7	38.0	24.3
Queue Length 50th (m)	25.7	50.8	11.1	37.0	0.0	17.6	126.5	2.7	95.5
Queue Length 95th (m)	45.9	79.0	25.1	57.7	1.9	#67.4	#223.0	#14.7	147.1
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	308	586	167	609	565	234	2168	70	1742
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.58	0.43	0.39	0.07	0.93	0.85	0.39	0.78

Intersection Summary
























Cycle Length: 108
 Actuated Cycle Length: 98.3
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Background Traffic (2031)
Weekday PM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	192	132	68	229	38	209	1701	72	26	1142	159
Future Volume (vph)	152	192	132	68	229	38	209	1701	72	26	1142	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1679		1539	1812	1531	1750	3503		1638	3356	
Flt Permitted	0.49	1.00		0.31	1.00	1.00	0.10	1.00		0.08	1.00	
Satd. Flow (perm)	917	1679		499	1812	1531	185	3503		136	3356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	158	200	138	71	239	40	218	1772	75	27	1190	166
RTOR Reduction (vph)	0	25	0	0	0	31	0	2	0	0	9	0
Lane Group Flow (vph)	158	313	0	71	239	9	218	1845	0	27	1347	0
Confl. Peds. (#/hr)							1			1		
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	60.6	60.6		50.6	50.6	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	60.6	60.6		50.6	50.6	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.52	0.52	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	393		116	424	358	225	2161		70	1729	
v/s Ratio Prot		c0.19			0.13		c0.07	0.53			0.40	
v/s Ratio Perm	0.17			0.14		0.01	c0.53			0.20		
v/c Ratio	0.74	0.80		0.61	0.56	0.03	0.97	0.85		0.39	0.78	
Uniform Delay, d1	34.8	35.4		33.6	33.2	29.0	20.2	15.2		14.4	19.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.5	10.7		9.2	1.7	0.0	50.6	3.5		3.5	2.3	
Delay (s)	47.3	46.0		42.8	34.9	29.0	70.8	18.7		17.9	21.6	
Level of Service	D	D		D	C	C	E	B		B	C	
Approach Delay (s)		46.4			35.8			24.2			21.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.9									C
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			98.2								17.6	
Intersection Capacity Utilization			141.8%									H
Analysis Period (min)			15									

c Critical Lane Group

The background features several thick, overlapping, curved lines in shades of grey. These lines sweep across the page from the top and right towards the bottom and left, creating a sense of movement and depth. The lines vary in opacity and thickness, with some appearing more prominent than others.

2036 Future Background

Queues
1: Highway 10 & King St

Future Background Traffic (2036)
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	118	154	48	140	16	146	1214	54	1878
Future Volume (vph)	118	154	48	140	16	146	1214	54	1878
Lane Group Flow (vph)	126	352	51	149	17	155	1350	57	2237
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.45	0.82	0.43	0.34	0.06	0.82	0.71	0.35	1.25
Control Delay	37.2	46.1	43.2	33.0	0.3	52.0	16.5	24.3	142.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	46.1	43.2	33.0	0.3	52.0	16.5	24.3	142.6
Queue Length 50th (m)	19.0	49.9	7.6	21.8	0.0	12.9	77.5	5.6	~260.8
Queue Length 95th (m)	34.3	78.9	18.2	36.9	0.0	#51.4	127.7	18.2	#344.0
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	397	589	170	619	408	188	1911	165	1788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.60	0.30	0.24	0.04	0.82	0.71	0.35	1.25

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 98.5

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

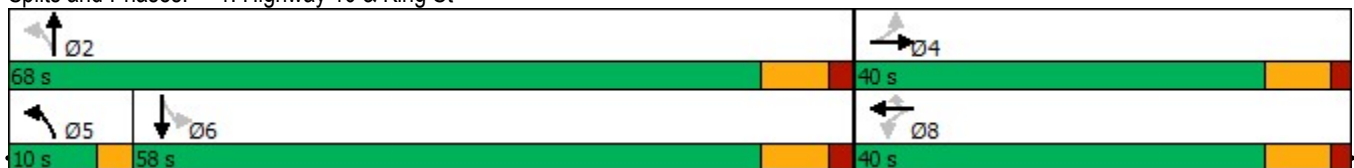
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Background Traffic (2036)
Weekday AM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	154	177	48	140	16	146	1214	55	54	1878	225
Future Volume (vph)	118	154	177	48	140	16	146	1214	55	54	1878	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1700	1649		1716	1847	1065	1608	3096		1750	3457	
Flt Permitted	0.66	1.00		0.28	1.00	1.00	0.07	1.00		0.17	1.00	
Satd. Flow (perm)	1185	1649		509	1847	1065	126	3096		320	3457	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	126	164	188	51	149	17	155	1291	59	57	1998	239
RTOR Reduction (vph)	0	42	0	0	0	13	0	3	0	0	8	0
Lane Group Flow (vph)	126	310	0	51	149	4	155	1347	0	57	2229	0
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.52	0.52	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.2		4.2	4.2	
Lane Grp Cap (vph)	276	385		118	431	248	183	1912		165	1784	
v/s Ratio Prot		c0.19			0.08		c0.06	0.44			c0.64	
v/s Ratio Perm	0.11			0.10		0.00	0.46			0.18		
v/c Ratio	0.46	0.80		0.43	0.35	0.02	0.85	0.70		0.35	1.25	
Uniform Delay, d1	32.3	35.6		32.1	31.4	29.0	26.1	12.7		14.0	23.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	11.6		2.5	0.5	0.0	28.6	1.3		1.9	117.2	
Delay (s)	33.5	47.2		34.7	31.9	29.0	54.7	14.0		15.9	141.0	
Level of Service	C	D		C	C	C	D	B		B	F	
Approach Delay (s)		43.6			32.3			18.2			137.8	
Approach LOS		D			C			B			F	
Intersection Summary												
HCM 2000 Control Delay			82.7									F
HCM 2000 Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			98.4								17.6	
Intersection Capacity Utilization			134.9%									H
Analysis Period (min)			15									

c Critical Lane Group

Queues
1: Highway 10 & King St

Future Background Traffic (2036)
Weekday PM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	152	192	73	243	40	230	1873	28	1260
Future Volume (vph)	152	192	73	243	40	230	1873	28	1260
Lane Group Flow (vph)	158	338	76	253	42	240	2034	29	1496
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.78	0.81	0.66	0.60	0.10	1.17	0.94	0.42	0.86
Control Delay	61.1	47.3	60.4	39.3	2.2	140.4	28.8	40.7	28.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.1	47.3	60.4	39.3	2.2	140.4	28.8	40.7	28.1
Queue Length 50th (m)	26.0	50.8	12.1	39.5	0.0	~35.3	157.0	3.0	113.5
Queue Length 95th (m)	47.0	79.0	27.0	61.2	2.5	#89.0	#263.4	#16.3	#188.1
Internal Link Dist (m)		198.1		422.6			165.3		324.6
Turn Bay Length (m)	135.0		113.0		65.0	55.0		45.0	
Base Capacity (vph)	290	585	166	607	563	205	2163	69	1739
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.58	0.46	0.42	0.07	1.17	0.94	0.42	0.86

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 98.5

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

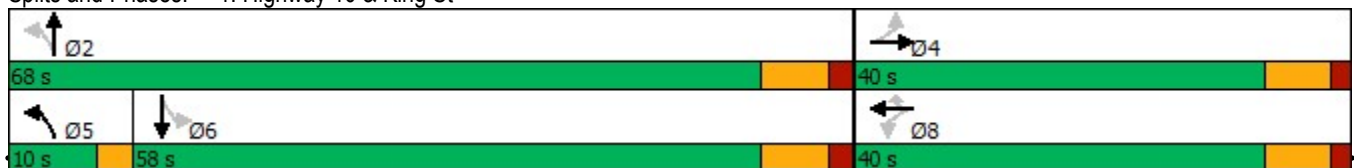
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Background Traffic (2036)
Weekday PM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	192	132	73	243	40	230	1873	80	28	1260	176
Future Volume (vph)	152	192	132	73	243	40	230	1873	80	28	1260	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1679		1539	1812	1531	1750	3502		1638	3356	
Flt Permitted	0.47	1.00		0.31	1.00	1.00	0.07	1.00		0.08	1.00	
Satd. Flow (perm)	866	1679		497	1812	1531	137	3502		136	3356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	158	200	138	76	253	42	240	1951	83	29	1312	183
RTOR Reduction (vph)	0	25	0	0	0	32	0	2	0	0	9	0
Lane Group Flow (vph)	158	313	0	76	253	10	240	2032	0	29	1487	0
Confl. Peds. (#/hr)						1			1			
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8	
Effective Green, g (s)	23.0	23.0		23.0	23.0	23.0	60.8	60.8		50.8	50.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.62	0.62		0.52	0.52	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	202	392		116	423	357	199	2163		70	1732	
v/s Ratio Prot		c0.19			0.14		c0.09	0.58			0.44	
v/s Ratio Perm	0.18			0.15		0.01	c0.66			0.21		
v/c Ratio	0.78	0.80		0.66	0.60	0.03	1.21	0.94		0.41	0.86	
Uniform Delay, d1	35.4	35.5		34.1	33.6	29.1	26.2	17.1		14.6	20.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.7	10.8		12.5	2.3	0.0	130.4	8.7		3.9	4.5	
Delay (s)	53.0	46.3		46.7	35.9	29.1	156.6	25.8		18.6	25.2	
Level of Service	D	D		D	D	C	F	C		B	C	
Approach Delay (s)		48.4			37.3			39.6			25.0	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.6								HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			98.4								Sum of lost time (s)	17.6
Intersection Capacity Utilization			146.8%								ICU Level of Service	H
Analysis Period (min)			15									

c Critical Lane Group



EXHIBIT F

**2026, 2031 and 2036 Future Total Intersection
Capacity Analysis**



2026 Future Total

Queues
1: Highway 10 & King St

Future Total Traffic (2026)
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	118	173	113	158	16	121	1072	64	1546
Future Volume (vph)	118	173	113	158	16	121	1072	64	1546
Lane Group Flow (vph)	126	372	120	168	17	129	1189	68	1842
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.45	0.83	0.99	0.37	0.05	0.70	0.63	0.33	1.05
Control Delay	36.6	46.6	119.4	32.8	0.3	36.9	15.7	23.2	62.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	46.6	119.4	32.8	0.3	36.9	15.7	23.2	62.4
Queue Length 50th (m)	19.1	55.2	21.4	24.8	0.0	8.6	67.0	7.0	~191.5
Queue Length 95th (m)	34.7	85.9	#51.8	41.0	0.0	#37.7	103.2	19.4	#258.8
Internal Link Dist (m)		198.1		179.9			165.3		167.4
Turn Bay Length (m)	135.0				65.0	55.0		45.0	
Base Capacity (vph)	373	578	159	607	401	184	1876	204	1753
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.64	0.75	0.28	0.04	0.70	0.63	0.33	1.05

