16533 Highway 12
Town of Midland

Traffic Impact Study for
Pratt Development Inc.

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Executive Summary

This report summarizes the traffic impact study prepared for the proposed industrial development located on the north side of Highway 12, between Brandon Street and William Street, in the Town Midland [Town], County of Simcoe [County]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The proposed development includes the construction of 5 industrial blocks with a total area of 12.33 hectares and a new roadway ("Street A") spanning between William Street and Brandon Street. It is anticipated that ultimate build-out will occur by 2023.

The proposed development will include one full-movement access driveway onto Brandon Street [West Access] and one full-movement access driveway onto William Street [East Access].

The scope of this analysis includes a review of the following intersections:

- Highway 12 / William Street;
- Highway 12 / Brandon Street;
- Highway 12 / King Street;
- William Street / Pillsbury Drive;
- William Street / East Access & Coral Springs Lane; and
- Brandon Street / West Access.

Conclusions

1. The proposed development is expected to generate a total of 351 AM and 417 PM peak hour trips.
2. Detailed intersection counts were obtained from MTO and commissioned by JD Engineering at the study intersections.
3. An intersection operation analysis was completed at the study area intersections, using the existing and background (2023, 2028 and 2033) traffic volumes, with consideration for the projected adjacent development traffic growth and without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. No improvements (other than the planned conversion of William Street to a 3-lane profile) are recommended within the study area.
4. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. No improvements (other than the planned conversion of William Street to a 3-lane profile) are recommended within the study area.
6. The proposed site accesses will operate efficiently with one-way stop control for egress movements. A single lane for ingress and egress movements will provide the necessary capacity to convey the traffic volume generated by the proposed development.
7. An eastbound left turn lane is recommended at the East Access with a 25 metre storage length and a 55 metre taper length.
8. An eastbound left turn lane is required on Highway 12 at Brandon Street with a 15 metre storage length, 55 metre parallel length and a 120 metre taper length. This left turn lane will

tie into the existing westbound left turn lane at the downstream intersection (Highway 12 / King Street), creating a shared auxiliary lane.

9. The location of the proposed site access connections are considered appropriate with respect to minimum corner clearance and spacing requirements as identified in the Transportation Association of Canada Design Guide for Canadian Roads (2017) and MTO Highway Management Guideline (2013).
10. The sight distance available for the proposed East Access is suitable for the intended use.
11. In summary, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

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1 Introduction

1.1 Background

Pratt Development Inc. [the Developer] is proposing an industrial development on a site located between Brandon Street and William Street, in the Town of Midland [Town]. The proposed development will include the construction of 5 industrial blocks with a total area of 12.33 hectares and a new roadway ("Street A") spanning between William Street and Brandon Street.

It is anticipated that ultimate build-out will occur by 2023.

The proposed development will include one full-movement access driveway onto Brandon Street [West Access] and one full-movement access driveway onto William Street [East Access].

The Developer has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

1.2 Study Area

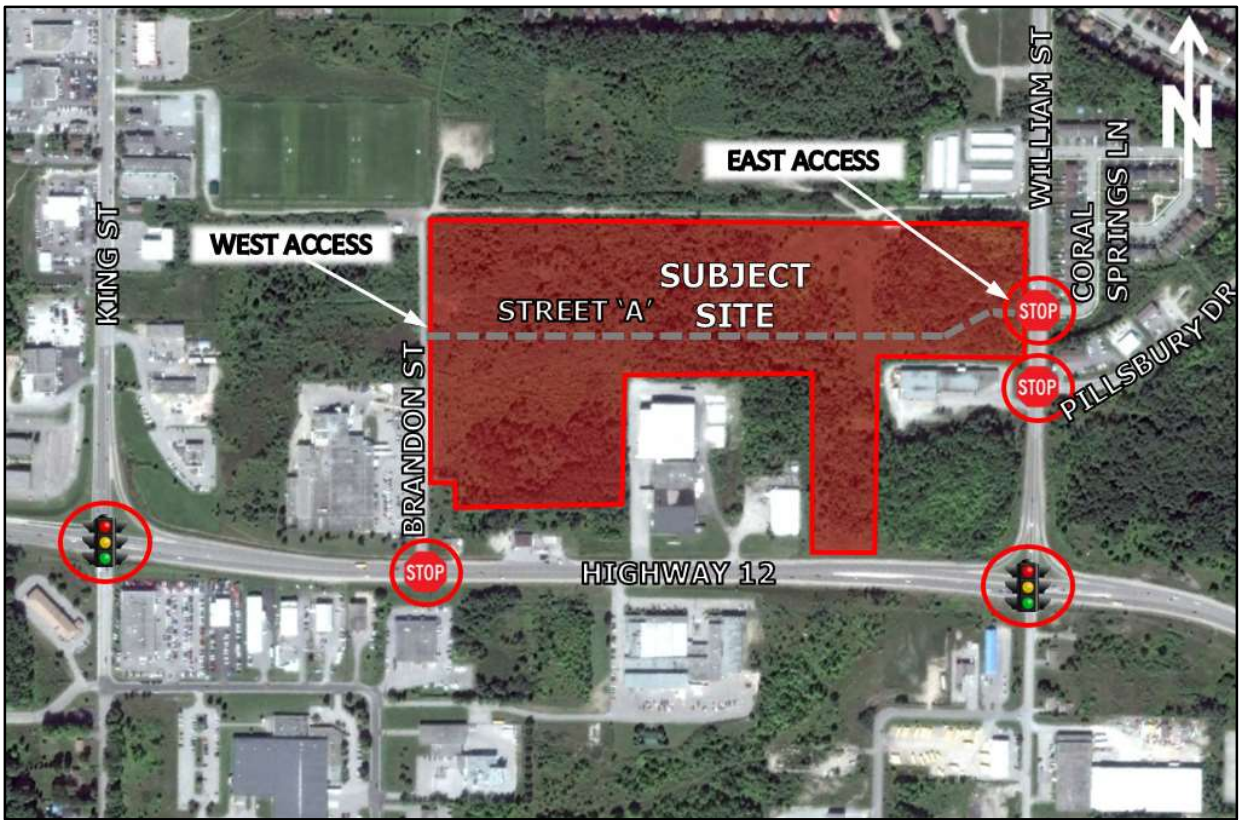
Figure 1 shows the location of the subject site and study area intersections in relation to the surrounding area. The Draft Plan of Subdivision by MHBC Planning is provided in **Appendix A**.

The subject site is bound by Highway 12 to the south, a proposed subdivision development to the north (currently undeveloped), Brandon Street to the west, William Street to the east.

Through consultation with the Town and MTO, the following intersections are included in the traffic impact study:

- Highway 12 / William Street;
- Highway 12 / Brandon Street;
- Highway 12 / King Street;
- William Street / Pillsbury Drive;
- William Street / East Access & Coral Springs Lane; and
- Brandon Street / West Access.

Figure 1 – Proposed Site Location and Study Area



1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site accesses and on the surrounding roadway network. The study analysis includes the following tasks:

- Consult with the Town and MTO to address any traffic-related issues or concerns they have with the proposed development;
- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;
- Complete level-of-service [LOS] analysis of horizon year (without the proposed development) traffic conditions and identify operational deficiencies;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies;
- Review the proposed intersection spacing;
- Review the available sight distance at the proposed site access driveway; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the existing year, ultimate buildout horizon year (2023), 5-year post-buildout horizon year (2028) and 10-year post-buildout horizon year (2033) were selected for analysis of traffic operations in the study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

2 Information Gathering

2.1 Street and Intersection Characteristics

Highway 12 is a four-lane Class 2B Arterial road through the study area. Highway 12 has a rural cross-section with gravel shoulders and ditches on both sides of the road. At its intersection with William Street and King Street, Highway 12 has curb on both sides of the road. West of King Street, Highway 12 has sidewalk on the north side of the road. Highway 12 has a posted speed limit of 60 km/h and is under the jurisdiction of MTO.

William Street is a three-lane arterial road (two southbound lanes and one northbound lane) with a rural cross-section through the study area. Between Pillsbury Drive and Southwinds Crescent, William Street has a four-lane profile (two lanes per direction). William Street has a posted speed limit of 50 km/h and is under the jurisdiction of the Town.

King Street is a four-lane arterial road with an urban cross-section and sidewalk on both sides of the road. King Street has a posted speed limit of 50 km/h and is under the jurisdiction of the Town.

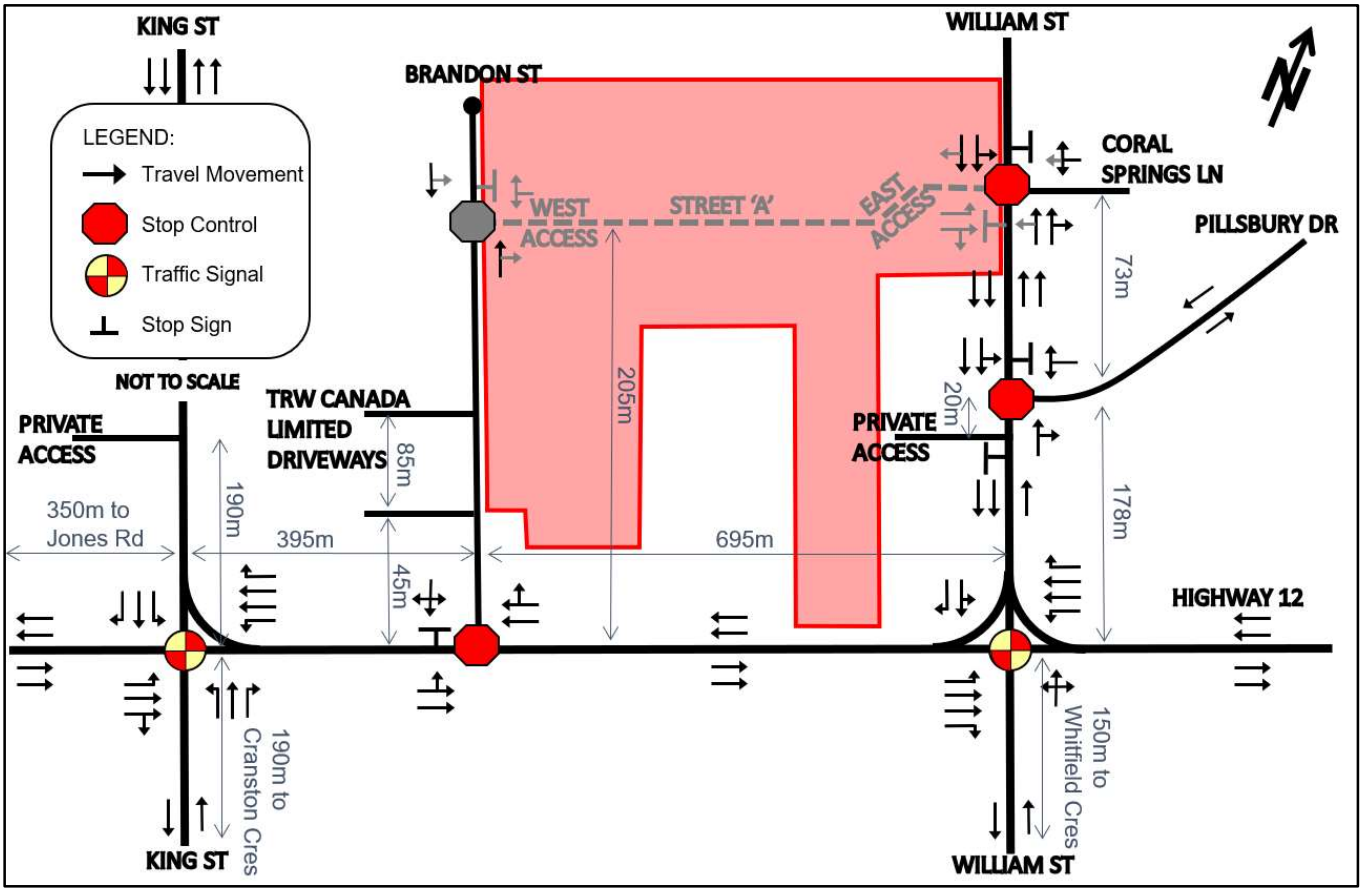
Pillsbury Drive is a two-lane collector road with a rural cross-section through the study area. Pillsbury Street has unposted (assumed) speed limit of 50 km/h and is under the jurisdiction of the Town.

Coral Springs Lane is a two-lane local road with an urban cross-section and sidewalk on the south/east side of the road. Coral Springs Lane has unposted (assumed) speed limit of 50 km/h and is under the jurisdiction of the Town.

Brandon Street is a two-lane local road with a rural cross-section. Brandon Street has unposted (assumed) speed limit of 50 km/h and is under the jurisdiction of the Town.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2**.

Figure 2 – Existing (2020) Intersection Spacing and Lane Configuration within Study Area



2.2 Local Transportation Infrastructure Improvements

Based on the Town's Multi-Modal Transportation Master Plan [TMP] (November 2019), the following improvement is listed as a short-term improvement (0-5 years):

- King Street;
  - Construction of separated bike lanes on both sides of the road from Yonge Street to Highway 12

The following improvements are listed as medium-term improvements (5-10 years):

- William Street;
  - Convert to a three-lane cross-section including a centre turn lane south of Chain Gate Drive to south of Coral Springs Lane;
  - Maintain existing cross-section south of Pillsbury Drive; and
  - Extension of the existing sidewalk on the road from Southwinds Crescent to Highway 12.

- William Street / Pillsbury Drive intersection
  - Implementation of traffic signals and realignment of the existing commercial access opposite Pillsbury Drive (as development occurs); and

  - Provide exclusive northbound, southbound and westbound left-turn lanes and a northbound right-turn lane (as development occurs).

- Highway 12;
  - Construction of bi-directional multi-use path on both sides of the road through the study area

2.3 Transit Access

The Midland South bus route provides bus service to various points of interest within the Town travelling along Birchwood Drive, Galloway Boulevard, and William Street, adjacent the study area.

This bus operates between 07:15 – 17:15 on weekdays and 09:15 – 16:15 on Saturdays with service every 60 minutes. There is no bus service on Sundays or Holidays. This bus route provides a "flag on" service where passengers are not required to be at a bus stop and can flag down the bus along its route to get on the bus.

2.4 Development Growth

In review of the Town's development information and through discussions with Town planning staff, the following developments have been noted for consideration with respect to impacts on the local traffic volumes / infrastructure capacity:

- Pratt Homes subdivision – 133 single detached and 135 townhouse units;
- 786 William Street development – 80 apartment units;
- Tiffin By The Lake – 47 residential units;
- Captain's Cove – 61 residential units;
- 16928 Highway 12 – 93 room hotel; and
- Hanson Development – 1,703 residential units and 3,300 m^2 (35,000 ft^2) commercial space.

Figure 3 illustrates the location of the above developments in relation to the subject site.

Figure 3 – Adjacent Development Location

2.4.1 Development Growth Traffic Generation

Traffic volumes generated by the 786 William Street, 16982 Highway 12 and Hanson development have been determined based on their respective traffic impact studies (Excerpts provided in **Appendix B**). For the remaining developments, traffic volumes have been calculated based on the data provided in the Institute of Transportation Engineers [ITE] Trip Generation Manual (10th Edition) [ITE Trip Generation Manual].

The following ITE land uses have been applied to estimate the traffic from the adjacent developments:

- ITE land use 210 (Single-Family Detached Housing) – General Urban/Suburban Setting; and
- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban/Suburban Setting

The AM and PM peak hour traffic generation for the adjacent developments do not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

For trip rates showing a strong statistical relationship, fitted curve equations have been utilized. **Table 1** summarizes the utilized trips generation rates and equations.

Table 1 – ITE Traffic Generation Rates & Equations

Land Use	Trip Basis	AM Peak Hour			PM/EVE Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached ITE Land Use: 210	equation (units)	T = 0.71 X + 4.80			Ln(T) = 0.96 Ln(X) + 0.2		
	distribution	25%	75%	100%	63%	37%	100%
Multifamily Housing (Low-Rise) ITE Land Use: 220	equation (units)	Ln(T) = 0.95 Ln(X) - 0.51			Ln(T) = 0.89 Ln(X) - 0.02		
	distribution	23%	77%	100%	63%	37%	100%

The estimated trip generation of the adjacent developments is illustrated below in **Table 2**.

Table 2 – Estimated Traffic Generation – Adjacent Developments

Development	Land Use	Size	AM Peak Hour			PM Peak Hour		
			IN	OUT	TOTAL	IN	OUT	TOTAL
Pratt Homes Subdivision	Single-Family Detached	133	25	74	99	84	49	133
	Multifamily Housing (Low-Rise)	135	15	49	64	49	29	78
Tiffin By The Lake	Single-Family Detached	47 (35 remaining)	7	22	29	23	14	37
Captains Cove	Single-Family Detached	61 (10 remaining)	3	9	12	7	4	11

The future phasing assumptions of the adjacent development lanes are summarized in **Table 3**.

Table 3 – Adjacent Developments Phasing Details

Development	% Build Out		
	2023	2028	2033
Pratt Homes Subdivision	50%	100%	100%
786 William Street	100%	100%	100%
Tiffin By The Lake	100%	100%	100%
Captain's Cove	100%	100%	100%
16928 Highway 12	100%	100%	100%
Hanson Development	25%	50%	100%

2.4.2 Adjacent Development Traffic Volume Assignment

For the noted adjacent developments that did not have available traffic study's, traffic volumes have been distributed to the study area road network based on the traffic distribution developed in Section 4.4, in context with the location of each development area.

The assignment of the background development volumes through the study area road network is illustrated in **Figure 4** through **Figure 12**.

2.5 Background Traffic Growth

2.5.1 Population & Employment Growth

The 2016 census profile for the Town of Midland indicates that the population has increased from 16,572 in 2011 to 16,864 in 2016, translating to an average annual increase of 0.35%.

As per the Town's TMP, the Town's population is projected to grow to 26,881 in 2041 translating to an average annual increase of 1.88%.

The Town's employment population is projected to grow from 13,786 persons in 2016 to 16,487 persons in 2041, translating to an annual growth rate of 0.72%.

2.5.2 Traffic Growth

In review of the available data published by MTO, the Annual Average Daily Traffic (AADT) volumes on Highway 12 for the period of 2010 to 2016 shows an average annual decrease 2.6% for the road section east of the Towns limits. West of the Towns limits, an average annual increase of 2.2% is shown.

2.5.3 Other Studies

In review of the *Proposed Hotel Development 16928 Highway 12 Traffic Impact Study* (WSP Canada Inc., January 30, 2019), a growth rate of 1.25% per annum was utilized for all through movements on Highway 12 and King Street. No growth rates were applied to turning movements at the study intersections (specifically Highway 12 / King Street) as they were assumed to be accounted for in the consideration of adjacent development volumes

The *Hanson Development Traffic Impact Study* (MMM Group, August 2016) utilized the same 1.25% per annum growth rate for all east-west and north-south directional movements. It is noted that this growth rate was assumed to include the entirety of the traffic growth related to any other developments in the local area.

2.5.4 Overall Background Growth Rate

In consideration of the historic growth for the Town, growth projections utilized for other transportation reports in the area and further noting that extensive consideration has been given to traffic generated by adjacent developments in the study area, a background growth rate of 1.25% per annum has been applied to through movements on Highway 12, King Street and William Street.

2.6 Traffic Counts

Detailed turning movement traffic and pedestrian counts were obtained from MTO and commissioned by JD Engineering at the study intersections. **Table 4** summarizes the traffic count data collection information.

Table 4 – Traffic Count Data

Intersection (N-S Street / E-W Street)	Count Date	AM Peak Hour	PM Peak Hour	Source
Highway 12 / King Street	Tuesday December 4, 2018	07:45 – 08:45	16:00 – 17:00	MTO
Highway 12 / Brandon Street	Wednesday August 26, 2020	07:30 – 08:30	16:00 – 17:00	JD Eng.*
Highway 12 / William Street	Tuesday August 15, 2017	08:15 – 09:15	15:45 – 15:45	MTO
Pillsbury Drive / William Street	Wednesday August 26, 2020	07:15 – 08:15	16:00 – 17:00	JD Eng.*

*Traffic counts were completed by Accu-Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**. Heavy vehicle percentages from the traffic count data have also been included in the Synchro analysis.

Traffic volumes at the north leg of the William Street / Pillsbury Drive intersection (William Street) were carried north through to the south leg of the William Street / Coral Spring Lane intersection. Turning movements at Coral Spring Lane have been estimated based on the existing land use and expected catchment area for motorists utilizing the roadway in conjunction with trip generation rates as per the ITE Trip Generation Manual 10th Edition [ITE Manual]. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 210 (Single Family Detached) – General Urban / Suburban Setting

Table 5 summarizes estimated trip generation for the Coral Spring Lane catchment area.

Table 5 – ITE Traffic Generation Trip Rates & Fitted Curve Equations

Land Use	Trip Basis / Units	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached ITE Land Use: 210	equation (units)	T = 0.71 X + 4.80			Ln(T) = 0.96 Ln(X) + 0.2		
	distribution	25%	75%	100%	63%	37%	100%
Coral Spring Lane area	48	10	29	39	32	19	51

The noted turning movements have been applied to the William Street / Coral Spring Lane intersection based on the existing directional split along William Street.

2.7 Existing Traffic Volumes

The 2020 existing AM and PM peak hour traffic volumes at the study area are illustrated in **Figure 13**, established based on the commissioned and conducted counts, adjusted to reflect the annual background growth rate of 1.25% where necessary. It is noted that the 1.25% growth rate has been

applied to all movements at the study intersections (rather than just the through movements) to ensure a conservative estimate in forecasting the 2020 volumes. A 10% increase was applied to volumes on Brandon Street and Pillsbury Drive, in addition to minor volume balancing through the intersections in order to account for any effects of the COVID-19 pandemic. The magnitude of the increase was a conservative estimate, based on a comparison of the 2017 and 2020 traffic volumes on William Street between Highway 12 and Pillsbury Drive.

2.8 Horizon Year Traffic Volumes

The background (2023, 2028 and 2033) horizon year traffic volumes are illustrated in **Figure 14** through **Figure 16**. The background volumes are based on the existing (2020) traffic volumes, adjusted to reflect the annual background growth rate of 1.25% in addition to the noted adjacent development traffic volumes (outlined in Section 2.4).

3 Intersection Operation without Proposed Development

3.1 Introduction

Existing and background horizon operational conditions were established to determine how the street network within the study area is currently functioning without the proposed development. This provides a base case scenario to compare with future development scenarios. Traffic operations within the study area were evaluated using the existing and future background traffic volumes with the existing road configuration and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 10, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analyzing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 10 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign-controlled intersections are shown in **Table 6**. A description of traffic performance characteristics is included for each LOS.

Table 6 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

3.2 Existing Intersection Operation

The results of the LOS analysis under existing (2020) traffic volumes during the AM and PM peak hour can be found below in **Table 7**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

A review of the need for auxiliary right and left turn lanes at the William Street unsignalized intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Further consideration for traffic signal improvements were considered at the unsignalized intersection based on the Ontario Traffic Manual Book 12 *Signal Justification*. The results indicate that traffic signals are not warranted at the intersection (results are provided in **Appendix H**).

An analysis was completed for left turn movements at the Highway 12 / Brandon Street intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the MTO DS criteria, an exclusive left turn lane is not recommended at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**).

No additional improvements are recommended within the study area.

Table 7 – Existing (2020) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.43	17.5	B	-	-	0.77	25.8	C	-	-
EBL	0.54	19.5	B	130	38	0.93	49.7	D	130	58.3
EBTR	0.27	19.1	B	-	-	0.50	22.3	C	-	-
WBL	0.19	14.4	B	135	16	0.12	14.2	B	135	7.0
WBT	0.25	18.3	B	-	-	0.36	20.1	C	-	-
WBR	0.21	0.3	A	-	-	0.14	0.2	A	-	-
NBL	0.09	24.4	C	35	10.4	0.21	25.2	C	35	21.6
NBT	0.10	24.4	C	-	-	0.22	25.3	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	23.7	C	35	7.0
SBL	0.26	26.9	C	75	30.5	0.54	33.4	C	75	59.7
SBT	0.16	25.2	C	-	-	0.12	24.6	C	-	-
SBR	0.13	24.8	C	-	-	0.29	27.1	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	1.4	A	-	-	-	0.9	A	-	-
EBTL	0.17	0.4	A	-	-	0.35	0.1	A	-	-
WBTR	0.31	0.0	-	-	-	0.27	0.0	-	-	-
SB	0.26	18.7	C	-	-	0.21	15.7	C	-	-
William Street / Highway 12 (signalized)	0.44	10.9	B	-	-	0.73	20.2	C	-	-
EBL	0.23	10.2	B	80	12.9	0.48	20.0	B	80	31.9
EBTR	0.26	9.4	A	-	-	0.52	16.7	B	-	-
WBL	0.01	8.0	A	40	1.4	0.04	12.6	B	40	2.6
WBT	0.31	9.8	A	-	-	0.37	15.0	B	-	-
WBR	0.20	0.3	A	-	-	0.25	0.4	A	-	-
NBT	0.14	16.6	B	-	-	0.18	14.1	B	-	-
SBTL	0.65	26.9	C	-	-	0.96	51.9	D	-	-
SBR	0.07	15.8	B	-	-	0.08	13.6	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.0	A	-	-	-	3.1	A	-	-
EB	0.00	0.0	A	-	-	0.09	23.8	C	-	-
WB	0.12	17.5	C	-	-	0.46	28.9	D	-	-
NB	0.00	0.1	A	-	-	0.02	0.1	A	-	-
SB	0.11	0.4	A	-	-	0.18	0.3	A	-	-
William Street / Coral Springs Lane (unsignalized)	-	0.5	A	-	-	-	0.4	A	-	-
WB	0.05	11.4	B	-	-	0.05	14.0	B	-	-
NB	0.15	0.0	-	-	-	0.22	0.0	-	-	-
SB	0.14	0.4	A	-	-	0.22	0.9	A	-	-

3.3 Background (2023) Intersection Operation

The results of the LOS analysis under background (2023) traffic volumes during the AM and PM peak hour can be found below in **Table 8**. Existing intersection geometry has been utilized for this scenario. Minor traffic signal timings adjustments have been made to ensure acceptable operations (namely an increase to the eastbound left-turn green time at the intersection of King Street / Highway 12). Detailed output of the Synchro analysis can be found in **Appendix E**.

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

A review of the need for auxiliary right and left turn lanes at the William Street unsignalized intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Further consideration for traffic signal improvements were considered at the unsignalized intersections based on the Ontario Traffic Manual Book 12 *Signal Justification*. The results indicate that traffic signals are not warranted at the intersection (results are provided in **Appendix H**).

An analysis was completed for left turn movements at the Highway 12 / Brandon Street intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the MTO DS criteria, an exclusive left turn lane is not recommended at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**).

No additional improvements are recommended within the study area.

Table 8 – Background (2023) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.47	18.2	B	-	-	0.83	27.4	C	-	-
EBL	0.61	21.6	C	130	41.2	0.94	47.4	D	130	66.4
EBTR	0.30	19.4	B	-	-	0.52	22.1	C	-	-
WBL	0.20	14.5	B	135	16.0	0.12	16.6	B	135	7.0
WBT	0.27	19.1	B	-	-	0.42	24.1	C	-	-
WBR	0.21	0.3	A	-	-	0.14	0.2	A	-	-
NBL	0.09	24.4	C	35	10.4	0.22	28.0	C	35	23.7
NBT	0.11	24.5	C	-	-	0.24	28.1	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	26.2	C	35	4.6
SBL	0.27	27.0	C	75	30.8	0.57	37.6	D	75	65.5
SBT	0.17	25.3	C	-	-	0.13	27.3	C	-	-
SBR	0.15	25.0	C	-	-	0.36	31.1	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	1.5	A	-	-	-	0.9	A	-	-
EBTL	0.19	1.0	A	-	-	0.38	0.0	A	-	-
WBTR	0.33	0.0	-	-	-	0.30	0.0	-	-	-
SB	0.29	20.4	C	-	-	0.23	17.0	C	-	-
William Street / Highway 12 (signalized)	0.46	11.3	B	-	-	0.77	20.2	C	-	-
EBL	0.25	10.6	B	80	14.0	0.68	33.9	C	80	51.7
EBTR	0.28	9.5	A	-	-	0.60	21.9	B	-	-
WBL	0.01	8.0	A	40	1.4	0.05	16.3	B	40	3.0
WBT	0.33	9.9	A	-	-	0.44	19.5	B	-	-
WBR	0.20	0.3	A	-	-	0.26	0.4	A	-	-
NBT	0.14	16.6	B	-	-	0.15	12.8	B	-	-
SBTL	0.68	28.3	C	-	-	0.85	34.0	C	-	-
SBR	0.08	15.9	B	-	-	0.09	12.6	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.7	A	-	-	-	5.0	A	-	-
EB	0.00	0.0	A	-	-	0.12	31.3	D	-	-
WB	0.23	18.8	C	-	-	0.63	43.4	E	-	-
NB	0.00	0.1	A	-	-	0.04	0.1	A	-	-
SB	0.11	1.1	A	-	-	0.19	1.4	A	-	-
William Street / Coral Springs Lane (unsignalized)	-	0.5	A	-	-	-	0.4	A	-	-
WB	0.06	11.9	B	-	-	0.05	14.9	B	-	-
NB	0.17	0.0	-	-	-	0.24	0.0	-	-	-
SB	0.15	0.3	A	-	-	0.24	0.9	A	-	-

3.4 Background (2028) Intersection Operation

The results of the LOS analysis under background (2028) traffic volumes during the AM and PM peak hour can be found below in **Table 9**. The improvement of William Street to a three-lane profile (as discussed in Section 2.2) has been utilized for this scenario. The implementation of traffic signals at the William Street / Pillsbury Drive intersection has not been included, to evaluate the warrant for the improvement. Minor traffic signal timings adjustments have been made to ensure acceptable operations. Detailed output of the Synchro analysis can be found in **Appendix E**.

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1. As indicated, with the provision of a three-lane cross-section on William Street, the operations at the Pillsbury Drive and Coral Springs Lane intersections are improved.

A review of the need for auxiliary right and left turn lanes at the William Street unsignalized intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Further consideration for traffic signal improvements were considered at the unsignalized intersections based on the Ontario Traffic Manual Book 12 *Signal Justification*. The results indicate that traffic signals are not warranted at the intersection (results are provided in **Appendix H**).

An analysis was completed for left turn movements at the Highway 12 / Brandon Street intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the MTO DS criteria, an exclusive left turn lane is not recommended at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**).

No additional improvements are recommended within the study area.

Table 9 – Background (2028) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.51	18.8	B	-	-	0.80	28.7	C	-	-
EBL	0.66	23.6	C	130	43.1	0.87	34.9	C	130	76.5
EBTR	0.33	19.8	B	-	-	0.53	22.3	C	-	-
WBL	0.22	14.6	B	135	16.0	0.14	23.1	C	135	7.2
WBT	0.29	19.4	B	-	-	0.56	33.9	C	-	-
WBR	0.21	0.3	A	-	-	0.14	0.2	A	-	-
NBL	0.09	24.4	C	35	10.6	0.24	31.5	C	35	26.6
NBT	0.12	24.6	C	-	-	0.27	31.8	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	29.4	C	35	6.2
SBL	0.27	27.1	C	75	31.6	0.61	43.0	D	75	72.4
SBT	0.19	25.5	C	-	-	0.14	30.7	C	-	-
SBR	0.16	25.2	C	-	-	0.27	32.8	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	1.5	A	-	-	-	0.9	A	-	-
EBTL	0.21	1.0	A	-	-	0.41	0.1	A	-	-
WBTR	0.35	0.0	-	-	-	0.33	0.0	-	-	-
SB	0.31	22.5	C	-	-	0.26	18.9	C	-	-
William Street / Highway 12 (signalized)	0.48	11.5	B	-	-	0.83	21.6	C	-	-
EBL	0.28	11.0	B	80	15.0	0.79	44.7	D	80	59.4
EBTR	0.31	9.8	A	-	-	0.65	22.6	C	-	-
WBL	0.01	8.0	A	40	1.4	0.06	16.5	B	40	3.1
WBT	0.35	10.1	B	-	-	0.49	19.9	B	-	-
WBR	0.21	0.3	A	-	-	0.27	0.4	A	-	-
NBT	0.14	16.7	B	-	-	0.16	13.0	B	-	-
SBTL	0.70	29.3	C	-	-	0.87	35.8	D	-	-
SBR	0.08	15.9	B	-	-	0.12	12.9	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.3	A	-	-	-	2.6	A	-	-
EB	0.00	0.0	A	-	-	0.06	16.7	C	-	-
WB	0.17	14.7	B	-	-	0.44	23.5	C	-	-
NB	0.00	0.1	A	-	-	0.00	0.1	A	-	-
SB	0.24	9.0	A	-	-	0.41	9.3	A	-	-
William Street / Coral Springs Lane (unsignalized)	-	0.4	A	-	-	-	0.3	A	-	-
WB	0.06	11.8	B	-	-	0.05	14.2	B	-	-
NB	0.28	0.0	-	-	-	0.41	0.0	-	-	-
SB	0.25	8.3	A	-	-	0.39	9.1	A	-	-

3.5 Background (2033) Intersection Operation

The results of the LOS analysis under background (2033) traffic volumes during the AM and PM peak hour can be found below in **Table 10**. The improvement of William Street to a three-lane profile (as discussed in Section 2.2) has been utilized for this scenario. The implementation of traffic signals at the William Street / Pillsbury Drive intersection has not been included in order to evaluate the need for such improvement. Minor traffic signal timings adjustments have been made to ensure acceptable operations Detailed output of the Synchro analysis can be found in **Appendix E**.

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

A review of the need for auxiliary right and left turn lanes at the William Street unsignalized intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Further consideration for traffic signal improvements were considered at the unsignalized intersections based on the Ontario Traffic Manual Book 12 *Signal Justification*. The results indicate that traffic signals are not warranted at the intersection (results are provided in **Appendix H**).

An analysis was completed for left turn movements at the Highway 12 / Brandon Street intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the MTO DS criteria, an exclusive left turn lane is not recommended at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**).

No additional improvements are recommended within the study area.

Table 10 – Background (2033) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.56	19.8	B	-	-	0.83	32.4	C	-	-
EBL	0.73	27.7	C	130	46.1	0.88	45.3	D	130	102
EBTR	0.38	20.5	C	-	-	0.58	22.6	C	-	-
WBL	0.23	14.9	B	135	16.0	0.16	26.6	C	135	7.0
WBT	0.32	19.7	B	-	-	0.72	41.7	D	-	-
WBR	0.21	0.3	A	-	-	0.15	0.2	A	-	-
NBL	0.10	24.6	C	35	11.2	0.27	32.5	C	35	28.6
NBT	0.13	24.7	C	-	-	0.30	32.9	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	30.1	C	35	6.3
SBL	0.29	27.4	C	75	33.3	0.67	46.7	D	75	76.0
SBT	0.20	25.7	C	-	-	0.16	31.7	C	-	-
SBR	0.17	25.3	C	-	-	0.28	33.8	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	1.5	A	-	-	-	0.9	A	-	-
EBTL	0.23	1.0	A	-	-	0.45	0.1	A	-	-
WBTR	0.38	0.0	-	-	-	0.37	0.0	-	-	-
SB	0.35	25.3	D	-	-	0.31	22.5	C	-	-
William Street / Highway 12 (signalized)	0.50	11.7	B	-	-	0.89	23.3	C	-	-
EBL	0.31	11.7	B	80	16.1	0.87	55.9	E	80	63.7
EBTR	0.35	10.1	B	-	-	0.67	21.9	C	-	-
WBL	0.01	8.0	A	40	1.5	0.06	15.6	B	40	3.0
WBT	0.38	10.3	B	-	-	0.52	19.2	B	-	-
WBR	0.21	0.3	A	-	-	0.27	0.4	A	-	-
NBT	0.14	16.7	B	-	-	0.18	14.2	B	-	-
SBTL	0.70	29.5	C	-	-	0.92	44.2	D	-	-
SBR	0.08	15.9	B	-	-	0.14	14.2	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.3	A	-	-	-	2.7	A	-	-
EB	0.00	0.0	A	-	-	0.06	17.7	C	-	-
WB	0.18	15.3	C	-	-	0.47	25.8	D	-	-
NB	0.00	0.1	A	-	-	0.00	0.1	A	-	-
SB	0.26	9.1	A	-	-	0.44	9.4	A	-	-
William Street / Coral Springs Lane (unsignalized)	-	0.4	A	-	-	-	0.3	A	-	-
WB	0.06	12.1	B	-	-	0.05	14.8	B	-	-
NB	0.30	0.0	-	-	-	0.43	0.0	-	-	-
SB	0.26	8.3	A	-	-	0.42	9.2	A	-	-

4 Proposed Development Traffic Generation and Assignment

4.1 Traffic Generation

Recognizing that at the time of this study no specific uses have been confirmed for within the subject site, trip generation for the development has been established based on review of the permitted uses within the *Town of Midland Zoning By-Law 2004-90* in context with the trip generation rates published in the ITE Trip Generation Manual.

Based on the permitted uses listed for the Industrial Zone – M1 zoning, the following ITE land uses have been considered:

- ITE land use 110 (General Light Industrial);
- ITE land use 130 (Industrial Park);
- ITE land use 140 (Manufacturing);
- ITE land use 150 (Warehousing);
- ITE land use 160 (Data Centre);
- ITE land use 180 (Specialty Trade Contractor);
- ITE land use 710 (General Office Building);
- ITE land use 810 (Tractor Supply Store);
- ITE land use 811 (Construction Equipment Rental Store);
- ITE land use 812 (Building Materials and Lumber Store);
- ITE land use 842 (Recreational Vehicle Sales); and
- ITE land use 943 (Automobile Parts and Service Centre).

The associated trip rates are provided in **Table 11.**

Table 11 – Trip Generation Rates – Permitted Uses

ITE Land Use Code	Land Use	Variable	AM Peak Hour			PM Peak Hour		
			IN	OUT	TOTAL	IN	OUT	TOTAL
110	General Light Industrial	1000 ft² GFA	0.62	0.08	0.7	0.08	0.55	0.63
130	Industrial Park		0.32	0.08	0.4	0.08	0.32	0.4
140	Manufacturing		0.45	0.17	0.62	0.27	0.40	0.67
150	Warehousing		0.13	0.04	0.17	0.09	0.10	0.19
160	Data Centre		0.09	0.02	0.11	0.03	0.06	0.09
180	Specialty Trade Contractor		0.91	0.75	1.66	0.95	1.02	1.97
710	General Office Building		0.85	0.31	1.16	0.46	0.69	1.15
810	Tractor Supply Store		-	-	-	0.66	0.74	1.40
811	Construction Equipment Rental Store		-	-	-	0.28	0.71	0.99
812	Building Materials and Lumber Store		0.99	0.58	1.57	0.97	1.09	2.06
842	Recreational Vehicle Sales		0.35	0.11	0.46	0.21	0.56	0.77
943	Automobile Parts and Service Centre		1.67	0.29	1.96	0.70	1.56	2.26
Average Trip Rate			**0.64**	**0.24**	**0.88**	**0.40**	**0.65**	**1.05**

As previously noted, there are no specific uses planned for the development. Therefore, the average trip rate has been applied to the subject site in efforts to encompass a wide variety of permitted uses.

It is noted that the existing zoning permits a maximum lot coverage of 60%; however, a review of similar industrial/commercial lots in the surrounding area indicates a much lower average lot coverage of approximately 25%. For the purpose of this study, a lot coverage of 30% has been assumed. With a developable area of 12.33 hectares (1,327,189 ft^2) a lot coverage of 30% results in a total gross floor area of 398,157 ft^2.

The estimated trip generation of the proposed development is illustrated below in **Table 12**.

Table 12 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Industrial Zone – M1	398,157 ft^2 GFA	254	97	351	158	259	417
Total		**254**	**97**	**351**	**158**	**259**	**417**

No transportation modal split has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour. The distribution of traffic has been calculated based on the 2016 Transportation Tomorrow Survey [TTS] data for traffic zone 8576 retrieved using the TTS Internet Data Retrieval System [IDRS] (output attached as **Appendix E**). TTS data provides historical origin and destination work trip percentages for specific areas within the County and the Greater Toronto and Hamilton Area [GTHA].

Traffic distribution for the trips generated by the proposed development are expected to generally follow commuter travel patterns. Our analysis is based on egress traffic during the AM peak hour. Logically, the distribution of ingress traffic will follow the inverse of the exiting traffic distribution. For each of the individual areas identified in the TTS data, we have selected the probable route of travel, assuming drivers will select their route primarily based on travel time.

The distribution of trips is illustrated in **Table 13** using the methodology outlined above.

Table 13 – Proposed Development Traffic Distribution

Travel Direction (to / from)	Percent of Total Traffic Generation
North via William Street / King Street	65%
East via Highway 12	10%
West via Highway 12	25%
TOTAL	**100%**

The site traffic assignment for buildout of the proposed developments for the AM and PM peak hour is illustrated in **Figure 17**.

4.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2023, 2028 and 2033) horizon year traffic volumes, the proposed development traffic was added to the background (2023, 2028 and 2033) traffic volumes. The resulting total (2023, 2028 and 2033) horizon year traffic volume for the AM and PM peak hour are illustrated in **Figure 18** through **Figure 20**.