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 100.5

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

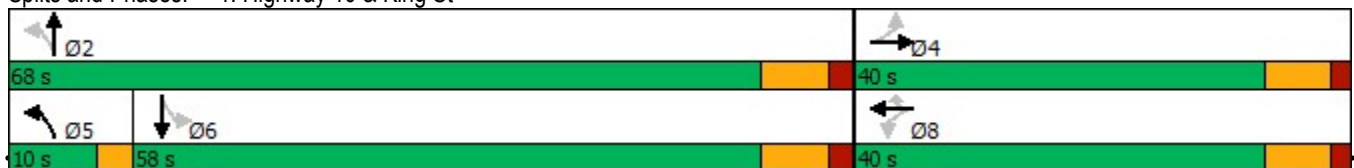
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Total Traffic (2026)
Weekday AM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	173	177	113	158	16	121	1072	46	64	1546	185
Future Volume (vph)	118	173	177	113	158	16	121	1072	46	64	1546	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1700	1659		1716	1847	1065	1608	3097		1750	3457	
Flt Permitted	0.63	1.00		0.27	1.00	1.00	0.07	1.00		0.22	1.00	
Satd. Flow (perm)	1134	1659		486	1847	1065	126	3097		406	3457	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	126	184	188	120	168	17	129	1140	49	68	1645	197
RTOR Reduction (vph)	0	37	0	0	0	13	0	2	0	0	8	0
Lane Group Flow (vph)	126	335	0	120	168	4	129	1187	0	68	1834	0
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0	25.0	60.8	60.8		50.8	50.8	
Effective Green, g (s)	25.0	25.0		25.0	25.0	25.0	60.8	60.8		50.8	50.8	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.61	0.61		0.51	0.51	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	413		121	459	265	179	1875		205	1749	
v/s Ratio Prot		0.20			0.09		c0.05	0.38			c0.53	
v/s Ratio Perm	0.11			c0.25		0.00	0.39			0.17		
v/c Ratio	0.45	0.81		0.99	0.37	0.02	0.72	0.63		0.33	1.05	
Uniform Delay, d1	31.9	35.5		37.6	31.2	28.4	22.4	12.7		14.7	24.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	11.5		79.0	0.5	0.0	13.3	0.7		1.0	35.6	
Delay (s)	33.0	47.0		116.6	31.6	28.4	35.7	13.4		15.7	60.4	
Level of Service	C	D		F	C	C	D	B		B	E	
Approach Delay (s)		43.4			64.9			15.6			58.8	
Approach LOS		D			E			B			E	
Intersection Summary												
HCM 2000 Control Delay			43.2									D
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			100.4								17.6	
Intersection Capacity Utilization			135.9%									H
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	151	1016	190	0	1776
Future Vol, veh/h	0	151	1016	190	0	1776
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	60	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	16	0	0	4
Mvmt Flow	0	159	1069	200	0	1869

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	535	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	495	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %					
Mov Cap-1 Maneuver	-	495	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	495
HCM Lane V/C Ratio	-	-	0.321
HCM Control Delay (s)	-	-	15.7
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.4

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↑↑	↗		↗
Traffic Vol, veh/h	38	245	183	40	0	104
Future Vol, veh/h	38	245	183	40	0	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	30	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	7	8	0	0	0
Mvmt Flow	40	258	193	42	0	109

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	235	0	-	0	- 97
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	- 6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	- 3.3
Pot Cap-1 Maneuver	1344	-	-	-	0 947
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1344	-	-	-	- 947
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1344	-	-	-	947
HCM Lane V/C Ratio	0.03	-	-	-	0.116
HCM Control Delay (s)	7.8	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Queues
1: Highway 10 & King St

Future Total Traffic (2026)
Weekday PM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	152	204	97	224	35	190	1587	35	1036
Future Volume (vph)	152	204	97	224	35	190	1587	35	1036
Lane Group Flow (vph)	158	351	101	233	36	198	1722	36	1229
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.70	0.82	0.89	0.54	0.08	0.74	0.80	0.51	0.71
Control Delay	50.6	48.3	95.7	37.1	0.9	27.7	19.6	50.3	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	48.3	95.7	37.1	0.9	27.7	19.6	50.3	22.3
Queue Length 50th (m)	25.3	53.5	17.1	35.7	0.0	12.3	112.7	4.1	83.2
Queue Length 95th (m)	45.4	82.9	#41.9	56.2	1.1	#38.0	176.5	#21.0	125.5
Internal Link Dist (m)		198.1		179.9			165.3		167.4
Turn Bay Length (m)	135.0				65.0	55.0		45.0	
Base Capacity (vph)	316	583	159	605	561	266	2155	70	1732
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.60	0.64	0.39	0.06	0.74	0.80	0.51	0.71

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 98.9

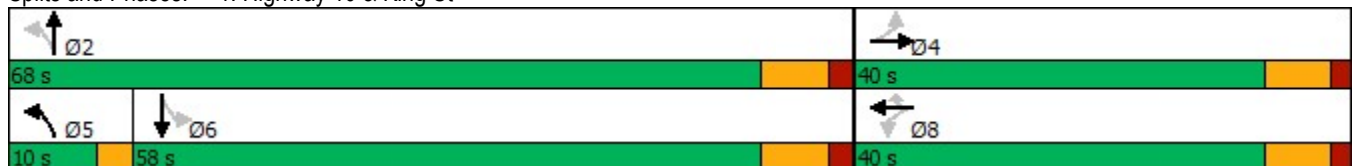
Natural Cycle: 110

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Total Traffic (2026)
Weekday PM PH

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	152	204	132	97	224	35	190	1587	66	35	1036	144	
Future Volume (vph)	152	204	132	97	224	35	190	1587	66	35	1036	144	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1767	1684		1539	1812	1531	1750	3503		1638	3357		
Flt Permitted	0.51	1.00		0.29	1.00	1.00	0.13	1.00		0.08	1.00		
Satd. Flow (perm)	946	1684		475	1812	1531	242	3503		137	3357		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	158	212	138	101	233	36	198	1653	69	36	1079	150	
RTOR Reduction (vph)	0	24	0	0	0	27	0	2	0	0	9	0	
Lane Group Flow (vph)	158	327	0	101	233	9	198	1720	0	36	1220	0	
Confl. Peds. (#/hr)						1			1				
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA		
Protected Phases		4			8		5	2			6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	23.7	23.7		23.7	23.7	23.7	60.4	60.4		50.4	50.4		
Effective Green, g (s)	23.7	23.7		23.7	23.7	23.7	60.4	60.4		50.4	50.4		
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.61	0.61		0.51	0.51		
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	227	404		114	435	367	255	2143		69	1714		
v/s Ratio Prot		0.19			0.13		0.06	c0.49			0.36		
v/s Ratio Perm	0.17			c0.21		0.01	0.42			0.26			
v/c Ratio	0.70	0.81		0.89	0.54	0.02	0.78	0.80		0.52	0.71		
Uniform Delay, d1	34.2	35.4		36.2	32.7	28.7	13.3	14.6		16.1	18.6		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	8.9	11.7		50.1	1.3	0.0	13.8	2.3		6.9	1.4		
Delay (s)	43.1	47.0		86.3	34.0	28.7	27.0	16.9		23.1	20.0		
Level of Service	D	D		F	C	C	C	B		C	B		
Approach Delay (s)		45.8			47.8			17.9			20.1		
Approach LOS		D			D			B			C		
Intersection Summary													
HCM 2000 Control Delay			24.8		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.86										
Actuated Cycle Length (s)			98.7		Sum of lost time (s)						17.6		
Intersection Capacity Utilization			139.1%		ICU Level of Service						H		
Analysis Period (min)			15										

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	100	1643	131	0	1203
Future Vol, veh/h	0	100	1643	131	0	1203
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	60	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	7
Mvmt Flow	0	105	1729	138	0	1266

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	865	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	301	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	301	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	301
HCM Lane V/C Ratio	-	-	0.35
HCM Control Delay (s)	-	-	23.3
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.5

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗↗	↘		↘
Traffic Vol, veh/h	23	281	299	27	0	56
Future Vol, veh/h	23	281	299	27	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	30	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	8	8	0	0	0
Mvmt Flow	24	296	315	28	0	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	343	0	-	0	158
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	3.3
Pot Cap-1 Maneuver	1227	-	-	0	866
Stage 1	-	-	-	0	-
Stage 2	-	-	-	0	-
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1227	-	-	-	866
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1227	-	-	-	866
HCM Lane V/C Ratio	0.02	-	-	-	0.068
HCM Control Delay (s)	8	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



2031 Future Total

Queues
1: Highway 10 & King St

Future Total Traffic (2031)
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	118	173	113	158	16	133	1172	68	1703
Future Volume (vph)	118	173	113	158	16	133	1172	68	1703
Lane Group Flow (vph)	126	372	120	168	17	141	1300	72	2029
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.45	0.83	0.99	0.37	0.05	0.77	0.69	0.42	1.16
Control Delay	36.6	46.6	119.4	32.8	0.3	44.6	17.1	28.0	103.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	46.6	119.4	32.8	0.3	44.6	17.1	28.0	103.5
Queue Length 50th (m)	19.1	55.2	21.4	24.8	0.0	10.9	77.7	7.9	~229.2
Queue Length 95th (m)	34.7	85.9	#51.8	41.0	0.0	#44.3	119.5	23.3	#299.2
Internal Link Dist (m)		198.1		179.9			165.3		167.4
Turn Bay Length (m)	135.0				65.0	55.0		45.0	
Base Capacity (vph)	373	578	159	607	401	184	1876	171	1753
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.64	0.75	0.28	0.04	0.77	0.69	0.42	1.16

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 100.5

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

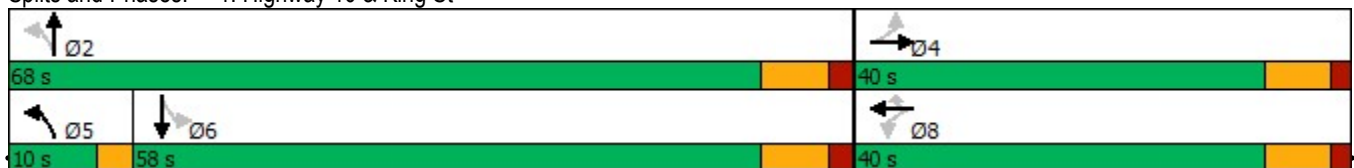
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Total Traffic (2031)
Weekday AM PH