5 Intersection Operation with Proposed Development

5.1 Total (2023) Intersection Operation

The results of the LOS analysis under total (2023) traffic volumes during the AM and PM peak hour can be found below in **Table 14**. Existing intersection geometry has been utilized for this scenario, including stop control has been assumed at the Site Access egress movements. The East Access has been modelled to include an eastbound left and shared through/right turn lane. Minor traffic signal timings adjustments have been made to ensure acceptable operations (namely an increase to the eastbound left turn green time at the intersection of King Street / Highway 12). Detailed output of the Synchro analysis can be found in **Appendix G**.

The results of the LOS analysis indicate that the majority of the study intersections are operating within the typical design limits noted in Section 3.1.

The exception occurs during the PM peak hour where eastbound movement at the William Street / Coral Springs Lane & East Access will experience a LOS F. While traffic signals would address the operating conditions, such are not considered necessary given that the delay only occurs during the PM peak hour and the approach will continue to operate well below capacity (v/c = 0.90). The same can be noted for the eastbound movement at William Street / Pillsbury Drive & Private Access where eastbound operations will slightly exceed the LOS F threshold (the delay threshold for LOS F is > 50 seconds). It is further noted that the intersection volumes do not warrant the implementation of traffic signals (Ontario Traffic Manual Book 12 *Signal Justification* results provided in **Appendix H**).

A review of the need for auxiliary right and left turn lanes at William Street intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess

capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the remaining unsignalized intersections (results are provided in **Appendix H**).

It is noted that this study utilizes an aggressive timeline for both the development in the local area and the proposed development itself, creating a conservative estimate of future traffic volumes for which analyses are based upon. However, the need for traffic signal improvements should be verified through continued monitoring of traffic volumes as development in the study area occurs.

Based on MTO DS criteria, an exclusive left turn lane is warranted at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**). As illustrated in **Table 14**, the intersection will provide satisfactory operations for all movements with minimal queuing for the eastbound left turn movement (LOS D or greater, 95th percentile queue length < 3.4 metres). Furthermore, there is significant excess capacity within the two eastbound lanes on Highway 12 at this intersection; consequently, the additional eastbound left turn movements will not result in any traffic capacity constraints in Highway 12. Notwithstanding, it is our understanding that MTO will require an exclusive eastbound left turn lane on Highway 12 at Brandon Street with a storage length of 15 metres, parallel length of 55 metres and taper length of 120 metres. The turn lane will tie into the existing westbound left turn lane at the downstream intersection (Highway 12 / King Street), creating a shared auxiliary lane. Based on our review of the site generated traffic volumes, the left turn warrant will be satisfied upon the 29% build-out mark of the Subject Site (approximately 115,465 ft^2 GFA).

No additional improvements are recommended within the study area.

Table 14 – Total (2023) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.51	18.6	B	-	-	0.79	28.1	C	-	-
EBL	0.63	22.4	C	130	41.2	0.84	31.7	C	130	71.2
EBTR	0.35	20.2	C	-	-	0.52	22.0	C	-	-
WBL	0.22	14.8	B	135	16.0	0.13	23.0	C	135	7.2
WBT	0.29	19.3	B	-	-	0.57	34.2	C	-	-
WBR	0.21	0.3	A	-	-	0.16	0.2	A	-	-
NBL	0.09	24.4	C	35	10.4	0.23	31.4	C	35	25.8
NBT	0.11	24.5	C	-	-	0.25	31.5	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	29.4	C	35	6.2
SBL	0.33	28.1	C	75	37.3	0.64	43.9	D	75	76.6
SBT	0.17	25.3	C	-	-	0.13	30.6	C	-	-
SBR	0.15	25.0	C	-	-	0.25	32.6	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	4.0	A	-	-	-	3.7	B	-	-
EBTL	0.13	4.9	A	-	-	0.39	1.9	A	-	-
WBTR	0.33	0.0	-	-	-	0.30	0.0	-	-	-
SB	0.55	30.9	D	-	-	0.62	27.8	D	-	-
William Street / Highway 12 (signalized)	0.47	11.4	B	-	-	0.81	21.0	C	-	-
EBL	0.31	11.4	B	80	17.1	0.74	37.8	D	80	57.6
EBTR	0.28	9.6	A	-	-	0.61	21.9	C	-	-
WBL	0.01	8.0	A	40	1.4	0.05	16.2	B	40	3.0
WBT	0.33	9.9	A	-	-	0.45	19.4	B	-	-
WBR	0.21	0.3	A	-	-	0.27	0.4	A	-	-
NBT	0.14	16.7	B	-	-	0.16	13.0	B	-	-
SBTL	0.70	29.1	C	-	-	0.88	37.2	D	-	-
SBR	0.08	15.9	B	-	-	0.13	13.0	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.8	A	-	-	-	5.9	A	-	-
EB	0.00	0.0	A	-	-	0.14	36.3	E	-	-
WB	0.26	20.2	C	-	-	0.70	52.5	F	-	-
NB	0.00	0.2	A	-	-	0.00	0.1	A	-	-
SB	0.12	0.6	A	-	-	0.20	1.6	A	-	-
William Street / Coral Springs Lane & East Access (unsignalized)	-	2.1	A	-	-	-	11.3	A	-	-
EBL	0.22	19.7	C	25	5.9	0.93	108.4	F	25	53
EBTR	0.02	10.0	B	-	-	0.06	11.0	B	-	-
WB	0.07	13.6	B	-	-	0.07	18.6	C	-	-
NB	0.13	1.6	A	-	-	0.19	0.9	A	-	-
SB	0.20	0.2	A	-	-	0.24	0.7	A	-	-
Brandon Street / West Access (unsignalized)	-	6.9	A	-	-	-	5.6	A	-	-
WB	0.04	7.5	A	-	-	0.09	9.0	A	-	-
NB	0.08	6.7	A	-	-	0.03	0.0	A	-	-

5.2 Total (2028) Intersection Operation

The results of the LOS analysis under total (2028) traffic volumes during the AM and PM peak hour can be found below in **Table 15**. The improvement of William Street to a three-lane profile (as discussed in Section 2.2) has been utilized for this scenario. The implementation of traffic signals at the William Street / Pillsbury Drive intersection has not been included in order to evaluate the need for such improvement. Stop control has been assumed at the Site Access egress movements. Detailed output of the Synchro analysis can be found in **Appendix G**.

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1. Similar to the background conditions, the provision of a three-lane cross-section on William Street will provide improved operating conditions at the Pillsbury Drive and Coral Springs Lane / East Access intersections.

A review of the need for auxiliary right and left turn lanes at William Street intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the remaining unsignalized intersections (results are provided in **Appendix H**).

Based on MTO DS criteria, an exclusive left turn lane is warranted at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**). However, as illustrated in **Table 15**, the intersection will provide satisfactory operations for all movements with minimal queuing for the eastbound left turn movement (LOS D or greater, 95th percentile queue length < 3.7 metres). Furthermore, there is significant excess capacity within the two eastbound lanes on Highway 12 at this intersection; consequently, the additional eastbound left turn movements will not result in any traffic capacity constraints in Highway 12. Notwithstanding, it is our understanding that MTO will require an exclusive eastbound left turn lane on Highway 12 at Brandon Street with a storage length of 15 metres, parallel length of 55 metres and taper length of 120 metres. The turn lane will tie into the existing westbound left turn lane at the downstream intersection (Highway 12 / King Street), creating a shared auxiliary lane. Based on our review of the site generated traffic volumes, the left turn warrant will be satisfied upon the 29% build-out mark of the Subject Site (approximately 115,465 ft^2 GFA).

No additional improvements are recommended within the study area.

Table 15 – Total (2028) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.54	19.3	B	-	-	0.80	31.1	C	-	-
EBL	0.68	24.7	C	130	43.1	0.84	39.0	D	130	92.9
EBTR	0.39	20.6	C	-	-	0.55	22.1	C	-	-
WBL	0.24	15.0	B	135	16.0	0.15	26.5	C	135	7.0
WBT	0.31	19.6	B	-	-	0.71	41.3	C	-	-
WBR	0.21	0.3	A	-	-	0.16	0.2	A	-	-
NBL	0.09	24.4	C	35	10.6	0.25	32.3	C	35	26.9
NBT	0.12	24.6	C	-	-	0.28	32.6	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	30.1	C	35	6.3
SBL	0.33	28.3	C	75	38.5	0.68	46.9	D	75	79.4
SBT	0.19	25.5	C	-	-	0.14	31.5	C	-	-
SBR	0.16	25.2	C	-	-	0.27	33.5	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	4.3	A	-	-	-	4.3	C	-	-
EBTL	0.21	5.0	A	-	-	0.42	2.0	A	-	-
WBTR	0.35	0.0	-	-	-	0.33	0.0	-	-	-
SB	0.60	36.1	E	-	-	0.70	35.1	E	-	-
William Street / Highway 12 (signalized)	0.49	11.7	B	-	-	0.86	22.6	C	-	-
EBL	0.34	12.1	B	80	18.4	0.78	41.5	D	80	61.7
EBTR	0.31	9.8	A	-	-	0.62	20.9	C	-	-
WBL	0.01	8.0	A	40	1.4	0.05	15.2	B	40	2.9
WBT	0.36	10.1	B	-	-	0.46	18.4	B	-	-
WBR	0.21	0.3	A	-	-	0.27	0.4	A	-	-
NBT	0.14	16.7	B	-	-	0.18	14.2	B	-	-
SBTL	0.72	30.0	C	-	-	0.94	47.6	D	-	-
SBR	0.09	15.9	B	-	-	0.14	14.2	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.3	A	-	-	-	2.8	B	-	-
EB	0.00	0.0	A	-	-	0.06	17.6	C	-	-
WB	0.19	15.3	C	-	-	0.47	25.5	D	-	-
NB	0.00	0.1	A	-	-	0.00	0.1	A	-	-
SB	0.25	9.1	A	-	-	0.44	9.4	A	-	-
William Street / Coral Springs Lane & East Access (unsignalized)	-	1.6	A	-	-	-	3.7	B	-	-
EBL	0.15	15.8	C	25	3.8	0.55	32.4	D	25	23.4
EBTR	0.02	11.4	B	-	-	0.09	14.1	B	-	-
WB	0.06	12.8	B	-	-	0.06	16.0	C	-	-
NB	0.28	8.7	A	-	-	0.41	9.3	A	-	-
SB	0.33	8.3	A	-	-	0.44	9.1	A	-	-
Brandon Street / West Access (unsignalized)	-	6.9	A	-	-	-	5.5	A	-	-
WB	0.04	7.5	A	-	-	0.09	8.8	A	-	-
NB	0.08	6.7	A	-	-	0.03	0.0	-	-	-

5.3 Total (2033) Intersection Operation

The results of the LOS analysis under total (2033) traffic volumes during the AM and PM peak hour can be found below in **Table 16** The improvement of Highway 12 to a three-lane profile (as discussed in Section 2.2) has been utilized for this scenario. Stop control has been assumed at the Site Access egress movements. Detailed output of the Synchro analysis can be found in **Appendix G**.

The results of the LOS analysis indicate that the majority of the study intersections are operating within the typical design limits noted in Section 3.1. The exception occurs at the intersection of Brandon Street / Highway 12 where southbound movement will experience a LOS F. However, such delay is not a concern given that it only marginally exceeds the LOS F threshold (the delay threshold for LOS F is > 50 seconds) while the overall intersection continues to provide good operations (LOS C or greater). It is further noted that the intersection volumes do not warrant the implementation of traffic signals (Ontario Traffic Manual Book 12 *Signal Justification* results provided in **Appendix H**).

A review of the need for auxiliary right and left turn lanes at William Street intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, auxiliary turn lanes are not recommended at any unsignalized study area intersections.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the remaining unsignalized intersections (results are provided in **Appendix H**).

Based on MTO DS criteria, an exclusive left turn lane is warranted at the Highway 12 / Brandon Street intersection (results provided in **Appendix I**). As outlined in Section 5.1 and 5.2, there is significant excess capacity within the two eastbound lanes on Highway 12 at this intersection. Notwithstanding, it is our understanding that MTO will require an exclusive eastbound left turn lane on Highway 12 at Brandon Street with a storage length of 15 metres, parallel length of 55 metres and taper length of 120 metres. The turn lane will tie into the existing westbound left turn lane at the downstream intersection (Highway 12 / King Street), creating a shared auxiliary lane. Based on our review of the site generated traffic volumes, the left turn warrant will be satisfied upon the 29% build-out mark of the Subject Site (approximately 115,465 ft^2 GFA).

No additional improvements are recommended within the study area.

Table 16 – Total (2033) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
King Street / Highway 12 (signalized)	0.60	20.4	C	-	-	0.87	34.7	C	-	-
EBL	0.76	29.4	C	130	46.1	0.93	56.1	E	130	119.7
EBTR	0.44	21.3	C	-	-	0.61	23.2	C	-	-
WBL	0.26	15.3	B	135	16.0	0.16	26.7	C	135	7.0
WBT	0.34	19.9	B	-	-	0.80	44.8	D	-	-
WBR	0.22	0.3	A	-	-	0.17	0.2	A	-	-
NBL	0.10	24.6	C	35	11.2	0.27	32.5	C	35	28.6
NBT	0.13	24.7	C	-	-	0.30	32.9	C	-	-
NBR	0.02	23.5	C	35	0.0	0.05	30.1	C	35	6.3
SBL	0.35	28.6	C	75	39.9	0.71	49.4	D	75	82.9
SBT	0.20	25.7	C	-	-	0.16	31.7	C	-	-
SBR	0.17	25.3	C	-	-	0.28	33.8	C	-	-
Brandon Street / Highway 12 (unsignalized)	-	4.9	A	-	-	-	5.8	C	-	-
EBTL	0.24	4.9	A	-	-	0.46	2.1	A	-	-
WBTR	0.38	0.0	-	-	-	0.38	0.0	-	-	-
SB	0.68	45.6	E	-	-	0.82	52.8	F	-	-
William Street / Highway 12 (signalized)	0.51	11.9	B	-	-	0.94	25.0	C	-	-
EBL	0.38	13.0	B	80	19.7	0.94	69.8	E	80	69.5
EBTR	0.35	10.1	B	-	-	0.68	22.1	C	-	-
WBL	0.01	8.0	A	40	1.5	0.06	15.7	B	40	3.0
WBT	0.39	10.4	B	-	-	0.52	19.3	B	-	-
WBR	0.21	0.3	A	-	-	0.27	0.4	A	-	-
NBT	0.14	16.7	B	-	-	0.18	14.2	B	-	-
SBTL	0.72	30.1	C	-	-	0.94	48.3	D	-	-
SBR	0.09	15.9	B	-	-	0.18	14.6	B	-	-
William Street / Pillsbury Dr & Private Access (unsignalized)	-	1.3	A	-	-	-	2.9	A	-	-
EB	0.00	0.0	A	-	-	0.07	18.7	C	-	-
WB	0.20	16.0	B	-	-	0.50	28.3	D	-	-
NB	0.00	0.1	A	-	-	0.05	0.1	A	-	-
SB	0.27	9.2	A	-	-	0.47	0.5	A	-	-
William Street / Coral Springs Lane & East Access (unsignalized)	-	1.5	A	-	-	-	3.9	B	-	-
EBL	0.16	16.4	C	25	4.2	0.59	36.7	E	25	26.2
EBTR	0.03	11.6	B	-	-	0.10	14.7	B	-	-
WB	0.07	13.2	B	-	-	0.06	16.8	C	-	-
NB	0.30	8.8	A	-	-	0.43	9.5	A	-	-
SB	0.35	8.4	A	-	-	0.47	9.2	A		
Brandon Street / West Access (unsignalized)	-	6.9	A	-	-	-	5.5	A		
WB	0.04	7.5	A	-	-	0.09	8.8	A		
NB	0.08	6.7	A	-	-	0.03	0.0	A		

For comparative purposes, an additional scenario was undertaken to consider the improvements noted within the Town's TMP at William Street / Pillsbury Dr & Private Access intersection including

the implementation of traffic signals and the provision of northbound, southbound and westbound left-turn lanes.

The results of the LOS analysis under total (2033) traffic volumes during the AM and PM peak hour can be found below in **Table 17**. Detailed output of the Synchro analysis can be found in **Appendix G**.

Table 17 – Total (2033) + TMP Improvements LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Storage	Model				Storage	Model
William Street / Pillsbury Dr & Private Access (unsignalized)	0.46	4.9	A	-	-	0.56	7.1	A	-	-
EB	-	0.0	A	-	-	0.02	20.8	C	-	-
WBL	0.39	26.7	C	15.0	9.6	0.44	23.6	C	15.0	12.2
WBTR	0.02	23.9	C	-	-	0.04	20.9	C	-	-
NBL	0.01	1.8	A	15.0	0.8	0.01	2.2	A	15.0	0.6
NBTR	0.47	3.8	A	-	-	0.58	5.6	A	-	-
SBL	0.05	2.0	A	25.0	2.4	0.11	2.9	A	25.0	4.0
SBTR	0.33	2.9	A	-	-	0.59	5.6	A	-	-

As indicated, the noted improvements provide marginal operational improvements at the study intersection.

5.4 Site Access

The site accesses will operate efficiently as a full-movement driveways, with one-way stop control for the egress movements. Single ingress and egress lane will provide the necessary capacity to service the proposed development.

It is recommended that an eastbound left turn lane is provided at the East Access with a 25 metre storage length and a 55 metre taper length.

The proposed spacing between the proposed East Access and the closest intersection to the north and south are in excess of the minimum intersection spacing requirements as identified in the Transportation Association of Canada Design Guide for Canadian Roads (2017) [TAC Guidelines] – Figure 8.8.2 (Suggested Minimum Corner Clearance to Accesses at Major Intersections) – 35 metres for arterial roads for unsignalized conditions.

The proposed spacing between the proposed West Access and Highway 12 (approximately 205 metres) is less than the desirable offset spacing criteria as identified in the MTO Highway Management Guideline (2013) – Figure 13 (Public Road and Commercial / Private Road Access Connections for Medium / High Volume Traffic Generators) – 400 metres. However, the proposed spacing does exceed the desirable offset spacing criteria for a Low Volume Traffic Generator (Figure 12) – 80 metres.

In context with the relatively moderate site generated trips expected to utilize Brandon Street (110 AM and 129 PM trips) and the provision of a second access point (East Access) onto William Street, the proposed spacing is considered reasonable.

5.5 Sight Distance Review

A review of the available sight distances for the proposed East Access was completed as part of this analysis.

The sight distance north and south of the East Access is greater than both the minimum sight stopping and intersection sight distance requirements as identified in the TAC Guidelines for a design speed of 60km/h (85 and 130 meters, respectively).

As such, there are no issue with the sight distance available for the proposed East Access.

The sight distance for the West Access will be confirmed once detailed design of the road profile is complete. Based on the existing topography on Brandon Street, no issues are anticipated.

6 Summary

Pratt Development Inc. retained **JD Engineering** to prepare this traffic impact study in support of the proposed industrial development in the Town of Midland. The proposed Draft Plan of Subdivision is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed development includes the construction of 5 industrial blocks with a total area of 12.33 hectares and a new roadway ("Street A") spanning between William Street and Brandon Street. It is anticipated that ultimate build-out will occur by 2023.

1. The proposed development is expected to generate a total of 351 AM and 417 PM peak hour trips.
2. Detailed intersection counts were obtained from MTO and commissioned by JD Engineering at the study intersections.
3. An intersection operation analysis was completed at the study area intersections, using the existing and background (2023, 2028 and 2033) traffic volumes, with consideration for the projected adjacent development traffic growth and without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. No improvements (other than the planned conversion to a 3-lane profile on William Street) are recommended within the study area.
4. An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2023, 2028 and 2033) traffic volumes with the proposed development operational at the study area intersections. No improvements (other than the planned conversion to a 3-lane profile on William Street) are recommended within the study area.
6. The proposed Site Accesses will operate efficiently with one-way stop control for egress movements. A single lane for ingress and egress movements will provide the necessary capacity to convey the traffic volume generated by the proposed development.
7. An eastbound left turn lane is recommended at the East Access with a 25 metre storage length and a 55 metre taper length.
8. An eastbound left turn lane is required on Highway 12 at Brandon Street with a 15 metre storage length, 55 metre parallel length and a 120 metre taper length. This left turn lane will

tie into the existing westbound left turn lane at the downstream intersection (Highway 12 / King Street), creating a shared auxiliary lane.

9. The location of the proposed site access points is considered appropriate with respect to minimum corner clearance and spacing requirements as identified in the Transportation Association of Canada Design Guide for Canadian Roads (2017) and MTO Highway Management Guideline (2013).
10. The sight distance available for the proposed East Access is suitable for the intended use.
11. In summary, the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

Figure 4: Adjacent Development Traffic Volumes – Pratt Subdivision

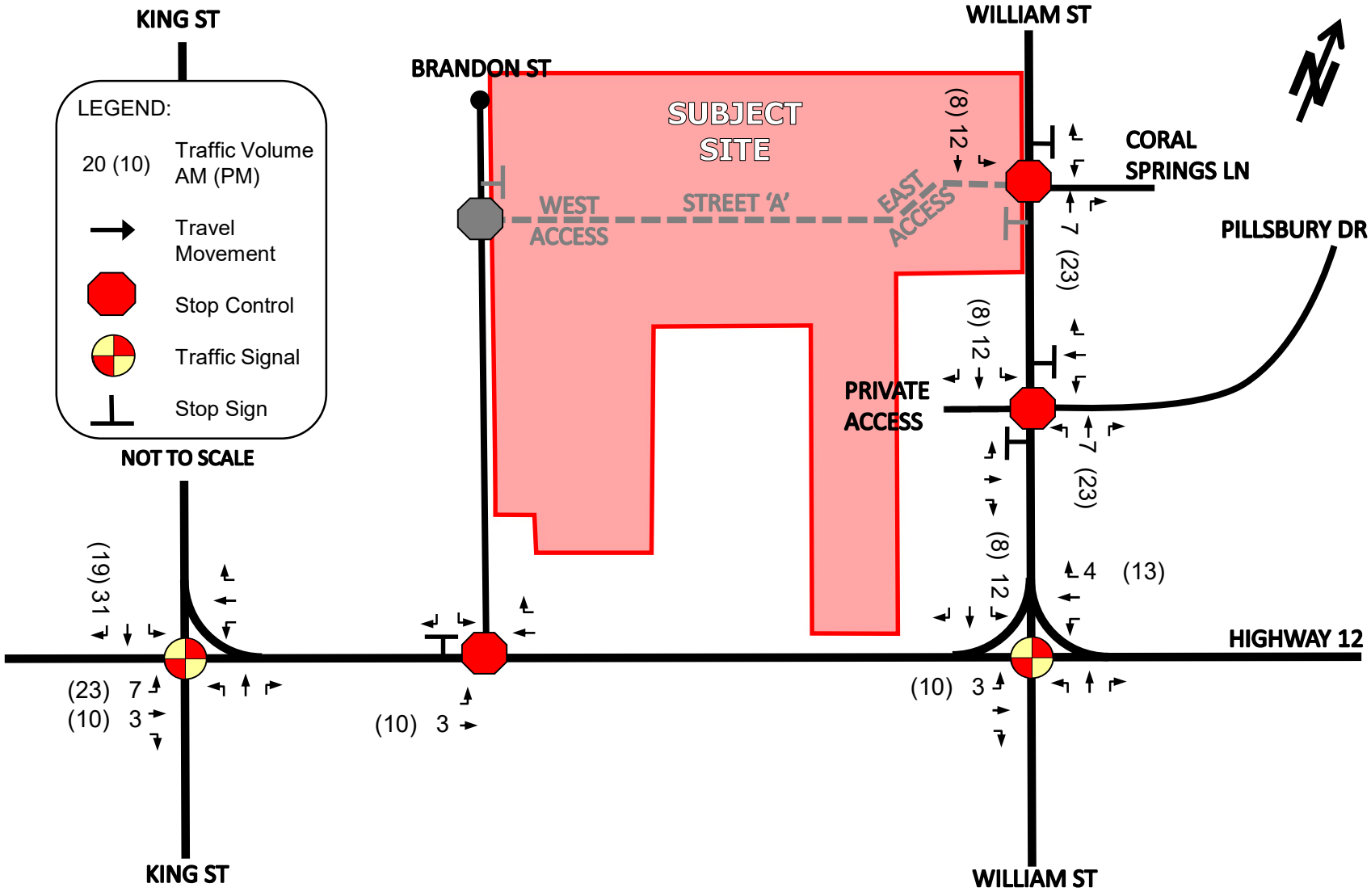


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Figure 5: Adjacent Development Traffic Volumes – Tiffin By The Lake

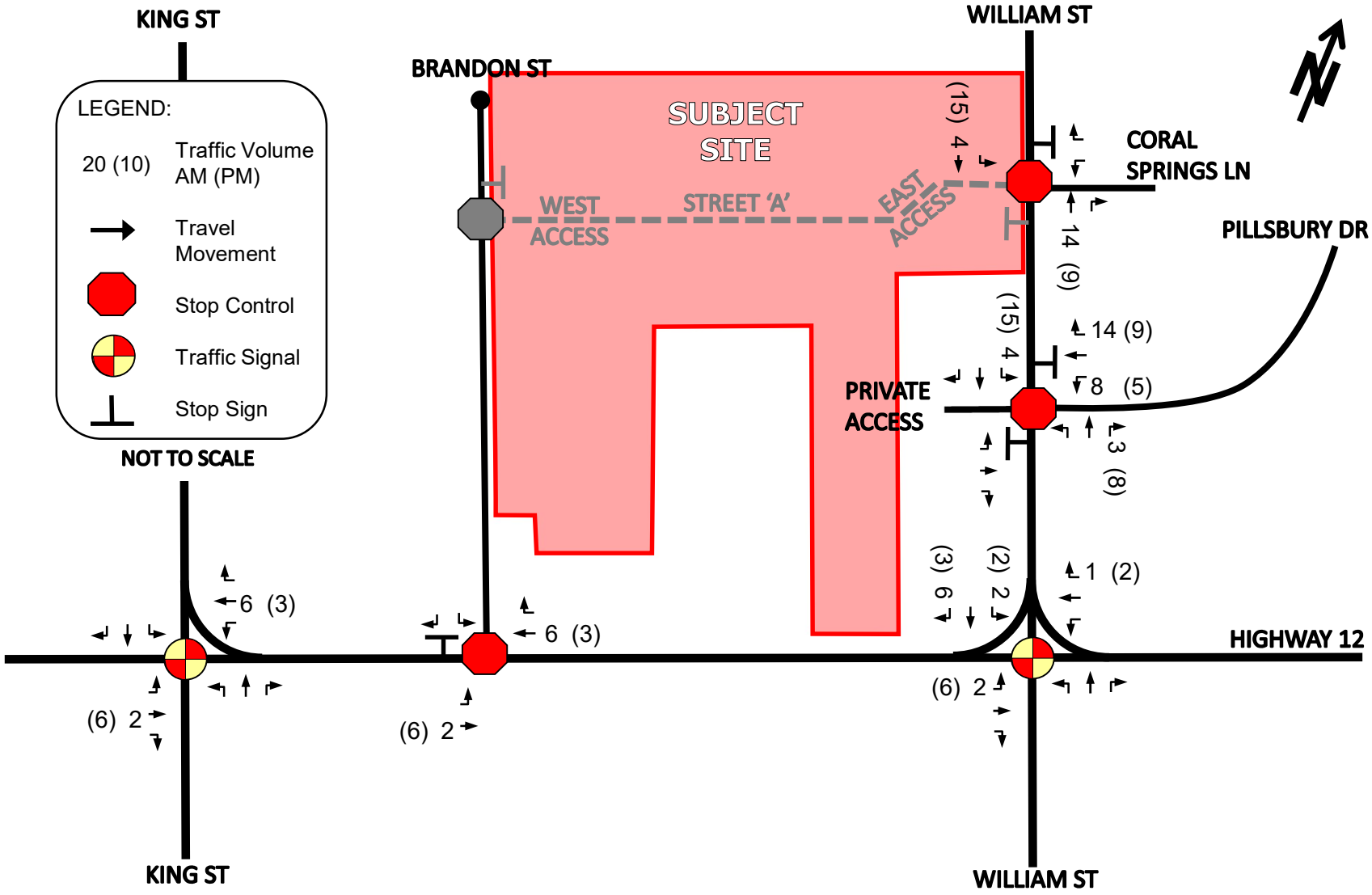

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Figure 6: Adjacent Development Traffic Volumes – Captain's Cove

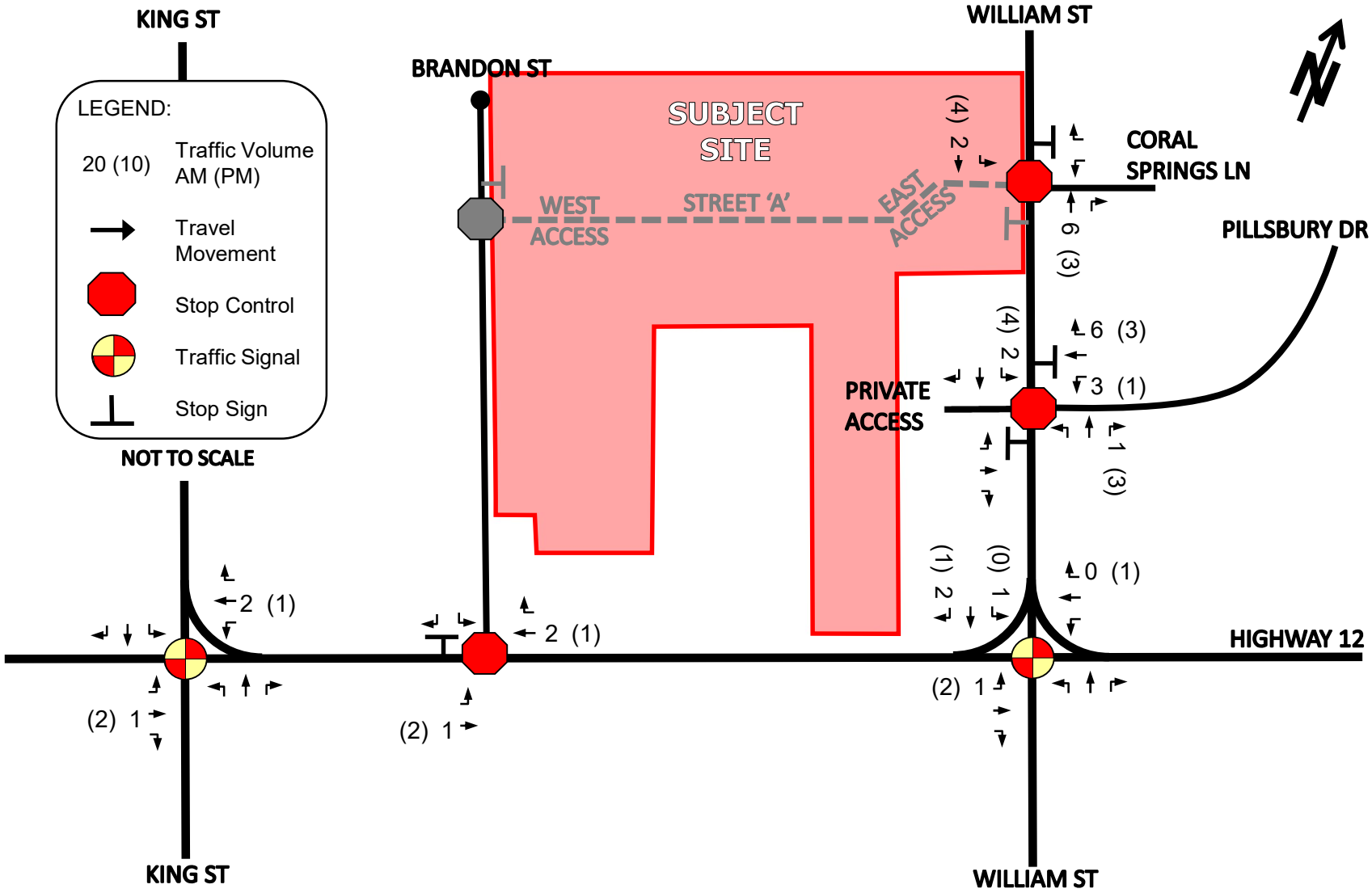

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Figure 7: Adjacent Development Traffic Volumes – 786 William Street

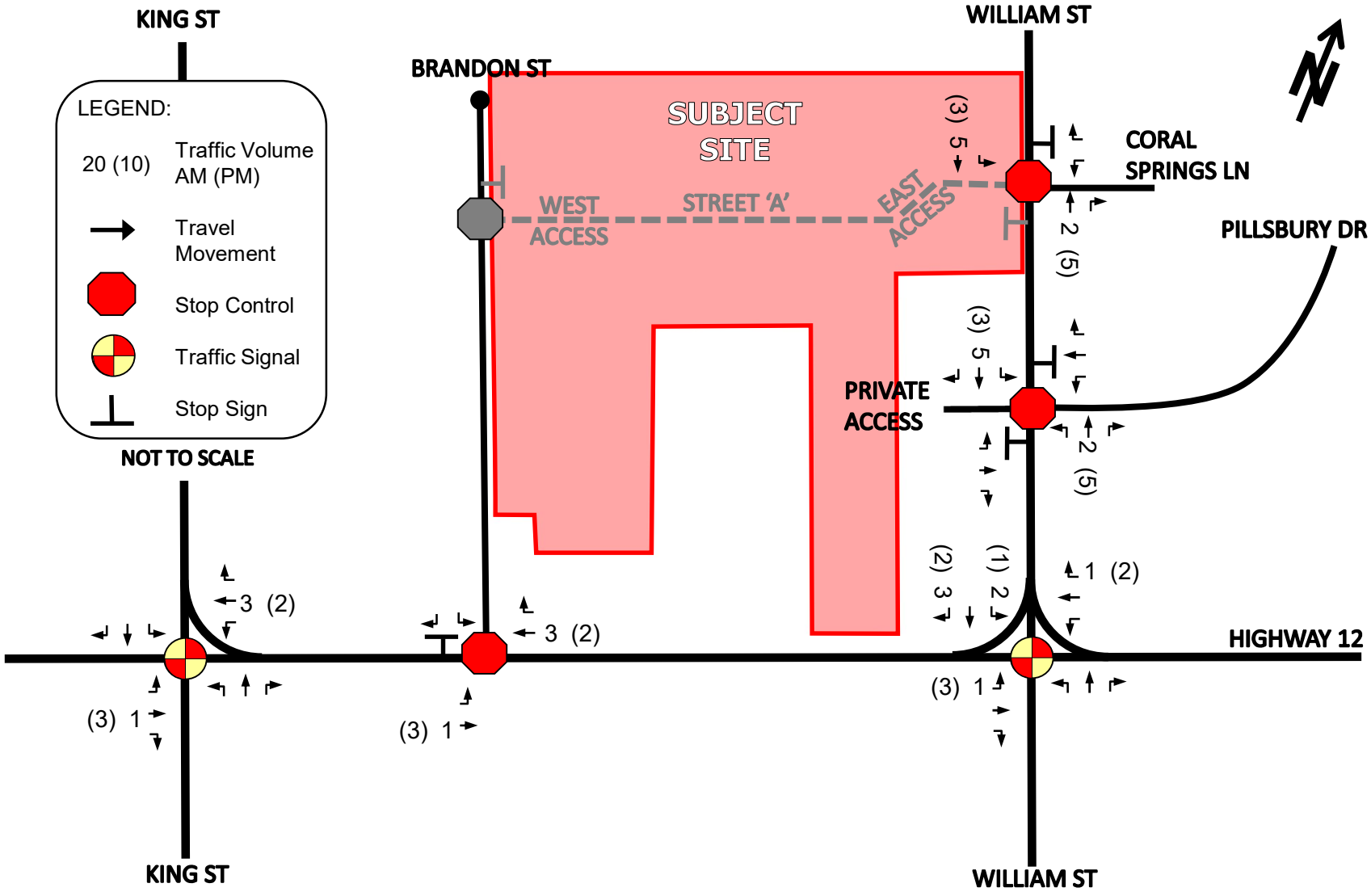

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Figure 8: Adjacent Development Traffic Volumes – 16928 Highway 12

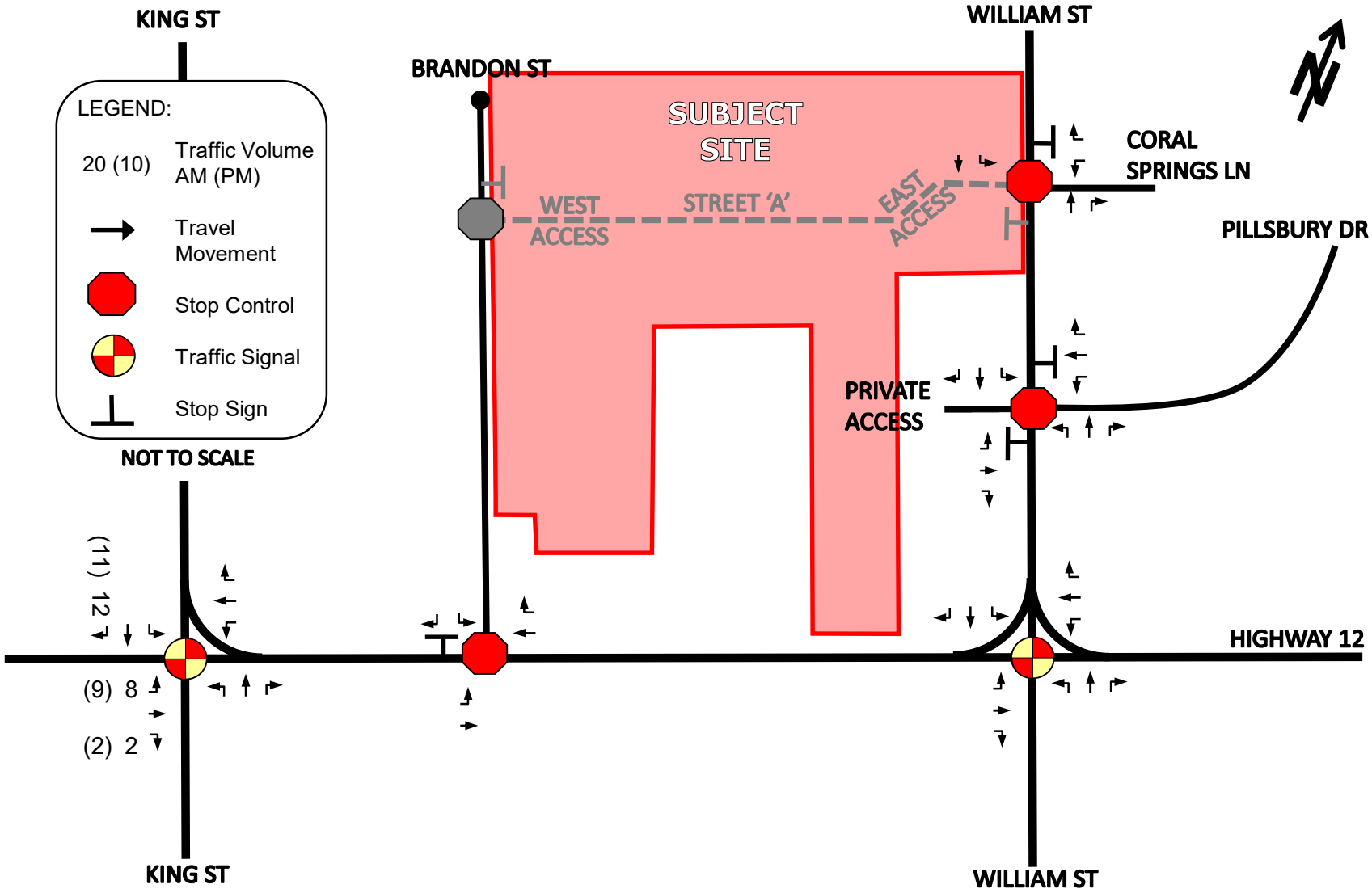

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Figure 9: Adjacent Development Traffic Volumes – Hanson Development