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	118	173	177	113	158	16	133	1172	50	68	1703	204	
Future Volume (vph)	118	173	177	113	158	16	133	1172	50	68	1703	204	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1700	1659		1716	1847	1065	1608	3097		1750	3457		
Flt Permitted	0.63	1.00		0.27	1.00	1.00	0.07	1.00		0.18	1.00		
Satd. Flow (perm)	1134	1659		486	1847	1065	126	3097		339	3457		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	126	184	188	120	168	17	141	1247	53	72	1812	217	
RTOR Reduction (vph)	0	37	0	0	0	13	0	2	0	0	8	0	
Lane Group Flow (vph)	126	335	0	120	168	4	141	1298	0	72	2021	0	
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA		
Protected Phases		4			8		5	2			6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	25.0	25.0		25.0	25.0	25.0	60.8	60.8		50.8	50.8		
Effective Green, g (s)	25.0	25.0		25.0	25.0	25.0	60.8	60.8		50.8	50.8		
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.61	0.61		0.51	0.51		
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	282	413		121	459	265	179	1875		171	1749		
v/s Ratio Prot		0.20			0.09		c0.05	0.42			c0.58		
v/s Ratio Perm	0.11			c0.25		0.00	0.42			0.21			
v/c Ratio	0.45	0.81		0.99	0.37	0.02	0.79	0.69		0.42	1.16		
Uniform Delay, d1	31.9	35.5		37.6	31.2	28.4	24.5	13.4		15.6	24.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.1	11.5		79.0	0.5	0.0	20.1	1.1		1.7	77.0		
Delay (s)	33.0	47.0		116.6	31.6	28.4	44.6	14.6		17.2	101.8		
Level of Service	C	D		F	C	C	D	B		B	F		
Approach Delay (s)		43.4			64.9			17.5			98.9		
Approach LOS		D			E			B			F		
Intersection Summary													
HCM 2000 Control Delay			63.1									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.08										
Actuated Cycle Length (s)			100.4									Sum of lost time (s)	17.6
Intersection Capacity Utilization			135.9%									ICU Level of Service	H
Analysis Period (min)			15										

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	151	1116	190	0	1956
Future Vol, veh/h	0	151	1116	190	0	1956
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	60	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	16	0	0	4
Mvmt Flow	0	159	1175	200	0	2059

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	588	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	457	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %					
Mov Cap-1 Maneuver	-	457	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	457
HCM Lane V/C Ratio	-	-	0.348
HCM Control Delay (s)	-	-	17
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.5

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↑↑	↗		↗
Traffic Vol, veh/h	38	253	183	40	0	104
Future Vol, veh/h	38	253	183	40	0	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	30	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	7	8	0	0	0
Mvmt Flow	40	266	193	42	0	109

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	235	0	-	0	- 97
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	- 6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	- 3.3
Pot Cap-1 Maneuver	1344	-	-	-	0 947
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1344	-	-	-	- 947
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1344	-	-	-	947
HCM Lane V/C Ratio	0.03	-	-	-	0.116
HCM Control Delay (s)	7.8	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Queues
1: Highway 10 & King St

Future Total Traffic (2031)
Weekday PM PH

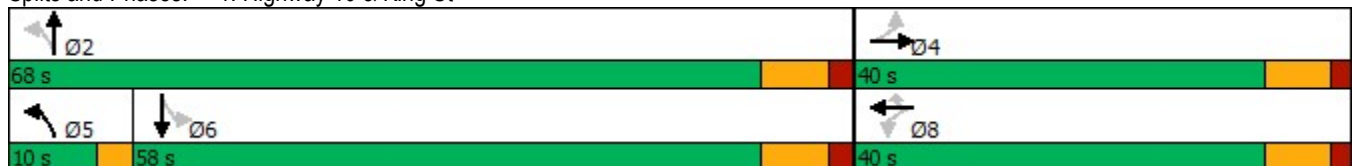


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	152	204	101	238	38	209	1744	38	1142
Future Volume (vph)	152	204	101	238	38	209	1744	38	1142
Lane Group Flow (vph)	158	351	105	248	40	218	1892	40	1356
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.74	0.82	0.92	0.57	0.09	0.95	0.88	0.58	0.79
Control Delay	55.1	48.2	104.0	38.1	1.8	66.3	23.8	58.4	24.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	48.2	104.0	38.1	1.8	66.3	23.8	58.4	24.9
Queue Length 50th (m)	25.8	53.9	18.1	38.7	0.0	18.4	137.3	4.7	97.9
Queue Length 95th (m)	46.4	82.9	#44.4	59.9	1.9	#68.1	#232.8	#23.6	147.1
Internal Link Dist (m)		198.1		179.9			165.3		167.4
Turn Bay Length (m)	135.0				65.0	55.0		45.0	
Base Capacity (vph)	298	582	158	604	561	230	2151	69	1729
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.60	0.66	0.41	0.07	0.95	0.88	0.58	0.78

Intersection Summary

Cycle Length: 108
 Actuated Cycle Length: 99
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Total Traffic (2031)
Weekday PM PH

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	204	132	101	238	38	209	1744	72	38	1142	159
Future Volume (vph)	152	204	132	101	238	38	209	1744	72	38	1142	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1684		1539	1812	1531	1750	3504		1638	3356	
Flt Permitted	0.48	1.00		0.29	1.00	1.00	0.10	1.00		0.08	1.00	
Satd. Flow (perm)	893	1684		475	1812	1531	181	3504		136	3356	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	158	212	138	105	248	40	218	1817	75	40	1190	166
RTOR Reduction (vph)	0	24	0	0	0	30	0	2	0	0	9	0
Lane Group Flow (vph)	158	327	0	105	248	10	218	1890	0	40	1347	0
Confl. Peds. (#/hr)							1		1			
Confl. Bikes (#/hr)			1									
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	23.8	23.8		23.8	23.8	23.8	60.6	60.6		50.6	50.6	
Effective Green, g (s)	23.8	23.8		23.8	23.8	23.8	60.6	60.6		50.6	50.6	
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.61	0.61		0.51	0.51	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	404		114	435	368	221	2144		69	1715	
v/s Ratio Prot		0.19			0.14		c0.07	0.54			0.40	
v/s Ratio Perm	0.18			c0.22		0.01	c0.53			0.29		
v/c Ratio	0.74	0.81		0.92	0.57	0.03	0.99	0.88		0.58	0.79	
Uniform Delay, d1	34.7	35.5		36.7	33.1	28.7	21.1	16.2		16.8	19.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.5	11.7		59.8	1.8	0.0	56.2	4.6		11.3	2.4	
Delay (s)	47.2	47.1		96.5	34.9	28.8	77.3	20.8		28.1	22.2	
Level of Service	D	D		F	C	C	E	C		C	C	
Approach Delay (s)		47.2			50.7			26.6			22.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.8									C
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			99.0								17.6	
Intersection Capacity Utilization			143.6%									H
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	100	1803	131	0	1327
Future Vol, veh/h	0	100	1803	131	0	1327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	60	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	7
Mvmt Flow	0	105	1898	138	0	1397

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	949	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	265	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	265	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	27.3	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	265
HCM Lane V/C Ratio	-	-	0.397
HCM Control Delay (s)	-	-	27.3
HCM Lane LOS	-	-	D
HCM 95th %tile Q(veh)	-	-	1.8

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↑↑	↗		↗
Traffic Vol, veh/h	23	290	320	27	0	56
Future Vol, veh/h	23	290	320	27	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	30	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	8	8	0	0	0
Mvmt Flow	24	305	337	28	0	59

Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	365	0	-	0	-	169
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	3.3
Pot Cap-1 Maneuver	1205	-	-	-	0	852
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1205	-	-	-	-	852
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1205	-	-	-	852
HCM Lane V/C Ratio	0.02	-	-	-	0.069
HCM Control Delay (s)	8	-	-	-	9.5
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



2036 Future Total

Queues
1: Highway 10 & King St

Future Total Traffic (2036)
Weekday AM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	118	173	113	158	16	146	1282	73	1878
Future Volume (vph)	118	173	113	158	16	146	1282	73	1878
Lane Group Flow (vph)	126	372	120	168	17	155	1423	78	2237
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.45	0.83	0.99	0.37	0.05	0.84	0.76	0.57	1.28
Control Delay	36.6	46.6	119.4	32.8	0.3	55.7	19.1	40.1	154.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	46.6	119.4	32.8	0.3	55.7	19.1	40.1	154.1
Queue Length 50th (m)	19.1	55.2	21.4	24.8	0.0	13.6	91.5	9.4	~271.2
Queue Length 95th (m)	34.7	85.9	#51.8	41.0	0.0	#51.4	140.7	#33.3	#344.0
Internal Link Dist (m)		198.1		179.9			165.3		167.4
Turn Bay Length (m)	135.0				65.0	55.0		45.0	
Base Capacity (vph)	373	578	159	607	401	184	1876	137	1753
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.64	0.75	0.28	0.04	0.84	0.76	0.57	1.28

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 100.5

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

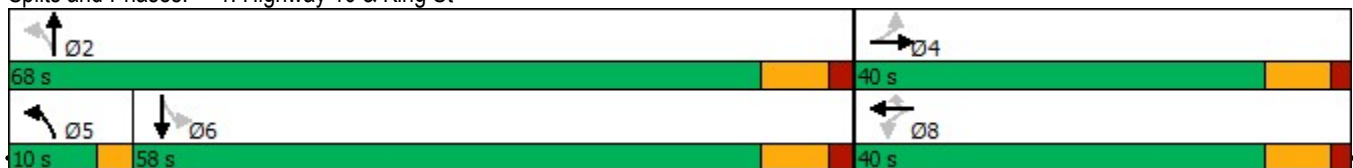
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Total Traffic (2036)
Weekday AM PH

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	173	177	113	158	16	146	1282	55	73	1878	225
Future Volume (vph)	118	173	177	113	158	16	146	1282	55	73	1878	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flt	1.00	0.92		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1700	1659		1716	1847	1065	1608	3097		1750	3457	
Flt Permitted	0.63	1.00		0.27	1.00	1.00	0.07	1.00		0.15	1.00	
Satd. Flow (perm)	1134	1659		486	1847	1065	126	3097		272	3457	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	126	184	188	120	168	17	155	1364	59	78	1998	239
RTOR Reduction (vph)	0	37	0	0	0	13	0	2	0	0	8	0
Lane Group Flow (vph)	126	335	0	120	168	4	155	1421	0	78	2229	0
Heavy Vehicles (%)	5%	5%	9%	4%	4%	50%	11%	17%	20%	2%	4%	3%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	25.0	25.0		25.0	25.0	25.0	60.8	60.8		50.8	50.8	
Effective Green, g (s)	25.0	25.0		25.0	25.0	25.0	60.8	60.8		50.8	50.8	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.61	0.61		0.51	0.51	
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	282	413		121	459	265	179	1875		137	1749	
v/s Ratio Prot		0.20			0.09		c0.06	0.46			c0.64	
v/s Ratio Perm	0.11			c0.25		0.00	0.46			0.29		
v/c Ratio	0.45	0.81		0.99	0.37	0.02	0.87	0.76		0.57	1.27	
Uniform Delay, d1	31.9	35.5		37.6	31.2	28.4	26.7	14.4		17.2	24.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	11.5		79.0	0.5	0.0	32.7	1.8		5.3	128.1	
Delay (s)	33.0	47.0		116.6	31.6	28.4	59.3	16.2		22.6	152.9	
Level of Service	C	D		F	C	C	E	B		C	F	
Approach Delay (s)		43.4			64.9			20.5			148.5	
Approach LOS		D			E			C			F	
Intersection Summary												
HCM 2000 Control Delay			88.9			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.15									
Actuated Cycle Length (s)			100.4			Sum of lost time (s)				17.6		
Intersection Capacity Utilization			135.9%			ICU Level of Service				H		
Analysis Period (min)			15									

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	151	1226	190	0	2157
Future Vol, veh/h	0	151	1226	190	0	2157
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	60	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	16	0	0	4
Mvmt Flow	0	159	1291	200	0	2271

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	646	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	419	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %					
Mov Cap-1 Maneuver	-	419	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	419
HCM Lane V/C Ratio	-	-	0.379
HCM Control Delay (s)	-	-	18.7
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	1.7

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↑↑	↗		↗
Traffic Vol, veh/h	38	263	183	40	0	104
Future Vol, veh/h	38	263	183	40	0	104
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	30	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	7	8	0	0	0
Mvmt Flow	40	277	193	42	0	109

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	235	0	-	0	- 97
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	- 6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	- 3.3
Pot Cap-1 Maneuver	1344	-	-	-	0 947
Stage 1	-	-	-	-	0 -
Stage 2	-	-	-	-	0 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1344	-	-	-	- 947
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1344	-	-	-	947
HCM Lane V/C Ratio	0.03	-	-	-	0.116
HCM Control Delay (s)	7.8	-	-	-	9.3
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.4

Queues
1: Highway 10 & King St

Future Total Traffic (2036)
Weekday PM PH



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↖	↕	↖	↕
Traffic Volume (vph)	152	204	106	252	40	230	1916	40	1260
Future Volume (vph)	152	204	106	252	40	230	1916	40	1260
Lane Group Flow (vph)	158	351	110	263	42	240	2079	42	1496
Turn Type	Perm	NA	Perm	NA	Perm	pm+pt	NA	Perm	NA
Protected Phases		4		8		5	2		6
Permitted Phases	4		8		8	2		6	
Detector Phase	4	4	8	8	8	5	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	7.0	50.0	50.0	50.0
Minimum Split (s)	39.1	39.1	39.1	39.1	39.1	10.0	57.5	57.5	57.5
Total Split (s)	40.0	40.0	40.0	40.0	40.0	10.0	68.0	58.0	58.0
Total Split (%)	37.0%	37.0%	37.0%	37.0%	37.0%	9.3%	63.0%	53.7%	53.7%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.4	3.0	5.4	5.4	5.4
All-Red Time (s)	1.7	1.7	1.7	1.7	1.7	0.0	2.1	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.1	7.1	7.1	7.1	7.1	3.0	7.5	7.5	7.5
Lead/Lag						Lead		Lag	Lag
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Ped	Ped	Ped
v/c Ratio	0.77	0.81	0.95	0.60	0.10	1.18	0.97	0.61	0.87
Control Delay	59.5	47.4	108.8	39.0	2.2	145.8	34.5	62.1	29.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.5	47.4	108.8	39.0	2.2	145.8	34.5	62.1	29.4
Queue Length 50th (m)	26.1	53.9	19.2	41.4	0.0	~36.3	170.7	5.1	116.2
Queue Length 95th (m)	47.4	82.9	#46.8	63.6	2.5	#89.0	#273.2	#25.2	#188.1
Internal Link Dist (m)		198.1		179.9			165.3		167.4
Turn Bay Length (m)	135.0				65.0	55.0		45.0	
Base Capacity (vph)	280	579	159	600	558	203	2139	69	1719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.61	0.69	0.44	0.08	1.18	0.97	0.61	0.87

Intersection Summary

Cycle Length: 108

Actuated Cycle Length: 99.6

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

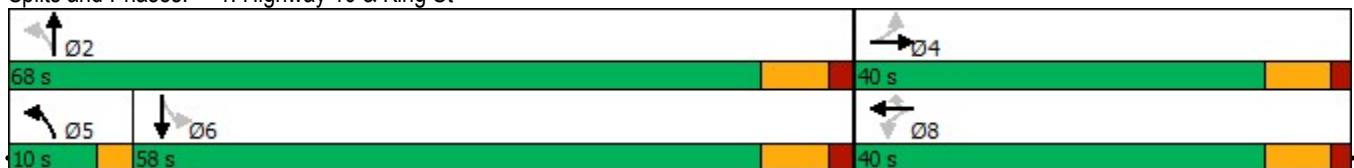
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
























Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 10 & King St



HCM Signalized Intersection Capacity Analysis
1: Highway 10 & King St

Future Total Traffic (2036)
Weekday PM PH

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	152	204	132	106	252	40	230	1916	80	40	1260	176	
Future Volume (vph)	152	204	132	106	252	40	230	1916	80	40	1260	176	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	
Total Lost time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95		
Frbp, ped/bikes	1.00	0.99		1.00	1.00	0.99	1.00	1.00		1.00	1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.99		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1767	1684		1539	1812	1531	1750	3503		1638	3356		
Flt Permitted	0.45	1.00		0.30	1.00	1.00	0.07	1.00		0.08	1.00		
Satd. Flow (perm)	844	1684		480	1812	1531	137	3503		136	3356		
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	158	212	138	110	262	42	240	1996	83	42	1312	183	
RTOR Reduction (vph)	0	23	0	0	0	32	0	2	0	0	9	0	
Lane Group Flow (vph)	158	328	0	110	263	10	240	2077	0	42	1487	0	
Confl. Peds. (#/hr)							1		1				
Confl. Bikes (#/hr)			1										
Heavy Vehicles (%)	1%	6%	8%	16%	6%	3%	2%	3%	15%	9%	7%	5%	
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		Perm	NA		
Protected Phases		4			8		5	2			6		
Permitted Phases	4			8		8	2			6			
Actuated Green, G (s)	24.2	24.2		24.2	24.2	24.2	60.8	60.8		50.8	50.8		
Effective Green, g (s)	24.2	24.2		24.2	24.2	24.2	60.8	60.8		50.8	50.8		
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.61	0.61		0.51	0.51		
Clearance Time (s)	7.1	7.1		7.1	7.1	7.1	3.0	7.5		7.5	7.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	205	409		116	440	371	196	2138		69	1711		
v/s Ratio Prot		0.19			0.15		c0.09	0.59			0.44		
v/s Ratio Perm	0.19			c0.23		0.01	c0.66			0.31			
v/c Ratio	0.77	0.80		0.95	0.60	0.03	1.22	0.97		0.61	0.87		
Uniform Delay, d1	35.1	35.4		37.1	33.4	28.7	26.5	18.6		17.3	21.5		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	16.3	10.7		66.6	2.2	0.0	137.8	13.3		14.3	5.0		
Delay (s)	51.4	46.2		103.7	35.6	28.8	164.2	31.9		31.6	26.5		
Level of Service	D	D		F	D	C	F	C		C	C		
Approach Delay (s)		47.8			52.9			45.6			26.6		
Approach LOS		D			D			D			C		
Intersection Summary													
HCM 2000 Control Delay			40.4		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio			1.17										
Actuated Cycle Length (s)			99.6		Sum of lost time (s)						17.6		
Intersection Capacity Utilization			148.6%		ICU Level of Service						H		
Analysis Period (min)			15										

c Critical Lane Group

Intersection						
Int Delay, s/veh	0.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕	↗		↕
Traffic Vol, veh/h	0	100	1977	131	0	1464
Future Vol, veh/h	0	100	1977	131	0	1464
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	60	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	3	0	0	7
Mvmt Flow	0	105	2081	138	0	1541

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	1041	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	230	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	230	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	33.2	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	230
HCM Lane V/C Ratio	-	-	0.458
HCM Control Delay (s)	-	-	33.2
HCM Lane LOS	-	-	D
HCM 95th %tile Q(veh)	-	-	2.2

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗↗	↘		↘
Traffic Vol, veh/h	23	300	341	27	0	56
Future Vol, veh/h	23	300	341	27	0	56
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	35	-	-	30	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	8	8	0	0	0
Mvmt Flow	24	316	359	28	0	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	387	0	-	0	180
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	3.3
Pot Cap-1 Maneuver	1183	-	-	0	838
Stage 1	-	-	-	0	-
Stage 2	-	-	-	0	-
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1183	-	-	-	838
Mov Cap-2 Maneuver		-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1183	-	-	-	838
HCM Lane V/C Ratio	0.02	-	-	-	0.07
HCM Control Delay (s)	8.1	-	-	-	9.6
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2



EXHIBIT G

Left-Turn Warrant Analysis

LEFT TURN WARRANT

INTERSECTION:

King Street & Site Access 2

HORIZON / DESCRIPTION:

Future Total (2026)

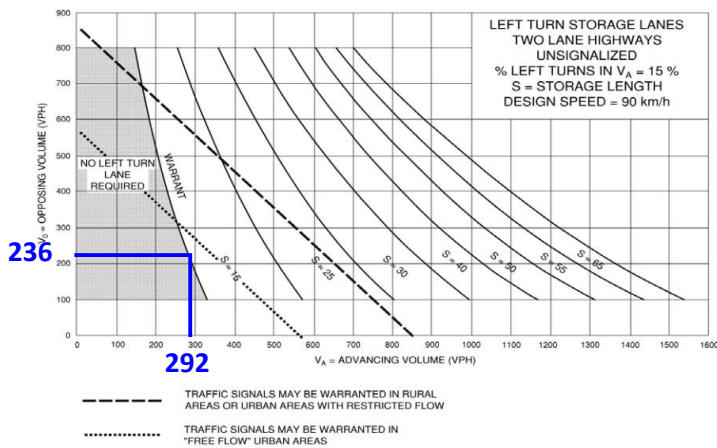
Major Direction: East-West
Turning Lane: Eastbound