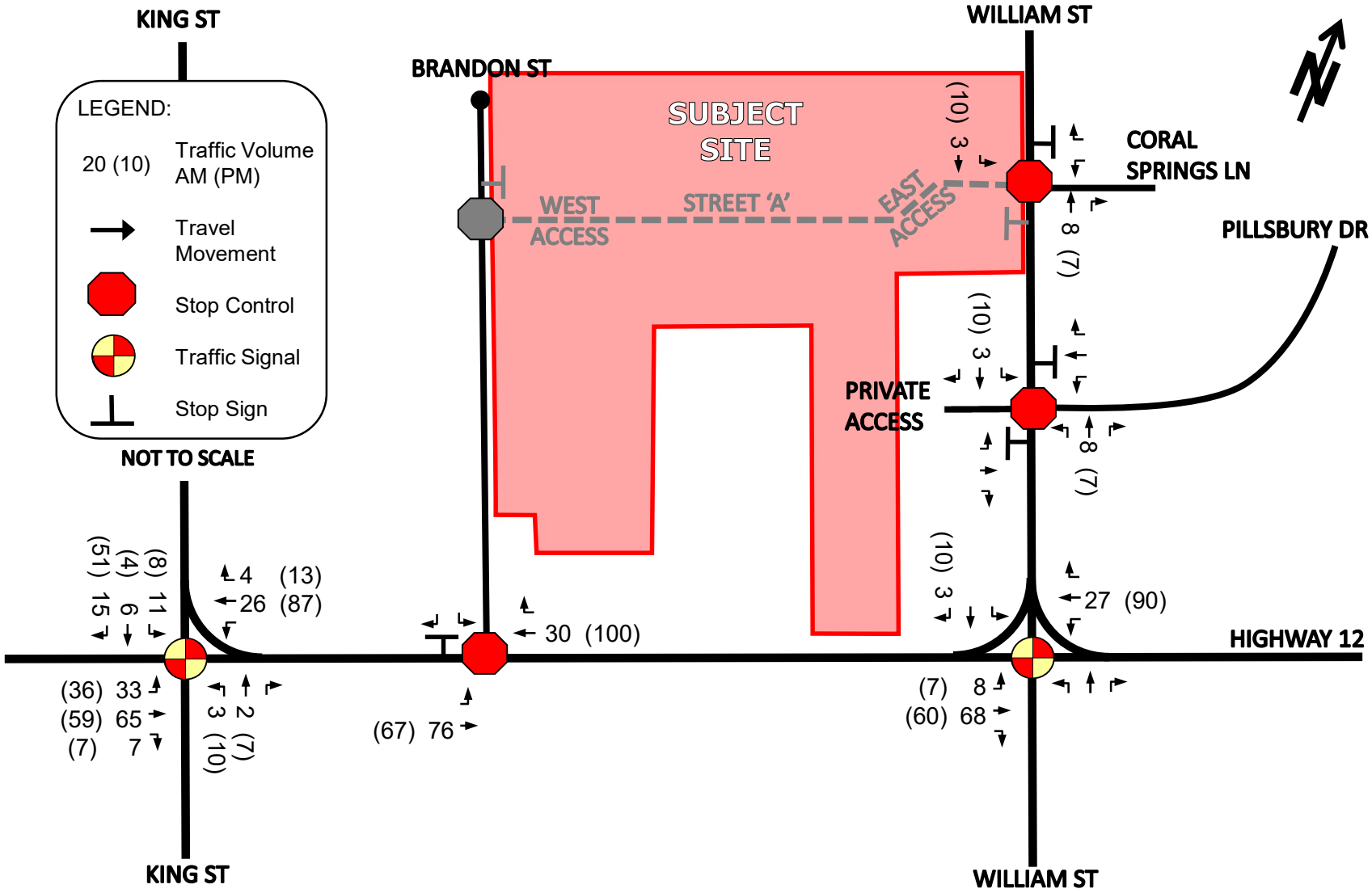

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Figure 10: Adjacent Development Traffic Volumes – Total (2023)

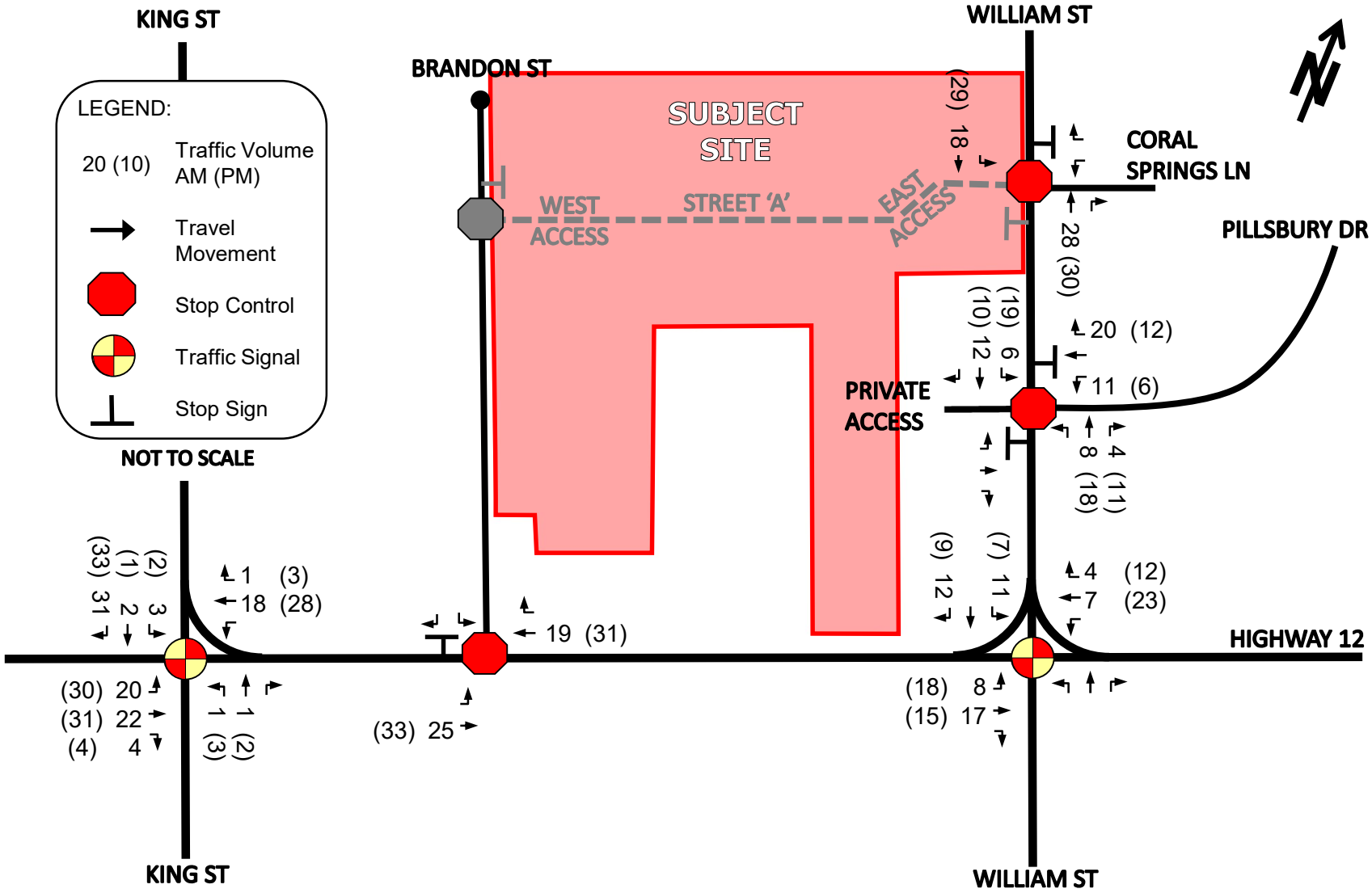

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Figure 11: Adjacent Development Traffic Volumes – Total (2028)

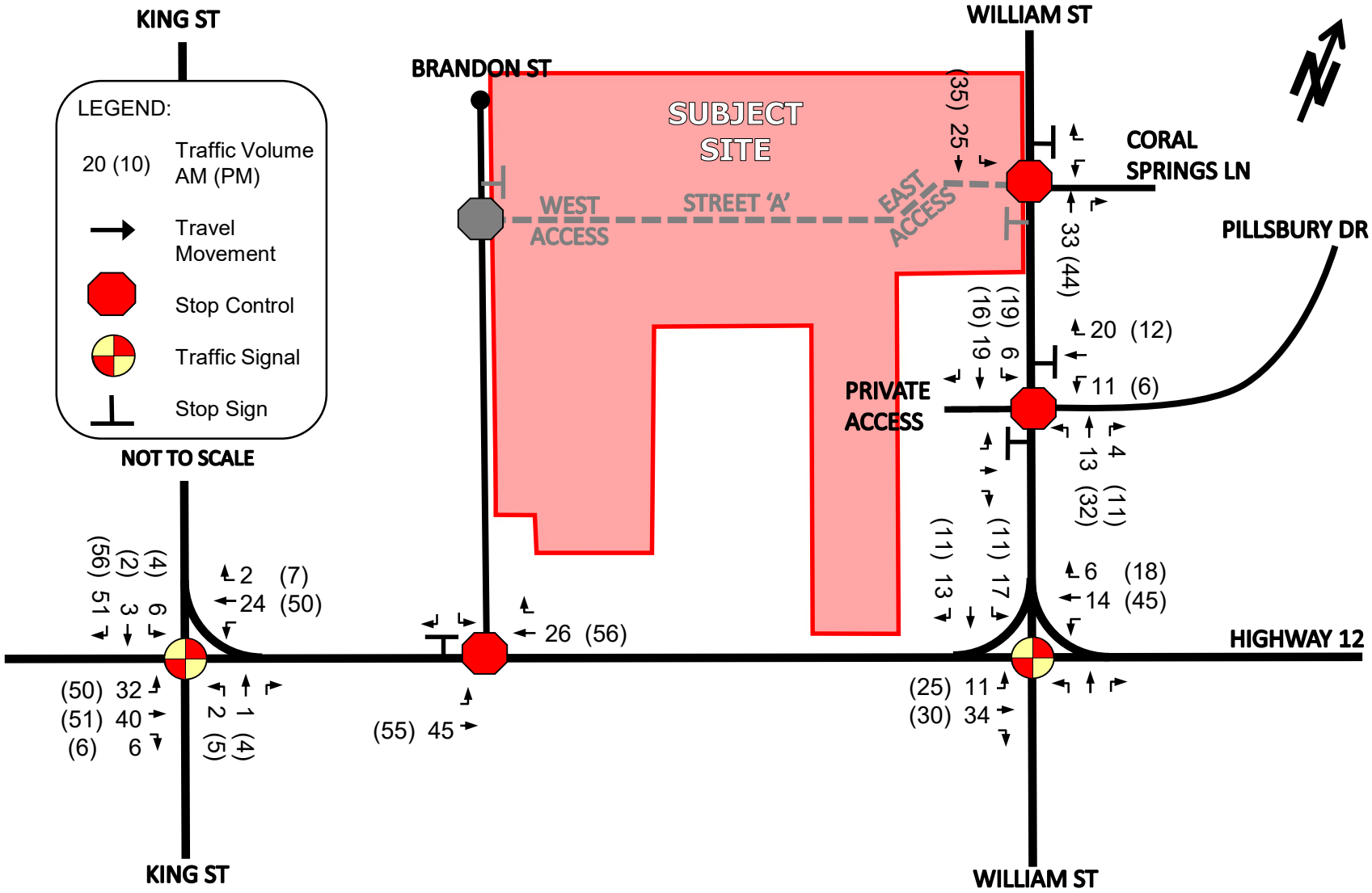

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Figure 12: Adjacent Development Traffic Volumes – Total (2033)

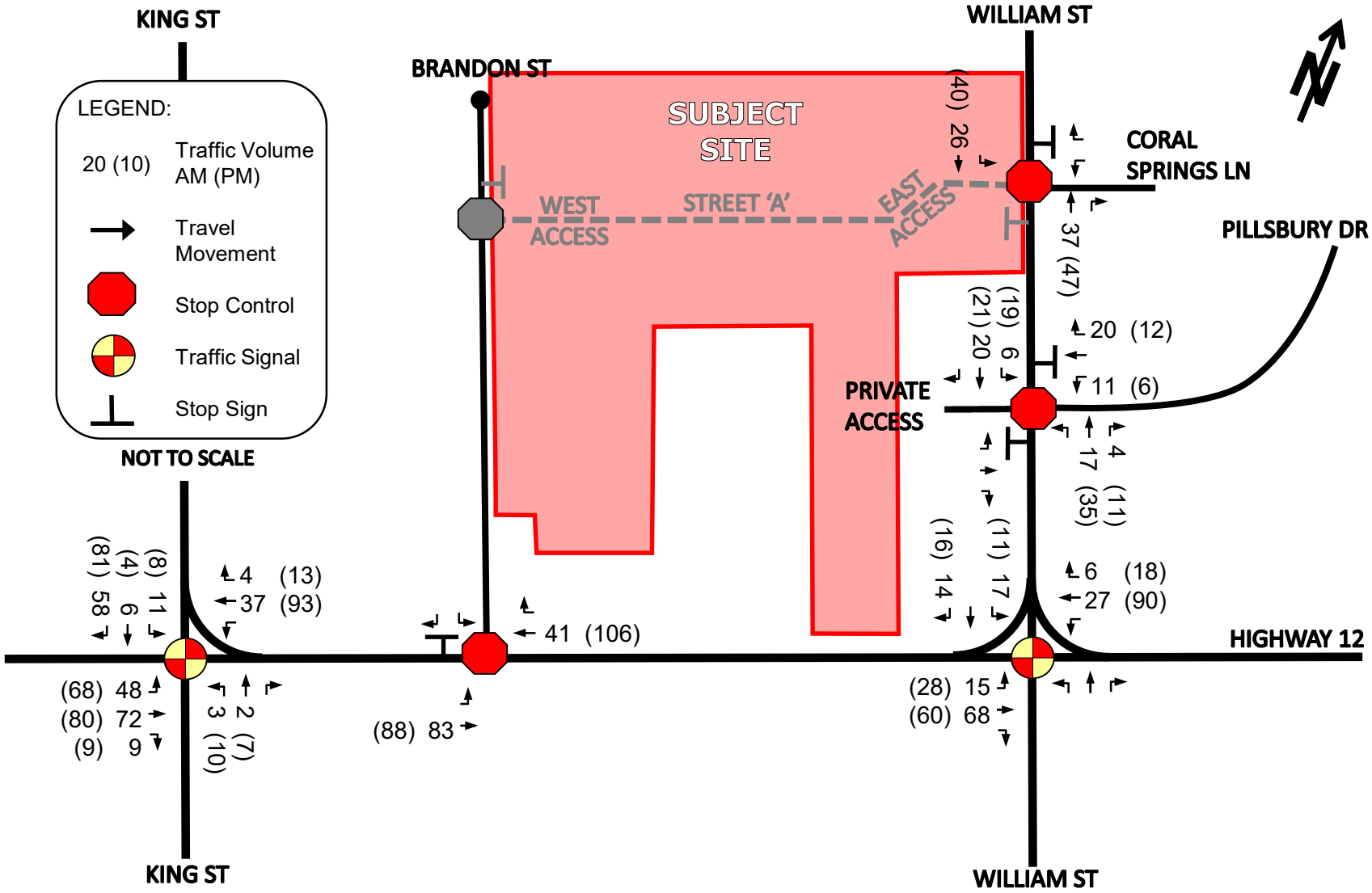

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Figure 13: Existing (2020) Traffic Volumes

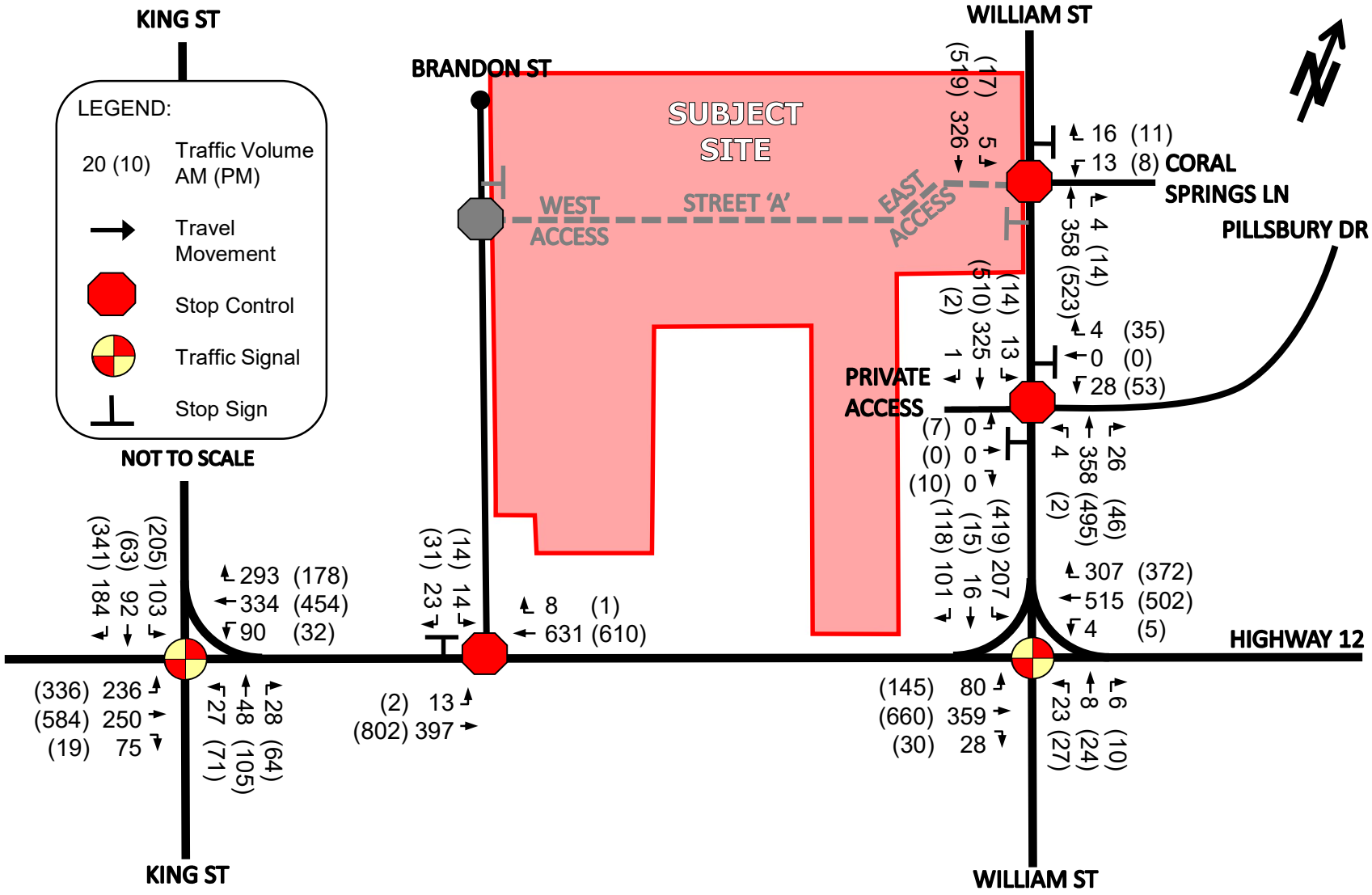

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Figure 14: Background (2023) Traffic Volumes

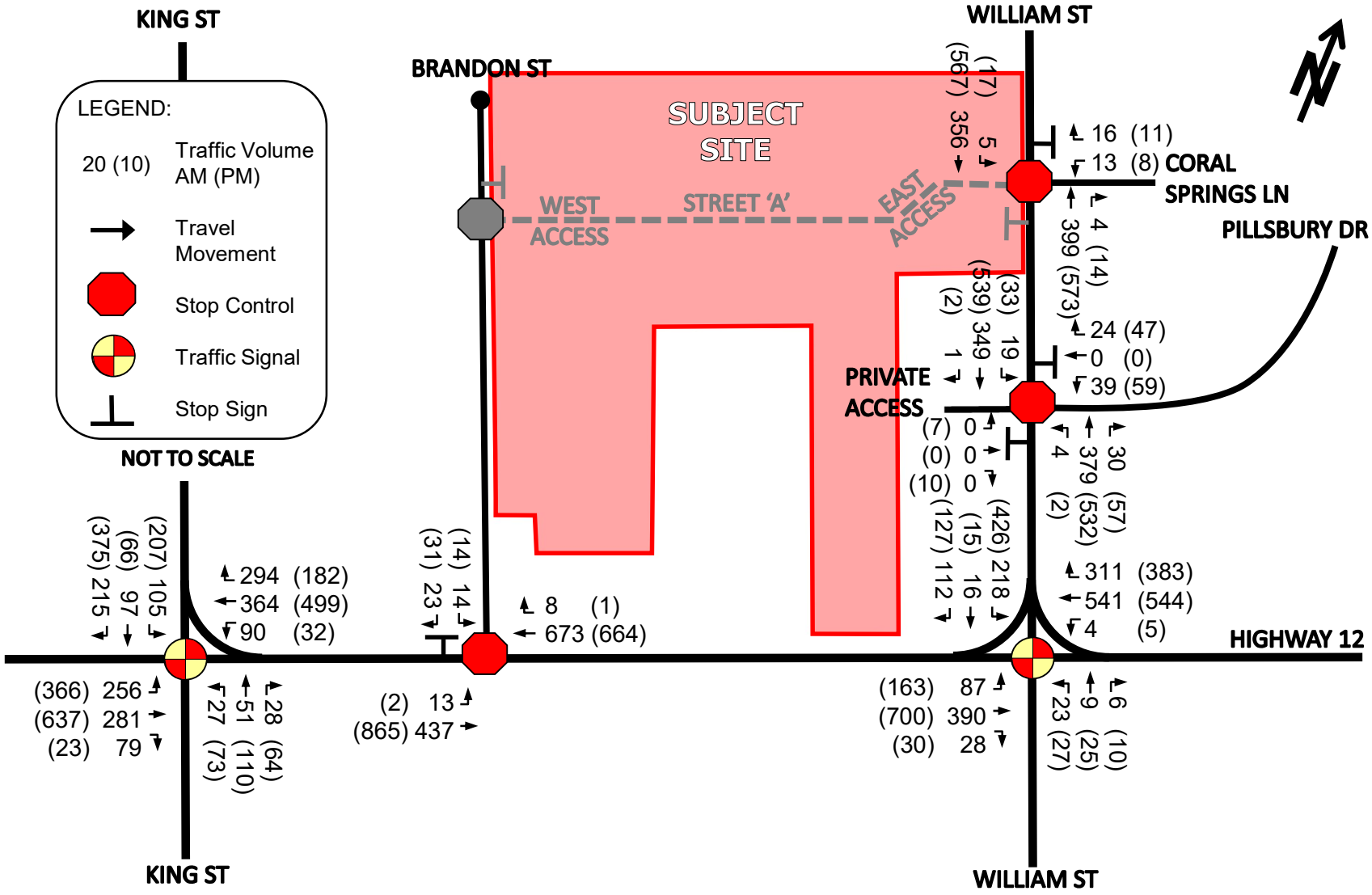

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Figure 15: Background (2028) Traffic Volumes

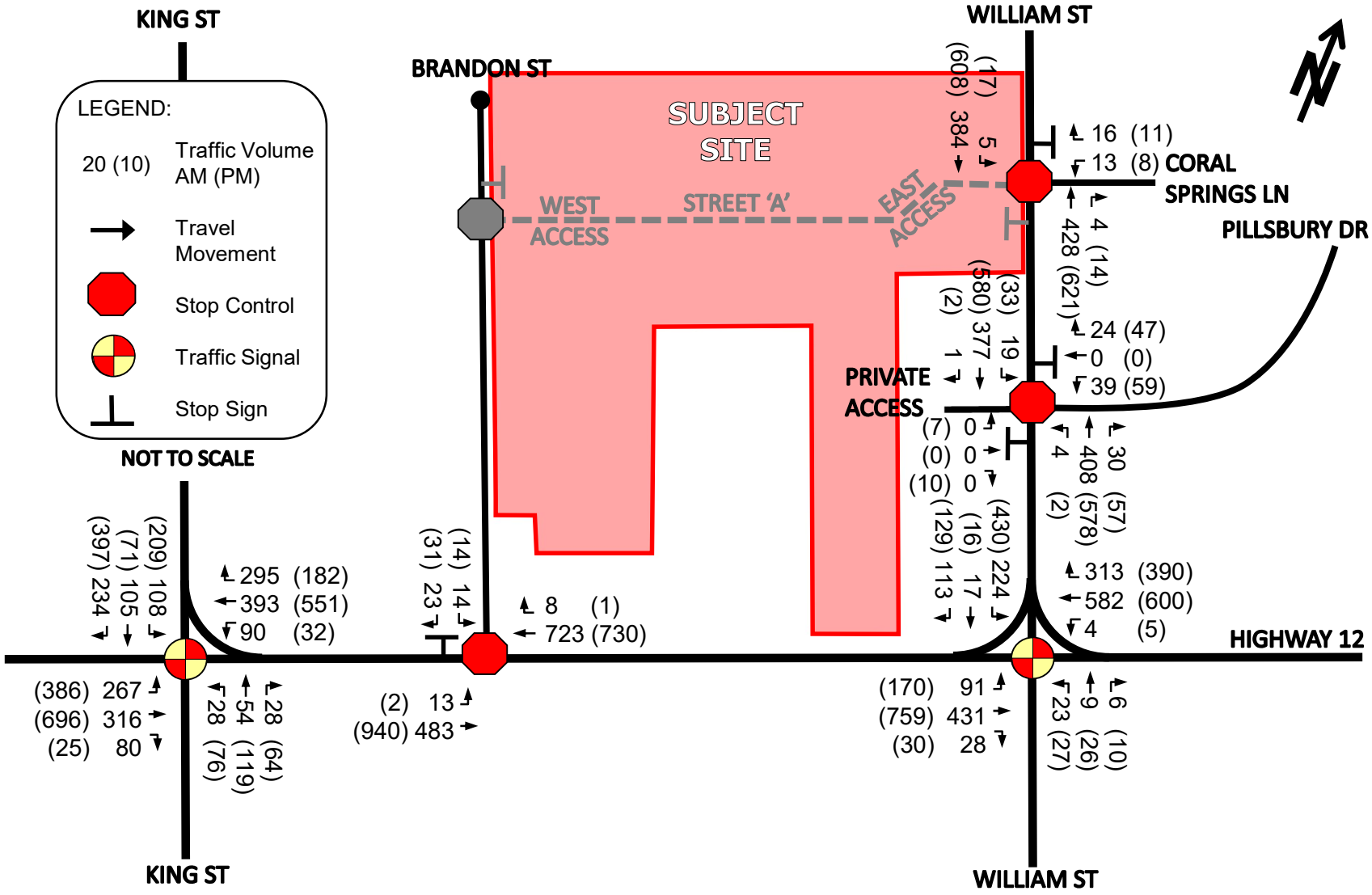

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Figure 16: Background (2033) Traffic Volumes

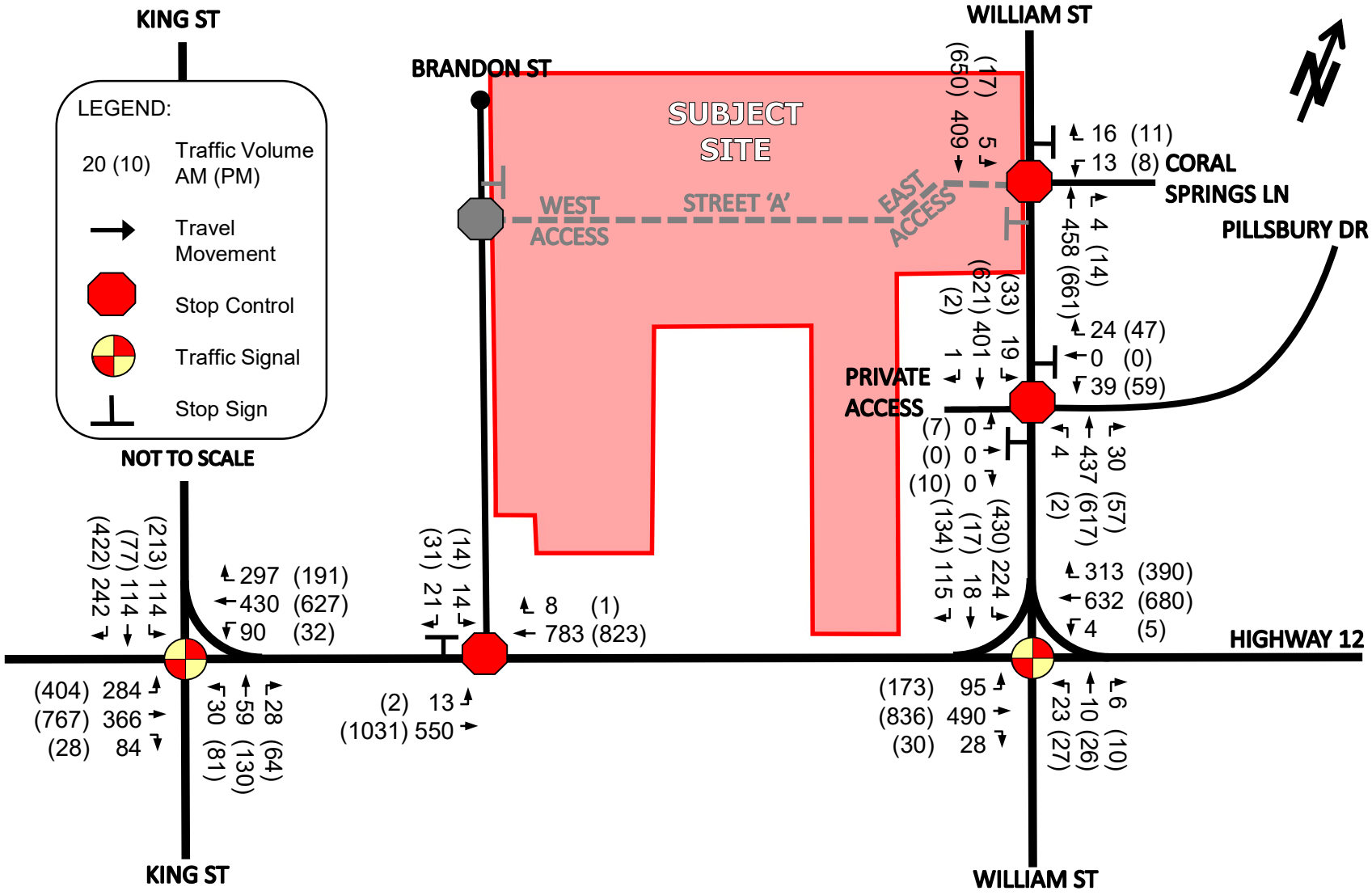

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Figure 17: Site Traffic Assignment

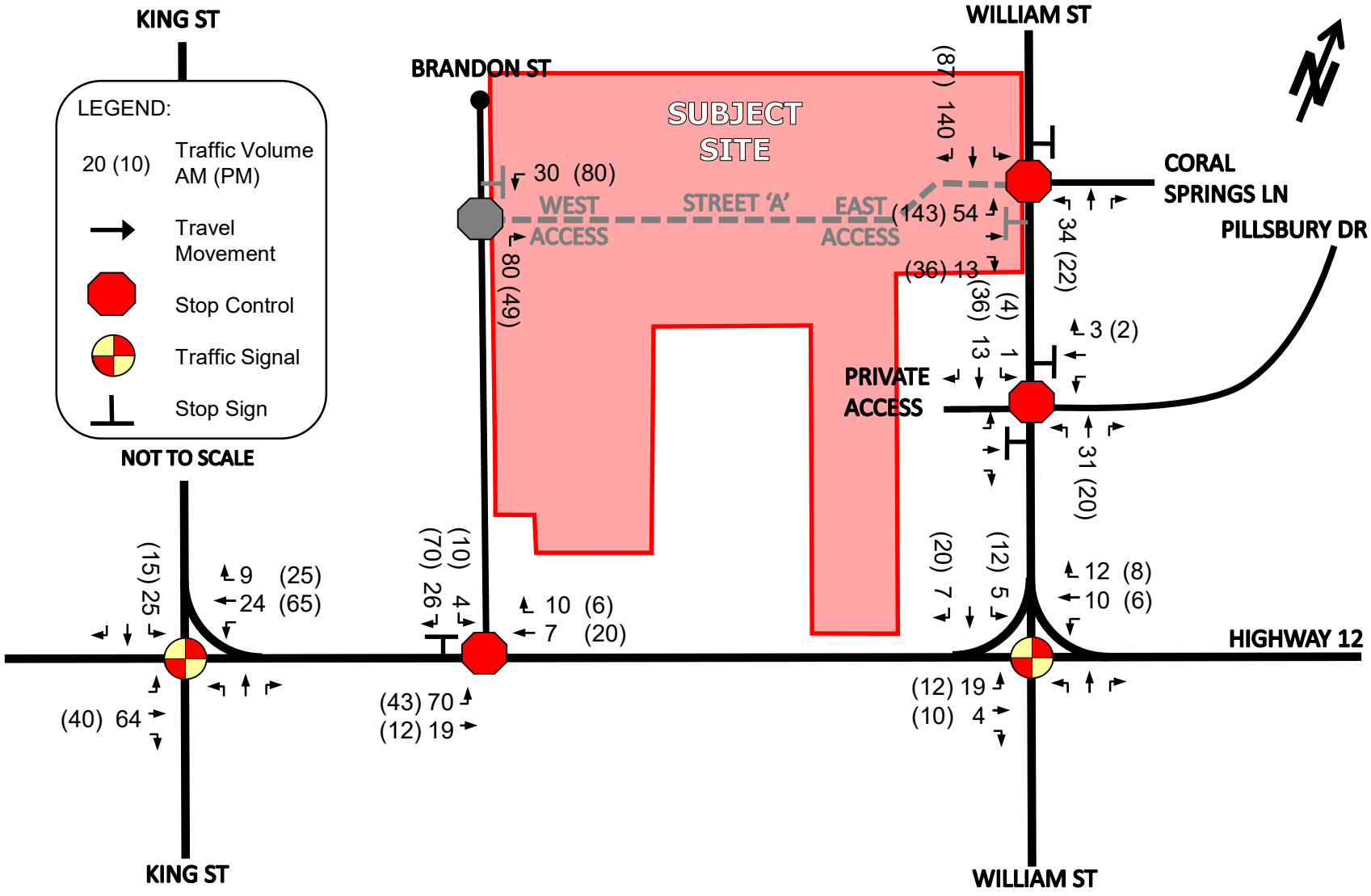

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Figure 18: Total (2023) Traffic Volumes

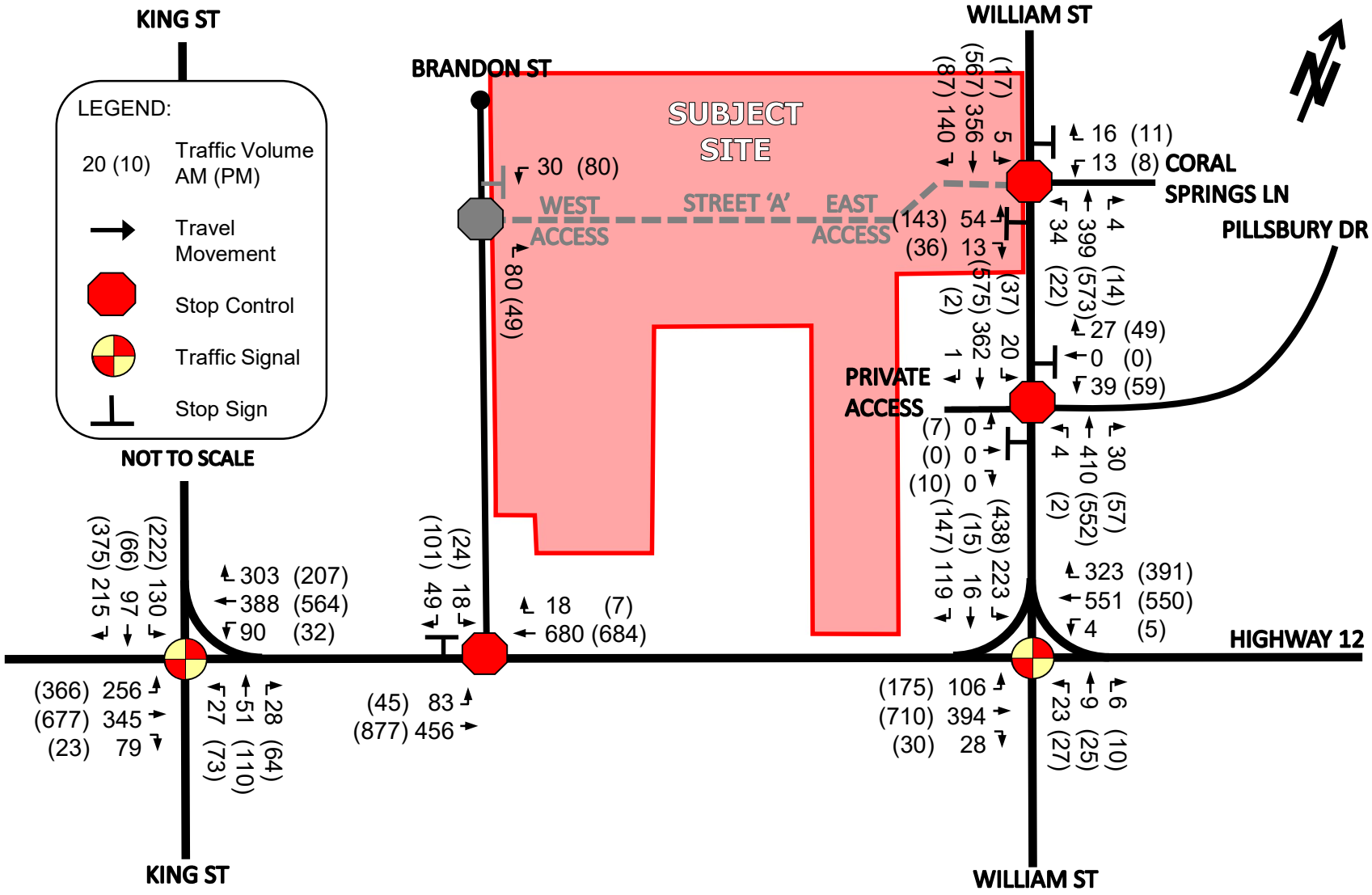

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Figure 19: Total (2028) Traffic Volumes

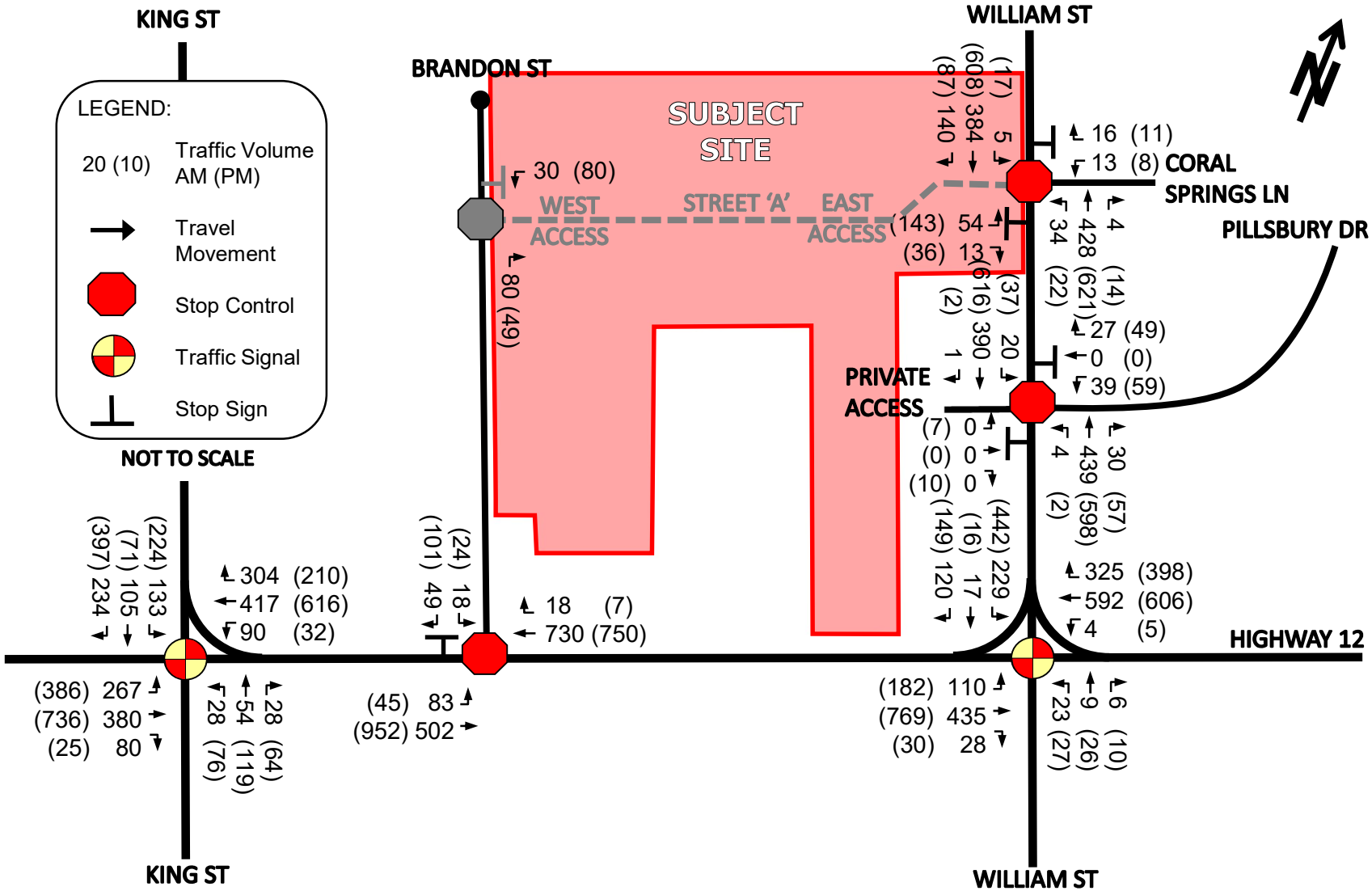

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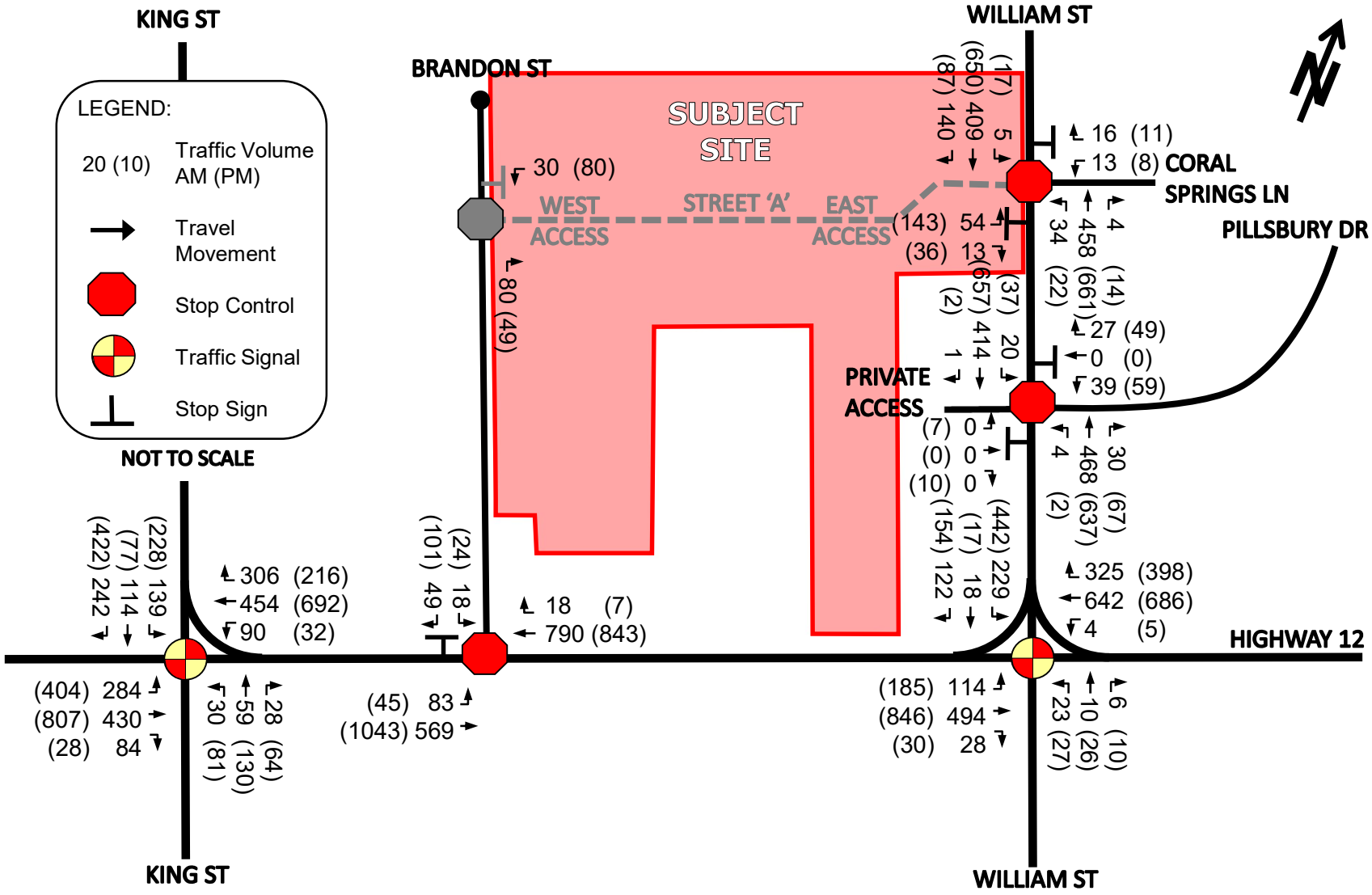
Figure 20: Total (2033) Traffic Volumes



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Appendix A – Site Plan

ADJACENT LANDS OWNED BY APPLICANT
APPROVED RESIDENTIAL DRAFT PLAN /
PROPOSED REDLINE REVISION

N57°37'00"E 181.47m | N57°37'00"E 245.85m | N57°37'00"E 73.17m | N57°37'00"E 175.70m

9m SWM INLET | 9m WALKWAY

EXISTING EASEMENT | EXISTING EASEMENT | EXISTING EASEMENT

BLOCK 07
CUL-DE-SAC
0.08ha

BLOCK 06
SWM AREA
3.53ha

BLOCK 02
1.79ha

BLOCK 01
5.29ha

BLOCK 03
0.94ha

BLOCK 05
3.04ha

BLOCK 04
1.27ha

HYDRO
NOT IN SUBDIVISION
OWNED BY OTHERS

PROPOSED 6m EASEMENT

EXISTING EASEMENT

BRANDON STREET

WILLIAM STREET

CORAL SPRINGS LN.