	Volumes	
	AM	PM
NBL	0	0
NBT	0	0
NBR	0	0
SBL	0	0
SBT	0	0
SBR	105	57
EBL	38	23
EBT	254	293
EBR	0	0
WBL	0	0
WBT	194	306
WBR	42	28

Criteria / Value	AM	PM
Design Speed (km/h)	90	
Advance Volume (vph) (VA)	292	316
Left Turning Volume (vph) (VL)	38	23
% of Left Turning Volume	13%	7%
Opposing Volume (vph) (VO)	236	334
Warrant Met?	Yes	Yes
Storage Lane (m)	15	15

AM

Exhibit 9A-20



PM

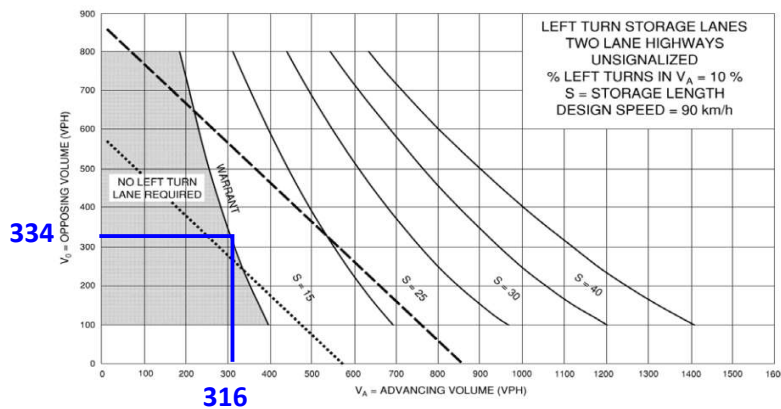




EXHIBIT H

Road Design Drawings for Highway 10 and King Street

SUPPLEMENTARY LEGEND:

LEGEND	
1.	SOLID YELLOW, 10cm
2.	SOLID DOUBLE YELLOW, 10cm
3.	363 BROKEN YELLOW, 10cm
4.	SOLID YELLOW, 20cm
5.	SOLID WHITE, 10cm
6.	333 BROKEN WHITE, 10cm
7.	363 BROKEN WHITE, 10cm
8.	393 BROKEN WHITE, 10cm
9.	SOLID WHITE, 20cm
10.	111 BROKEN WHITE, 20cm
11.	333 BROKEN WHITE, 20cm
12.	333 BROKEN WHITE, 30cm
13.	SOLID WHITE, 30cm
14.	SOLID WHITE, 45cm
15.	SOLID WHITE, 60cm
20.	SYMBOLS
] [LIMITS OF MARKINGS	

PAVEMENT MARKINGS NOTES:

- 333, 363, 393 DENOTES PAVEMENT MARKING SPACING (ie., 3m LINE, 3m GAP, 3m LINE)
- USE ⊙ TO DENOTE PAVEMENT MARKING
- USE □ TO DENOTE PAVEMENT MARKING, TEMPORARY
- USE △ TO DENOTE PAVEMENT MARKING, TEMPORARY-REMOVABLE
- USE ⊕ TO DENOTE PAVEMENT MARKING, DURABLE

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

PLATE No

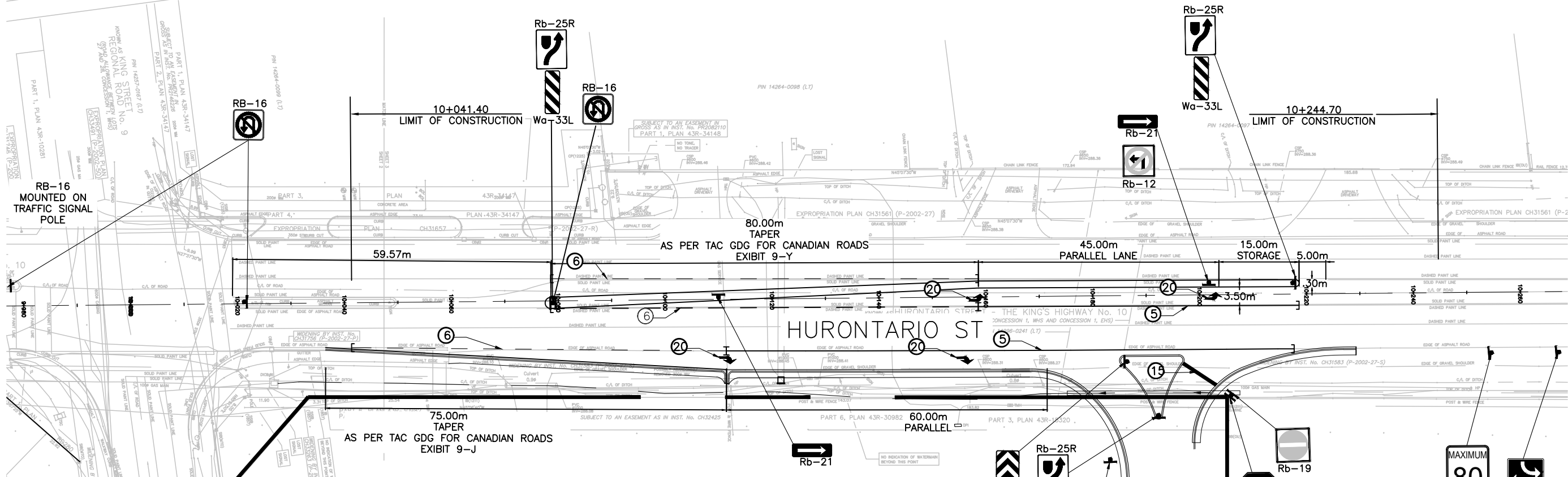
CONT -
WP -

PAVEMENT MARKING & SIGNAGE
HURONTARIO STREET
STA 10+040 TO STA 10+245



SHEET
4

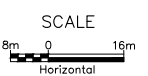
LEA Consulting Ltd.
Consulting Engineers and Planners
www.LEA.ca



SIGNAGE TABLE

LOCATION : HIGHWAY 10

STATION	OFFSET FROM EP (m)	SIGN NUMBER	SYMBOL / MESSAGE DESCRIPTION	SIZE BxH (cm)	SIGN AREA (sq.m)	SIGN SUPPLIED BY	ACTION	COMMENTS
9+978.0	11.7 LT	Rb-16	NO U-TURN	60x60	0.36	MTO	NEW	ON MEDIAN
10+021.5	10.5 LT	Rb-16	NO U-TURN	60x60	0.36	MTO	NEW	ON MEDIAN
10+079.0	10.5 LT	Rb-16	NO U-TURN	60x60	0.36	MTO	NEW	ON MEDIAN
10+079.0	10.5 LT	Wa-33L	HAZARD MARKER	30x90	0.27	MTO	NEW	ON MEDIAN
10+079.0	10.5 LT	Rb-25R	KEEP RIGHT	60x75	0.45	MTO	NEW	ON MEDIAN
10+110.0	13.4LT	Rb-21	ONE WAY	30x90	0.27	MTO	NEW	ON MEDIAN
10+183.0	17.5m RT	Rb-12	NO LEFT TURN	60x60	0.36	MTO	NEW	ON ACCESS ROAD
10+186.5	1.0 RT	Wa-33LR	HAZARD MARKER	45x90	0.40	MTO	NEW	SPLITTER ISLAND ON ACCESS
10+192.0	12.2 RT	Wa-33L	HAZARD MARKER	30x90	0.27	MTO	NEW	SPLITTER ISLAND ON ACCESS
10+192.0	12.2 RT	Rb-25R	KEEP RIGHT	60x75	0.45	MTO	NEW	SPLITTER ISLAND ON ACCESS
10+203.0	12.2 LT	Rb-21	ONE WAY	30x90	0.27	MTO	NEW	ON MEDIAN
10+203.5	6.5m RT	Ra-1	STOP - ON ACCESS ROAD	60x60	0.36	MTO	NEW	ON ACCESS ROAD
10+203.5	6.5m RT	Rb-19	DO NOT ENTER	60x60	0.36	MTO	NEW	ON ACCESS ROAD
10+217.5	12.3 LT	Rb-12	NO LEFT TURN	60x60	0.36	MTO	NEW	ON MEDIAN
10+217.5	12.3 LT	Wa-33L	HAZARD MARKER	30x90	0.27	MTO	NEW	ON MEDIAN
10+217.5	12.3 LT	Rb-25R	KEEP RIGHT	60x75	0.45	MTO	NEW	ON MEDIAN
10+254.0	1.0 RT	Rb-3	MAX SPEED KM/H	90x165	0.27	MTO	RELOCATE	REMOVE SALVAGE & REINSTALL
10+266.0	1.0 RT	Rb-48A	TWO WAY LEFT TURN LANE AND BEGINS	90x150	1.35	MTO	RELOCATE	REMOVE SALVAGE & REINSTALL





APPENDIX I

ITE Trip Generation

Land Use: 932

High-Turnover (Sit-Down) Restaurant

Description

This land use consists of sit-down, full-service eating establishments with a typical duration of stay of 60 minutes or less. This type of restaurant is usually moderately priced, frequently belongs to a restaurant chain, and is commonly referred to as casual dining. Generally, these restaurants serve lunch and dinner; they may also be open for breakfast and are sometimes open 24 hours a day. These restaurants typically do not accept reservations. A patron commonly waits to be seated, is served by wait staff, orders from a menu, and pays after the meal.

Some facilities offer carry-out for a small proportion of its customers. Some facilities within this land use may also contain a bar area for serving food and alcoholic drinks.

Fast casual restaurant (Land Use 930), fine dining restaurant (Land Use 931), fast-food restaurant without drive-through window (Land Use 933), and fast-food restaurant with drive-through window (Land Use 934) are related uses.

Additional Data

Users should exercise caution when applying statistics during the AM peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the AM peak hour of the adjacent street traffic were removed from the database.

If the restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), California, Florida, Georgia, Indiana, Kentucky, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Vermont, and Wisconsin.

Source Numbers

126, 269, 275, 280, 300, 301, 305, 338, 340, 341, 358, 384, 424, 432, 437, 438, 444, 507, 555, 577, 589, 617, 618, 728, 868, 884, 885, 903, 927, 939, 944, 961, 962, 977, 1048

High-Turnover (Sit-Down) Restaurant (932)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 37

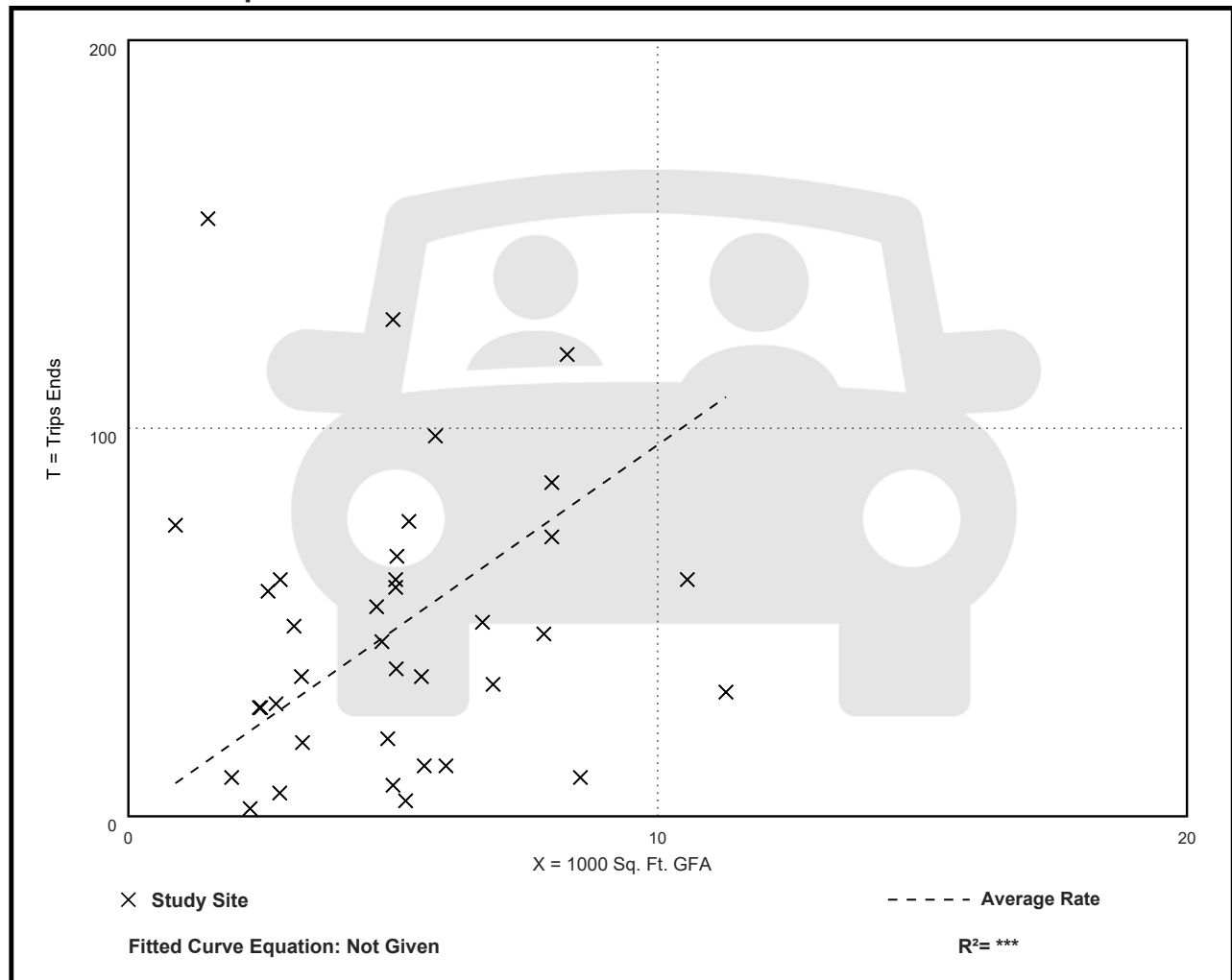
Avg. 1000 Sq. Ft. GFA: 5

Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.57	0.76 - 102.39	11.61

Data Plot and Equation



High-Turnover (Sit-Down) Restaurant (932)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 104

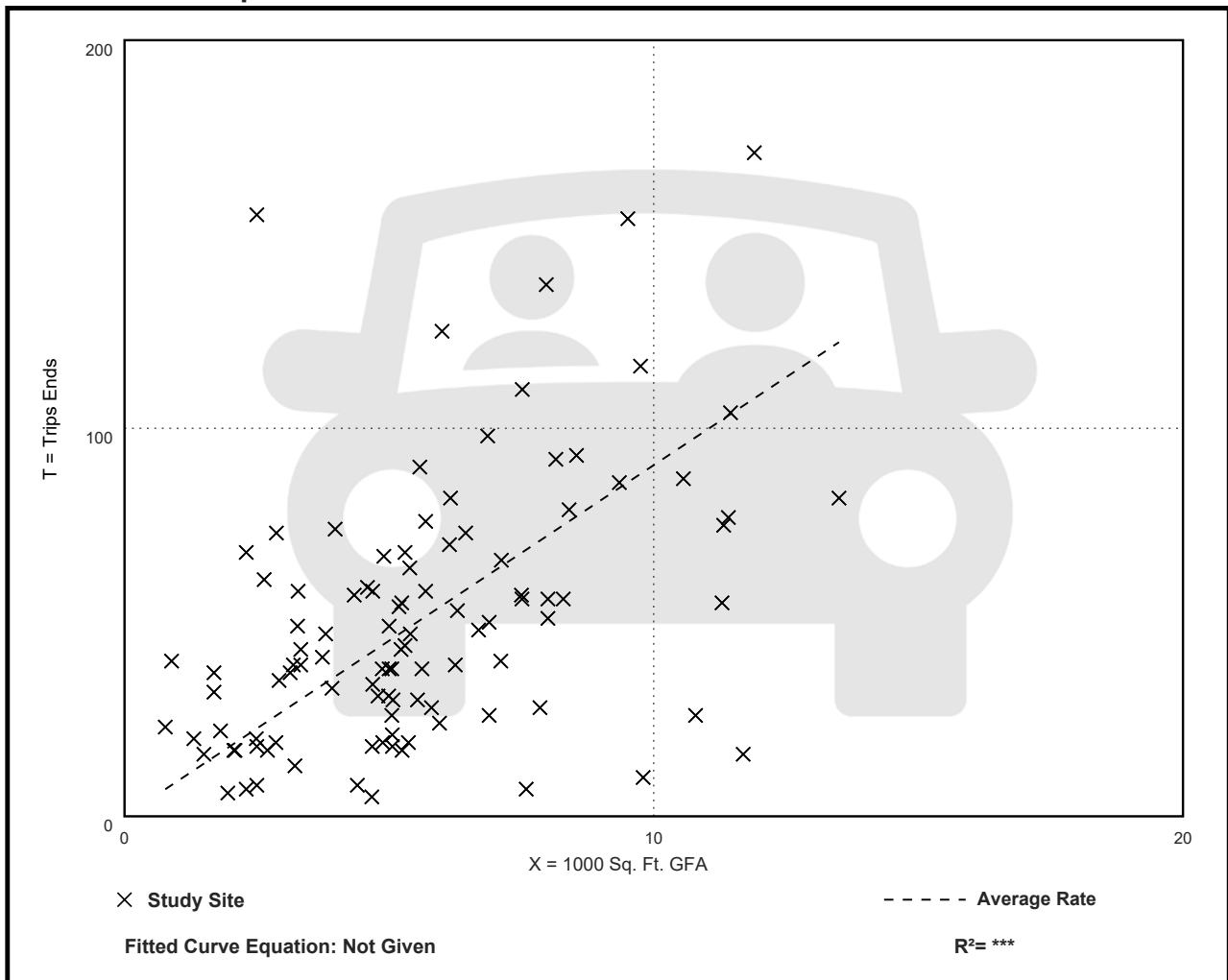
Avg. 1000 Sq. Ft. GFA: 6

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
9.05	0.92 - 62.00	6.18

Data Plot and Equation



Land Use: 934

Fast-Food Restaurant with Drive-Through Window

Description

This land use includes any fast-food restaurant with a drive-through window. This type of restaurant is characterized by a large drive-through and large carry-out clientele, long hours of service (some are open for breakfast, all are open for lunch and dinner, some are open late at night or 24 hours a day) and high turnover rates for eat-in customers. The restaurant does not provide table service. A patron generally orders from a menu board and pays before receiving the meal. A typical duration of stay for an eat-in patron is less than 30 minutes. Fast casual restaurant (Land Use 930), high-turnover (sit-down) restaurant (Land Use 932), fast-food restaurant without drive-through window (Land Use 933), and fast-food restaurant with drive-through window and no indoor seating (Land Use 935) are related uses.

Additional Data

Users should exercise caution when applying statistics during the AM peak periods, as the sites contained in the database for this land use may or may not be open for breakfast. In cases where it was confirmed that the sites were not open for breakfast, data for the AM peak hour of the adjacent street traffic were removed from the database.

If the restaurant has outdoor seating, its area is not included in the overall gross floor area. For a restaurant that has significant outdoor seating, the number of seats may be more reliable than GFA as an independent variable on which to establish a trip generation rate.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alaska, Alberta (CAN), California, Colorado, Florida, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Dakota, Texas, Vermont, Virginia, Washington, and Wisconsin.