PILLSBURY DR.

STREET 'A'

N57°23'30"E 200.92m

N57°23'00"E 182.84m

N31°38'50"W 8.75m

N32°33'30"W 170.74m

N33°10'35"W 165.3m

N57°24'40"E 30.46m

N31°24'00"W 35.47m

N57°16'40"E 192.15m

N32°26'05"W 140.44m

N32°37'40"W 183.02m

N31°46'15"W 202.86m

N53°19'45"E 37.21m

N60°31'50"E 25.58m

EXISTING RESIDENTIAL (RT-5)

EXISTING RESIDENTIAL (RT-5)

EXISTING RESIDENTIAL (RT-5)

EXISTING OPEN SPACE (OS)

EXISTING INDUSTRIAL (M1)

EXISTING INDUSTRIAL (M1)

EXISTING INDUSTRIAL (M1)

EXISTING INDUSTRIAL (M1)

VACANT (HC)

VACANT (HC)

VACANT (M1)

EXISTING INDUSTRIAL (M1)

EXISTING INDUSTRIAL (M1)

HIGHWAY 12

LAND USE SUMMARY

LAND USE	BLOCKS	AREA
EMPLOYMENT BLOCK	01-05	12.32ha
STORMWATER MANAGEMENT AREA	06	3.53ha
CUL-DE-SAC	07	0.08ha
RIGHT OF WAY	A	1.40ha
TOTALS	-	17.33ha

LEGAL DESCRIPTION

16533 HIGHWAY 12
PART OF LOT 101, CONCESSION 2
GEOGRAPHIC TOWNSHIP OF TAY
TOWN OF MIDLAND
COUNTY OF SIMCOE

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

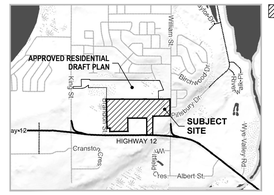
DATE: _____ PRATT DEVELOPMENT INC.
DON PRATT, PRESIDENT

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____ RUDY MAL - O.L.S.
RUDY MAK SURVEYING LTD.

KEY PLAN



LEGEND

- SITE BOUNDARY
- BLOCK & RIGHT OF WAY LINE
- EASEMENT LINE
- PARCEL FABRIC LINE
- CONCEPTUAL POTENTIAL FUTURE DEVELOPMENT BLOCK LINE
- WATERCOURSE
- WOODED AREA

REVISION No.	DATE	ISSUED / REVISION	BY
01	NOV. 23, 2022	RELOCATE STORMWATER MANAGEMENT AREA, RELOCATE CUL-DE-SAC, REVISE ROW, ADJUST BLOCKS, ADD EASEMENT	MAM

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

- **A.** AS SHOWN
- **B.** AS SHOWN
- **C.** AS SHOWN
- **D.** INDUSTRIAL/COMMERCIAL
- **E.** AS SHOWN
- **F.** AS SHOWN
- **G.** AS SHOWN
- **H.** MUNICIPAL
- **I.** SILTY SAND/SILT AND CLAY/SILTY CLAY
- **J.** AS SHOWN
- **K.** MUNICIPAL
- **L.** AS SHOWN

113 COLLIER STREET
BARRIE, ON, L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING

STAMP

DATE	AUG. 19, 2022
FILE No.	12162G
SCALE	1:1,250 (ARCH D)
DRAWN BY	M.M.
CHECKED BY	K.C.
OTHER	

PROJECT

PRATT EMPLOYMENT SUBDIVISION
PRATT DEVELOPMENTS INC.
27 CLAPPERTON ST. SUITE 300
BARRIE ON L4M 3E6
705-722-4500

NORTH

FILE NAME DRAFT PLAN OF SUBDIVISION

DWG No. 1 of 1

SCALE BAR

0 6 12 18 24 30 45 60 90 120m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Brian\12162G\Drawings\Draft Plan\CAD\12162G – Draft Plan – 2020-10-08.dwg

Appendix B –
Adjacent Development Excerpts

786 William Street
Town of Midland

Traffic Brief for

786 William Street Inc.

Type of Document:
Final Report

Project Number:
JDE – 18004

Date Submitted:
February 23rd, 2018

John Northcote, P.Eng.
Professional License #: 100124071

ENGINEERING

JD Northcote Engineering Inc.
86 Cumberland Street
Barrie, ON
705.725.4035
www.JDEngineering.ca

3 Proposed Development Traffic Generation and Assignment

3.1 Traffic Generation

The traffic generation for these proposed development has been calculated based on the data provided in the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (10th Edition) [ITE Trip Generation Manual]. The following ITE land use has been applied to estimate the traffic from the proposed development:

- ITE land use 221 (Multifamily Housing (Mid-Rise)) – General Urban / Suburban Setting

The estimated trip generation of the proposed development is illustrated below in **Table 2**. The AM and PM peak traffic generation for the proposed development does not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 2 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (Mid-Rise) ITE Land Use: 221	80 units	7	21	28	22	14	36

No transportation modal split has been applied to the above-noted traffic generation calculation.

3.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour. The distribution of traffic has been calculated based on the 2011 TTS data for traffic zone 8576, retrieved using the TTS IDRS (output attached as **Appendix C**). TTS data provides historical origin and destination work trip percentages for specific areas within the Town and the GTHA.

Traffic distribution for the trips generated by the subject site during the AM and PM peak hour is expected to generally follow commuter travel patterns. Our analysis is based on egress traffic during the AM peak hour. Logically, the distribution of ingress traffic will follow the inverse of the exiting traffic distribution. For each of the individual areas identified in the TTS data, we have selected the probable route of travel, assuming that people will select their route primarily based on travel time.

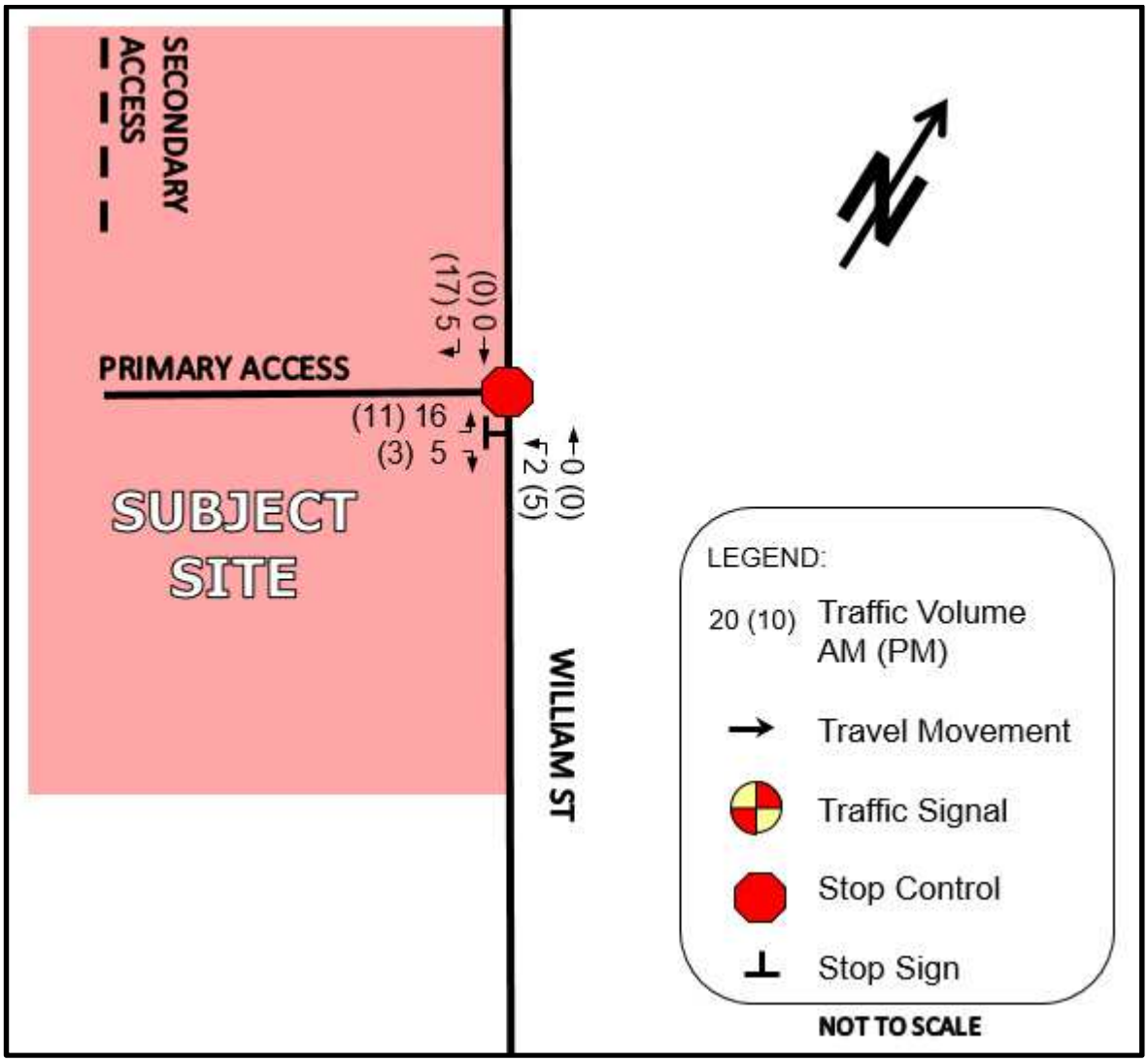
The distribution of trips is illustrated in **Table 3**, using the methodology outlined above. In order to be conservative, it has been assumed that all traffic generated by the proposed development will use the William Street / Primary Access intersection.

Table 3 – Proposed Development Traffic Distribution

Travel Direction (to / from)	Percentage of Total Traffic Generation
North via William Street	75%
South via William Street	25%
TOTAL	**100%**

Using the traffic distribution pattern noted above, the site traffic assignment for the proposed development was calculated for the AM and PM peak hour and is illustrated in **Figure 5**.

Figure 5 – Site Traffic Assignment



COLAND DEVELOPMENT CORPORATION

PROPOSED HOTEL DEVELOPMENT
16928 HIGHWAY 12
TOWN OF MIDLAND
TRAFFIC IMPACT STUDY

JANUARY 30, 2019

wsp

4 SITE GENERATED TRAFFIC

4.1 TRIP GENERATION

The vehicle trips generated by the proposed development during the weekday a.m. and p.m. peak hours were estimated using the trip generation rates outlined in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

4.1.1 TRIP GENERATION JUSTIFICATION

The proposed development consists of a hotel and a conference facility as two separate buildings. Although they are separate, the hotel and conference facility are under the same lease, with the understanding that the hotel, lacking any conference facilities, will be using the conference facility next door for all events. The Town of Midland's Zoning By-Law 2004-90 also defines a Hotel as one or more buildings used mainly for the purposes of catering to the needs of the travelling public by supplying an eating establishment, conference & athletic facilities and furnished overnight accommodations.

Additionally, Land Use Code 310 (Hotel) in the ITE Trip Generation Manual, 10th Edition, defines a hotel as a place of lodging that provides sleeping accommodations and supporting facilities such as restaurants and convention facilities. Therefore, it can be assumed that this trip rate can be applied as if the conference centre and the hotel were a stand-alone structure.

Using the 310 Hotel Land Use Code, the rates and directional split percentages used in this analysis are detailed in **Table 4.1**, and the total vehicle trips generated are illustrated in **Table 4.2**.

Table 4.1 Trip Generation Rates

Land Use (Land Use Code)	ITE Average Trip Generation Rate			
	A.M. Inbound	A.M. Outbound	P.M. Inbound	P.M. Outbound
ITE Land Use 310 (Hotel)	0.47 per Unit		0.60 per Unit	
	59%	41%	51%	49%

Table 4.2 Site Generated Vehicle Trips

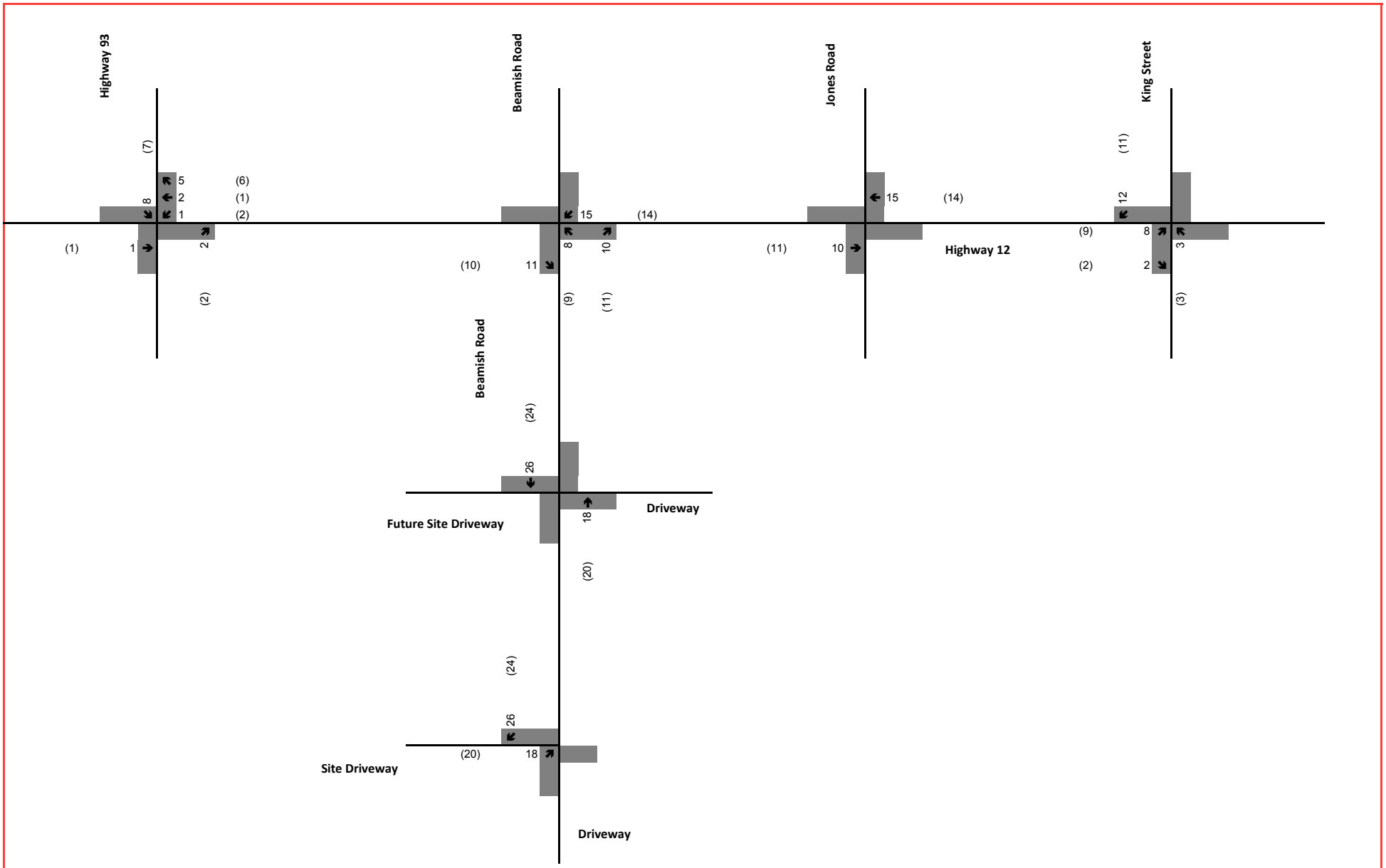
Land Use (Units)	Basis/Parameter	Vehicle Trips			
		Weekday A.M. Peak Hour		Weekday P.M. Peak Hour	
		Inbound	Outbound	Inbound	Outbound
Hotel 93 rooms	ITE Land Use 310	26	18	28	27

As shown in Table 4.2, the proposed development is expected to generate 26 inbound and 18 outbound trips during the a.m. peak hour, and 28 inbound and 27 outbound trips during the p.m. peak hour.

4.2 TRIP DISTRIBUTION

The 2011 Transportation Tomorrow Survey (TTS) was used as the method to distribute and assign site traffic.

The resultant distribution of site traffic is illustrated in **Figure 4.1**. Additionally, due to a temporary road closure on Beamish Road located south of the site, our distribution conservatively assumes that both inbound and outbound traffic will be using the Beamish Road and Highway 12 intersection.



xx A.M. Peak Hour Traffic Volumes

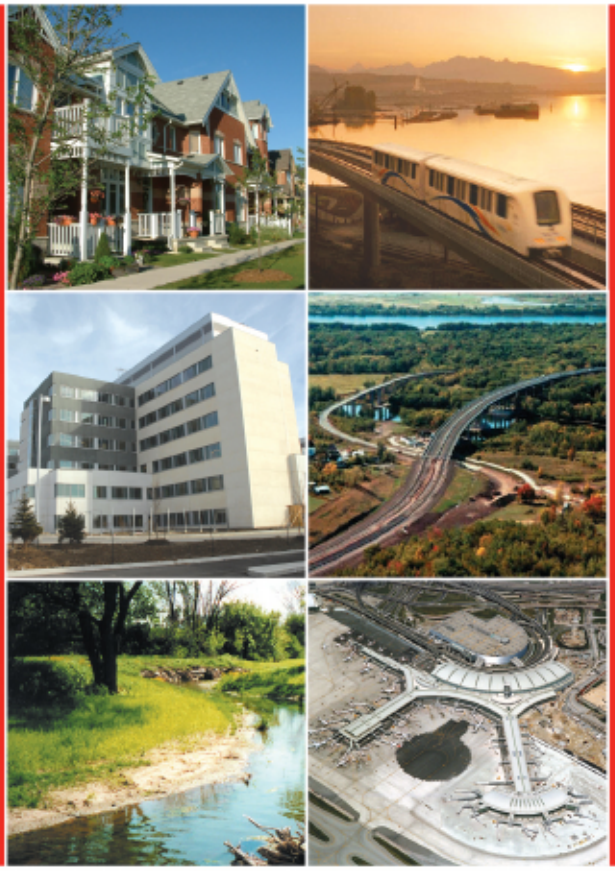
(xx) P.M. Peak Hour Traffic Volumes

Figure 4.1

Site Traffic Volumes

16928 Highway 12

MMM Group Limited



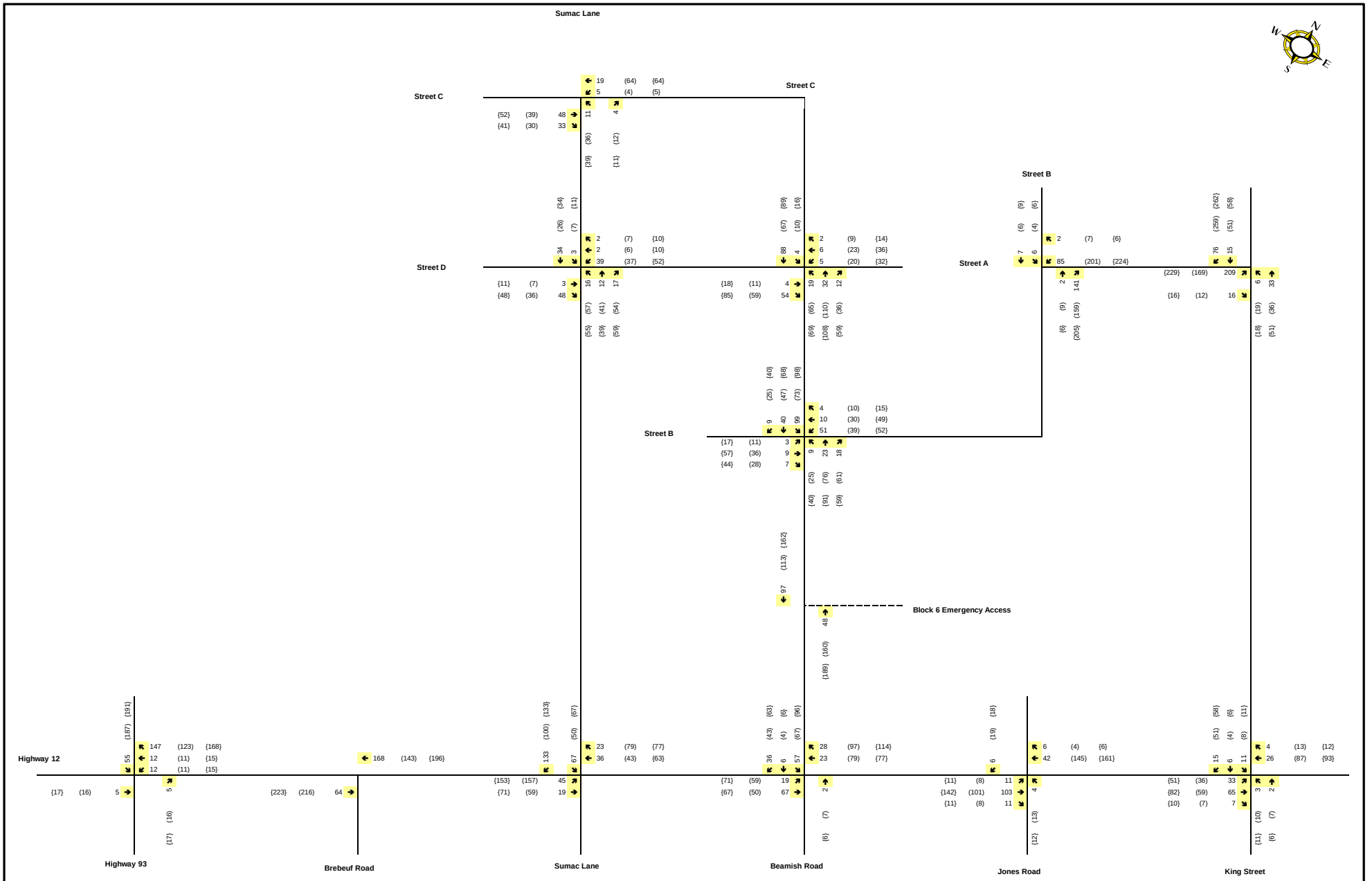
Hanson Development, Town of Midland

Traffic Impact Study

COMMUNITIES
TRANSPORTATION
BUILDINGS
INFRASTRUCTURE

MMM GROUP

August 2016 | 10-04062



MMM GROUP

LEGEND

XX AM Peak Hour Volumes
(XX) PM Peak Hour Volumes
{XX} Saturday Peak Hour Volumes

FIGURE 10
Trip Assignment for Phases 1, 2 and 3

Appendix C –
Traffic Count Data

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

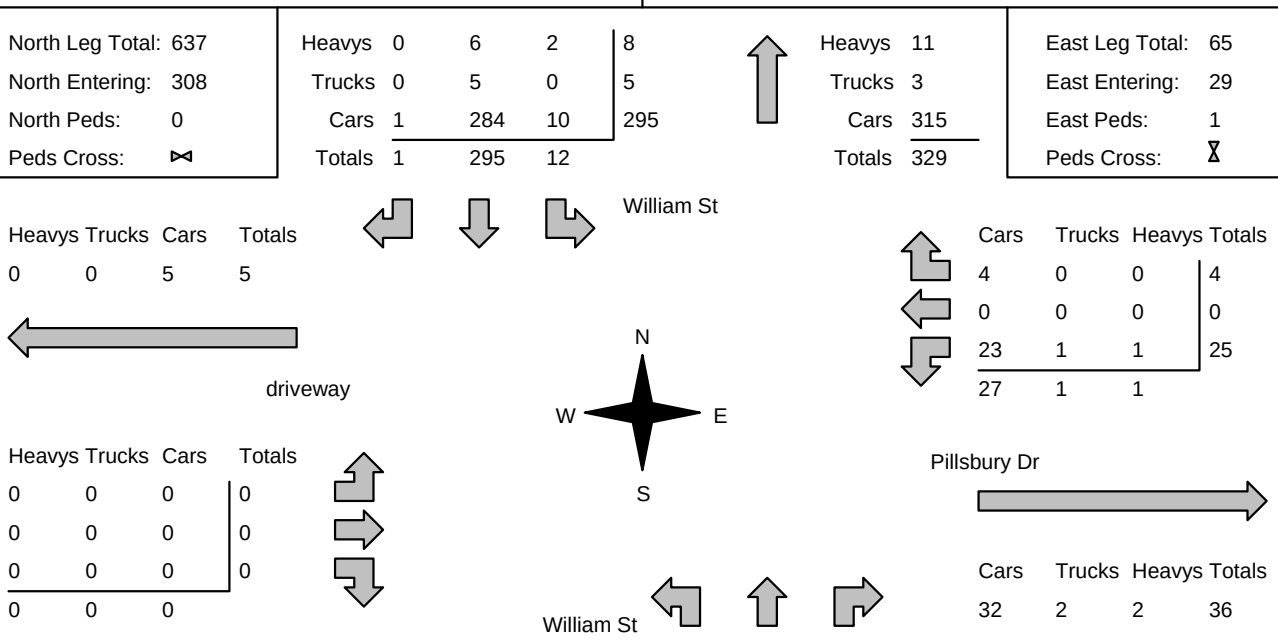
Municipality: Midland
Site #: 2006400001
Intersection: William St & Pillsbury Dr
TFR File #: 1
Count date: 26-Aug-20

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: William St runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 19:00:00

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

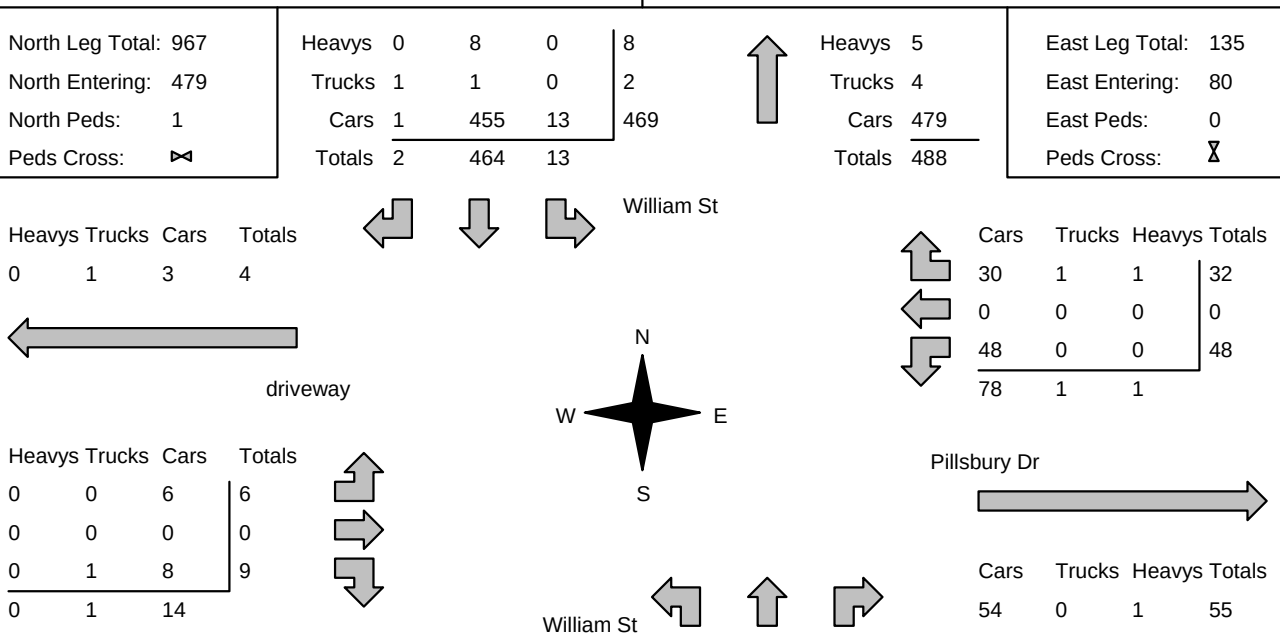
Municipality: Midland
Site #: 2006400001
Intersection: William St & Pillsbury Dr
TFR File #: 1
Count date: 26-Aug-20

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: William St runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

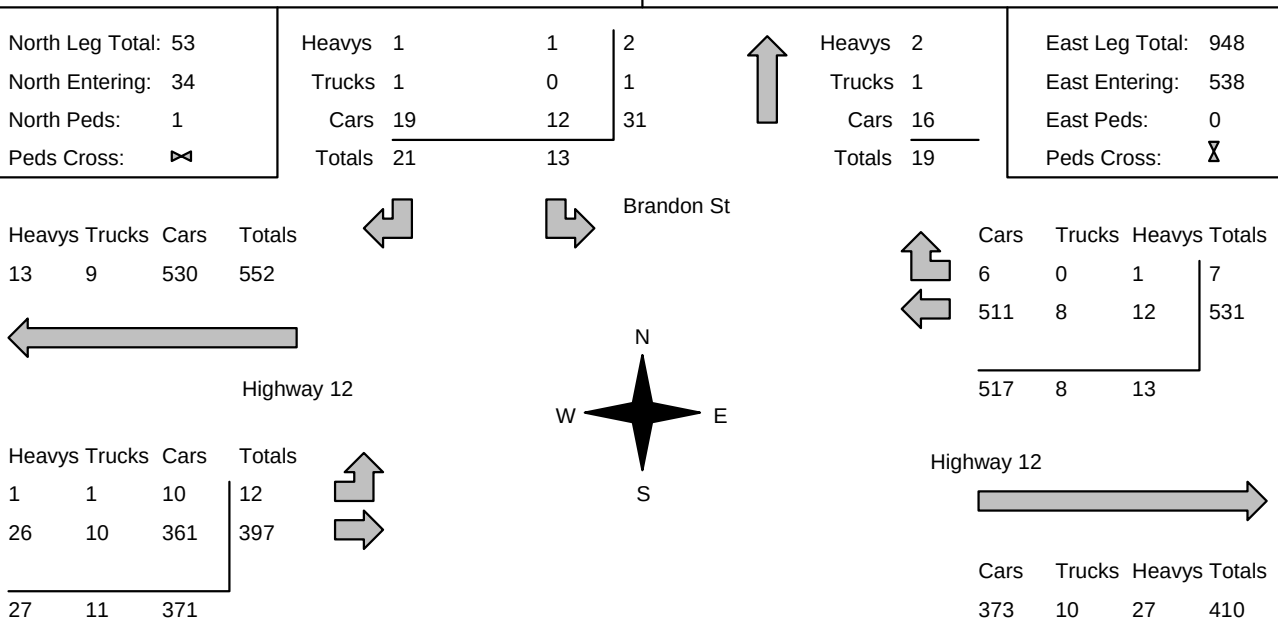
Municipality: Midland
Site #: 2006400002
Intersection: Highway 12 & Brandon St
TFR File #: 1
Count date: 26-Aug-20

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Highway 12 runs W/E



Peds Cross:
West Peds: 0
West Entering: 409
West Leg Total: 961

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 19:00:00

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

Municipality: Midland
Site #: 2006400002
Intersection: Highway 12 & Brandon St
TFR File #: 1
Count date: 26-Aug-20

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Highway 12 runs W/E

North Leg Total: 44
North Entering: 41
North Peds: 0
Peds Cross: ⋈

Heavys	0	1	1
Trucks	1	0	1
Cars	27	12	39
Totals	28	13	

Heavys	1
Trucks	1
Cars	1
Totals	3

East Leg Total: 1376
East Entering: 611
East Peds: 0
Peds Cross: ⧖

Brandon St

Heavys	Trucks	Cars	Totals
12	7	619	638

Highway 12

Heavys	Trucks	Cars	Totals
0	1	1	2
10	8	734	752
10	9	735	

N
W E
S

Cars	Trucks	Heavys	Totals
0	0	1	1
592	6	12	610
592	6	13	

Highway 12

Cars	Trucks	Heavys	Totals
746	8	11	765

Peds Cross: ⧖
West Peds: 0
West Entering: 754
West Leg Total: 1392

Comments

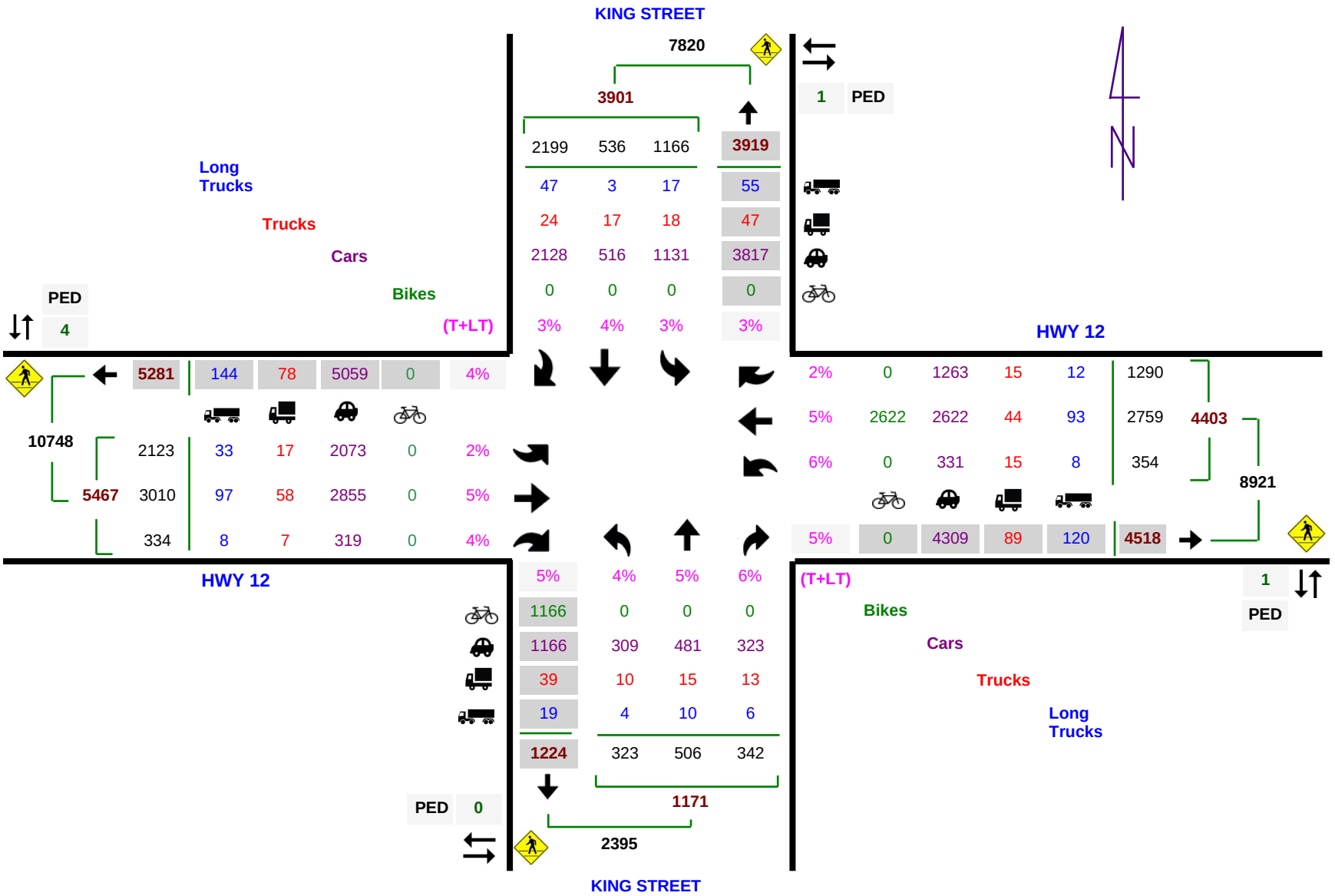
Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Count Total Report

Description: HWY 12 @ KING STREET
Region: CENTRAL | **Survey Type:** TM – Intersection | **Hwy:** 12
Start Date: 04-Dec-2018 (Tue) | **I/C Side:** | **LHRS:** 19555
End Date: 04-Dec-2018 (Tue) | **Int. Type:** Four Leg | **Offset:** 2.050
Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00



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Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

Turning Movement Total Count and Peak Summary Report

Description: HWY 12 @ KING STREET

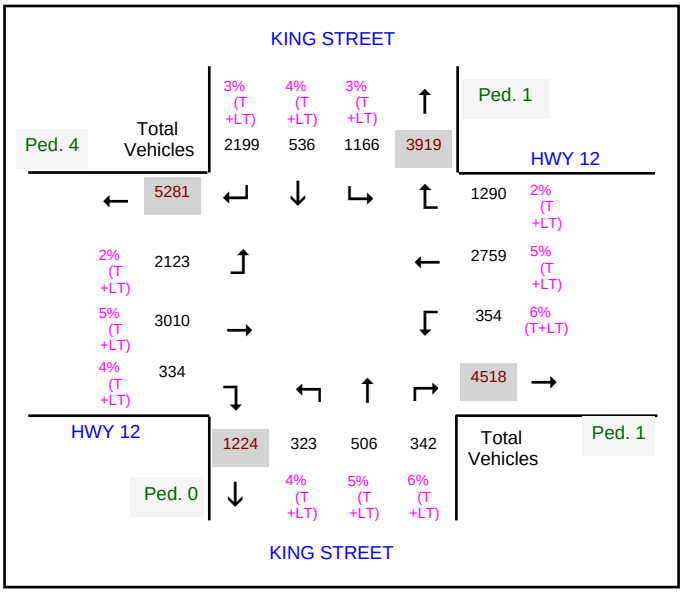
Region: CENTRAL | **Survey Type:** TM – Intersection | **Hwy:** 12

Start Date: 04-Dec-2018 (Tue) | **I/C Side:** | **LHRS:** 19555

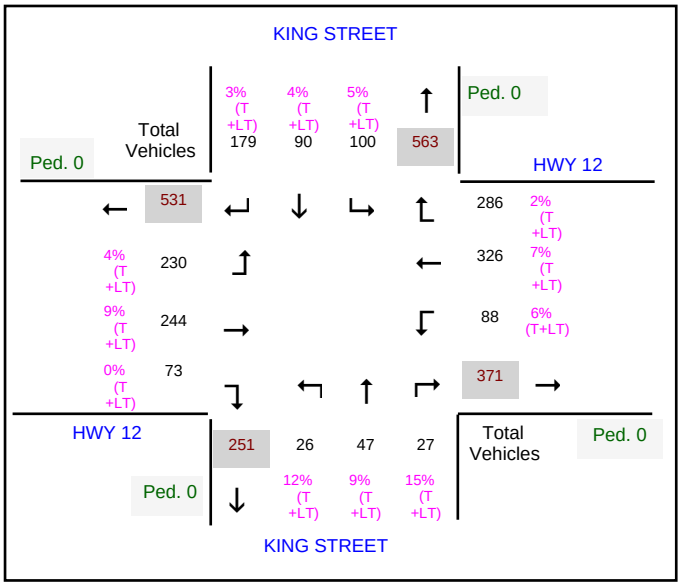
End Date: 04-Dec-2018 (Tue) | **Int. Type:** Four Leg | **Offset:** 2.050

Schedule Summary: TUES-THURS, 07:00-09:00, 11:00-14:00, 15:00-18:00

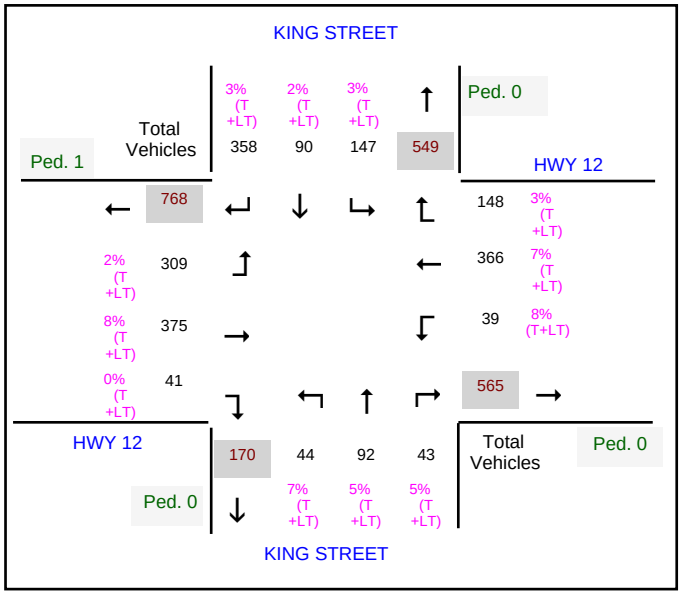
Total Count — Number of hours: 8



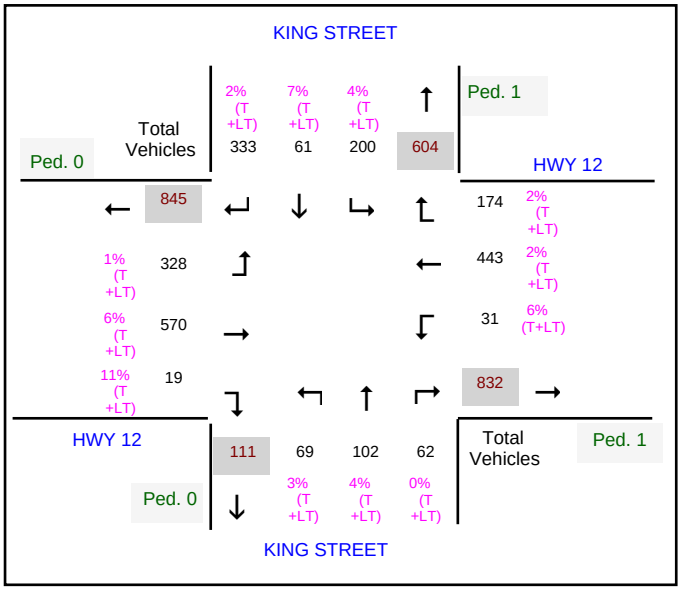
AM Peak Hour Report — Start Time: 07:45



Midday Peak Hour Report — Start Time: 12:00



PM Peak Hour Report — Start Time: 16:00



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Ministry of Transportation
Ministère des Transports
2017

Version: 1.0 Feb 1, 2016

Intersection Layout Sheet

Contract # 9015-E-0008
Work Order # 328

Date: August / 15 Day: Tu / Hrs: 7 - 10 + 12 - 14 + 15 - 18

Location: WILLIAM ST Ramps: /

Reg/Mun: CR Town/City: Midland Area:

File Name: 0195550100 Device: Gretch / Jamar Unit # 16 / Interval 1: (AM) / NN / PM

Observer: Alena Mariyskaya Weather: Cloudy / Cloudy Road Condition: Dry / Dry

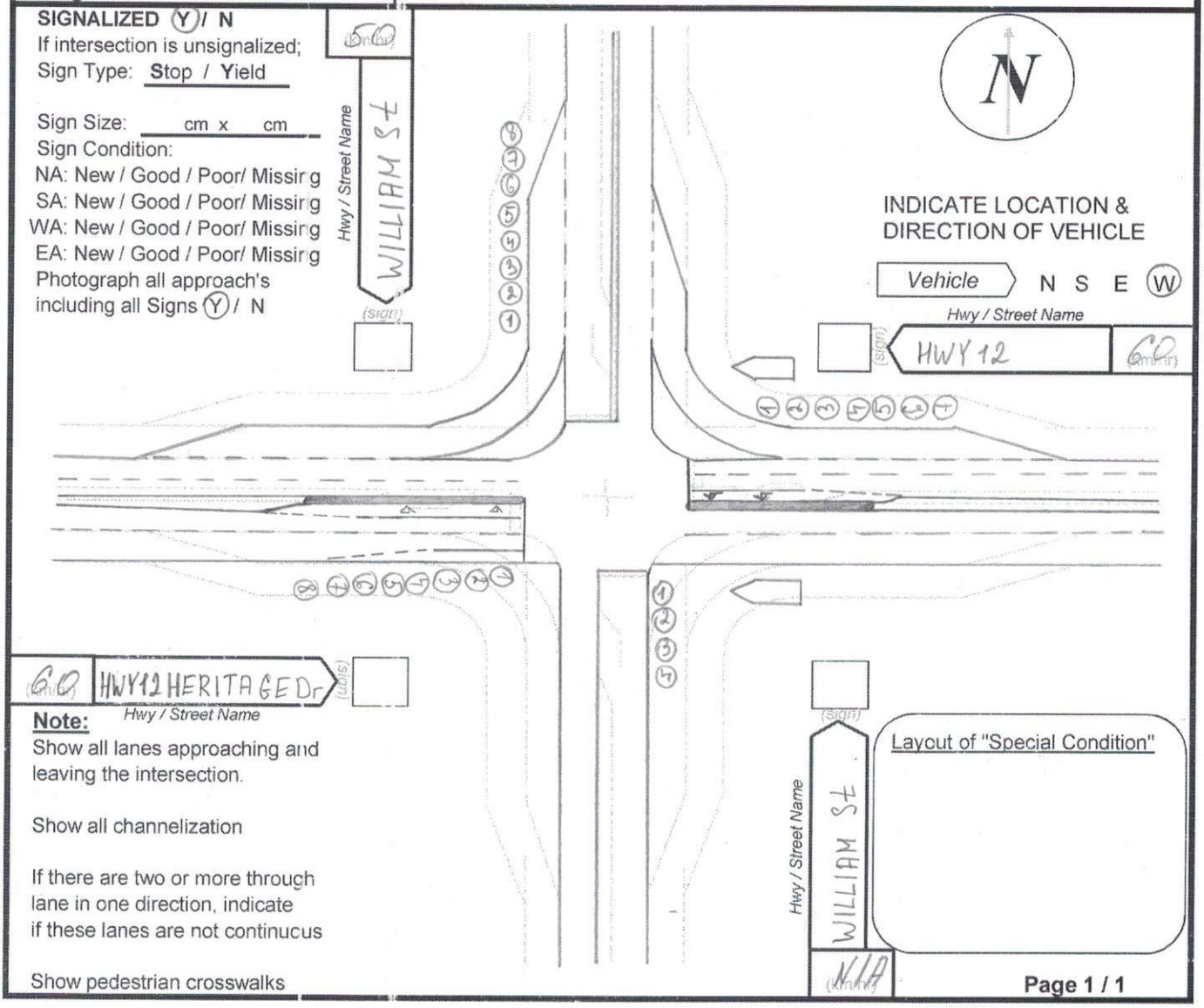
LHRS & O/S: 19555 1

GPS: G-Star IV
Datum: WGS 84 (Y) / N
Lat: 44.73575
Long: -79.95756

Comments:

SIGNALIZED (Y) / N
If intersection is unsignalized;
Sign Type: Stop / Yield

Sign Size: cm x cm
Sign Condition:
NA: New / Good / Poor / Missing
SA: New / Good / Poor / Missing
WA: New / Good / Poor / Missing
EA: New / Good / Poor / Missing
Photograph all approach's including all Signs (Y) / N



Note:
Show all lanes approaching and leaving the intersection.

Show all channelization

If there are two or more through lane in one direction, indicate if these lanes are not continucus

Show pedestrian crosswalks

Layout of "Special Condition"

Ontario

Ministry of Transportation

TVIS II - Traffic Volume Information System

AdHoc Turning Movement Total Count and Peak Summary Report

Description: HWY 12 @ WILLIAM STREET

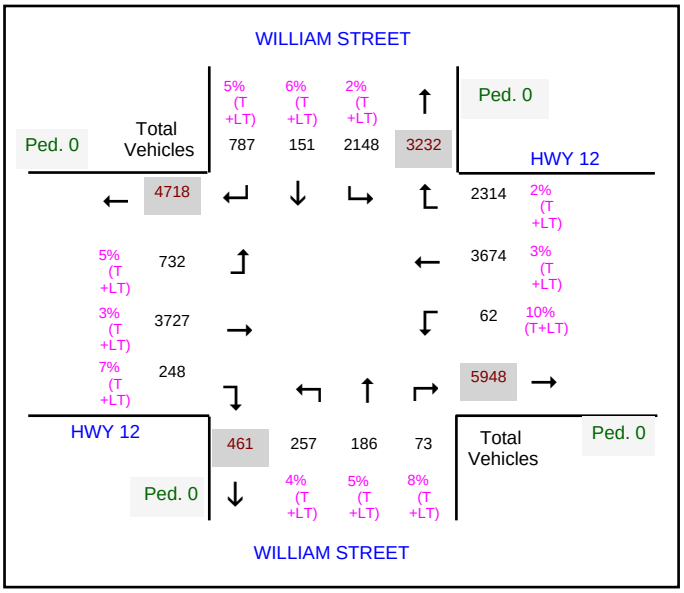
Region: CENTRAL | **Survey Type:** TM – Intersection | **Hwy:** 12

Start Date: 15-Aug-2017 (Tue) | **I/C Side:** | **LHRS:** 19555

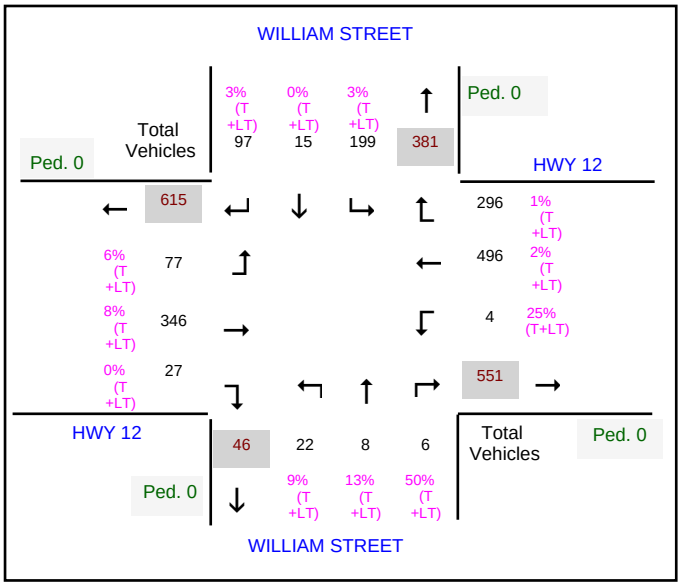
End Date: 15-Aug-2017 (Tue) | **Int. Type:** Four Leg | **Offset:** 1.000

Schedule Summary: TUES-THURS, 07:00-10:00, 12:00-14:00, 15:00-18:00

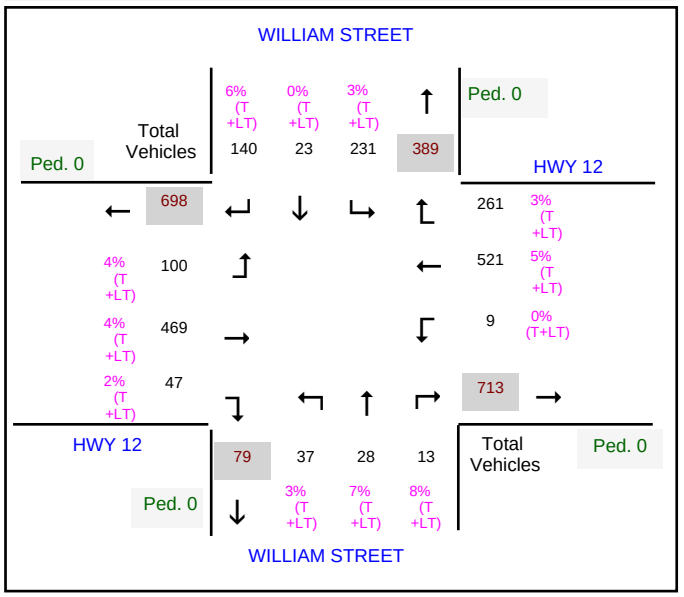
Total Count — Number of hours: 8



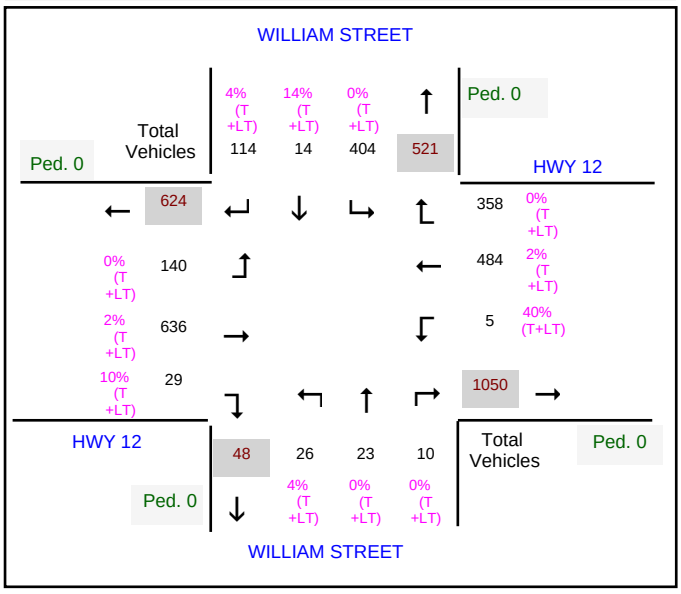
AM Peak Hour Report — Start Time: 08:15



Midday Peak Hour Report — Start Time: 12:00



PM Peak Hour Report — Start Time: 15:45



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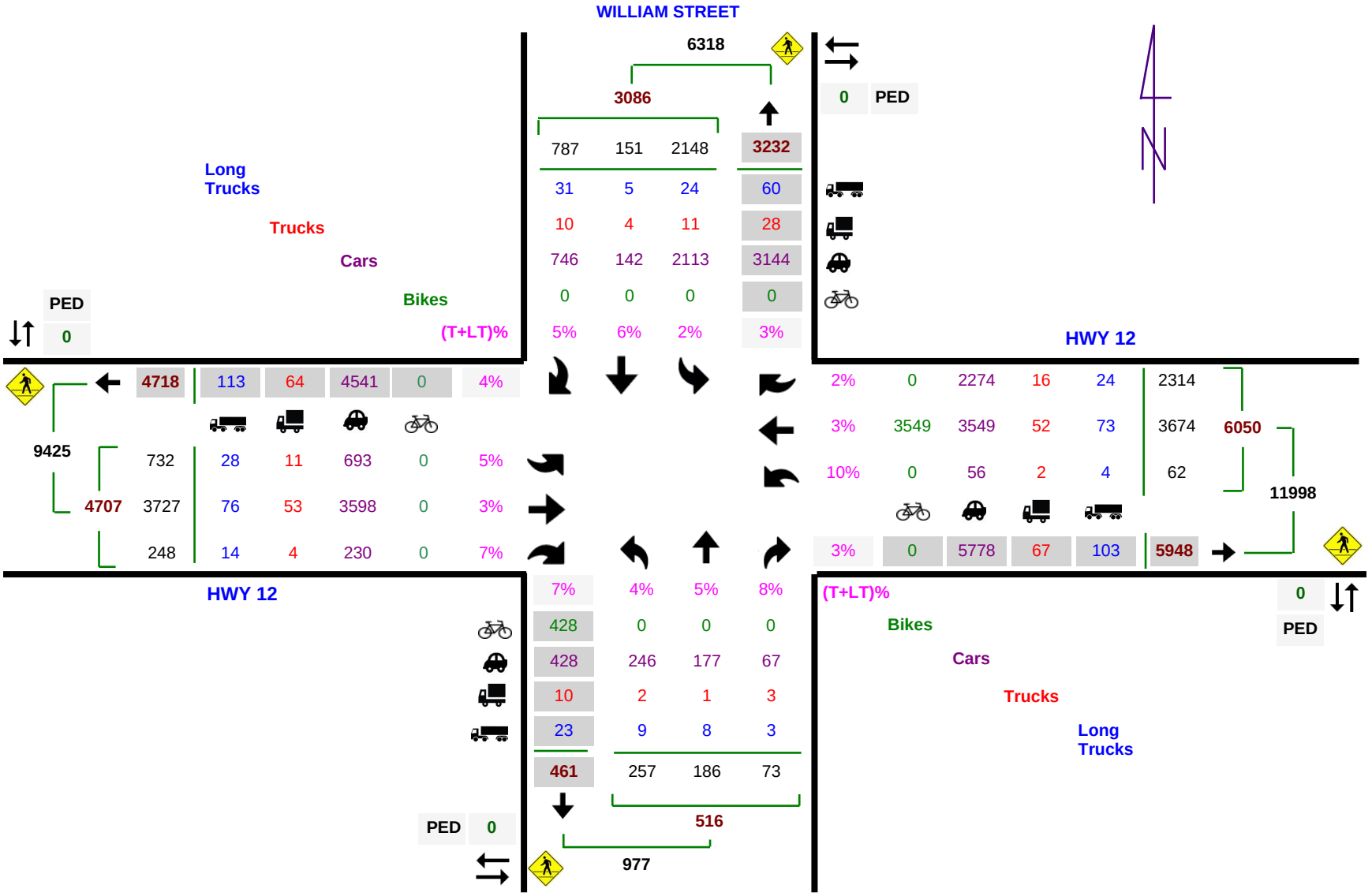
Ministry of Transportation

TVIS II - Traffic Volume Information System

Ad Hoc Turning Movement Count Total Report

Description: HWY 12 @ WILLIAM STREET
Region: CENTRAL | **Survey Type:** TM – Intersection | **Hwy:** 12
Start Date: 15-Aug-2017 (Tue) | **I/C Side:** | **LHRS:** 19555
End Date: 15-Aug-2017 (Tue) | **Int. Type:** Four Leg | **Offset:** 1.000
Schedule Summary: TUES-THURS, 07:00-10:00, 12:00-14:00, 15:00-18:00



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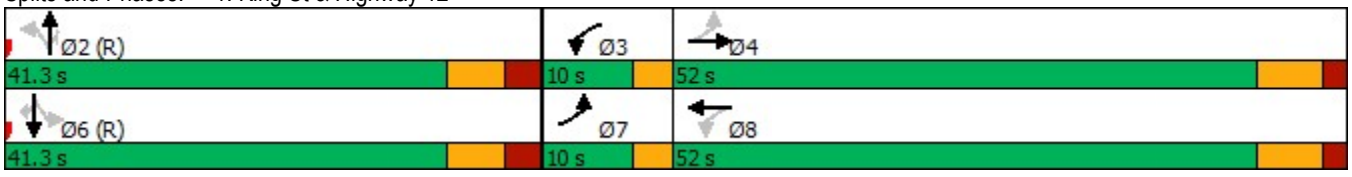
Appendix D –
Synchro Analysis Output –
Existing Traffic Volumes

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	236	250	90	334	293	27	48	28	103	92	184
Future Volume (vph)	236	250	90	334	293	27	48	28	103	92	184
Lane Group Flow (vph)	295	407	100	371	326	34	60	35	112	100	200
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.51	0.28	0.18	0.25	0.21	0.09	0.10	0.07	0.26	0.16	0.31
Control Delay	15.9	17.0	11.0	19.0	0.3	24.9	24.8	1.0	27.5	25.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.9	17.0	11.0	19.0	0.3	24.9	24.8	1.0	27.5	25.5	5.0
Queue Length 50th (m)	28.7	23.4	8.6	24.2	0.0	4.7	8.3	0.0	16.4	14.1	0.0
Queue Length 95th (m)	38.0	29.2	16.0	34.2	0.0	10.4	15.4	0.0	30.5	26.2	14.7
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	50.0		
Base Capacity (vph)	582	1455	549	1485	1581	390	579	511	432	607	655
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.28	0.18	0.25	0.21	0.09	0.10	0.07	0.26	0.16	0.31

Intersection Summary

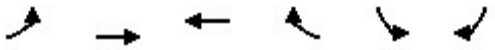
Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

Splits and Phases: 1: King St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	250	75	90	334	293	27	48	28	103	92	184
Future Volume (vph)	236	250	75	90	334	293	27	48	28	103	92	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	3281		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.53	1.00		0.50	1.00	1.00	0.69	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	979	3281		911	3411	1581	1188	1762	1402	1312	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	295	312	94	100	371	326	34	60	35	112	100	200
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	23	0	0	134
Lane Group Flow (vph)	295	380	0	100	371	326	34	60	12	112	100	66
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	545	1429		513	1485	1581	391	579	461	431	607	521
v/s Ratio Prot	c0.04	0.12		0.01	0.11			0.03			0.05	
v/s Ratio Perm	c0.24			0.08		0.21	0.03		0.01	c0.09		0.04
v/c Ratio	0.54	0.27		0.19	0.25	0.21	0.09	0.10	0.02	0.26	0.16	0.13
Uniform Delay, d1	15.6	18.6		13.5	18.5	0.0	23.9	24.1	23.4	25.4	24.6	24.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	0.5		0.8	0.4	0.3	0.4	0.4	0.1	1.5	0.6	0.5
Delay (s)	19.5	19.1		14.4	18.9	0.3	24.4	24.4	23.5	26.9	25.2	24.8
Level of Service	B	B		B	B	A	C	C	C	C	C	C
Approach Delay (s)		19.2			10.7			24.2			25.4	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	397	631	8	14	23
Future Volume (Veh/h)	13	397	631	8	14	23
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	14	432	779	10	35	58
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked						
vC, conflicting volume	790				1029	396
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	790				1029	396
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	98				84	90
cM capacity (veh/h)	735				215	581

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	158	288	519	270	93
Volume Left	14	0	0	0	35
Volume Right	0	0	0	10	58
cSH	735	1700	1700	1700	354
Volume to Capacity	0.02	0.17	0.31	0.16	0.26
Queue Length 95th (m)	0.4	0.0	0.0	0.0	7.9
Control Delay (s)	1.1	0.0	0.0	0.0	18.7
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		18.7
Approach LOS					C

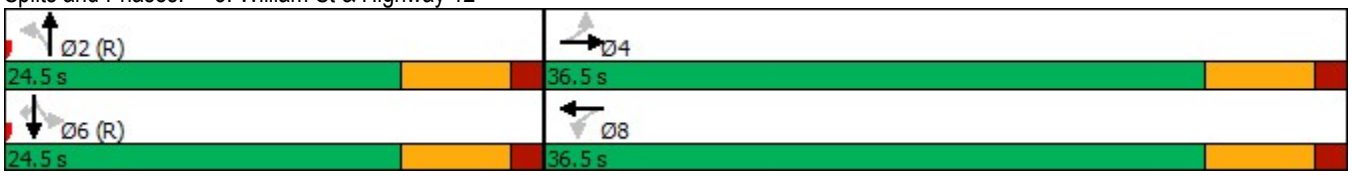
Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

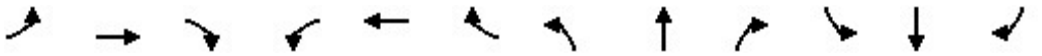
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	80	359	4	515	307	23	8	207	16	101
Future Volume (vph)	80	359	4	515	307	23	8	207	16	101
Lane Group Flow (vph)	90	434	4	548	327	0	54	0	251	113
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.23	0.26	0.01	0.31	0.20		0.15		0.65	0.21
Control Delay	10.8	9.2	8.2	9.9	0.3		15.2		28.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	10.8	9.2	8.2	9.9	0.3		15.2		28.3	5.1
Queue Length 50th (m)	5.4	13.2	0.2	18.0	0.0		3.7		24.3	0.0
Queue Length 95th (m)	12.9	20.4	1.4	26.8	0.0		7.8		#47.4	9.0
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	398	1661	377	1760	1617		355		387	547
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.23	0.26	0.01	0.31	0.20		0.15		0.65	0.21

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12

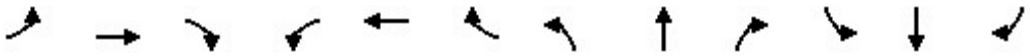




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	359	28	4	515	307	23	8	6	207	16	101
Future Volume (vph)	80	359	28	4	515	307	23	8	6	207	16	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3361		1460	3579	1617		1561			1786	1585
Flt Permitted	0.45	1.00		0.50	1.00	1.00		0.74			0.70	1.00
Satd. Flow (perm)	811	3361		768	3579	1617		1184			1312	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	90	403	31	4	548	327	33	12	9	233	18	113
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	80
Lane Group Flow (vph)	90	425	0	4	548	327	0	48	0	0	251	33
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	398	1652		377	1760	1617		349			387	467
v/s Ratio Prot		0.13			c0.15							
v/s Ratio Perm	0.11			0.01		0.20		0.04			c0.19	0.02
v/c Ratio	0.23	0.26		0.01	0.31	0.20		0.14			0.65	0.07
Uniform Delay, d1	8.9	9.0		7.9	9.3	0.0		15.8			18.7	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	1.3	0.4		0.1	0.5	0.3		0.8			8.2	0.3
Delay (s)	10.2	9.4		8.0	9.8	0.3		16.6			26.9	15.8
Level of Service	B	A		A	A	A		B			C	B
Approach Delay (s)		9.5			6.2			16.6			23.5	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	28	0	4	4	358	26	13	325	1
Future Volume (Veh/h)	0	0	0	28	0	4	4	358	26	13	325	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	35	0	5	4	465	34	14	357	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	880	894	179	698	877	483	358			500		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	880	894	179	698	877	483	358			500		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	89	100	99	100			99		
cM capacity (veh/h)	236	274	833	311	280	529	1197			961		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	40	503	192	180
Volume Left	0	35	4	14	0
Volume Right	0	5	34	0	1
cSH	1700	328	1197	961	1700
Volume to Capacity	0.00	0.12	0.00	0.01	0.11
Queue Length 95th (m)	0.0	3.1	0.1	0.3	0.0
Control Delay (s)	0.0	17.5	0.1	0.8	0.0
Lane LOS	A	C	A	A	
Approach Delay (s)	0.0	17.5	0.1	0.4	
Approach LOS	A	C			

Intersection Summary				
Average Delay	1.0			
Intersection Capacity Utilization	33.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	16	358	4	5	326
Future Volume (Veh/h)	13	16	358	4	5	326
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	17	389	4	5	354
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	578	196			393	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	578	196			393	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	445	812			1162	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	259	134	123	236
Volume Left	14	0	0	5	0
Volume Right	17	0	4	0	0
cSH	591	1700	1700	1162	1700
Volume to Capacity	0.05	0.15	0.08	0.00	0.14
Queue Length 95th (m)	1.3	0.0	0.0	0.1	0.0
Control Delay (s)	11.4	0.0	0.0	0.4	0.0
Lane LOS	B			A	
Approach Delay (s)	11.4	0.0		0.1	
Approach LOS	B				

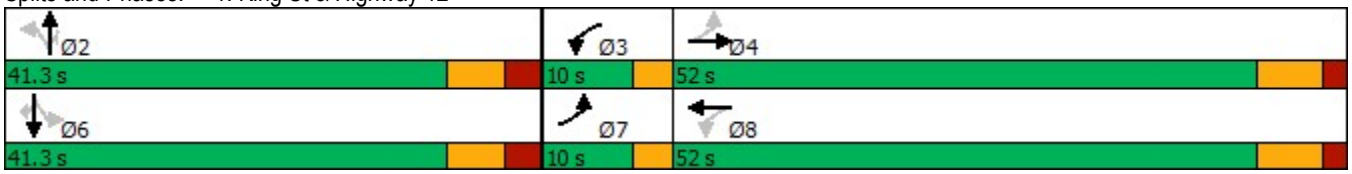
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	336	584	32	454	178	71	105	64	205	63	341
Future Volume (vph)	336	584	32	454	178	71	105	64	205	63	341
Lane Group Flow (vph)	420	754	40	560	220	91	135	82	220	68	367
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	45.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.87	0.51	0.11	0.36	0.14	0.21	0.22	0.14	0.54	0.12	0.49
Control Delay	37.5	22.4	10.5	20.3	0.2	26.6	26.3	6.2	34.2	24.9	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	22.4	10.5	20.3	0.2	26.6	26.3	6.2	34.2	24.9	7.2
Queue Length 50th (m)	44.3	55.8	3.3	38.6	0.0	13.1	19.5	0.0	35.7	9.5	6.3
Queue Length 95th (m)	#58.3	62.0	7.0	45.2	0.0	21.6	28.8	7.0	59.7	19.2	28.5
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	50.0		
Base Capacity (vph)	482	1492	364	1559	1581	437	607	585	407	590	742
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.51	0.11	0.36	0.14	0.21	0.22	0.14	0.54	0.12	0.49

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Natural Cycle: 105
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

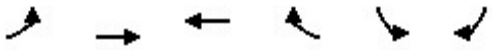
Splits and Phases: 1: King St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	336	584	19	32	454	178	71	105	64	205	63	341
Future Volume (vph)	336	584	19	32	454	178	71	105	64	205	63	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3422		1722	3579	1581	1772	1847	1612	1754	1795	1601
Flt Permitted	0.40	1.00		0.29	1.00	1.00	0.71	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	758	3422		523	3579	1581	1329	1847	1612	1238	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	420	730	24	40	560	220	91	135	82	220	68	367
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	55	0	0	215
Lane Group Flow (vph)	420	752	0	40	560	220	91	135	27	220	68	152
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	452	1490		344	1559	1581	437	607	530	407	590	526
v/s Ratio Prot	c0.06	0.22		0.01	0.16			0.07			0.04	
v/s Ratio Perm	c0.40			0.05		0.14	0.07		0.02	c0.18		0.09
v/c Ratio	0.93	0.50		0.12	0.36	0.14	0.21	0.22	0.05	0.54	0.12	0.29
Uniform Delay, d1	21.9	21.1		13.5	19.5	0.0	25.0	25.1	23.6	28.3	24.2	25.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.9	1.2		0.7	0.6	0.2	0.2	0.2	0.0	5.1	0.4	1.4
Delay (s)	49.7	22.3		14.2	20.1	0.2	25.2	25.3	23.7	33.4	24.6	27.1
Level of Service	D	C		B	C	A	C	C	C	C	C	C
Approach Delay (s)		32.1			14.5			24.8			28.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	802	610	1	14	31
Future Volume (Veh/h)	2	802	610	1	14	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	2	901	693	1	28	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.89	
vC, conflicting volume	694				1148	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	694				911	347
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				88	90
cM capacity (veh/h)	897				242	649

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	302	601	462	232	90
Volume Left	2	0	0	0	28
Volume Right	0	0	0	1	62
cSH	897	1700	1700	1700	426
Volume to Capacity	0.00	0.35	0.27	0.14	0.21
Queue Length 95th (m)	0.1	0.0	0.0	0.0	6.0
Control Delay (s)	0.1	0.0	0.0	0.0	15.7
Lane LOS	A				C
Approach Delay (s)	0.0		0.0		15.7
Approach LOS					C

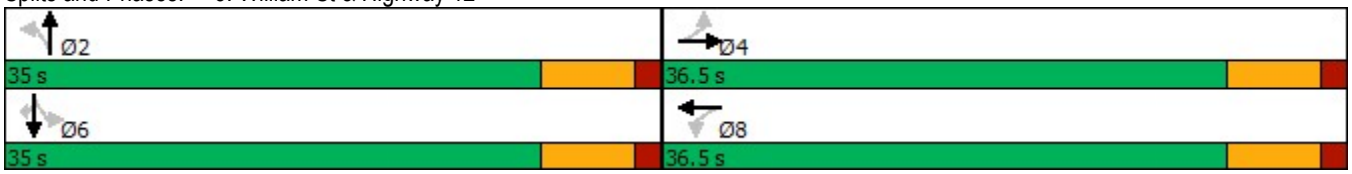
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	145	660	5	502	372	27	24	419	15	118
Future Volume (vph)	145	660	5	502	372	27	24	419	15	118
Lane Group Flow (vph)	163	776	6	558	413	0	99	0	483	131
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		35.0	35.0	35.0	35.0	35.0
Total Split (%)	51.0%	51.0%	51.0%	51.0%		49.0%	49.0%	49.0%	49.0%	49.0%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.48	0.52	0.04	0.37	0.25		0.20		0.96	0.19
Control Delay	21.2	16.8	13.2	15.2	0.4		13.3		55.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	21.2	16.8	13.2	15.2	0.4		13.3		55.2	3.7
Queue Length 50th (m)	15.3	38.7	0.5	26.0	0.0		7.0		61.0	0.0
Queue Length 95th (m)	31.9	52.9	2.6	37.5	0.0		9.9		#118.0	9.1
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	337	1490	166	1501	1633		493		504	704
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.48	0.52	0.04	0.37	0.25		0.20		0.96	0.19

Intersection Summary

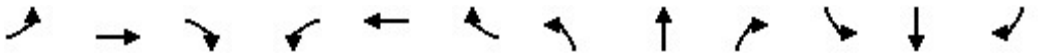
Cycle Length: 71.5
Actuated Cycle Length: 71.5
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	660	30	5	502	372	27	24	10	419	15	118
Future Volume (vph)	145	660	30	5	502	372	27	24	10	419	15	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3543		1304	3579	1633		1806			1824	1570
Flt Permitted	0.42	1.00		0.29	1.00	1.00		0.66			0.66	1.00
Satd. Flow (perm)	806	3543		398	3579	1633		1215			1266	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	163	742	34	6	558	413	44	39	16	466	17	131
RTOR Reduction (vph)	0	5	0	0	0	0	0	10	0	0	0	79
Lane Group Flow (vph)	163	771	0	6	558	413	0	89	0	0	483	52
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	71.5		28.5			28.5	28.5
Effective Green, g (s)	30.0	30.0		30.0	30.0	71.5		28.5			28.5	28.5
Actuated g/C Ratio	0.42	0.42		0.42	0.42	1.00		0.40			0.40	0.40
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	338	1486		166	1501	1633		484			504	625
v/s Ratio Prot		c0.22			0.16							
v/s Ratio Perm	0.20			0.02		0.25		0.07			c0.38	0.03
v/c Ratio	0.48	0.52		0.04	0.37	0.25		0.18			0.96	0.08
Uniform Delay, d1	15.1	15.4		12.2	14.3	0.0		14.0			20.9	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	4.9	1.3		0.4	0.7	0.4		0.2			31.0	0.3
Delay (s)	20.0	16.7		12.6	15.0	0.4		14.1			51.9	13.6
Level of Service	B	B		B	B	A		B			D	B
Approach Delay (s)		17.3			8.8			14.1			43.7	
Approach LOS		B			A			B			D	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	13.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	53	0	35	2	495	46	14	510	2
Future Volume (Veh/h)	7	0	10	53	0	35	2	495	46	14	510	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	75	0	49	2	550	51	17	614	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								224				
pX, platoon unblocked	0.99	0.99		0.99	0.99	0.99				0.99		
vC, conflicting volume	1278	1254	309	932	1230	576	616			601		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1277	1252	309	929	1228	570	616			595		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	98	65	100	89	100			98		
cM capacity (veh/h)	108	166	686	214	172	461	960			971		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	124	603	324	309
Volume Left	8	75	2	17	0
Volume Right	11	49	51	0	2
cSH	211	272	960	971	1700
Volume to Capacity	0.09	0.46	0.00	0.02	0.18
Queue Length 95th (m)	2.2	17.1	0.0	0.4	0.0
Control Delay (s)	23.8	28.9	0.1	0.6	0.0
Lane LOS	C	D	A	A	
Approach Delay (s)	23.8	28.9	0.1	0.3	
Approach LOS	C	D			

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	45.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	11	523	14	17	519
Future Volume (Veh/h)	8	11	523	14	17	519
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	12	568	15	18	564
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	894	292			583	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	894	292			583	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			98	
cM capacity (veh/h)	276	705			987	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	21	379	204	206	376
Volume Left	9	0	0	18	0
Volume Right	12	0	15	0	0
cSH	423	1700	1700	987	1700
Volume to Capacity	0.05	0.22	0.12	0.02	0.22
Queue Length 95th (m)	1.2	0.0	0.0	0.4	0.0
Control Delay (s)	14.0	0.0	0.0	0.9	0.0
Lane LOS	B			A	
Approach Delay (s)	14.0	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

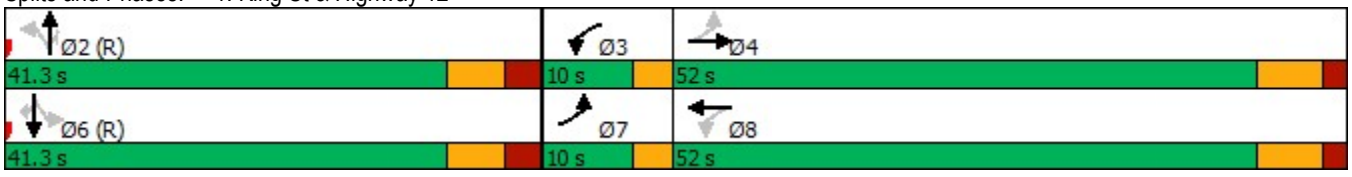
Appendix E –
Synchro Analysis Output –
Background Traffic Volumes

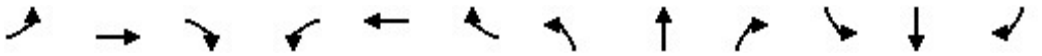
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	256	281	90	364	294	27	51	28	105	97	215
Future Volume (vph)	256	281	90	364	294	27	51	28	105	97	215
Lane Group Flow (vph)	320	450	100	404	327	34	64	35	114	105	234
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.57	0.31	0.19	0.27	0.21	0.09	0.11	0.07	0.27	0.17	0.35
Control Delay	17.6	17.7	11.1	19.3	0.3	24.9	24.9	1.0	27.6	25.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	17.7	11.1	19.3	0.3	24.9	24.9	1.0	27.6	25.7	4.9
Queue Length 50th (m)	31.6	27.0	8.6	26.6	0.0	4.7	8.9	0.0	16.7	14.9	0.0
Queue Length 95th (m)	41.2	32.9	16.0	37.2	0.0	10.4	16.3	0.0	30.8	27.5	16.0
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	561	1455	522	1485	1581	389	579	511	430	607	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.31	0.19	0.27	0.21	0.09	0.11	0.07	0.27	0.17	0.35