Source Numbers

163, 164, 168, 180, 181, 241, 245, 278, 294, 300, 301, 319, 338, 340, 342, 358, 389, 438, 502, 552, 577, 583, 584, 617, 640, 641, 704, 715, 728, 810, 866, 867, 869, 885, 886, 927, 935, 962, 977, 1050, 1053, 1054

Fast-Food Restaurant with Drive-Through Window (934)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 96

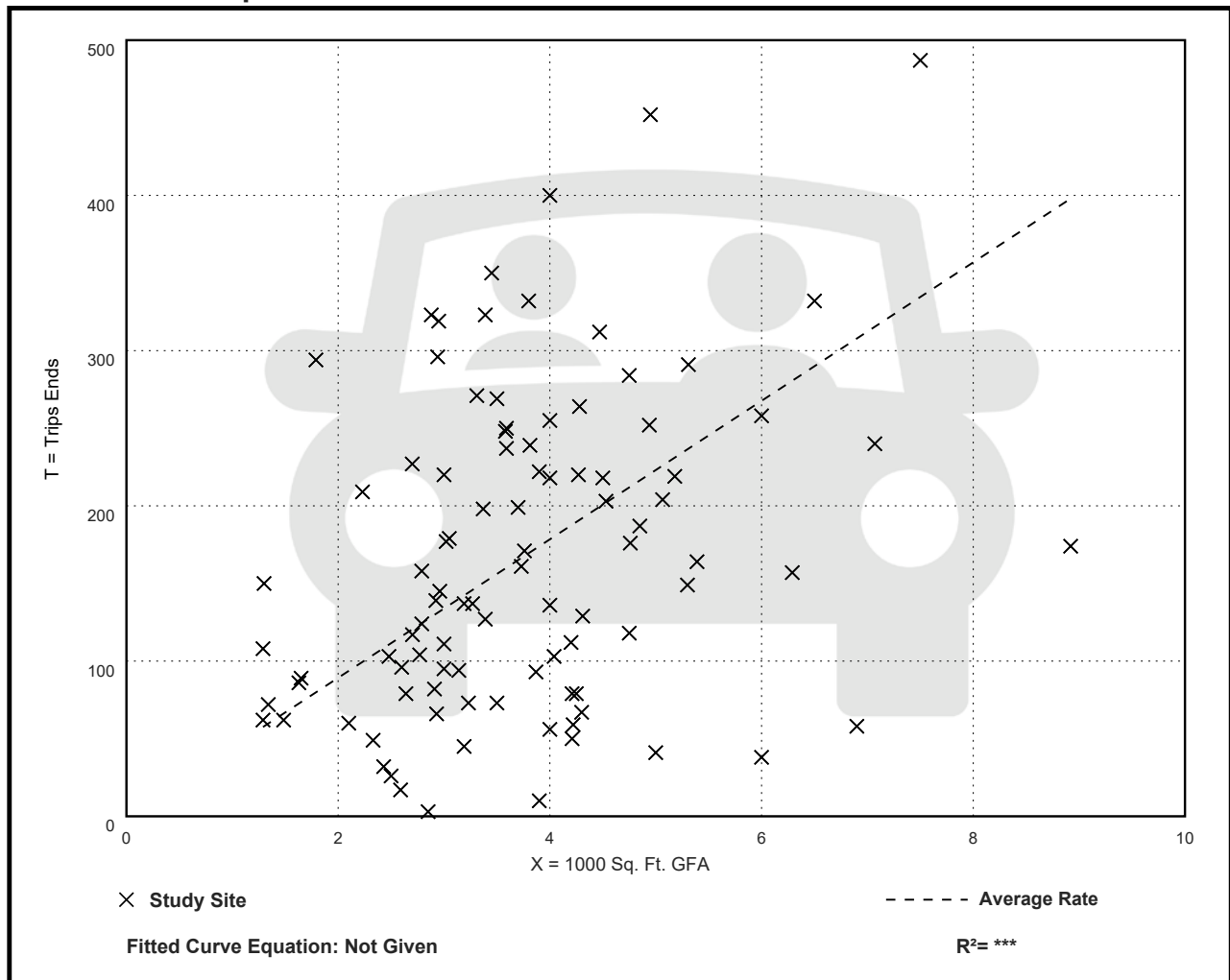
Avg. 1000 Sq. Ft. GFA: 4

Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
44.61	1.05 - 164.25	27.14

Data Plot and Equation



Fast-Food Restaurant with Drive-Through Window (934)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 190

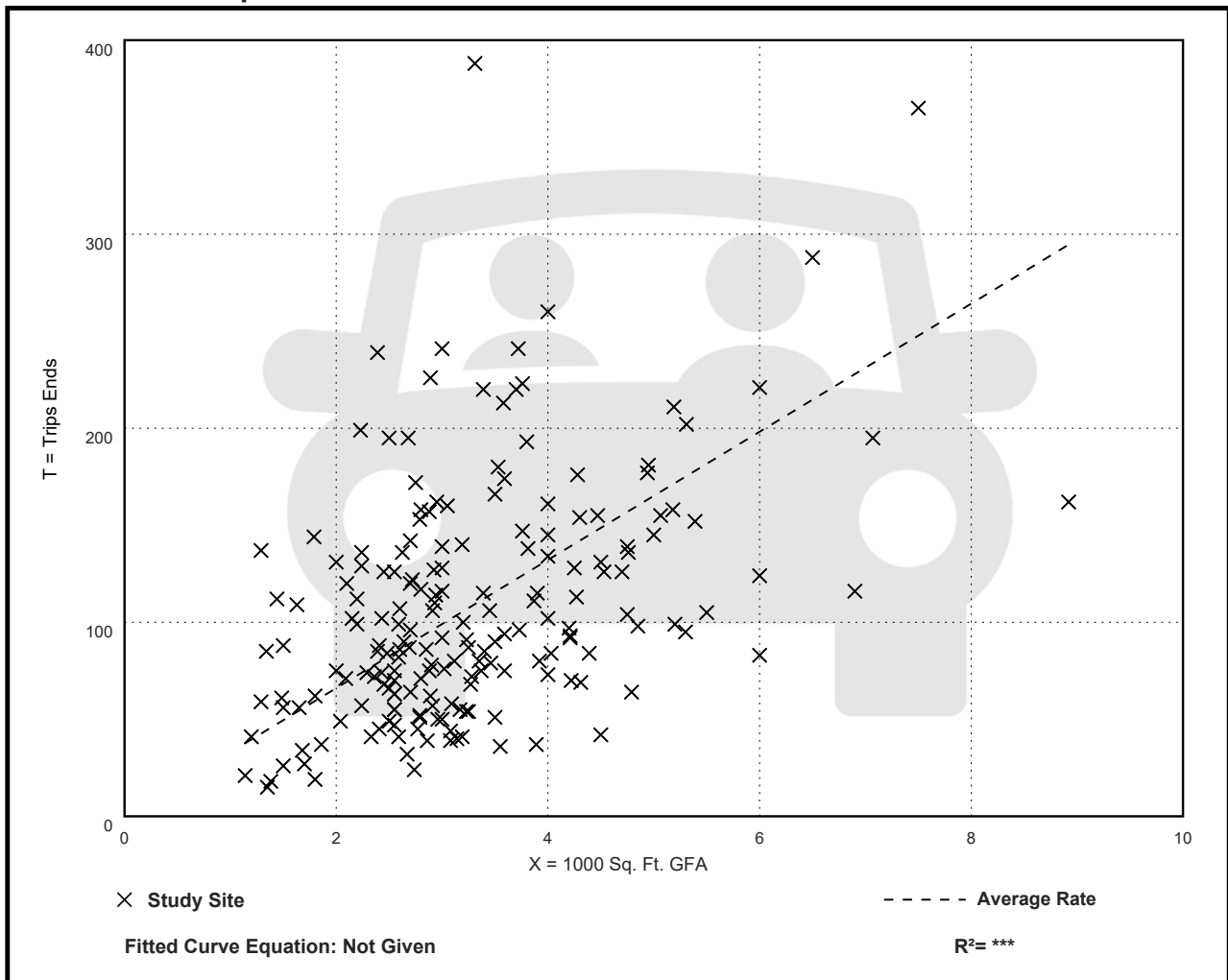
Avg. 1000 Sq. Ft. GFA: 3

Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
33.03	8.77 - 117.22	17.59

Data Plot and Equation



Land Use: 945

Convenience Store/Gas Station

Description

A convenience store/gas station is a facility with a co-located convenience store and gas station. The convenience store sells grocery and other everyday items that a person may need or want as a matter of convenience. The gas station sells automotive fuels such as gasoline and diesel.

A convenience store/gas station is typically located along a major thoroughfare to optimize motorist convenience. Extended hours of operation (with many open 24 hours, 7 days a week) are common at these facilities.

The convenience store product mix typically includes pre-packaged grocery items, beverages, dairy products, snack foods, confectionary, tobacco products, over-the-counter drugs, and toiletries. A convenience store may sell alcohol, often limited to beer and wine. Coffee and pre-made sandwiches are also commonly sold at a convenience store. Made-to-order food orders are sometimes offered. Some stores offer limited seating.

The sites in this land use include both self-pump and attendant-pumped fueling positions and both pre-pay and post-pay operations.

Convenience store (Land Use 851), gasoline/service station (Land Use 944), and truck stop (Land Use 950) are related uses.

Land Use Subcategory

Multiple subcategories were added to this land use to allow for multi-variable evaluation of sites with single-variable data plots. All study sites are assigned to one of three subcategories, based on the number of vehicle fueling positions (VFP) at the site: between 2 and 8 VFP, between 9 and 15 VFP, and between 16 and 24 VFP. For each VFP range subcategory, data plots are presented with GFA as the independent variable for all time periods and trip types for which data are available. The use of both GFA and VFP (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

Further, the study sites were also assigned to one of three other subcategories, based on the gross floor area (GFA) of the convenience store at the site: between 2,000 and 4,000 square feet, between 4,000 and 5,500 square feet, and between 5,500 and 10,000 square feet. For each GFA subcategory range, data plots are presented with VFP as the independent variable for all time periods and trip types for which data are available. The use of both VFP and GFA (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

When analyzing the convenience store/gas station land use with each combination of GFA and VFP values as described above, the two sets of data plots will produce two estimates of site-generated trips. Both values can be considered when determining a site trip generation estimate.

Data plots are also provided for three additional independent variables: AM peak hour traffic on adjacent street, PM peak hour traffic on adjacent street, and employees. These independent variables are intended to be analyzed as single independent variables and do not have sub-categories associated with them. Within the data plots and within the ITETripGen web app, these plots are found under the land use subcategory “none.”

Additional Data

ITE recognizes there are existing convenience store/gas station sites throughout North America that are larger than the sites presented in the data plots. However, the ITE database does not include any site with more than 24 VFP or any site with gross floor area greater than 10,000 square feet. Submission of trip generation data for larger sites is encouraged.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), Arkansas, California, Connecticut, Delaware, Florida, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, Pennsylvania, Rhode Island, South Dakota, Texas, Utah, Vermont, Washington, and Wisconsin.