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

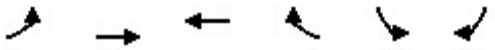
Splits and Phases: 1: King St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	281	79	90	364	294	27	51	28	105	97	215
Future Volume (vph)	256	281	79	90	364	294	27	51	28	105	97	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	3285		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.51	1.00		0.47	1.00	1.00	0.69	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	933	3285		855	3411	1581	1182	1762	1402	1308	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	320	351	99	100	404	327	34	64	35	114	105	234
RTOR Reduction (vph)	0	25	0	0	0	0	0	0	23	0	0	157
Lane Group Flow (vph)	320	425	0	100	404	327	34	64	12	114	105	77
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	525	1431		489	1485	1581	389	579	461	430	607	521
v/s Ratio Prot	c0.04	0.13		0.01	0.12			0.04			0.06	
v/s Ratio Perm	c0.27			0.09		0.21	0.03		0.01	c0.09		0.05
v/c Ratio	0.61	0.30		0.20	0.27	0.21	0.09	0.11	0.02	0.27	0.17	0.15
Uniform Delay, d1	16.4	18.9		13.5	18.7	0.0	23.9	24.1	23.4	25.5	24.6	24.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.5		0.9	0.5	0.3	0.4	0.4	0.1	1.5	0.6	0.6
Delay (s)	21.6	19.4		14.5	19.1	0.3	24.4	24.5	23.5	27.0	25.3	25.0
Level of Service	C	B		B	B	A	C	C	C	C	C	C
Approach Delay (s)		20.3			11.2			24.2			25.6	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	437	673	8	14	23
Future Volume (Veh/h)	13	437	673	8	14	23
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	14	475	831	10	35	58
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked						
vC, conflicting volume	842				1102	422
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	842				1102	422
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	98				82	90
cM capacity (veh/h)	700				192	558

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	172	317	554	287	93
Volume Left	14	0	0	0	35
Volume Right	0	0	0	10	58
cSH	700	1700	1700	1700	325
Volume to Capacity	0.02	0.19	0.33	0.17	0.29
Queue Length 95th (m)	0.5	0.0	0.0	0.0	8.8
Control Delay (s)	1.0	0.0	0.0	0.0	20.4
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		20.4
Approach LOS					C

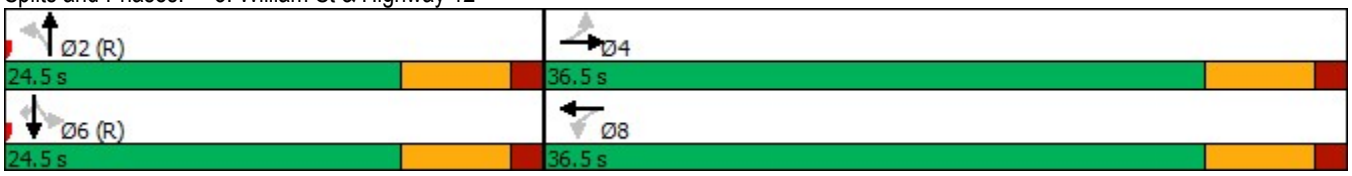
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

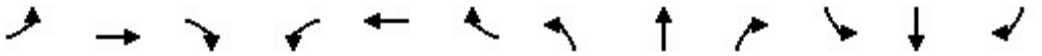
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	87	390	4	541	311	23	9	218	16	112
Future Volume (vph)	87	390	4	541	311	23	9	218	16	112
Lane Group Flow (vph)	98	469	4	576	331	0	55	0	263	126
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.25	0.28	0.01	0.33	0.20		0.15		0.68	0.23
Control Delay	11.2	9.4	8.2	10.0	0.3		15.3		30.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	11.2	9.4	8.2	10.0	0.3		15.3		30.1	4.9
Queue Length 50th (m)	5.9	14.5	0.2	19.1	0.0		3.8		25.8	0.0
Queue Length 95th (m)	14.0	22.1	1.4	28.1	0.0		8.0		#53.9	9.5
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	387	1662	364	1760	1617		355		386	556
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.25	0.28	0.01	0.33	0.20		0.15		0.68	0.23

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12

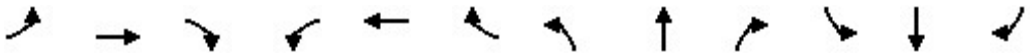




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	390	28	4	541	311	23	9	6	218	16	112
Future Volume (vph)	87	390	28	4	541	311	23	9	6	218	16	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3363		1460	3579	1617		1564			1786	1585
Flt Permitted	0.44	1.00		0.48	1.00	1.00		0.73			0.70	1.00
Satd. Flow (perm)	789	3363		742	3579	1617		1183			1310	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	98	438	31	4	576	331	33	13	9	245	18	126
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	89
Lane Group Flow (vph)	98	460	0	4	576	331	0	49	0	0	263	37
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	388	1653		364	1760	1617		349			386	467
v/s Ratio Prot		0.14			c0.16							
v/s Ratio Perm	0.12			0.01		0.20		0.04			c0.20	0.02
v/c Ratio	0.25	0.28		0.01	0.33	0.20		0.14			0.68	0.08
Uniform Delay, d1	9.0	9.1		7.9	9.4	0.0		15.8			19.0	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	1.6	0.4		0.1	0.5	0.3		0.8			9.4	0.3
Delay (s)	10.6	9.5		8.0	9.9	0.3		16.6			28.3	15.9
Level of Service	B	A		A	A	A		B			C	B
Approach Delay (s)		9.7			6.4			16.6			24.3	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	39	0	24	4	379	30	19	349	1
Future Volume (Veh/h)	0	0	0	39	0	24	4	379	30	19	349	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	48	0	30	4	492	39	21	384	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	976	966	192	754	948	512	385			532		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	976	966	192	754	948	512	385			532		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	83	100	94	100			98		
cM capacity (veh/h)	189	246	817	281	253	506	1170			933		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	78	535	213	193
Volume Left	0	48	4	21	0
Volume Right	0	30	39	0	1
cSH	1700	339	1170	933	1700
Volume to Capacity	0.00	0.23	0.00	0.02	0.11
Queue Length 95th (m)	0.0	6.6	0.1	0.5	0.0
Control Delay (s)	0.0	18.8	0.1	1.1	0.0
Lane LOS	A	C	A	A	
Approach Delay (s)	0.0	18.8	0.1	0.6	
Approach LOS	A	C			

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	35.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	16	399	4	5	356
Future Volume (Veh/h)	13	16	399	4	5	356
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	17	434	4	5	387
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	640	219			438	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640	219			438	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	406	785			1118	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	289	149	134	258
Volume Left	14	0	0	5	0
Volume Right	17	0	4	0	0
cSH	552	1700	1700	1118	1700
Volume to Capacity	0.06	0.17	0.09	0.00	0.15
Queue Length 95th (m)	1.4	0.0	0.0	0.1	0.0
Control Delay (s)	11.9	0.0	0.0	0.3	0.0
Lane LOS	B			A	
Approach Delay (s)	11.9	0.0		0.1	
Approach LOS	B				

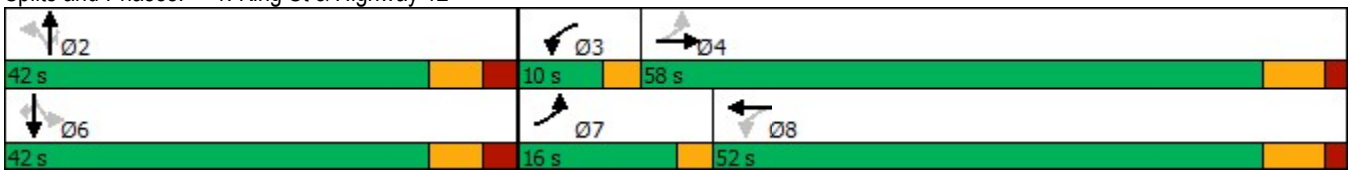
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	23.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	366	637	32	499	182	73	110	64	207	66	375
Future Volume (vph)	366	637	32	499	182	73	110	64	207	66	375
Lane Group Flow (vph)	458	825	40	616	225	94	141	82	223	71	403
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	45.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	16.0	58.0	10.0	52.0		42.0	42.0	42.0	42.0	42.0	42.0
Total Split (%)	14.5%	52.7%	9.1%	47.3%		38.2%	38.2%	38.2%	38.2%	38.2%	38.2%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.90	0.52	0.11	0.42	0.14	0.22	0.24	0.14	0.57	0.13	0.56
Control Delay	37.5	22.2	10.6	24.3	0.2	29.6	29.3	4.3	38.5	27.7	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	22.2	10.6	24.3	0.2	29.6	29.3	4.3	38.5	27.7	10.1
Queue Length 50th (m)	50.6	63.6	3.4	48.8	0.0	14.8	22.4	0.0	39.9	10.8	12.7
Queue Length 95th (m)	#66.4	69.1	7.0	55.9	0.0	23.7	32.3	4.6	65.5	21.4	40.4
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	509	1588	349	1464	1581	418	582	576	388	566	724
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.52	0.11	0.42	0.14	0.22	0.24	0.14	0.57	0.13	0.56

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Natural Cycle: 105
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

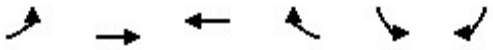
Splits and Phases: 1: King St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	366	637	23	32	499	182	73	110	64	207	66	375
Future Volume (vph)	366	637	23	32	499	182	73	110	64	207	66	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3420		1722	3579	1581	1772	1847	1612	1753	1795	1601
Flt Permitted	0.33	1.00		0.30	1.00	1.00	0.71	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	626	3420		539	3579	1581	1326	1847	1612	1231	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	458	796	29	40	616	225	94	141	82	223	71	403
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	56	0	0	220
Lane Group Flow (vph)	458	823	0	40	616	225	94	141	26	223	71	183
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	61.0	51.0		52.0	45.0	110.0	34.7	34.7	34.7	34.7	34.7	34.7
Effective Green, g (s)	61.0	51.0		52.0	45.0	110.0	34.7	34.7	34.7	34.7	34.7	34.7
Actuated g/C Ratio	0.55	0.46		0.47	0.41	1.00	0.32	0.32	0.32	0.32	0.32	0.32
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	486	1585		330	1464	1581	418	582	508	388	566	505
v/s Ratio Prot	c0.11	0.24		0.01	0.17			0.08			0.04	
v/s Ratio Perm	c0.41			0.05		0.14	0.07		0.02	c0.18		0.11
v/c Ratio	0.94	0.52		0.12	0.42	0.14	0.22	0.24	0.05	0.57	0.13	0.36
Uniform Delay, d1	18.6	20.8		15.8	23.2	0.0	27.7	27.9	26.2	31.5	26.8	29.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.7	1.2		0.8	0.9	0.2	0.3	0.2	0.0	6.1	0.5	2.0
Delay (s)	47.4	22.1		16.6	24.1	0.2	28.0	28.1	26.2	37.6	27.3	31.1
Level of Service	D	C		B	C	A	C	C	C	D	C	C
Approach Delay (s)		31.1			17.6			27.6			32.8	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	27.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	865	664	1	14	31
Future Volume (Veh/h)	2	865	664	1	14	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	2	972	755	1	28	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.87	
vC, conflicting volume	756				1246	378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	756				980	378
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				87	90
cM capacity (veh/h)	851				214	620

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	326	648	503	253	90
Volume Left	2	0	0	0	28
Volume Right	0	0	0	1	62
cSH	851	1700	1700	1700	390
Volume to Capacity	0.00	0.38	0.30	0.15	0.23
Queue Length 95th (m)	0.1	0.0	0.0	0.0	6.7
Control Delay (s)	0.1	0.0	0.0	0.0	17.0
Lane LOS	A				C
Approach Delay (s)	0.0		0.0		17.0
Approach LOS					C

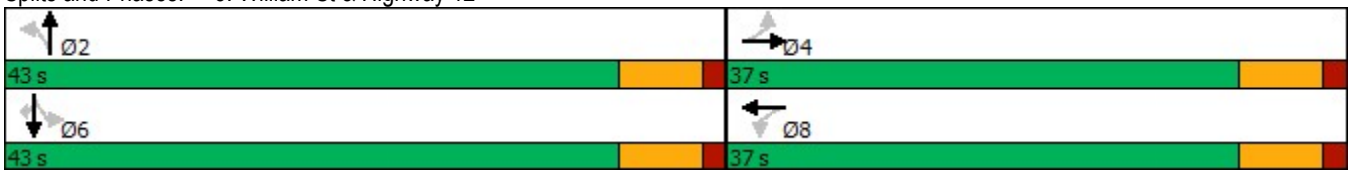
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

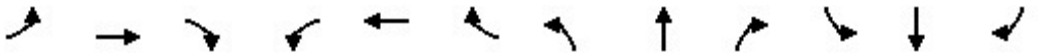
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	163	700	5	544	383	27	25	426	15	127
Future Volume (vph)	163	700	5	544	383	27	25	426	15	127
Lane Group Flow (vph)	183	821	6	604	426	0	101	0	490	141
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	37.0	37.0	37.0	37.0		43.0	43.0	43.0	43.0	43.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%		53.8%	53.8%	53.8%	53.8%	53.8%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.68	0.61	0.05	0.44	0.26		0.16		0.85	0.18
Control Delay	36.4	22.1	17.0	19.7	0.4		11.6		36.0	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	36.4	22.1	17.0	19.7	0.4		11.6		36.0	3.4
Queue Length 50th (m)	22.7	51.2	0.6	35.1	0.0		7.2		63.4	0.5
Queue Length 95th (m)	#51.7	68.0	3.0	48.8	0.0		9.8		#119.7	9.4
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	268	1355	125	1364	1633		616		576	789
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.68	0.61	0.05	0.44	0.26		0.16		0.85	0.18

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

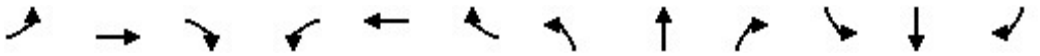
Splits and Phases: 3: William St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	700	30	5	544	383	27	25	10	426	15	127
Future Volume (vph)	163	700	30	5	544	383	27	25	10	426	15	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3545		1304	3579	1633		1808			1824	1570
Flt Permitted	0.37	1.00		0.24	1.00	1.00		0.72			0.66	1.00
Satd. Flow (perm)	704	3545		329	3579	1633		1332			1264	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	183	787	34	6	604	426	44	41	16	473	17	141
RTOR Reduction (vph)	0	4	0	0	0	0	0	9	0	0	0	73
Lane Group Flow (vph)	183	817	0	6	604	426	0	92	0	0	490	68
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.5	30.5		30.5	30.5	80.0		36.5			36.5	36.5
Effective Green, g (s)	30.5	30.5		30.5	30.5	80.0		36.5			36.5	36.5
Actuated g/C Ratio	0.38	0.38		0.38	0.38	1.00		0.46			0.46	0.46
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	268	1351		125	1364	1633		607			576	716
v/s Ratio Prot		0.23			0.17							
v/s Ratio Perm	c0.26			0.02		0.26		0.07			c0.39	0.04
v/c Ratio	0.68	0.60		0.05	0.44	0.26		0.15			0.85	0.09
Uniform Delay, d1	20.7	19.9		15.6	18.4	0.0		12.7			19.3	12.4
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	13.2	2.0		0.7	1.0	0.4		0.1			14.6	0.3
Delay (s)	33.9	21.9		16.3	19.5	0.4		12.8			34.0	12.6
Level of Service	C	C		B	B	A		B			C	B
Approach Delay (s)		24.1			11.6			12.8			29.2	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	59	0	47	2	532	57	33	539	2
Future Volume (Veh/h)	7	0	10	59	0	47	2	532	57	33	539	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	83	0	66	2	591	63	40	649	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								224				
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1424	1388	326	1043	1358	624	651			654		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1420	1383	326	1024	1352	588	651			619		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	100	98	52	100	85	100			96		
cM capacity (veh/h)	76	131	669	173	137	434	931			919		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	149	656	364	326
Volume Left	8	83	2	40	0
Volume Right	11	66	63	0	2
cSH	156	235	931	919	1700
Volume to Capacity	0.12	0.63	0.00	0.04	0.19
Queue Length 95th (m)	3.1	29.0	0.0	1.0	0.0
Control Delay (s)	31.3	43.4	0.1	1.4	0.0
Lane LOS	D	E	A	A	
Approach Delay (s)	31.3	43.4	0.1	0.8	
Approach LOS	D	E			

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	53.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	11	573	14	17	567
Future Volume (Veh/h)	8	11	573	14	17	567
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	12	623	15	18	616
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	974	319			638	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	974	319			638	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			98	
cM capacity (veh/h)	244	677			942	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	21	415	223	223	411
Volume Left	9	0	0	18	0
Volume Right	12	0	15	0	0
cSH	385	1700	1700	942	1700
Volume to Capacity	0.05	0.24	0.13	0.02	0.24
Queue Length 95th (m)	1.3	0.0	0.0	0.4	0.0
Control Delay (s)	14.9	0.0	0.0	0.9	0.0
Lane LOS	B			A	
Approach Delay (s)	14.9	0.0		0.3	
Approach LOS	B				

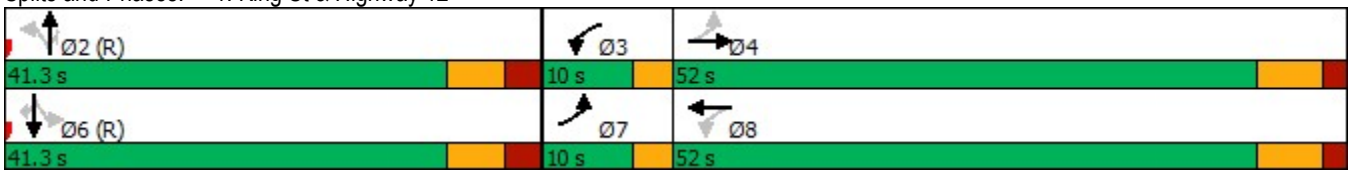
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

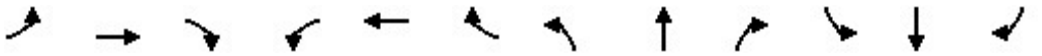
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	267	316	90	393	295	28	54	28	108	105	234
Future Volume (vph)	267	316	90	393	295	28	54	28	108	105	234
Lane Group Flow (vph)	334	495	100	437	328	35	68	35	117	114	254
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.62	0.34	0.20	0.29	0.21	0.09	0.12	0.07	0.27	0.19	0.37
Control Delay	19.2	18.5	11.2	19.6	0.3	24.9	25.0	1.0	27.7	25.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	18.5	11.2	19.6	0.3	24.9	25.0	1.0	27.7	25.8	4.9
Queue Length 50th (m)	33.4	31.0	8.6	29.1	0.0	4.8	9.5	0.0	17.2	16.2	0.0
Queue Length 95th (m)	43.1	37.0	16.0	40.3	0.0	10.6	16.9	0.0	31.6	29.3	16.4
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	540	1455	495	1485	1581	386	579	511	428	607	692
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.34	0.20	0.29	0.21	0.09	0.12	0.07	0.27	0.19	0.37

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

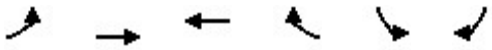
Splits and Phases: 1: King St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	316	80	90	393	295	28	54	28	108	105	234
Future Volume (vph)	267	316	80	90	393	295	28	54	28	108	105	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	3290		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.48	1.00		0.44	1.00	1.00	0.68	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	889	3290		799	3411	1581	1173	1762	1402	1303	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	334	395	100	100	437	328	35	68	35	117	114	254
RTOR Reduction (vph)	0	21	0	0	0	0	0	0	23	0	0	170
Lane Group Flow (vph)	334	474	0	100	437	328	35	68	12	117	114	84
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	506	1433		464	1485	1581	386	579	461	428	607	521
v/s Ratio Prot	c0.04	0.14		0.01	0.13			0.04			0.06	
v/s Ratio Perm	c0.29			0.09		0.21	0.03		0.01	c0.09		0.05
v/c Ratio	0.66	0.33		0.22	0.29	0.21	0.09	0.12	0.02	0.27	0.19	0.16
Uniform Delay, d1	17.0	19.2		13.6	18.9	0.0	24.0	24.2	23.4	25.5	24.8	24.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	0.6		1.1	0.5	0.3	0.5	0.4	0.1	1.6	0.7	0.7
Delay (s)	23.6	19.8		14.6	19.4	0.3	24.4	24.6	23.5	27.1	25.5	25.2
Level of Service	C	B		B	B	A	C	C	C	C	C	C
Approach Delay (s)		21.4			11.6			24.3			25.7	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	483	723	8	14	23
Future Volume (Veh/h)	13	483	723	8	14	23
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	14	525	893	10	35	58
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.99	
vC, conflicting volume	904				1190	452
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904				1165	452
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	98				80	89
cM capacity (veh/h)	660				172	533

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	189	350	595	308	93
Volume Left	14	0	0	0	35
Volume Right	0	0	0	10	58
cSH	660	1700	1700	1700	298
Volume to Capacity	0.02	0.21	0.35	0.18	0.31
Queue Length 95th (m)	0.5	0.0	0.0	0.0	9.8
Control Delay (s)	1.0	0.0	0.0	0.0	22.5
Lane LOS	A				C
Approach Delay (s)	0.4		0.0		22.5
Approach LOS					C

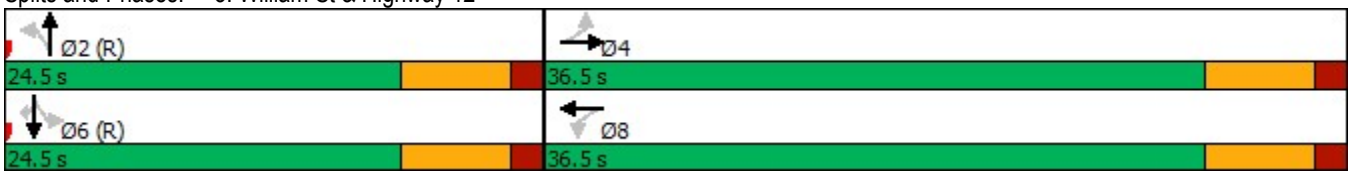
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

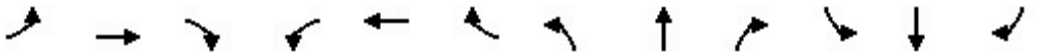
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	91	431	4	582	313	23	9	224	17	113
Future Volume (vph)	91	431	4	582	313	23	9	224	17	113
Lane Group Flow (vph)	102	515	4	619	333	0	55	0	271	127
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.28	0.31	0.01	0.35	0.21		0.16		0.70	0.23
Control Delay	11.7	9.6	8.2	10.2	0.3		15.3		31.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	11.7	9.6	8.2	10.2	0.3		15.3		31.3	4.9
Queue Length 50th (m)	6.3	16.3	0.2	20.7	0.0		3.8		26.8	0.0
Queue Length 95th (m)	15.0	24.5	1.4	30.5	0.0		8.0		#56.1	9.4
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	367	1662	349	1760	1617		353		386	557
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.28	0.31	0.01	0.35	0.21		0.16		0.70	0.23

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12

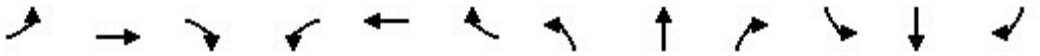




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	431	28	4	582	313	23	9	6	224	17	113
Future Volume (vph)	91	431	28	4	582	313	23	9	6	224	17	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3364		1460	3579	1617		1564			1786	1585
Flt Permitted	0.41	1.00		0.46	1.00	1.00		0.73			0.70	1.00
Satd. Flow (perm)	747	3364		710	3579	1617		1178			1310	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	102	484	31	4	619	333	33	13	9	252	19	127
RTOR Reduction (vph)	0	8	0	0	0	0	0	6	0	0	0	90
Lane Group Flow (vph)	102	507	0	4	619	333	0	49	0	0	271	37
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	367	1654		349	1760	1617		347			386	467
v/s Ratio Prot		0.15			c0.17							
v/s Ratio Perm	0.14			0.01		0.21		0.04			c0.21	0.02
v/c Ratio	0.28	0.31		0.01	0.35	0.21		0.14			0.70	0.08
Uniform Delay, d1	9.1	9.3		7.9	9.5	0.0		15.8			19.1	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	1.9	0.5		0.1	0.6	0.3		0.8			10.2	0.3
Delay (s)	11.0	9.8		8.0	10.1	0.3		16.7			29.3	15.9
Level of Service	B	A		A	B	A		B			C	B
Approach Delay (s)		10.0			6.7			16.7			25.0	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	39	0	24	4	408	30	19	377	1
Future Volume (Veh/h)	0	0	0	39	0	24	4	408	30	19	377	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	48	0	30	4	530	39	21	414	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	1044	1034	414	1014	1016	550	415			570		
vC1, stage 1 conf vol	456	456		558	558							
vC2, stage 2 conf vol	588	578		456	457							
vCu, unblocked vol	1044	1034	414	1014	1016	550	415			570		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)	6.1	5.5		6.2	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	88	100	94	100			98		
cM capacity (veh/h)	382	405	638	409	419	534	1144			931		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	78	573	21	415
Volume Left	0	48	4	21	0
Volume Right	0	30	39	0	1
cSH	1700	450	1144	931	1700
Volume to Capacity	0.00	0.17	0.00	0.02	0.24
Queue Length 95th (m)	0.0	4.7	0.1	0.5	0.0
Control Delay (s)	0.0	14.7	0.1	9.0	0.0
Lane LOS	A	B	A	A	
Approach Delay (s)	0.0	14.7	0.1	0.4	
Approach LOS	A	B			

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	36.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	16	428	4	5	384
Future Volume (Veh/h)	13	16	428	4	5	384
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	17	465	4	5	417
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	894	467			469	
vC1, stage 1 conf vol	467					
vC2, stage 2 conf vol	427					
vCu, unblocked vol	894	467			469	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	97			100	
cM capacity (veh/h)	519	596			1093	

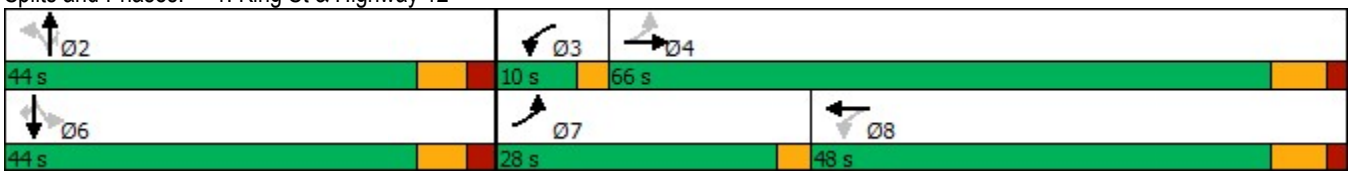
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	31	469	5	417
Volume Left	14	0	5	0
Volume Right	17	4	0	0
cSH	559	1700	1093	1700
Volume to Capacity	0.06	0.28	0.00	0.25
Queue Length 95th (m)	1.3	0.0	0.1	0.0
Control Delay (s)	11.8	0.0	8.3	0.0
Lane LOS	B		A	
Approach Delay (s)	11.8	0.0	0.1	
Approach LOS	B			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	386	696	32	551	185	76	119	64	209	71	397
Future Volume (vph)	386	696	32	551	185	76	119	64	209	71	397
Lane Group Flow (vph)	483	901	40	680	228	97	153	82	225	76	427
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	41.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	48.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	28.0	66.0	10.0	48.0		44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	23.3%	55.0%	8.3%	40.0%		36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.85	0.54	0.13	0.56	0.14	0.24	0.27	0.15	0.61	0.14	0.54
Control Delay	30.9	22.4	12.4	34.2	0.2	33.2	33.2	5.8	44.0	31.1	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	22.4	12.4	34.2	0.2	33.2	33.2	5.8	44.0	31.1	5.8
Queue Length 50th (m)	57.1	74.4	3.6	68.1	0.0	17.1	27.3	0.0	45.2	12.9	0.0
Queue Length 95th (m)	76.5	78.5	7.2	75.8	0.0	26.6	37.9	6.2	72.4	24.8	23.0
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	569	1684	315	1222	1581	404	564	556	367	548	786
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.54	0.13	0.56	0.14	0.24	0.27	0.15	0.61	0.14	0.54

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord

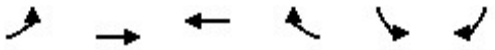
Splits and Phases: 1: King St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	386	696	25	32	551	185	76	119	64	209	71	397
Future Volume (vph)	386	696	25	32	551	185	76	119	64	209	71	397
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3420		1722	3579	1581	1772	1847	1612	1753	1795	1601
Flt Permitted	0.25	1.00		0.32	1.00	1.00	0.71	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	482	3420		573	3579	1581	1320	1847	1612	1203	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	482	870	31	40	680	228	97	153	82	225	76	427
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	57	0	0	296
Lane Group Flow (vph)	483	899	0	40	680	228	97	153	25	225	76	131
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	69.0	59.0		48.0	41.0	120.0	36.7	36.7	36.7	36.7	36.7	36.7
Effective Green, g (s)	69.0	59.0		48.0	41.0	120.0	36.7	36.7	36.7	36.7	36.7	36.7
Actuated g/C Ratio	0.58	0.49		0.40	0.34	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	553	1681		296	1222	1581	403	564	493	367	548	489
v/s Ratio Prot	c0.18	0.26		0.01	0.19			0.08			0.04	
v/s Ratio Perm	c0.32			0.05		0.14	0.07		0.02	c0.19		0.08
v/c Ratio	0.87	0.53		0.14	0.56	0.14	0.24	0.27	0.05	0.61	0.14	0.27
Uniform Delay, d1	17.7	21.0		22.1	32.1	0.0	31.2	31.5	29.4	35.6	30.2	31.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.2	1.2		0.9	1.8	0.2	0.3	0.3	0.0	7.5	0.5	1.3
Delay (s)	34.9	22.3		23.1	33.9	0.2	31.5	31.8	29.4	43.0	30.7	32.8
Level of Service	C	C		C	C	A	C	C	C	D	C	C
Approach Delay (s)		26.7			25.4			31.1			35.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	940	730	1	14	31
Future Volume (Veh/h)	2	940	730	1	14	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	2	1056	830	1	28	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.85	
vC, conflicting volume	831				1362	416
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	831				1070	416
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				85	89
cM capacity (veh/h)	797				183	586

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	354	704	553	278	90
Volume Left	2	0	0	0	28
Volume Right	0	0	0	1	62
cSH	797	1700	1700	1700	348
Volume to Capacity	0.00	0.41	0.33	0.16	0.26
Queue Length 95th (m)	0.1	0.0	0.0	0.0	7.7
Control Delay (s)	0.1	0.0	0.0	0.0	18.9
Lane LOS	A				C
Approach Delay (s)	0.0		0.0		18.9
Approach LOS					C

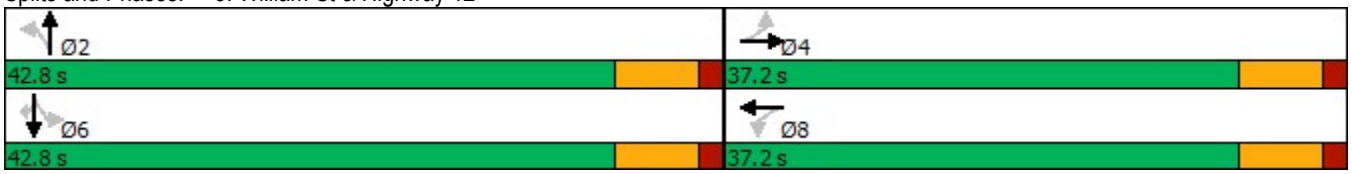
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	170	759	5	600	390	27	26	430	16	129
Future Volume (vph)	170	759	5	600	390	27	26	430	16	129
Lane Group Flow (vph)	191	887	6	667	433	0	103	0	496	143
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	37.2	37.2	37.2	37.2		42.8	42.8	42.8	42.8	42.8
Total Split (%)	46.5%	46.5%	46.5%	46.5%		53.5%	53.5%	53.5%	53.5%	53.5%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.79	0.65	0.06	0.49	0.27		0.17		0.87	0.19
Control Delay	48.2	22.8	17.4	20.2	0.4		11.9		37.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	48.2	22.8	17.4	20.2	0.4		11.9		37.9	5.0
Queue Length 50th (m)	25.1	56.4	0.6	39.4	0.0		7.5		65.1	2.8
Queue Length 95th (m)	#59.4	74.5	3.1	54.2	0.0		10.1		#122.6	12.1
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	241	1364	109	1373	1633		607		572	771
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.79	0.65	0.06	0.49	0.27		0.17		0.87	0.19

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	759	30	5	600	390	27	26	10	430	16	129
Future Volume (vph)	170	759	30	5	600	390	27	26	10	430	16	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3547		1304	3579	1633		1811			1824	1570
Flt Permitted	0.33	1.00		0.21	1.00	1.00		0.71			0.66	1.00
Satd. Flow (perm)	629	3547		286	3579	1633		1321			1261	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	191	853	34	6	667	433	44	43	16	478	18	143
RTOR Reduction (vph)	0	4	0	0	0	0	0	8	0	0	0	60
Lane Group Flow (vph)	191	883	0	6	667	433	0	95	0	0	496	83
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.7	30.7		30.7	30.7	80.0		36.3			36.3	36.3
Effective Green, g (s)	30.7	30.7		30.7	30.7	80.0		36.3			36.3	36.3
Actuated g/C Ratio	0.38	0.38		0.38	0.38	1.00		0.45			0.45	0.45
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	241	1361		109	1373	1633		599			572	712
v/s Ratio Prot		0.25			0.19							
v/s Ratio Perm	c0.30			0.02		0.27		0.07			c0.39	0.05
v/c Ratio	0.79	0.65		0.06	0.49	0.27		0.16			0.87	0.12
Uniform Delay, d1	21.8	20.2		15.5	18.7	0.0		12.9			19.7	12.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	22.9	2.4		1.0	1.2	0.4		0.1			16.2	0.3
Delay (s)	44.7	22.6		16.5	19.9	0.4		13.0			35.8	12.9
Level of Service	D	C		B	B	A		B			D	B
Approach Delay (s)		26.6			12.2			13.0			30.7	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	59	0	47	2	578	57	33	580	2
Future Volume (Veh/h)	7	0	10	59	0	47	2	578	57	33	580	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	83	0	66	2	642	63	40	699	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1524	1489	701	1468	1458	674	701			705		
vC1, stage 1 conf vol	780	780		678	678							
vC2, stage 2 conf vol	744	709		791	781							
vCu, unblocked vol	1525	1489	701	1467	1457	642	701			674		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	97	71	100	86	100			95		
cM capacity (veh/h)	242	291	438	285	307	456	896			883		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	149	707	40	701
Volume Left	8	83	2	40	0
Volume Right	11	66	63	0	2
cSH	326	341	896	883	1700
Volume to Capacity	0.06	0.44	0.00	0.05	0.41
Queue Length 95th (m)	1.4	16.2	0.1	1.1	0.0
Control Delay (s)	16.7	23.5	0.1	9.3	0.0
Lane LOS	C	C	A	A	
Approach Delay (s)	16.7	23.5	0.1	0.5	
Approach LOS	C	C			

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	51.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	11	621	14	17	608
Future Volume (Veh/h)	8	11	621	14	17	608
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	12	675	15	18	661
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	1380	682			690	
vC1, stage 1 conf vol	682					
vC2, stage 2 conf vol	697					
vCu, unblocked vol	1380	682			690	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			98	
cM capacity (veh/h)	371	450			905	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	21	690	18	661
Volume Left	9	0	18	0
Volume Right	12	15	0	0
cSH	412	1700	905	1700
Volume to Capacity	0.05	0.41	0.02	0.39
Queue Length 95th (m)	1.2	0.0	0.5	0.0
Control Delay (s)	14.2	0.0	9.1	0.0
Lane LOS	B		A	
Approach Delay (s)	14.2	0.0	0.2	
Approach LOS	B			

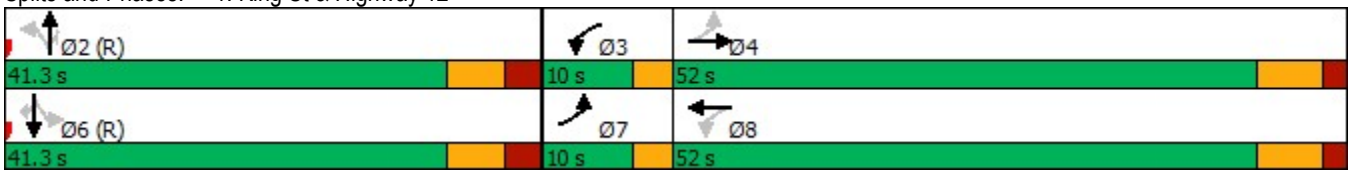
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

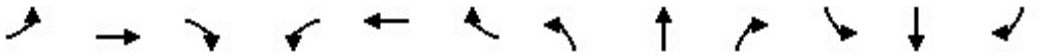
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	284	366	90	430	297	30	59	28	114	114	242
Future Volume (vph)	284	366	90	430	297	30	59	28	114	114	242
Lane Group Flow (vph)	355	563	100	478	330	38	74	35	124	124	263
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.69	0.39	0.22	0.32	0.21	0.10	0.13	0.07	0.29	0.20	0.38
Control Delay	22.3	19.5	11.4	19.9	0.3	25.1	25.1	1.0	28.1	26.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	19.5	11.4	19.9	0.3	25.1	25.1	1.0	28.1	26.1	4.9
Queue Length 50th (m)	36.0	36.7	8.6	32.3	0.0	5.3	10.3	0.0	18.3	17.8	0.0
Queue Length 95th (m)	46.1	42.9	16.0	44.1	0.0	11.2	18.1	0.0	33.3	31.5	16.6
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	515	1454	458	1485	1581	382	579	511	426	607	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.39	0.22	0.32	0.21	0.10	0.13	0.07	0.29	0.20	0.38

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

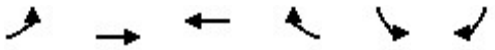
Splits and Phases: 1: King St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	284	366	84	90	430	297	30	59	28	114	114	242
Future Volume (vph)	284	366	84	90	430	297	30	59	28	114	114	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	3295		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.45	1.00		0.40	1.00	1.00	0.68	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	836	3295		719	3411	1581	1162	1762	1402	1296	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	355	458	105	100	478	330	38	74	35	124	124	263
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	23	0	0	176
Lane Group Flow (vph)	355	544	0	100	478	330	38	74	12	124	124	87
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	483	1435		429	1485	1581	382	579	461	426	607	521
v/s Ratio Prot	c0.05	0.17		0.02	0.14			0.04			0.07	
v/s Ratio Perm	c0.32			0.10		0.21	0.03		0.01	c0.10		0.05
v/c Ratio	0.73	0.38		0.23	0.32	0.21	0.10	0.13	0.02	0.29	0.20	0.17
Uniform Delay, d1	18.1	19.7		13.6	19.1	0.0	24.0	24.3	23.4	25.7	24.9	24.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.6	0.8		1.3	0.6	0.3	0.5	0.5	0.1	1.7	0.8	0.7
Delay (s)	27.7	20.5		14.9	19.7	0.3	24.6	24.7	23.5	27.4	25.7	25.3
Level of Service	C	C		B	B	A	C	C	C	C	C	C
Approach Delay (s)		23.3			12.1			24.4			25.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	550	783	8	14	23
Future Volume (Veh/h)	13	550	783	8	14	23
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	14	598	967	10	35	58
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.96	
vC, conflicting volume	978				1300	490
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	978				1227	490
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	98				77	88
cM capacity (veh/h)	616				152	503

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	213	399	645	332	93
Volume Left	14	0	0	0	35
Volume Right	0	0	0	10	58
cSH	616	1700	1700	1700	269
Volume to Capacity	0.02	0.23	0.38	0.20	0.35
Queue Length 95th (m)	0.5	0.0	0.0	0.0	11.3
Control Delay (s)	1.0	0.0	0.0	0.0	25.3
Lane LOS	A				D
Approach Delay (s)	0.3		0.0		25.3
Approach LOS					D

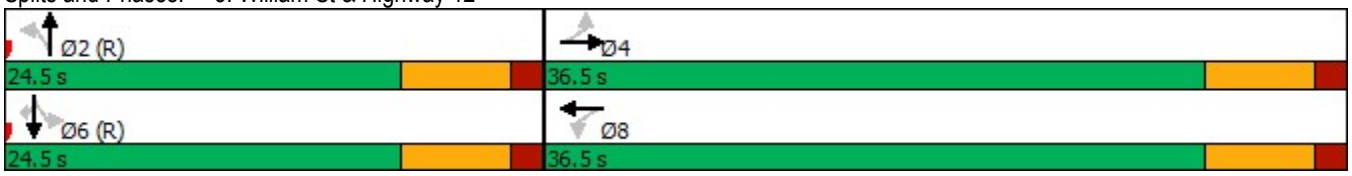
Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

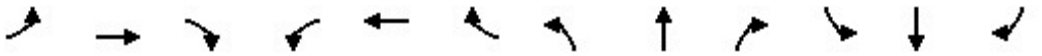
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	95	490	4	632	313	23	10	224	18	115
Future Volume (vph)	95	490	4	632	313	23	10	224	18	115
Lane Group Flow (vph)	107	582	4	672	333	0	56	0	272	129
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.31	0.35	0.01	0.38	0.21		0.16		0.70	0.23
Control Delay	12.6	10.0	8.2	10.5	0.3		15.4		31.5	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	12.6	10.0	8.2	10.5	0.3		15.4		31.5	4.9
Queue Length 50th (m)	6.7	19.0	0.2	22.9	0.0		3.8		26.8	0.0
Queue Length 95th (m)	16.1	28.1	1.5	33.4	0.0		8.1		#56.3	9.6
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	340	1662	327	1760	1617		355		386	558
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.31	0.35	0.01	0.38	0.21		0.16		0.70	0.23

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	490	28	4	632	313	23	10	6	224	18	115
Future Volume (vph)	95	490	28	4	632	313	23	10	6	224	18	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3366		1460	3579	1617		1566			1786	1585
Flt Permitted	0.38	1.00		0.43	1.00	1.00		0.73			0.70	1.00
Satd. Flow (perm)	692	3366		665	3579	1617		1183			1311	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	107	551	31	4	672	333	33	14	9	252	20	129
RTOR Reduction (vph)	0	7	0	0	0	0	0	6	0	0	0	91
Lane Group Flow (vph)	107	575	0	4	672	333	0	50	0	0	272	38
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	340	1655		327	1760	1617		349			386	467
v/s Ratio Prot		0.17			c0.19							
v/s Ratio Perm	0.15			0.01		0.21		0.04			c0.21	0.02
v/c Ratio	0.31	0.35		0.01	0.38	0.21		0.14			0.70	0.08
Uniform Delay, d1	9.3	9.5		7.9	9.7	0.0		15.8			19.1	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	2.4	0.6		0.1	0.6	0.3		0.9			10.3	0.3
Delay (s)	11.7	10.1		8.0	10.3	0.3		16.7			29.5	15.9
Level of Service	B	B		A	B	A		B			C	B
Approach Delay (s)		10.3			7.0			16.7			25.1	
Approach LOS		B			A			B			C	

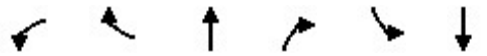
Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	39	0	24	4	437	30	19	401	1
Future Volume (Veh/h)	0	0	0	39	0	24	4	437	30	19	401	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	48	0	30	4	568	39	21	441	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	1109	1100	442	1080	1080	588	442			608		
vC1, stage 1 conf vol	484	484		596	596							
vC2, stage 2 conf vol	626	616		483	484							
vCu, unblocked vol	1109	1100	442	1080	1080	588	442			608		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)	6.1	5.5		6.2	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	88	100	94	100			98		
cM capacity (veh/h)	361	387	616	388	401	508	1118			901		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	78	611	21	442
Volume Left	0	48	4	21	0
Volume Right	0	30	39	0	1
cSH	1700	427	1118	901	1700
Volume to Capacity	0.00	0.18	0.00	0.02	0.26
Queue Length 95th (m)	0.0	5.0	0.1	0.5	0.0
Control Delay (s)	0.0	15.3	0.1	9.1	0.0
Lane LOS	A	C	A	A	
Approach Delay (s)	0.0	15.3	0.1	0.4	
Approach LOS	A	C			

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	38.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	16	458	4	5	409
Future Volume (Veh/h)	13	16	458	4	5	409
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	17	498	4	5	445
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	955	500			502	
vC1, stage 1 conf vol	500					
vC2, stage 2 conf vol	455					
vCu, unblocked vol	955	500			502	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	97			100	
cM capacity (veh/h)	498	571			1062	

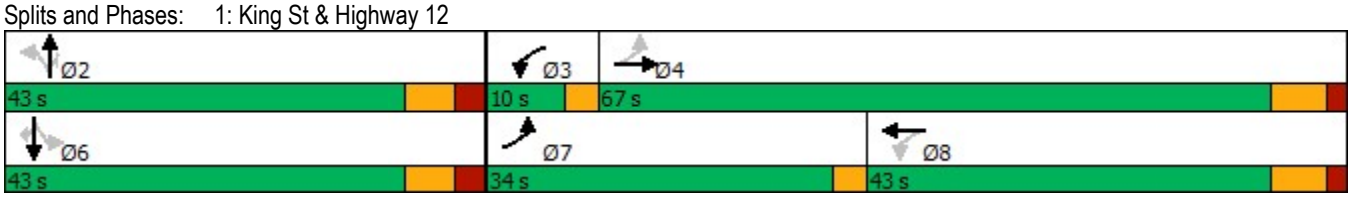
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	31	502	5	445
Volume Left	14	0	5	0
Volume Right	17	4	0	0
cSH	535	1700	1062	1700
Volume to Capacity	0.06	0.30	0.00	0.26
Queue Length 95th (m)	1.4	0.0	0.1	0.0
Control Delay (s)	12.1	0.0	8.4	0.0
Lane LOS	B		A	
Approach Delay (s)	12.1	0.0	0.1	
Approach LOS	B			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	404	767	32	627	191	81	130	64	213	77	422
Future Volume (vph)	404	767	32	627	191	81	130	64	213	77	422
Lane Group Flow (vph)	505	994	40	774	236	104	167	82	229	83	454
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	36.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	43.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	34.0	67.0	10.0	43.0		43.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	55.8%	8.3%	35.8%		35.8%	35.8%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.87	0.58	0.15	0.72	0.15	0.27	0.30	0.15	0.67	0.16	0.57
Control Delay	40.7	22.8	13.7	42.1	0.2	34.5	34.4	6.0	47.8	32.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	22.8	13.7	42.1	0.2	34.5	34.4	6.0	47.8	32.1	6.1
Queue Length 50th (m)	82.4	83.7	3.5	85.6	0.0	18.7	30.3	0.0	47.2	14.4	0.0
Queue Length 95th (m)	102.0	87.1	7.0	93.6	0.0	28.6	41.5	6.3	76.0	26.9	23.9
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	581	1712	274	1073	1581	390	549	543	344	534	795
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.58	0.15	0.72	0.15	0.27	0.30	0.15	0.67	0.16	0.57

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord

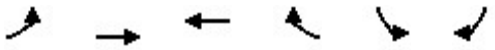
Splits and Phases: 1: King St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	404	767	28	32	627	191	81	130	64	213	77	422
Future Volume (vph)	404	767	28	32	627	191	81	130	64	213	77	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3420		1722	3579	1581	1772	1847	1612	1753	1795	1601
Flt Permitted	0.17	1.00		0.29	1.00	1.00	0.70	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	322	3420		523	3579	1581	1311	1847	1612	1158	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	505	959	35	40	774	236	104	167	82	229	83	454
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	58	0	0	319
Lane Group Flow (vph)	505	992	0	40	774	236	104	167	24	229	83	135
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	70.0	60.0		43.0	36.0	120.0	35.7	35.7	35.7	35.7	35.7	35.7
Effective Green, g (s)	70.0	60.0		43.0	36.0	120.0	35.7	35.7	35.7	35.7	35.7	35.7
Actuated g/C Ratio	0.58	0.50		0.36	0.30	1.00	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	571	1710		257	1073	1581	390	549	479	344	534	476
v/s Ratio Prot	c0.23	0.29		0.01	0.22			0.09			0.05	
v/s Ratio Perm	c0.29			0.05		0.15	0.08		0.02	c0.20		0.08
v/c Ratio	0.88	0.58		0.16	0.72	0.15	0.27	0.30	0.05	0.67	0.16	0.28
Uniform Delay, d1	27.4	21.1		25.3	37.5	0.0	32.2	32.6	30.1	36.9	31.0	32.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.9	1.4		1.3	4.2	0.2	0.4	0.3	0.0	9.8	0.6	1.5
Delay (s)	45.3	22.6		26.6	41.7	0.2	32.5	32.9	30.1	46.7	31.7	33.8
Level of Service	D	C		C	D	A	C	C	C	D	C	C
Approach Delay (s)		30.2			31.8			32.1			37.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	1031	823	1	14	31
Future Volume (Veh/h)	2	1031	823	1	14	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	2	1158	935	1	28	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.82	
vC, conflicting volume	936				1518	468
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936				1193	468
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				81	89
cM capacity (veh/h)	727				147	542

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	388	772	623	313	90
Volume Left	2	0	0	0	28
Volume Right	0	0	0	1	62
cSH	727	1700	1700	1700	295
Volume to Capacity	0.00	0.45	0.37	0.18	0.31
Queue Length 95th (m)	0.1	0.0	0.0	0.0	9.5
Control Delay (s)	0.1	0.0	0.0	0.0	22.5
Lane LOS	A				C
Approach Delay (s)	0.0		0.0		22.5
Approach LOS					C

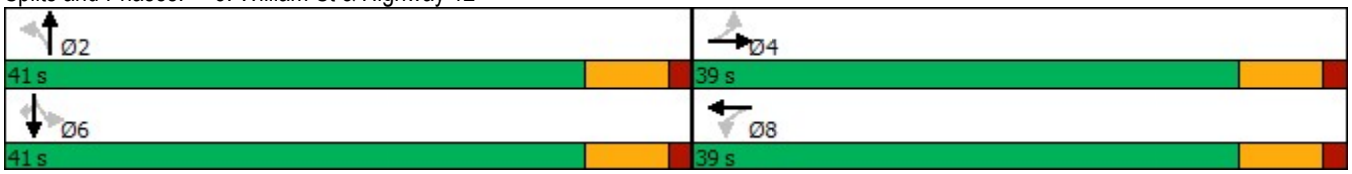
Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

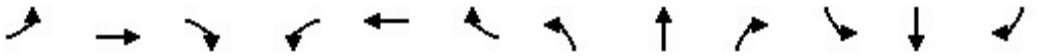
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	173	836	5	680	390	27	28	430	17	134
Future Volume (vph)	173	836	5	680	390	27	28	430	17	134
Lane Group Flow (vph)	194	973	6	756	433	0	106	0	497	149
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	39.0	39.0	39.0	39.0		41.0	41.0	41.0	41.0	41.0
Total Split (%)	48.8%	48.8%	48.8%	48.8%		51.3%	51.3%	51.3%	51.3%	51.3%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.87	0.67	0.06	0.52	0.27		0.19		0.92	0.20
Control Delay	60.3	22.2	16.4	19.5	0.4		13.3		46.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	60.3	22.2	16.4	19.5	0.4		13.3		46.7	6.9
Queue Length 50th (m)	26.3	61.5	0.6	44.2	0.0		8.3		68.6	4.9
Queue Length 95th (m)	#63.7	80.4	3.0	60.0	0.0		11.1		#127.8	15.3
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	223	1445	101	1453	1633		555		542	729
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.87	0.67	0.06	0.52	0.27		0.19		0.92	0.20

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12





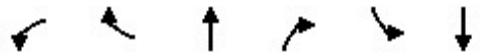
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	836	30	5	680	390	27	28	10	430	17	134
Future Volume (vph)	173	836	30	5	680	390	27	28	10	430	17	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3550		1304	3579	1633		1814			1823	1570
Flt Permitted	0.29	1.00		0.18	1.00	1.00		0.69			0.66	1.00
Satd. Flow (perm)	550	3550		250	3579	1633		1270			1258	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	194	939	34	6	756	433	44	46	16	478	19	149
RTOR Reduction (vph)	0	3	0	0	0	0	0	8	0	0	0	52
Lane Group Flow (vph)	194	970	0	6	756	433	0	98	0	0	497	97
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	32.5	32.5		32.5	32.5	80.0		34.5			34.5	34.5
Effective Green, g (s)	32.5	32.5		32.5	32.5	80.0		34.5			34.5	34.5
Actuated g/C Ratio	0.41	0.41		0.41	0.41	1.00		0.43			0.43	0.43
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	223	1442		101	1453	1633		547			542	677
v/s Ratio Prot		0.27			0.21							
v/s Ratio Perm	c0.35			0.02		0.27		0.08			c0.40	0.06
v/c Ratio	0.87	0.67		0.06	0.52	0.27		0.18			0.92	0.14
Uniform Delay, d1	21.8	19.4		14.5	17.9	0.0		14.0			21.4	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	34.1	2.5		1.1	1.3	0.4		0.2			22.8	0.4
Delay (s)	55.9	21.9		15.6	19.2	0.4		14.2			44.2	14.2
Level of Service	E	C		B	B	A		B			D	B
Approach Delay (s)		27.6			12.4			14.2			37.3	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	59	0	47	2	617	57	33	621	2
Future Volume (Veh/h)	7	0	10	59	0	47	2	617	57	33	621	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	83	0	66	2	686	63	40	748	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1618	1582	750	1562	1552	718	750			749		
vC1, stage 1 conf vol	829	829		722	722							
vC2, stage 2 conf vol	788	753		840	830							
vCu, unblocked vol	1622	1585	750	1564	1553	690	750			721		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	97	69	100	85	100			95		
cM capacity (veh/h)	223	273	411	265	289	429	859			849		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	149	751	40	750
Volume Left	8	83	2	40	0
Volume Right	11	66	63	0	2
cSH	303	319	859	849	1700
Volume to Capacity	0.06	0.47	0.00	0.05	0.44
Queue Length 95th (m)	1.5	18.0	0.1	1.1	0.0
Control Delay (s)	17.7	25.8	0.1	9.4	0.0
Lane LOS	C	D	A	A	
Approach Delay (s)	17.7	25.8	0.1	0.5	
Approach LOS	C	D			

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	53.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	11	661	14	17	650
Future Volume (Veh/h)	8	11	661	14	17	650
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	12	718	15	18	707
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			318			
pX, platoon unblocked						
vC, conflicting volume	1468	726			733	
vC1, stage 1 conf vol	726					
vC2, stage 2 conf vol	743					
vCu, unblocked vol	1468	726			733	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	97			98	
cM capacity (veh/h)	350	425			872	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	21	733	18	707
Volume Left	9	0	18	0
Volume Right	12	15	0	0
cSH	389	1700	872	1700
Volume to Capacity	0.05	0.43	0.02	0.42
Queue Length 95th (m)	1.3	0.0	0.5	0.0
Control Delay (s)	14.8	0.0	9.2	0.0
Lane LOS	B		A	
Approach Delay (s)	14.8	0.0	0.2	
Approach LOS	B			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix F –
Transportation Tomorrow Survey – Excerpt

2006 GTA Zone of Origin: 8576

Outside Midland		Distribution				Total
Planning District of Destination		N	S	E	W	
PD 3 of Toronto	21				21	21
Mississauga	28				28	28
Barrie	81				81	81
Springwater	18				18	18
Muskoka	28			28		28
Wasaga Beach	14				14	14
Tiny	76				76	76
Penetanguishene	96		96			96
Midland	1063					0
	362		96	0	28	238
Within Midland		Distribution				Total
2006 GTA zone of Destination		N	S	E	W	
8575	12		12			12
8576	404		162		121	121	404
8577	373		373			373
8578	275		275			275
	1064		821.6	0	121.2	121.2	1064
Totals	1426		917.6	0	149.2	359.2	1426
Distribution %			65%	0%	10%	25%	100%

```
Fri Aug 21 2020 12:03:42 GMT-0400 (Eastern Daylight Time) - Run Time: 3669ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: Planning district of destination - pd_dest


Filters:
(2006 GTA zone of origin - gta06_orig In 8576
and
Start time of trip - start_time In 0700-0900)

Trip 2016
ROW : gta06_orig
COLUMN : pd_dest
  gta06_orig     pd_dest      total
        8576           3         21
        8576          36         28
        8576          81         81
        8576          88         18
        8576         117         28
        8576         128         14
        8576         129         76
        8576         130         96
        8576         131       1063
        8576         132         19
```

```
Fri Aug 21 2020 12:05:22 GMT-0400 (Eastern Daylight Time) - Run Tir

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest


Filters:
(2006 GTA zone of origin - gta06_orig In 8576
and
Start time of trip - start_time In 0700-0900
and
Planning district of destination - pd_dest In 131, )

Trip 2016
ROW : gta06_orig
COLUMN : gta06_dest
  gta06_orig  gta06_dest      total
        8576        8575         12
        8576        8576        404
        8576        8577        373
        8576        8578        275
```

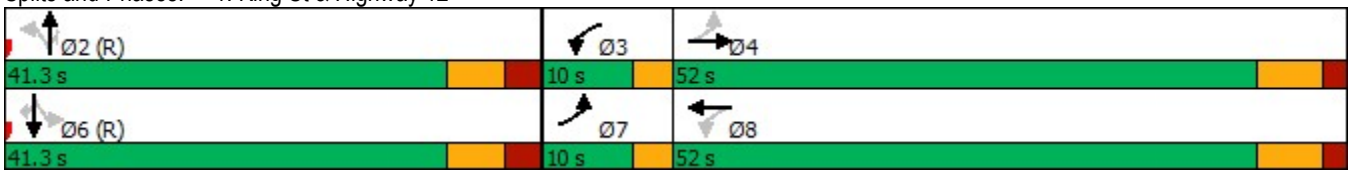
Appendix G –
Synchro Analysis Output –
Total Traffic Volumes

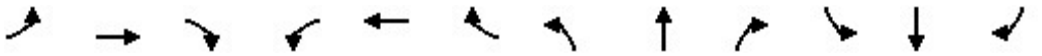
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	256	345	90	388	303	27	51	28	130	97	215
Future Volume (vph)	256	345	90	388	303	27	51	28	130	97	215
Lane Group Flow (vph)	320	530	100	431	337	34	64	35	141	105	234
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.59	0.36	0.21	0.29	0.21	0.09	0.11	0.07	0.33	0.17	0.35
Control Delay	18.2	19.1	11.3	19.5	0.3	24.9	24.9	1.0	28.7	25.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	19.1	11.3	19.5	0.3	24.9	24.9	1.0	28.7	25.7	4.9
Queue Length 50th (m)	31.6	34.1	8.6	28.6	0.0	4.7	8.9	0.0	21.1	14.9	0.0
Queue Length 95th (m)	41.2	40.2	16.0	39.7	0.0	10.4	16.3	0.0	37.3	27.5	16.0
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	543	1454	476	1485	1581	389	579	511	430	607	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.36	0.21	0.29	0.21	0.09	0.11	0.07	0.33	0.17	0.35

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

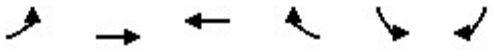
Splits and Phases: 1: King St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	345	79	90	388	303	27	51	28	130	97	215
Future Volume (vph)	256	345	79	90	388	303	27	51	28	130	97	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	3294		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.49	1.00		0.42	1.00	1.00	0.69	1.00	1.00	0.72	1.00	1.00
Satd. Flow (perm)	897	3294		757	3411	1581	1182	1762	1402	1308	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	320	431	99	100	431	337	34	64	35	141	105	234
RTOR Reduction (vph)	0	19	0	0	0	0	0	0	23	0	0	157
Lane Group Flow (vph)	320	511	0	100	431	337	34	64	12	141	105	77
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	509	1434		446	1485	1581	389	579	461	430	607	521
v/s Ratio Prot	c0.04	0.16		0.02	0.13			0.04			0.06	
v/s Ratio Perm	c0.27			0.10		0.21	0.03		0.01	c0.11		0.05
v/c Ratio	0.63	0.36		0.22	0.29	0.21	0.09	0.11	0.02	0.33	0.17	0.15
Uniform Delay, d1	16.6	19.5		13.6	18.8	0.0	23.9	24.1	23.4	26.1	24.6	24.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.8	0.7		1.2	0.5	0.3	0.4	0.4	0.1	2.0	0.6	0.6
Delay (s)	22.4	20.2		14.8	19.3	0.3	24.4	24.5	23.5	28.1	25.3	25.0
Level of Service	C	C		B	B	A	C	C	C	C	C	C
Approach Delay (s)		21.0			11.4			24.2			26.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	456	680	18	18	49
Future Volume (Veh/h)	83	456	680	18	18	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	90	496	840	22	45	122
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.98	
vC, conflicting volume	863				1280	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	863				1238	432
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	87				67	78
cM capacity (veh/h)	686				135	549

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	255	331	560	302	167
Volume Left	90	0	0	0	45
Volume Right	0	0	0	22	122
cSH	686	1700	1700	1700	301
Volume to Capacity	0.13	0.19	0.33	0.18	0.55
Queue Length 95th (m)	3.4	0.0	0.0	0.0	23.9
Control Delay (s)	4.9	0.0	0.0	0.0	30.9
Lane LOS	A				D
Approach Delay (s)	2.1		0.0		30.9
Approach LOS					D

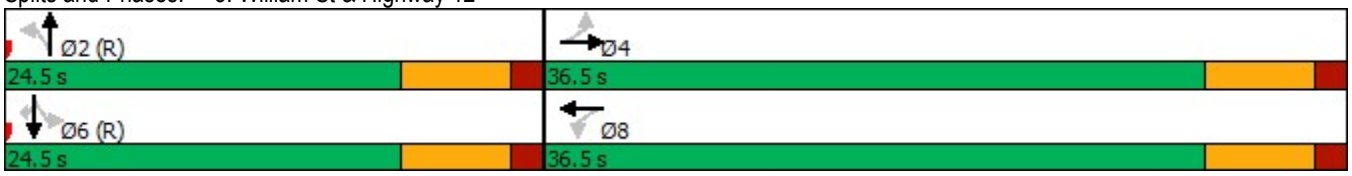
Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

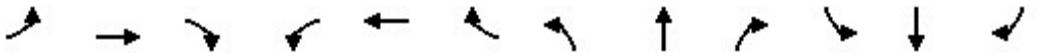
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	106	394	4	551	323	23	9	223	16	119
Future Volume (vph)	106	394	4	551	323	23	9	223	16	119
Lane Group Flow (vph)	119	474	4	586	344	0	55	0	269	134
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.31	0.29	0.01	0.33	0.21		0.16		0.70	0.24
Control Delay	12.1	9.4	8.2	10.1	0.3		15.3		31.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	12.1	9.4	8.2	10.1	0.3		15.3		31.2	4.9
Queue Length 50th (m)	7.4	14.6	0.2	19.5	0.0		3.8		26.5	0.0
Queue Length 95th (m)	17.1	22.3	1.4	28.7	0.0		8.0		#55.7	9.7
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	384	1662	363	1760	1617		354		385	562
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.31	0.29	0.01	0.33	0.21		0.16		0.70	0.24

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12

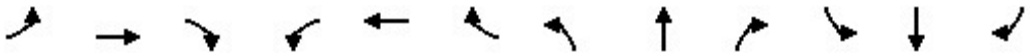




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	394	28	4	551	323	23	9	6	223	16	119
Future Volume (vph)	106	394	28	4	551	323	23	9	6	223	16	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3363		1460	3579	1617		1564			1785	1585
Flt Permitted	0.43	1.00		0.48	1.00	1.00		0.73			0.70	1.00
Satd. Flow (perm)	781	3363		739	3579	1617		1179			1309	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	119	443	31	4	586	344	33	13	9	251	18	134
RTOR Reduction (vph)	0	9	0	0	0	0	0	6	0	0	0	94
Lane Group Flow (vph)	119	465	0	4	586	344	0	49	0	0	269	40
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	384	1653		363	1760	1617		347			386	467
v/s Ratio Prot		0.14			c0.16							
v/s Ratio Perm	0.15			0.01		0.21		0.04			c0.21	0.02
v/c Ratio	0.31	0.28		0.01	0.33	0.21		0.14			0.70	0.08
Uniform Delay, d1	9.3	9.1		7.9	9.4	0.0		15.8			19.1	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	2.1	0.4		0.1	0.5	0.3		0.8			10.0	0.4
Delay (s)	11.4	9.6		8.0	9.9	0.3		16.7			29.1	15.9
Level of Service	B	A		A	A	A		B			C	B
Approach Delay (s)		9.9			6.4			16.7			24.7	
Approach LOS		A			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.2%	ICU Level of Service	E
Analysis Period (min)	15		

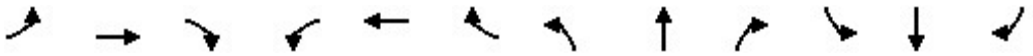
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	39	0	27	4	410	30	20	362	1
Future Volume (Veh/h)	0	0	0	39	0	27	4	410	30	20	362	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	48	0	33	4	532	39	22	398	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	1035	1022	200	804	1004	552	399			572		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1035	1022	200	804	1004	552	399			572		
tC, single (s)	7.5	6.5	6.9	7.7	6.5	6.9	4.1			4.4		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	81	100	93	100			98		
cM capacity (veh/h)	169	228	808	258	234	477	1156			899		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	81	575	221	200
Volume Left	0	48	4	22	0
Volume Right	0	33	39	0	1
cSH	1700	317	1156	899	1700
Volume to Capacity	0.00	0.26	0.00	0.02	0.12
Queue Length 95th (m)	0.0	7.6	0.1	0.6	0.0
Control Delay (s)	0.0	20.2	0.1	1.1	0.0
Lane LOS	A	C	A	A	
Approach Delay (s)	0.0	20.2	0.1	0.6	
Approach LOS	A	C			

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	37.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	0	13	13	0	16	34	399	4	5	356	140
Future Volume (Veh/h)	54	0	13	13	0	16	34	399	4	5	356	140
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	0	14	14	0	17	37	434	4	5	387	152
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								318				
pX, platoon unblocked												
vC, conflicting volume	781	985	270	728	1059	219	539			438		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	781	985	270	728	1059	219	539			438		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	98	95	100	98	96			100		
cM capacity (veh/h)	270	237	728	296	214	785	1025			1118		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	59	14	31	254	221	198	346
Volume Left	59	0	14	37	0	5	0
Volume Right	0	14	17	0	4	0	152
cSH	270	728	450	1025	1700	1118	1700
Volume to Capacity	0.22	0.02	0.07	0.04	0.13	0.00	0.20
Queue Length 95th (m)	6.2	0.4	1.7	0.9	0.0	0.1	0.0
Control Delay (s)	22.0	10.0	13.6	1.6	0.0	0.2	0.0
Lane LOS	C	B	B	A		A	
Approach Delay (s)	19.7		13.6	0.8		0.1	
Approach LOS	C		B				

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	45.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	30	0	0	80	0	0
Future Volume (vph)	30	0	0	80	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	0	87	0	0

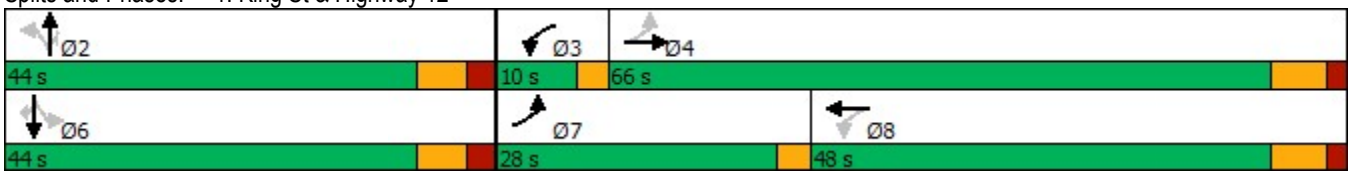
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	33	87	0
Volume Left (vph)	33	0	0
Volume Right (vph)	0	87	0
Hadj (s)	0.23	-0.57	0.00
Departure Headway (s)	4.3	3.4	4.0
Degree Utilization, x	0.04	0.08	0.00
Capacity (veh/h)	817	1043	884
Control Delay (s)	7.5	6.7	7.0
Approach Delay (s)	7.5	6.7	0.0
Approach LOS	A	A	A

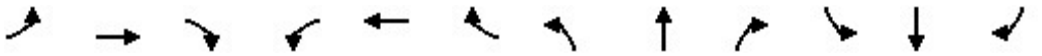
Intersection Summary			
Delay	6.9		
Level of Service	A		
Intersection Capacity Utilization	8.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	366	677	32	564	207	73	110	64	222	66	375
Future Volume (vph)	366	677	32	564	207	73	110	64	222	66	375
Lane Group Flow (vph)	458	875	40	696	256	94	141	82	239	71	403
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	41.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	48.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	28.0	66.0	10.0	48.0		44.0	44.0	44.0	44.0	44.0	44.0
Total Split (%)	23.3%	55.0%	8.3%	40.0%		36.7%	36.7%	36.7%	36.7%	36.7%	36.7%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.81	0.52	0.12	0.57	0.16	0.23	0.25	0.15	0.64	0.13	0.52
Control Delay	28.1	22.1	12.4	34.5	0.2	33.1	32.8	5.8	44.9	31.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	22.1	12.4	34.5	0.2	33.1	32.8	5.8	44.9	31.0	5.7
Queue Length 50th (m)	53.1	71.5	3.6	70.1	0.0	16.5	24.9	0.0	48.4	12.1	0.0
Queue Length 95th (m)	71.2	75.8	7.2	77.8	0.0	25.8	35.2	6.2	76.6	23.3	22.4
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	50.0		
Base Capacity (vph)	562	1684	320	1222	1581	405	564	556	376	548	769
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.52	0.13	0.57	0.16	0.23	0.25	0.15	0.64	0.13	0.52

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord

Splits and Phases: 1: King St & Highway 12

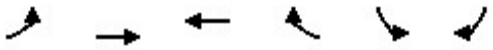




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	366	677	23	32	564	207	73	110	64	222	66	375
Future Volume (vph)	366	677	23	32	564	207	73	110	64	222	66	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3421		1722	3579	1581	1772	1847	1612	1753	1795	1601
Flt Permitted	0.24	1.00		0.32	1.00	1.00	0.71	1.00	1.00	0.67	1.00	1.00
Satd. Flow (perm)	465	3421		588	3579	1581	1326	1847	1612	1231	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	458	846	29	40	696	256	94	141	82	239	71	403
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	57	0	0	280
Lane Group Flow (vph)	458	873	0	40	696	256	94	141	25	239	71	123
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	69.0	59.0		48.0	41.0	120.0	36.7	36.7	36.7	36.7	36.7	36.7
Effective Green, g (s)	69.0	59.0		48.0	41.0	120.0	36.7	36.7	36.7	36.7	36.7	36.7
Actuated g/C Ratio	0.58	0.49		0.40	0.34	1.00	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	546	1681		301	1222	1581	405	564	493	376	548	489
v/s Ratio Prot	c0.17	0.26		0.01	0.19			0.08			0.04	
v/s Ratio Perm	c0.31			0.05		0.16	0.07		0.02	c0.19		0.08
v/c Ratio	0.84	0.52		0.13	0.57	0.16	0.23	0.25	0.05	0.64	0.13	0.25
Uniform Delay, d1	17.4	20.8		22.1	32.3	0.0	31.1	31.3	29.4	35.9	30.1	31.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.3	1.2		0.9	1.9	0.2	0.3	0.2	0.0	8.0	0.5	1.2
Delay (s)	31.7	22.0		23.0	34.2	0.2	31.4	31.5	29.4	43.9	30.6	32.6
Level of Service	C	C		C	C	A	C	C	C	D	C	C
Approach Delay (s)		25.3			25.0			31.0			36.2	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	877	684	7	24	101
Future Volume (Veh/h)	45	877	684	7	24	101
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	51	985	777	8	48	202
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.86	
vC, conflicting volume	785				1376	392
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	785				1107	392
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				71	67
cM capacity (veh/h)	829				165	606

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	379	657	518	267	250
Volume Left	51	0	0	0	48
Volume Right	0	0	0	8	202
cSH	829	1700	1700	1700	400
Volume to Capacity	0.06	0.39	0.30	0.16	0.62
Queue Length 95th (m)	1.5	0.0	0.0	0.0	31.2
Control Delay (s)	1.9	0.0	0.0	0.0	27.8
Lane LOS	A				D
Approach Delay (s)	0.7		0.0		27.8
Approach LOS					D

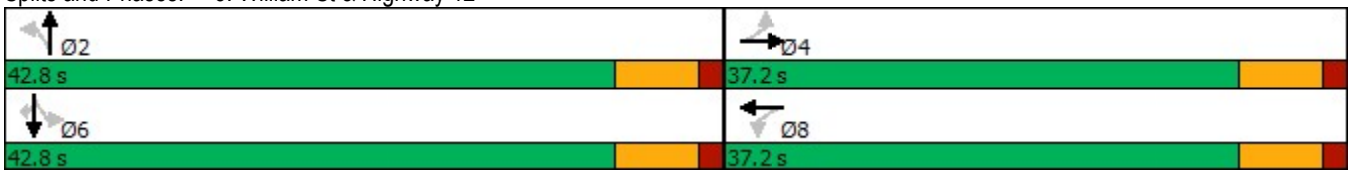
Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

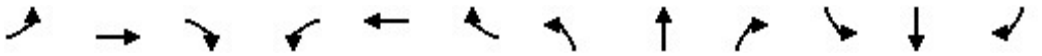
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	175	710	5	550	391	27	25	438	15	147
Future Volume (vph)	175	710	5	550	391	27	25	438	15	147
Lane Group Flow (vph)	197	832	6	611	434	0	101	0	504	163
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	37.2	37.2	37.2	37.2		42.8	42.8	42.8	42.8	42.8
Total Split (%)	46.5%	46.5%	46.5%	46.5%		53.5%	53.5%	53.5%	53.5%	53.5%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.74	0.61	0.05	0.45	0.27		0.17		0.88	0.21
Control Delay	40.7	22.0	17.0	19.6	0.4		11.8		39.4	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	40.7	22.0	17.0	19.6	0.4		11.8		39.4	4.5
Queue Length 50th (m)	25.1	51.9	0.6	35.4	0.0		7.3		66.8	2.4
Queue Length 95th (m)	#57.6	68.7	3.0	49.3	0.0		9.9		#125.3	12.3
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	267	1364	123	1373	1633		597		573	785
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.74	0.61	0.05	0.45	0.27		0.17		0.88	0.21

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

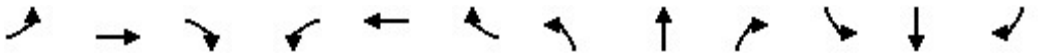
Splits and Phases: 3: William St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	710	30	5	550	391	27	25	10	438	15	147
Future Volume (vph)	175	710	30	5	550	391	27	25	10	438	15	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3545		1304	3579	1633		1808			1824	1570
Flt Permitted	0.36	1.00		0.24	1.00	1.00		0.70			0.66	1.00
Satd. Flow (perm)	697	3545		323	3579	1633		1297			1263	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	197	798	34	6	611	434	44	41	16	487	17	163
RTOR Reduction (vph)	0	4	0	0	0	0	0	9	0	0	0	73
Lane Group Flow (vph)	197	828	0	6	611	434	0	92	0	0	504	90
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.7	30.7		30.7	30.7	80.0		36.3			36.3	36.3
Effective Green, g (s)	30.7	30.7		30.7	30.7	80.0		36.3			36.3	36.3
Actuated g/C Ratio	0.38	0.38		0.38	0.38	1.00		0.45			0.45	0.45
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	267	1360		123	1373	1633		588			573	712
v/s Ratio Prot		0.23			0.17							
v/s Ratio Perm	c0.28			0.02		0.27		0.07			c0.40	0.06
v/c Ratio	0.74	0.61		0.05	0.45	0.27		0.16			0.88	0.13
Uniform Delay, d1	21.2	19.8		15.5	18.3	0.0		12.9			19.9	12.7
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	16.6	2.0		0.7	1.0	0.4		0.1			17.4	0.4
Delay (s)	37.8	21.9		16.2	19.4	0.4		13.0			37.2	13.0
Level of Service	D	C		B	B	A		B			D	B
Approach Delay (s)		24.9			11.5			13.0			31.3	
Approach LOS		C			B			B			C	

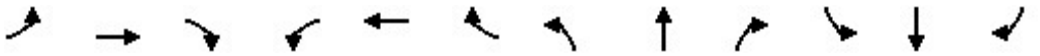
Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	59	0	49	2	552	57	37	575	2
Future Volume (Veh/h)	7	0	10	59	0	49	2	552	57	37	575	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	83	0	69	2	613	63	45	693	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								224				
pX, platoon unblocked	0.95	0.95		0.95	0.95	0.95				0.95		
vC, conflicting volume	1502	1464	348	1097	1434	646	695			676		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1503	1462	348	1077	1430	603	695			635		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	100	98	47	100	84	100			95		
cM capacity (veh/h)	64	115	647	156	120	421	897			899		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	152	678	392	348
Volume Left	8	83	2	45	0
Volume Right	11	69	63	0	2
cSH	134	218	897	899	1700
Volume to Capacity	0.14	0.70	0.00	0.05	0.20
Queue Length 95th (m)	3.6	34.0	0.1	1.2	0.0
Control Delay (s)	36.3	52.5	0.1	1.6	0.0
Lane LOS	E	F	A	A	
Approach Delay (s)	36.3	52.5	0.1	0.8	
Approach LOS	E	F			

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	0	36	8	0	11	22	573	14	17	567	87
Future Volume (Veh/h)	143	0	36	8	0	11	22	573	14	17	567	87
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	155	0	39	9	0	12	24	623	15	18	616	95
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								318				
pX, platoon unblocked												
vC, conflicting volume	1071	1386	356	1062	1426	319	711			638		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1071	1386	356	1062	1426	319	711			638		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	7	100	94	94	100	98	97			98		
cM capacity (veh/h)	166	136	641	161	128	677	884			942		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	155	39	21	336	326	326	403
Volume Left	155	0	9	24	0	18	0
Volume Right	0	39	12	0	15	0	95
cSH	166	641	286	884	1700	942	1700
Volume to Capacity	0.93	0.06	0.07	0.03	0.19	0.02	0.24
Queue Length 95th (m)	53.0	1.5	1.8	0.6	0.0	0.4	0.0
Control Delay (s)	108.4	11.0	18.6	0.9	0.0	0.7	0.0
Lane LOS	F	B	C	A		A	
Approach Delay (s)	88.8		18.6	0.5		0.3	
Approach LOS	F		C				

Intersection Summary				
Average Delay	11.3			
Intersection Capacity Utilization	53.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	80	0	0	49	0	0
Future Volume (Veh/h)	80	0	0	49	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	0	0	53	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	26	26			53	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	26			53	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	989	1049			1553	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	87	53	0
Volume Left	87	0	0
Volume Right	0	53	0
cSH	989	1700	1700
Volume to Capacity	0.09	0.03	0.00
Queue Length 95th (m)	2.2	0.0	0.0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

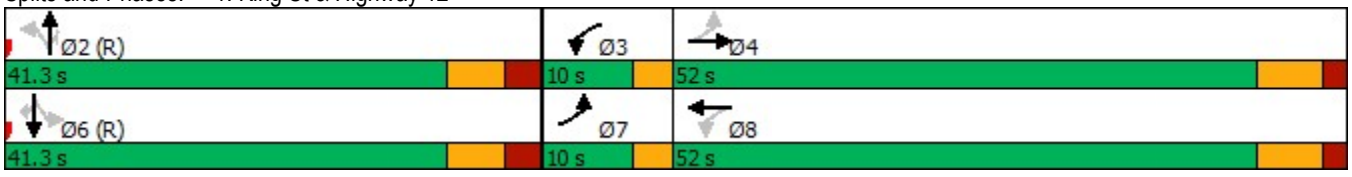
Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

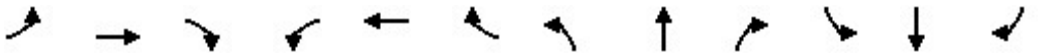
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	267	380	90	417	304	28	54	28	133	105	234
Future Volume (vph)	267	380	90	417	304	28	54	28	133	105	234
Lane Group Flow (vph)	334	575	100	463	338	35	68	35	145	114	254
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.64	0.40	0.22	0.31	0.21	0.09	0.12	0.07	0.34	0.19	0.37
Control Delay	19.9	19.7	11.4	19.8	0.3	24.9	25.0	1.0	29.0	25.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	19.7	11.4	19.8	0.3	24.9	25.0	1.0	29.0	25.8	4.9
Queue Length 50th (m)	33.4	38.1	8.6	31.1	0.0	4.8	9.5	0.0	21.8	16.2	0.0
Queue Length 95th (m)	43.1	44.2	16.0	42.7	0.0	10.6	16.9	0.0	38.5	29.3	16.4
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	524	1453	451	1485	1581	386	579	511	428	607	692
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.40	0.22	0.31	0.21	0.09	0.12	0.07	0.34	0.19	0.37

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

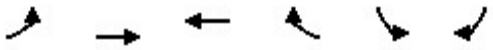
Splits and Phases: 1: King St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	380	80	90	417	304	28	54	28	133	105	234
Future Volume (vph)	267	380	80	90	417	304	28	54	28	133	105	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	3298		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.46	1.00		0.39	1.00	1.00	0.68	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	855	3298		706	3411	1581	1173	1762	1402	1303	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	334	475	100	100	463	338	35	68	35	145	114	254
RTOR Reduction (vph)	0	17	0	0	0	0	0	0	23	0	0	170
Lane Group Flow (vph)	334	558	0	100	463	338	35	68	12	145	114	84
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	491	1436		424	1485	1581	386	579	461	428	607	521
v/s Ratio Prot	c0.05	0.17		0.02	0.14			0.04			0.06	
v/s Ratio Perm	c0.30			0.10		0.21	0.03		0.01	c0.11		0.05
v/c Ratio	0.68	0.39		0.24	0.31	0.21	0.09	0.12	0.02	0.34	0.19	0.16
Uniform Delay, d1	17.3	19.8		13.7	19.0	0.0	24.0	24.2	23.4	26.2	24.8	24.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	0.8		1.3	0.5	0.3	0.5	0.4	0.1	2.1	0.7	0.7
Delay (s)	24.7	20.6		15.0	19.6	0.3	24.4	24.6	23.5	28.3	25.5	25.2
Level of Service	C	C		B	B	A	C	C	C	C	C	C
Approach Delay (s)		22.1			11.8			24.3			26.1	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	502	730	18	18	49
Future Volume (Veh/h)	83	502	730	18	18	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	90	546	901	22	45	122
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.96	
vC, conflicting volume	924				1366	462
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	924				1292	462
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	86				63	77
cM capacity (veh/h)	648				121	524