Source Numbers

221, 245, 274, 288, 300, 340, 350, 351, 352, 355, 359, 385, 440, 617, 718, 810, 813, 844, 850, 853, 864, 865, 867, 869, 882, 883, 888, 904, 926, 927, 936, 938, 954, 960, 962, 977, 1004, 1024, 1025, 1027, 1052

Convenience Store/Gas Station - VFP (9-15) (945)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 34

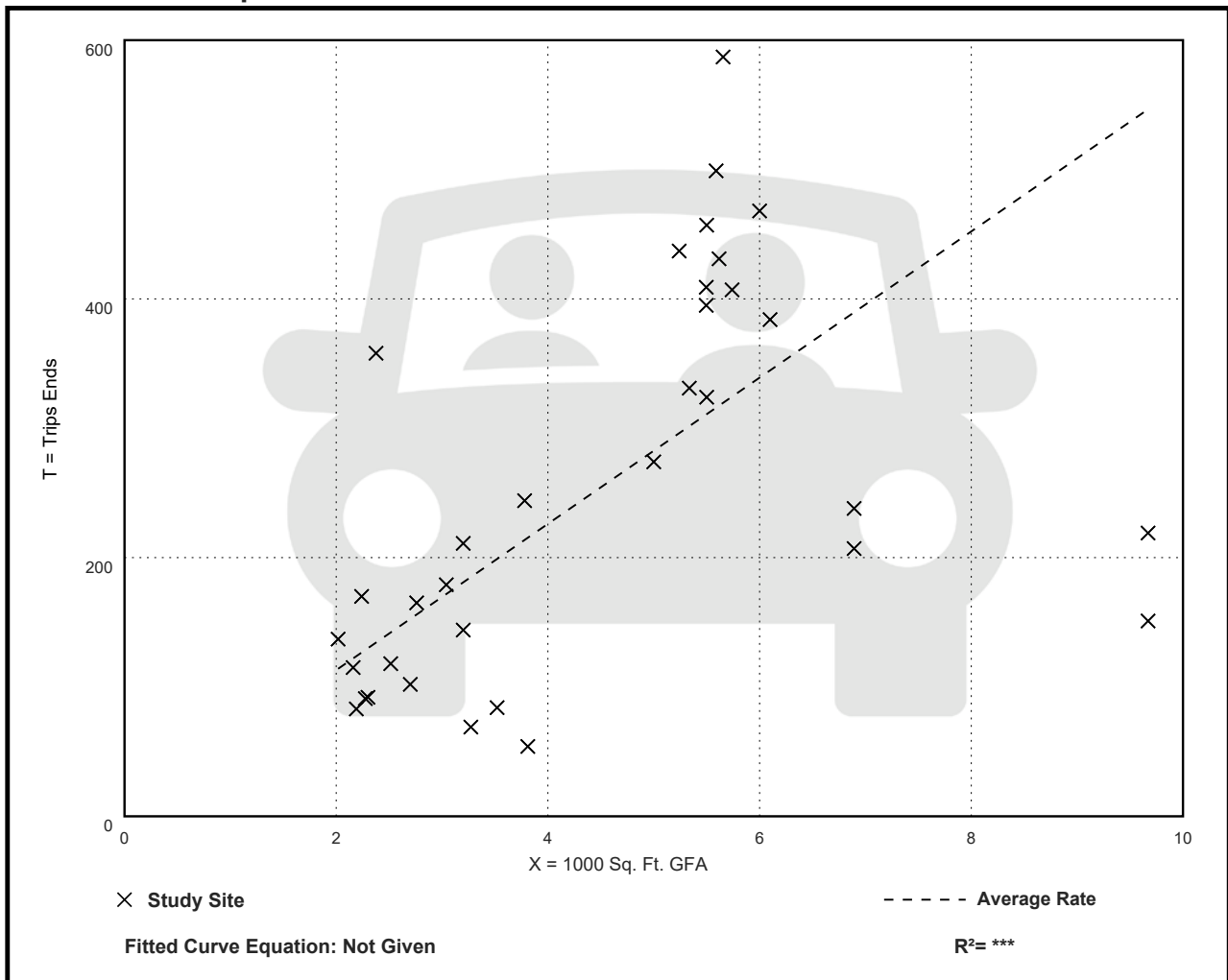
Avg. 1000 Sq. Ft. GFA: 4

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
56.52	14.17 - 150.67	27.56

Data Plot and Equation



Convenience Store/Gas Station - VFP (9-15) (945)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 39

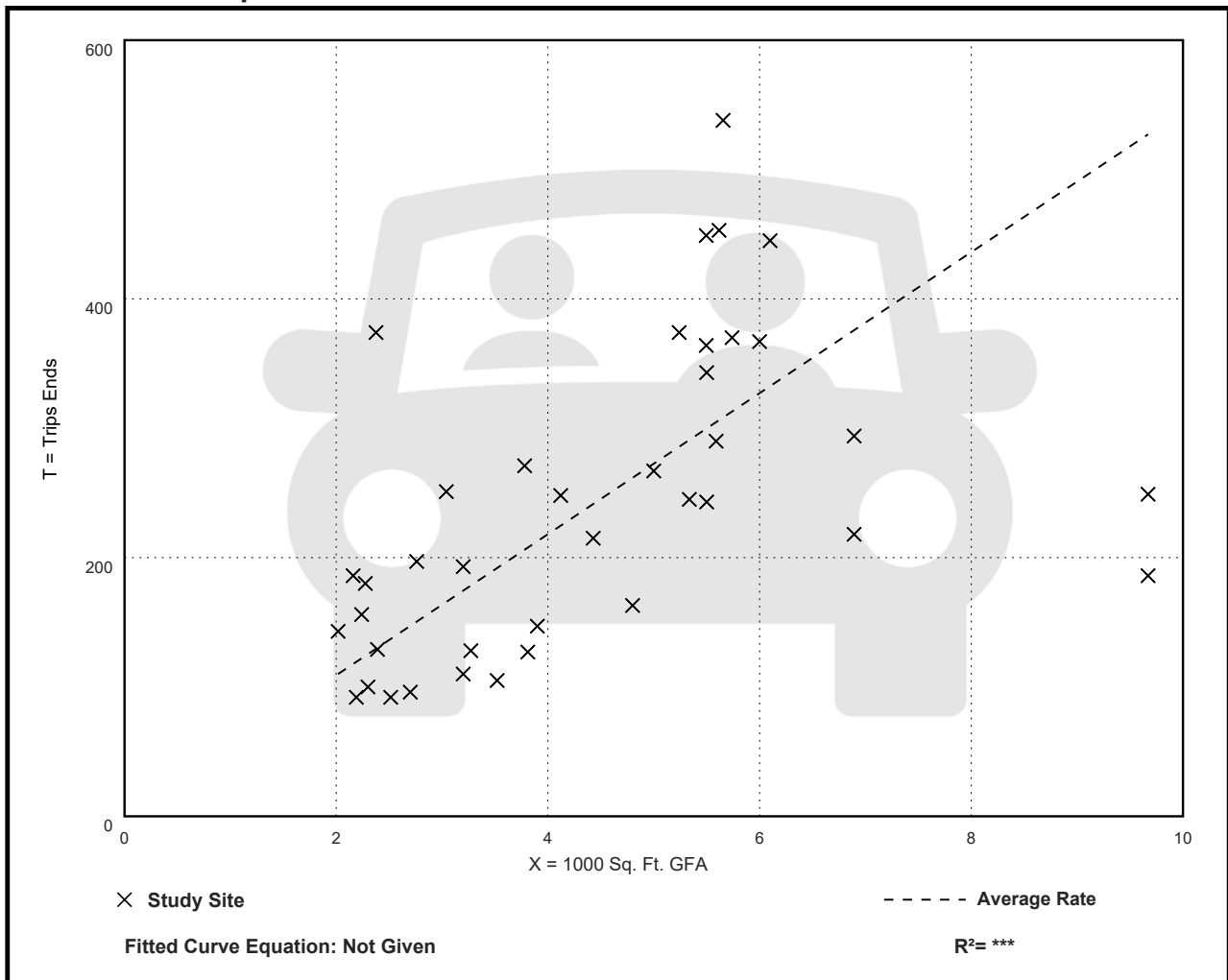
Avg. 1000 Sq. Ft. GFA: 4

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
54.52	19.23 - 157.41	23.69

Data Plot and Equation





APPENDIX J

Growth Rates Calculation

Hwy 10 & King St Intersection B Intersection C	AM Peak Hour				
	NB	SB	EB	WB	Overall
	2.00%	2.00%	0.00%	0.00%	0.00%

Hwy 10 & King St Intersection B Intersection C	PM Peak Hour				
	NB	SB	EB	WB	Overall
	2.00%	2.00%	0.00%	1.25%	1.00%

Assumptions and Reasonings:

Hwy 10 & King St

Intersection	Index	Movement	20-Oct-16					26-Mar-19					29-Jun-22					15-Nov-23				
			AM Peak	PM Peak	Sat Peak	AM Corridor	PM Corridor	AM Peak	PM Peak	Sat Peak	AM Corridor	PM Corridor	AM Peak	PM Peak	Sat Peak	AM Corridor	PM Corridor	AM Peak	PM Peak	Sat Peak	AM Corridor	PM Corridor
1 Highway 10 & King Street	1	NBL	48	175				58	160			108	170			109	174					
	2	NBT	629	1666		727	1895	634	1735		731	1966	880	1643		1097	1917	904	1413		1054	1647
	3	NBR	50	54				39	71			109	104			41	60					
	4	SBL	87	24				51	23			53	32			42	22					
	5	SBT	1581	705		1887	823	1771	765		2024	892	1520	1035		1726	1170	1430	964		1646	1122
	6	SBR	219	94				202	104			153	103			174	136					
	7	EBL	94	196				100	205			96	161			118	152					
	8	EBT	212	195		513	479	165	185		492	482	153	180		428	479	154	192		446	474
	9	EBR	207	88				227	92			179	138			174	130					
	10	WBL	61	32				54	48			63	59			47	61					
	11	WBT	203	193		281	281	185	178		253	274	134	197		218	297	140	207		203	302
	12	WBR	17	56				14	48			21	41			16	34					

Year	AM				
	NB	SB	EB	WB	Overall
2016	727	1887	513	281	3408
2019	731	2024	492	253	3500
2022	1097	1726	428	218	3469
2023	1054	1646	446	203	3349
Calculated Growth Rates:	5.43%	-2.39%	-2.62%	-5.45%	-0.15%
Applied Growth Rates:	2.0%	2.0%	0.0%	0.0%	0.0%

Year	PM				
	NB	SB	EB	WB	Overall
2016	1895	823	479	281	3478
2019	1966	892	482	274	3614
2022	1917	1170	479	297	3863
2023	1647	1122	474	302	3545
Calculated Growth Rates:	-1.56%	4.52%	-0.13%	1.13%	0.79%
Applied Growth Rates:	2.0%	2.0%	0.0%	1.25%	1.0%