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	272	364	601	322	167
Volume Left	90	0	0	0	45
Volume Right	0	0	0	22	122
cSH	648	1700	1700	1700	276
Volume to Capacity	0.14	0.21	0.35	0.19	0.60
Queue Length 95th (m)	3.7	0.0	0.0	0.0	27.6
Control Delay (s)	5.0	0.0	0.0	0.0	36.1
Lane LOS	A				E
Approach Delay (s)	2.1		0.0		36.1
Approach LOS					E

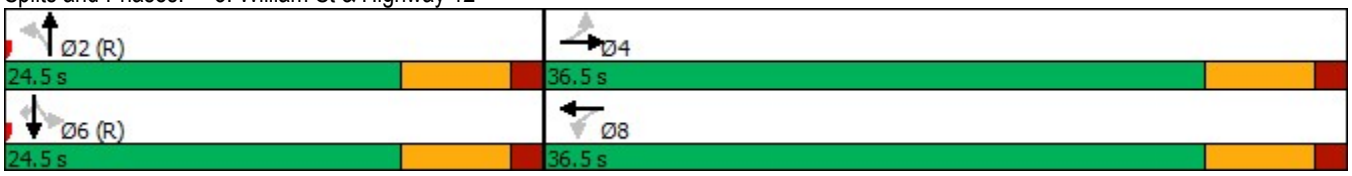
Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

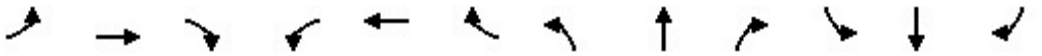
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	110	435	4	592	325	23	9	229	17	120
Future Volume (vph)	110	435	4	592	325	23	9	229	17	120
Lane Group Flow (vph)	124	520	4	630	346	0	55	0	276	135
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.34	0.31	0.01	0.36	0.21		0.16		0.72	0.24
Control Delay	12.9	9.7	8.2	10.3	0.3		15.3		32.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	12.9	9.7	8.2	10.3	0.3		15.3		32.2	4.9
Queue Length 50th (m)	7.9	16.5	0.2	21.2	0.0		3.8		27.3	0.0
Queue Length 95th (m)	18.4	24.7	1.4	31.1	0.0		8.0		#57.8	9.8
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	361	1662	347	1760	1617		352		386	562
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.34	0.31	0.01	0.36	0.21		0.16		0.72	0.24

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	435	28	4	592	325	23	9	6	229	17	120
Future Volume (vph)	110	435	28	4	592	325	23	9	6	229	17	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3364		1460	3579	1617		1564			1786	1585
Flt Permitted	0.41	1.00		0.46	1.00	1.00		0.73			0.70	1.00
Satd. Flow (perm)	736	3364		706	3579	1617		1174			1310	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	124	489	31	4	630	346	33	13	9	257	19	135
RTOR Reduction (vph)	0	8	0	0	0	0	0	6	0	0	0	95
Lane Group Flow (vph)	124	512	0	4	630	346	0	49	0	0	276	40
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	361	1654		347	1760	1617		346			386	467
v/s Ratio Prot		0.15			c0.18							
v/s Ratio Perm	0.17			0.01		0.21		0.04			c0.21	0.03
v/c Ratio	0.34	0.31		0.01	0.36	0.21		0.14			0.72	0.09
Uniform Delay, d1	9.5	9.3		7.9	9.6	0.0		15.8			19.2	15.5
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	2.6	0.5		0.1	0.6	0.3		0.8			10.8	0.4
Delay (s)	12.1	9.8		8.0	10.1	0.3		16.7			30.0	15.9
Level of Service	B	A		A	B	A		B			C	B
Approach Delay (s)		10.2			6.7			16.7			25.4	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	39	0	27	4	439	30	20	390	1
Future Volume (Veh/h)	0	0	0	39	0	27	4	439	30	20	390	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	48	0	33	4	570	39	22	429	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	1104	1092	430	1072	1072	590	430			610		
vC1, stage 1 conf vol	474	474		598	598							
vC2, stage 2 conf vol	630	618		473	474							
vCu, unblocked vol	1104	1092	430	1072	1072	590	430			610		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)	6.1	5.5		6.2	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	88	100	93	100			98		
cM capacity (veh/h)	359	388	626	390	402	507	1129			899		

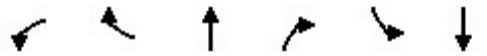
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	81	613	22	430
Volume Left	0	48	4	22	0
Volume Right	0	33	39	0	1
cSH	1700	430	1129	899	1700
Volume to Capacity	0.00	0.19	0.00	0.02	0.25
Queue Length 95th (m)	0.0	5.2	0.1	0.6	0.0
Control Delay (s)	0.0	15.3	0.1	9.1	0.0
Lane LOS	A	C	A	A	
Approach Delay (s)	0.0	15.3	0.1	0.4	
Approach LOS	A	C			

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	38.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	0	13	13	0	16	34	428	4	5	384	140
Future Volume (Veh/h)	54	0	13	13	0	16	34	428	4	5	384	140
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	0	14	14	0	17	37	465	4	5	417	152
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)								318				
pX, platoon unblocked												
vC, conflicting volume	1059	1046	493	982	1120	467	569			469		
vC1, stage 1 conf vol	503	503		541	541							
vC2, stage 2 conf vol	556	543		441	579							
vCu, unblocked vol	1059	1046	493	982	1120	467	569			469		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	100	98	97	100	97	96			100		
cM capacity (veh/h)	392	406	576	410	376	596	1003			1093		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	59	14	31	37	469	5	569
Volume Left	59	0	14	37	0	5	0
Volume Right	0	14	17	0	4	0	152
cSH	392	576	495	1003	1700	1093	1700
Volume to Capacity	0.15	0.02	0.06	0.04	0.28	0.00	0.33
Queue Length 95th (m)	4.0	0.6	1.5	0.9	0.0	0.1	0.0
Control Delay (s)	15.8	11.4	12.8	8.7	0.0	8.3	0.0
Lane LOS	C	B	B	A		A	
Approach Delay (s)	15.0		12.8	0.6		0.1	
Approach LOS	B		B				

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	43.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	30	0	0	80	0	0
Future Volume (vph)	30	0	0	80	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	0	87	0	0

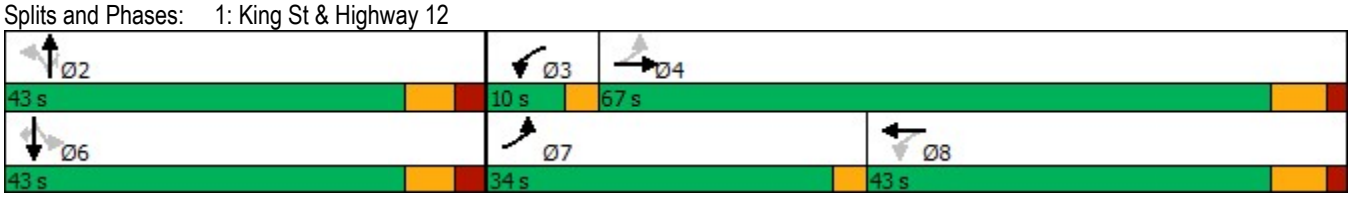
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	33	87	0
Volume Left (vph)	33	0	0
Volume Right (vph)	0	87	0
Hadj (s)	0.23	-0.57	0.00
Departure Headway (s)	4.3	3.4	4.0
Degree Utilization, x	0.04	0.08	0.00
Capacity (veh/h)	817	1043	884
Control Delay (s)	7.5	6.7	7.0
Approach Delay (s)	7.5	6.7	0.0
Approach LOS	A	A	A

Intersection Summary			
Delay	6.9		
Level of Service	A		
Intersection Capacity Utilization	8.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	386	736	32	616	210	76	119	64	224	71	397
Future Volume (vph)	386	736	32	616	210	76	119	64	224	71	397
Lane Group Flow (vph)	483	951	40	760	259	97	153	82	241	76	427
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	36.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	43.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	34.0	67.0	10.0	43.0		43.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	55.8%	8.3%	35.8%		35.8%	35.8%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.82	0.56	0.14	0.71	0.16	0.25	0.28	0.15	0.68	0.14	0.55
Control Delay	34.7	22.2	13.6	41.7	0.2	34.1	34.0	6.0	48.0	31.9	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	22.2	13.6	41.7	0.2	34.1	34.0	6.0	48.0	31.9	6.0
Queue Length 50th (m)	73.8	78.7	3.5	83.6	0.0	17.3	27.6	0.0	49.8	13.1	0.0
Queue Length 95th (m)	92.9	82.3	7.0	91.7	0.0	26.9	38.4	6.3	79.4	25.1	23.4
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	587	1712	282	1073	1581	392	549	543	357	534	776
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.56	0.14	0.71	0.16	0.25	0.28	0.15	0.68	0.14	0.55

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord

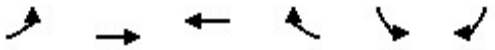
Splits and Phases: 1: King St & Highway 12



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	386	736	25	32	616	210	76	119	64	224	71	397
Future Volume (vph)	386	736	25	32	616	210	76	119	64	224	71	397
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3421		1722	3579	1581	1772	1847	1612	1753	1795	1601
Flt Permitted	0.18	1.00		0.30	1.00	1.00	0.71	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	337	3421		545	3579	1581	1320	1847	1612	1200	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	482	920	31	40	760	259	97	153	82	241	76	427
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	58	0	0	300
Lane Group Flow (vph)	483	949	0	40	760	259	97	153	24	241	76	127
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	70.0	60.0		43.0	36.0	120.0	35.7	35.7	35.7	35.7	35.7	35.7
Effective Green, g (s)	70.0	60.0		43.0	36.0	120.0	35.7	35.7	35.7	35.7	35.7	35.7
Actuated g/C Ratio	0.58	0.50		0.36	0.30	1.00	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	576	1710		263	1073	1581	392	549	479	357	534	476
v/s Ratio Prot	c0.22	0.28		0.01	0.21			0.08			0.04	
v/s Ratio Perm	c0.27			0.05		0.16	0.07		0.02	c0.20		0.08
v/c Ratio	0.84	0.55		0.15	0.71	0.16	0.25	0.28	0.05	0.68	0.14	0.27
Uniform Delay, d1	25.3	20.8		25.3	37.3	0.0	32.0	32.3	30.1	37.1	30.9	32.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.7	1.3		1.2	4.0	0.2	0.3	0.3	0.0	9.8	0.6	1.4
Delay (s)	39.0	22.1		26.5	41.3	0.2	32.3	32.6	30.1	46.9	31.5	33.5
Level of Service	D	C		C	D	A	C	C	C	D	C	C
Approach Delay (s)		27.8			30.7			31.9			37.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	952	750	7	24	101
Future Volume (Veh/h)	45	952	750	7	24	101
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	51	1070	852	8	48	202
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.84	
vC, conflicting volume	860				1493	430
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	860				1196	430
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				66	65
cM capacity (veh/h)	777				140	573

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	408	713	568	292	250
Volume Left	51	0	0	0	48
Volume Right	0	0	0	8	202
cSH	777	1700	1700	1700	359
Volume to Capacity	0.07	0.42	0.33	0.17	0.70
Queue Length 95th (m)	1.6	0.0	0.0	0.0	38.2
Control Delay (s)	2.0	0.0	0.0	0.0	35.1
Lane LOS	A				E
Approach Delay (s)	0.7		0.0		35.1
Approach LOS					E

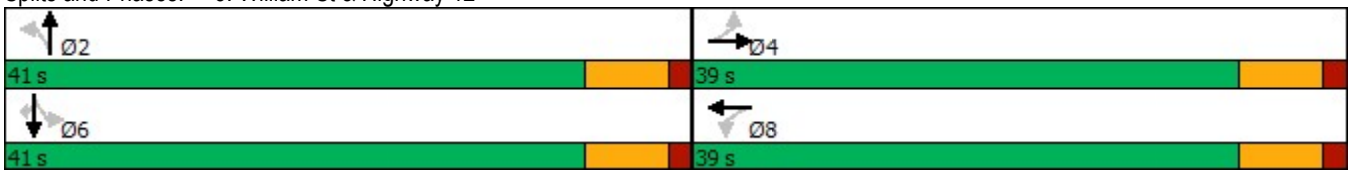
Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

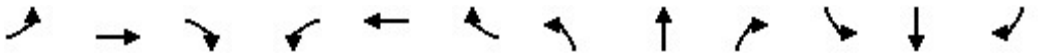
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	182	769	5	606	398	27	26	442	16	149
Future Volume (vph)	182	769	5	606	398	27	26	442	16	149
Lane Group Flow (vph)	204	898	6	673	442	0	103	0	509	166
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	39.0	39.0	39.0	39.0		41.0	41.0	41.0	41.0	41.0
Total Split (%)	48.8%	48.8%	48.8%	48.8%		51.3%	51.3%	51.3%	51.3%	51.3%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.78	0.62	0.05	0.46	0.27		0.19		0.94	0.22
Control Delay	44.8	21.1	16.0	18.7	0.4		13.1		49.8	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	44.8	21.1	16.0	18.7	0.4		13.1		49.8	5.6
Queue Length 50th (m)	26.3	55.0	0.5	38.2	0.0		7.9		71.2	3.8
Queue Length 95th (m)	#61.7	72.5	2.9	52.4	0.0		10.7		#131.6	14.3
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	260	1444	120	1453	1633		540		544	746
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.78	0.62	0.05	0.46	0.27		0.19		0.94	0.22

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12





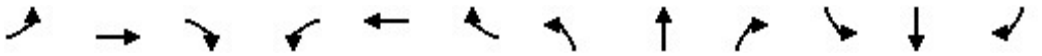
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	769	30	5	606	398	27	26	10	442	16	149
Future Volume (vph)	182	769	30	5	606	398	27	26	10	442	16	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3548		1304	3579	1633		1811			1824	1570
Flt Permitted	0.33	1.00		0.22	1.00	1.00		0.67			0.66	1.00
Satd. Flow (perm)	640	3548		296	3579	1633		1234			1261	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	204	864	34	6	673	442	44	43	16	491	18	166
RTOR Reduction (vph)	0	4	0	0	0	0	0	9	0	0	0	69
Lane Group Flow (vph)	204	894	0	6	673	442	0	94	0	0	509	97
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	32.5	32.5		32.5	32.5	80.0		34.5			34.5	34.5
Effective Green, g (s)	32.5	32.5		32.5	32.5	80.0		34.5			34.5	34.5
Actuated g/C Ratio	0.41	0.41		0.41	0.41	1.00		0.43			0.43	0.43
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	260	1441		120	1453	1633		532			543	677
v/s Ratio Prot		0.25			0.19							
v/s Ratio Perm	c0.32			0.02		0.27		0.08			c0.40	0.06
v/c Ratio	0.78	0.62		0.05	0.46	0.27		0.18			0.94	0.14
Uniform Delay, d1	20.7	18.9		14.4	17.4	0.0		14.0			21.7	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	20.8	2.0		0.8	1.1	0.4		0.2			25.9	0.4
Delay (s)	41.5	20.9		15.2	18.4	0.4		14.2			47.6	14.2
Level of Service	D	C		B	B	A		B			D	B
Approach Delay (s)		24.7			11.3			14.2			39.4	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	59	0	49	2	598	57	37	616	2
Future Volume (Veh/h)	7	0	10	59	0	49	2	598	57	37	616	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	83	0	69	2	664	63	45	742	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1602	1564	744	1544	1534	696	744			727		
vC1, stage 1 conf vol	833	833		700	700							
vC2, stage 2 conf vol	770	731		844	834							
vCu, unblocked vol	1607	1567	744	1545	1535	661	744			693		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	97	69	100	84	100			95		
cM capacity (veh/h)	223	274	414	266	290	442	864			864		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	152	729	45	744
Volume Left	8	83	2	45	0
Volume Right	11	69	63	0	2
cSH	304	325	864	864	1700
Volume to Capacity	0.06	0.47	0.00	0.05	0.44
Queue Length 95th (m)	1.5	18.1	0.1	1.3	0.0
Control Delay (s)	17.6	25.5	0.1	9.4	0.0
Lane LOS	C	D	A	A	
Approach Delay (s)	17.6	25.5	0.1	0.5	
Approach LOS	C	D			

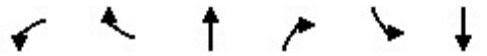
Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	52.5%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	0	36	8	0	11	22	621	14	17	608	87
Future Volume (Veh/h)	143	0	36	8	0	11	22	621	14	17	608	87
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	155	0	39	9	0	12	24	675	15	18	661	95
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)								318				
pX, platoon unblocked												
vC, conflicting volume	1480	1482	708	1466	1522	682	756			690		
vC1, stage 1 conf vol	744	744		730	730							
vC2, stage 2 conf vol	735	738		736	792							
vCu, unblocked vol	1480	1482	708	1466	1522	682	756			690		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	45	100	91	97	100	97	97			98		
cM capacity (veh/h)	281	301	434	270	290	450	855			905		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	155	39	21	24	690	18	756
Volume Left	155	0	9	24	0	18	0
Volume Right	0	39	12	0	15	0	95
cSH	281	434	350	855	1700	905	1700
Volume to Capacity	0.55	0.09	0.06	0.03	0.41	0.02	0.44
Queue Length 95th (m)	23.4	2.2	1.5	0.7	0.0	0.5	0.0
Control Delay (s)	32.4	14.1	16.0	9.3	0.0	9.1	0.0
Lane LOS	D	B	C	A		A	
Approach Delay (s)	28.7		16.0	0.3		0.2	
Approach LOS	D		C				

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	80	0	0	49	0	0
Future Volume (Veh/h)	80	0	0	49	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	0	0	53	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			53	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			53	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	1023	1085			1553	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	87	53	0
Volume Left	87	0	0
Volume Right	0	53	0
cSH	1023	1700	1700
Volume to Capacity	0.09	0.03	0.00
Queue Length 95th (m)	2.1	0.0	0.0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

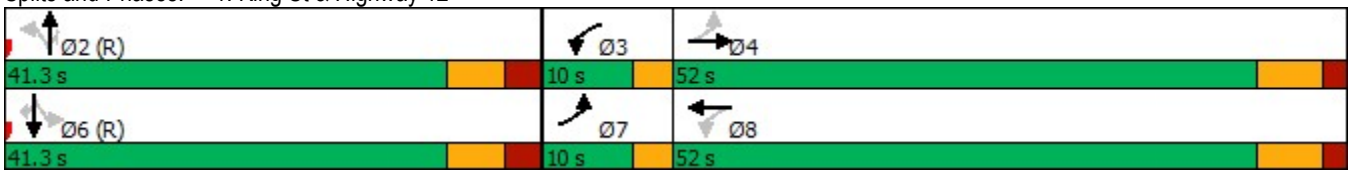
Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	7.8%	ICU Level of Service	A
Analysis Period (min)	15		

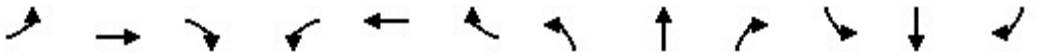
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	284	430	90	454	306	30	59	28	139	114	242
Future Volume (vph)	284	430	90	454	306	30	59	28	139	114	242
Lane Group Flow (vph)	355	643	100	504	340	38	74	35	151	124	263
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Minimum Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	10.0	52.0	10.0	52.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (%)	9.7%	50.3%	9.7%	50.3%		40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
v/c Ratio	0.71	0.44	0.24	0.34	0.22	0.10	0.13	0.07	0.35	0.20	0.38
Control Delay	23.5	20.6	11.7	20.1	0.3	25.1	25.1	1.0	29.3	26.1	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	20.6	11.7	20.1	0.3	25.1	25.1	1.0	29.3	26.1	4.9
Queue Length 50th (m)	36.0	44.1	8.6	34.4	0.0	5.3	10.3	0.0	22.9	17.8	0.0
Queue Length 95th (m)	46.1	50.3	16.0	46.6	0.0	11.2	18.1	0.0	39.9	31.5	16.6
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	499	1454	416	1485	1581	382	579	511	426	607	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.44	0.24	0.34	0.22	0.10	0.13	0.07	0.35	0.20	0.38

Intersection Summary

Cycle Length: 103.3
Actuated Cycle Length: 103.3
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 105
Control Type: Pretimed

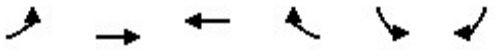
Splits and Phases: 1: King St & Highway 12





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	284	430	84	90	454	306	30	59	28	139	114	242
Future Volume (vph)	284	430	84	90	454	306	30	59	28	139	114	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1755	3301		1722	3411	1581	1630	1762	1402	1737	1847	1585
Flt Permitted	0.43	1.00		0.35	1.00	1.00	0.68	1.00	1.00	0.71	1.00	1.00
Satd. Flow (perm)	803	3301		632	3411	1581	1162	1762	1402	1296	1847	1585
Peak-hour factor, PHF	0.80	0.80	0.80	0.90	0.90	0.90	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	355	538	105	100	504	340	38	74	35	151	124	263
RTOR Reduction (vph)	0	16	0	0	0	0	0	0	23	0	0	176
Lane Group Flow (vph)	355	627	0	100	504	340	38	74	12	151	124	87
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	4%	9%	2%	6%	7%	2%	12%	9%	15%	5%	4%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	52.0	45.0		52.0	45.0	103.3	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.50	0.44		0.50	0.44	1.00	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lane Grp Cap (vph)	468	1437		392	1485	1581	382	579	461	426	607	521
v/s Ratio Prot	c0.05	0.19		0.02	0.15			0.04			0.07	
v/s Ratio Perm	c0.33			0.11		0.22	0.03		0.01	c0.12		0.05
v/c Ratio	0.76	0.44		0.26	0.34	0.22	0.10	0.13	0.02	0.35	0.20	0.17
Uniform Delay, d1	18.5	20.3		13.8	19.3	0.0	24.0	24.3	23.4	26.3	24.9	24.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.0	1.0		1.6	0.6	0.3	0.5	0.5	0.1	2.3	0.8	0.7
Delay (s)	29.4	21.3		15.3	19.9	0.3	24.6	24.7	23.5	28.6	25.7	25.3
Level of Service	C	C		B	B	A	C	C	C	C	C	C
Approach Delay (s)		24.2			12.4			24.4			26.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	96.8%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	569	790	18	18	49
Future Volume (Veh/h)	83	569	790	18	18	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.81	0.81	0.40	0.40
Hourly flow rate (vph)	90	618	975	22	45	122
Pedestrians					1	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.93	
vC, conflicting volume	998				1476	500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	998				1362	500
tC, single (s)	4.4				7.0	7.1
tC, 2 stage (s)						
tF (s)	2.4				3.6	3.4
p0 queue free %	85				57	75
cM capacity (veh/h)	605				104	495

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	296	412	650	347	167
Volume Left	90	0	0	0	45
Volume Right	0	0	0	22	122
cSH	605	1700	1700	1700	247
Volume to Capacity	0.15	0.24	0.38	0.20	0.68
Queue Length 95th (m)	4.0	0.0	0.0	0.0	33.2
Control Delay (s)	5.1	0.0	0.0	0.0	45.6
Lane LOS	A				E
Approach Delay (s)	2.1		0.0		45.6
Approach LOS					E

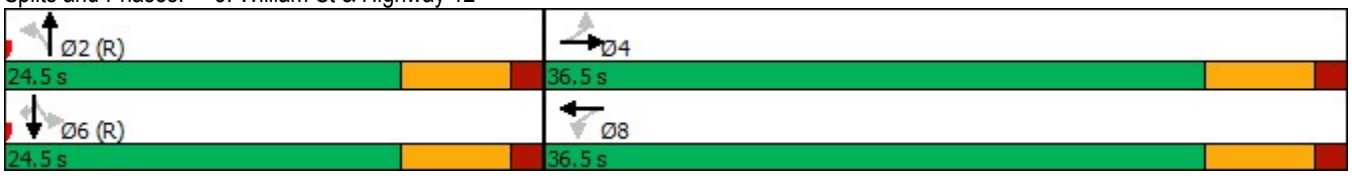
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

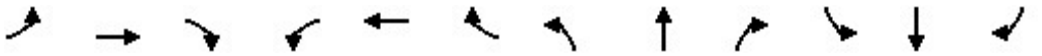
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	114	494	4	642	325	23	10	229	18	122
Future Volume (vph)	114	494	4	642	325	23	10	229	18	122
Lane Group Flow (vph)	128	586	4	683	346	0	56	0	277	137
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (%)	59.8%	59.8%	59.8%	59.8%		40.2%	40.2%	40.2%	40.2%	40.2%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
v/c Ratio	0.38	0.35	0.01	0.39	0.21		0.16		0.72	0.24
Control Delay	14.0	10.0	8.2	10.6	0.3		15.4		32.3	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	14.0	10.0	8.2	10.6	0.3		15.4		32.3	4.9
Queue Length 50th (m)	8.3	19.2	0.2	23.4	0.0		3.8		27.5	0.0
Queue Length 95th (m)	19.7	28.3	1.5	34.1	0.0		8.1		#57.8	9.9
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	334	1662	325	1760	1617		354		386	564
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.38	0.35	0.01	0.39	0.21		0.16		0.72	0.24

Intersection Summary

Cycle Length: 61
Actuated Cycle Length: 61
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 65
Control Type: Pretimed
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12

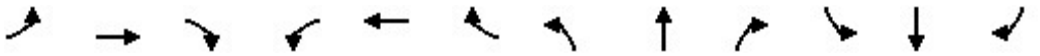




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	494	28	4	642	325	23	10	6	229	18	122
Future Volume (vph)	114	494	28	4	642	325	23	10	6	229	18	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	1.00
Satd. Flow (prot)	1722	3366		1460	3579	1617		1566			1786	1585
Flt Permitted	0.38	1.00		0.43	1.00	1.00		0.73			0.70	1.00
Satd. Flow (perm)	681	3366		662	3579	1617		1180			1310	1585
Peak-hour factor, PHF	0.89	0.89	0.89	0.94	0.94	0.94	0.69	0.69	0.69	0.89	0.89	0.89
Adj. Flow (vph)	128	555	31	4	683	346	33	14	9	257	20	137
RTOR Reduction (vph)	0	7	0	0	0	0	0	6	0	0	0	97
Lane Group Flow (vph)	128	579	0	4	683	346	0	50	0	0	277	40
Heavy Vehicles (%)	6%	8%	0%	25%	2%	1%	9%	13%	50%	3%	0%	3%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Effective Green, g (s)	30.0	30.0		30.0	30.0	61.0		18.0			18.0	18.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49	1.00		0.30			0.30	0.30
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Lane Grp Cap (vph)	334	1655		325	1760	1617		348			386	467
v/s Ratio Prot		0.17			c0.19							
v/s Ratio Perm	0.19			0.01		0.21		0.04			c0.21	0.03
v/c Ratio	0.38	0.35		0.01	0.39	0.21		0.14			0.72	0.09
Uniform Delay, d1	9.7	9.5		7.9	9.7	0.0		15.8			19.2	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	3.3	0.6		0.1	0.6	0.3		0.9			10.9	0.4
Delay (s)	13.0	10.1		8.0	10.4	0.3		16.7			30.1	15.9
Level of Service	B	B		A	B	A		B			C	B
Approach Delay (s)		10.6			7.0			16.7			25.4	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

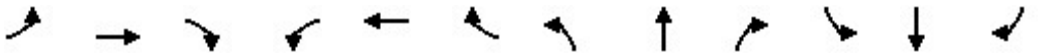
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	39	0	27	4	468	30	20	414	1
Future Volume (Veh/h)	0	0	0	39	0	27	4	468	30	20	414	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Hourly flow rate (vph)	0	0	0	48	0	33	4	608	39	22	455	1
Pedestrians					1							
Lane Width (m)					3.7							
Walking Speed (m/s)					1.1							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked												
vC, conflicting volume	1168	1156	456	1136	1136	628	456			648		
vC1, stage 1 conf vol	500	500		636	636							
vC2, stage 2 conf vol	668	656		499	500							
vCu, unblocked vol	1168	1156	456	1136	1136	628	456			648		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.3		
tC, 2 stage (s)	6.1	5.5		6.2	5.5							
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.4		
p0 queue free %	100	100	100	87	100	93	100			97		
cM capacity (veh/h)	339	371	605	370	385	482	1105			869		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	0	81	651	22	456
Volume Left	0	48	4	22	0
Volume Right	0	33	39	0	1
cSH	1700	409	1105	869	1700
Volume to Capacity	0.00	0.20	0.00	0.03	0.27
Queue Length 95th (m)	0.0	5.5	0.1	0.6	0.0
Control Delay (s)	0.0	16.0	0.1	9.2	0.0
Lane LOS	A	C	A	A	
Approach Delay (s)	0.0	16.0	0.1	0.4	
Approach LOS	A	C			

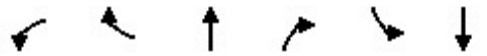
Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	40.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	0	13	13	0	16	34	458	4	5	409	140
Future Volume (Veh/h)	54	0	13	13	0	16	34	458	4	5	409	140
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	0	14	14	0	17	37	498	4	5	445	152
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)								318				
pX, platoon unblocked												
vC, conflicting volume	1120	1107	521	1043	1181	500	597			502		
vC1, stage 1 conf vol	531	531		574	574							
vC2, stage 2 conf vol	589	576		469	607							
vCu, unblocked vol	1120	1107	521	1043	1181	500	597			502		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	97	96	100	97	96			100		
cM capacity (veh/h)	373	390	555	390	361	571	980			1062		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	59	14	31	37	502	5	597
Volume Left	59	0	14	37	0	5	0
Volume Right	0	14	17	0	4	0	152
cSH	373	555	472	980	1700	1062	1700
Volume to Capacity	0.16	0.03	0.07	0.04	0.30	0.00	0.35
Queue Length 95th (m)	4.2	0.6	1.6	0.9	0.0	0.1	0.0
Control Delay (s)	16.4	11.6	13.2	8.8	0.0	8.4	0.0
Lane LOS	C	B	B	A		A	
Approach Delay (s)	15.5		13.2	0.6		0.1	
Approach LOS	C		B				

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	30	0	0	80	0	0
Future Volume (vph)	30	0	0	80	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	0	87	0	0

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	33	87	0
Volume Left (vph)	33	0	0
Volume Right (vph)	0	87	0
Hadj (s)	0.23	-0.57	0.00
Departure Headway (s)	4.3	3.4	4.0
Degree Utilization, x	0.04	0.08	0.00
Capacity (veh/h)	817	1043	884
Control Delay (s)	7.5	6.7	7.0
Approach Delay (s)	7.5	6.7	0.0
Approach LOS	A	A	A

Intersection Summary			
Delay	6.9		
Level of Service	A		
Intersection Capacity Utilization	8.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	21	52	25	55	20
Future Volume (Veh/h)	10	21	52	25	55	20
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	23	57	27	60	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	212	70			84	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	70			84	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			96	
cM capacity (veh/h)	745	992			1513	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	34	84	82
Volume Left	11	0	60
Volume Right	23	27	0
cSH	896	1700	1513
Volume to Capacity	0.04	0.05	0.04
Queue Length 95th (m)	0.9	0.0	0.9
Control Delay (s)	9.2	0.0	5.6
Lane LOS	A		A
Approach Delay (s)	9.2	0.0	5.6
Approach LOS	A		

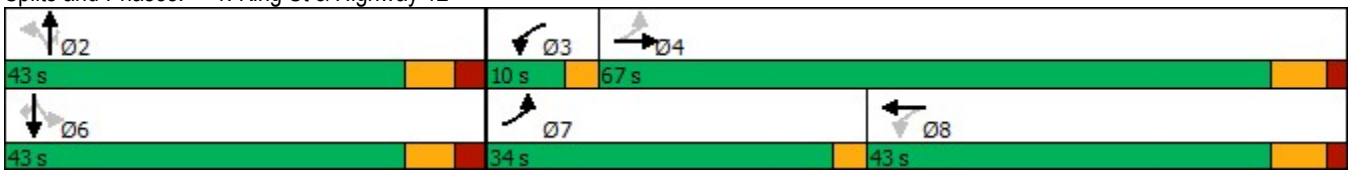
Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	20.8%	ICU Level of Service	A
Analysis Period (min)	15		

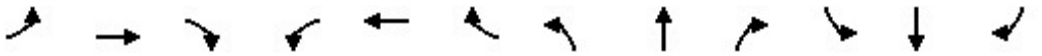
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	404	807	32	692	216	81	130	64	228	77	422
Future Volume (vph)	404	807	32	692	216	81	130	64	228	77	422
Lane Group Flow (vph)	505	1044	40	854	267	104	167	82	245	83	454
Turn Type	pm+pt	NA	pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8			2			6	
Permitted Phases	4		8		Free	2		2	6		6
Detector Phase	7	4	3	8		2	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	7.0	45.0	7.0	36.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	10.0	52.0	10.0	43.0		41.3	41.3	41.3	41.3	41.3	41.3
Total Split (s)	34.0	67.0	10.0	43.0		43.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	28.3%	55.8%	8.3%	35.8%		35.8%	35.8%	35.8%	35.8%	35.8%	35.8%
Yellow Time (s)	3.0	5.0	3.0	5.0		4.5	4.5	4.5	4.5	4.5	4.5
All-Red Time (s)	0.0	2.0	0.0	2.0		2.8	2.8	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Lead/Lag	Lead	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes							
Recall Mode	Max	Max	Max	Max		None	None	None	Max	Max	Max
v/c Ratio	0.91	0.61	0.15	0.80	0.17	0.27	0.30	0.15	0.71	0.16	0.57
Control Delay	51.6	23.4	13.8	45.2	0.2	34.5	34.4	6.0	50.6	32.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.6	23.4	13.8	45.2	0.2	34.5	34.4	6.0	50.6	32.1	6.1
Queue Length 50th (m)	92.2	89.7	3.5	97.2	0.0	18.7	30.3	0.0	51.4	14.4	0.0
Queue Length 95th (m)	#119.7	92.8	7.0	105.0	0.0	28.6	41.5	6.3	#82.9	26.9	23.9
Internal Link Dist (m)		281.6		347.1			143.2			249.3	
Turn Bay Length (m)	130.0		135.0		130.0	35.0		35.0	75.0		
Base Capacity (vph)	553	1712	266	1073	1581	390	549	543	344	534	795
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.61	0.15	0.80	0.17	0.27	0.30	0.15	0.71	0.16	0.57

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 105
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: King St & Highway 12

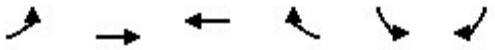




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	404	807	28	32	692	216	81	130	64	228	77	422
Future Volume (vph)	404	807	28	32	692	216	81	130	64	228	77	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		3.0	7.0	4.0	7.3	7.3	7.3	7.3	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	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	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3421		1722	3579	1581	1772	1847	1612	1753	1795	1601
Flt Permitted	0.13	1.00		0.27	1.00	1.00	0.70	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	243	3421		497	3579	1581	1311	1847	1612	1158	1795	1601
Peak-hour factor, PHF	0.80	0.80	0.80	0.81	0.81	0.81	0.78	0.78	0.78	0.93	0.93	0.93
Adj. Flow (vph)	505	1009	35	40	854	267	104	167	82	245	83	454
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	58	0	0	319
Lane Group Flow (vph)	505	1042	0	40	854	267	104	167	24	245	83	135
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	1%	6%	11%	6%	2%	2%	3%	4%	0%	4%	7%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Free	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8		Free	2		2	6		6
Actuated Green, G (s)	70.0	60.0		43.0	36.0	120.0	35.7	35.7	35.7	35.7	35.7	35.7
Effective Green, g (s)	70.0	60.0		43.0	36.0	120.0	35.7	35.7	35.7	35.7	35.7	35.7
Actuated g/C Ratio	0.58	0.50		0.36	0.30	1.00	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	3.0	7.0		3.0	7.0		7.3	7.3	7.3	7.3	7.3	7.3
Vehicle Extension (s)	3.0	5.4		3.0	5.4		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	545	1710		249	1073	1581	390	549	479	344	534	476
v/s Ratio Prot	c0.24	0.30		0.01	0.24			0.09			0.05	
v/s Ratio Perm	c0.30			0.05		0.17	0.08		0.02	c0.21		0.08
v/c Ratio	0.93	0.61		0.16	0.80	0.17	0.27	0.30	0.05	0.71	0.16	0.28
Uniform Delay, d1	32.0	21.6		25.3	38.6	0.0	32.2	32.6	30.1	37.6	31.0	32.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.1	1.6		1.4	6.1	0.2	0.4	0.3	0.0	11.9	0.6	1.5
Delay (s)	56.1	23.2		26.7	44.8	0.2	32.5	32.9	30.1	49.4	31.7	33.8
Level of Service	E	C		C	D	A	C	C	C	D	C	C
Approach Delay (s)		33.9			33.9			32.1			38.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.3
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	1043	843	7	24	101
Future Volume (Veh/h)	45	1043	843	7	24	101
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.88	0.88	0.50	0.50
Hourly flow rate (vph)	51	1172	958	8	48	202
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		371				
pX, platoon unblocked					0.80	
vC, conflicting volume	966				1650	483
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	966				1319	483
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				57	62
cM capacity (veh/h)	709				111	530

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	442	781	639	327	250
Volume Left	51	0	0	0	48
Volume Right	0	0	0	8	202
cSH	709	1700	1700	1700	307
Volume to Capacity	0.07	0.46	0.38	0.19	0.82
Queue Length 95th (m)	1.8	0.0	0.0	0.0	51.4
Control Delay (s)	2.1	0.0	0.0	0.0	52.8
Lane LOS	A				F
Approach Delay (s)	0.7		0.0		52.8
Approach LOS					F

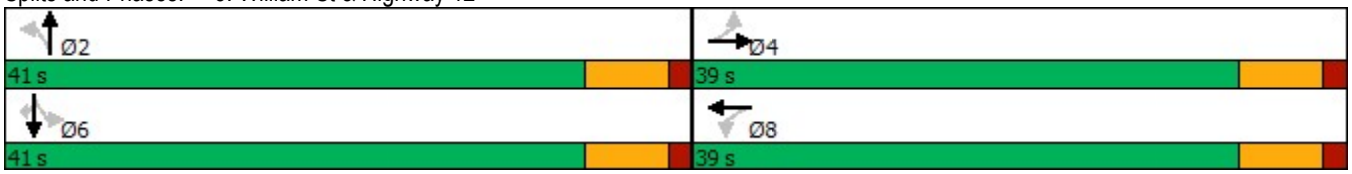
Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

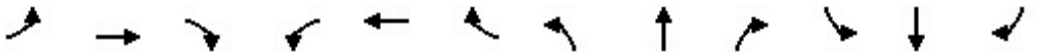
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	185	846	5	686	398	27	28	442	17	154
Future Volume (vph)	185	846	5	686	398	27	28	442	17	154
Lane Group Flow (vph)	208	985	6	762	442	0	106	0	510	171
Turn Type	Perm	NA	Perm	NA	Free	Perm	NA	Perm	NA	Perm
Protected Phases		4		8			2		6	
Permitted Phases	4		8		Free	2		6		6
Detector Phase	4	4	8	8		2	2	6	6	6
Switch Phase										
Minimum Initial (s)	30.0	30.0	30.0	30.0		10.0	10.0	15.0	15.0	15.0
Minimum Split (s)	36.5	36.5	36.5	36.5		24.5	24.5	24.5	24.5	24.5
Total Split (s)	39.0	39.0	39.0	39.0		41.0	41.0	41.0	41.0	41.0
Total Split (%)	48.8%	48.8%	48.8%	48.8%		51.3%	51.3%	51.3%	51.3%	51.3%
Yellow Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.5	1.5	1.5	1.5		1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0			0.0		0.0	0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5			6.5		6.5	6.5
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max		None	None	Max	Max	Max
v/c Ratio	0.94	0.68	0.06	0.52	0.27		0.19		0.94	0.23
Control Delay	74.6	22.4	16.6	19.5	0.4		13.4		50.9	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	74.6	22.4	16.6	19.5	0.4		13.4		50.9	8.1
Queue Length 50th (m)	29.5	62.5	0.6	44.6	0.0		8.3		71.6	7.1
Queue Length 95th (m)	#69.5	81.5	3.0	60.5	0.0		11.1		#132.2	18.5
Internal Link Dist (m)		300.0		205.3			130.1		199.8	
Turn Bay Length (m)	80.0		40.0		120.0					
Base Capacity (vph)	221	1445	98	1453	1633		544		542	728
Starvation Cap Reductn	0	0	0	0	0		0		0	0
Spillback Cap Reductn	0	0	0	0	0		0		0	0
Storage Cap Reductn	0	0	0	0	0		0		0	0
Reduced v/c Ratio	0.94	0.68	0.06	0.52	0.27		0.19		0.94	0.23

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Natural Cycle: 75
Control Type: Semi Act-Uncoord
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: William St & Highway 12





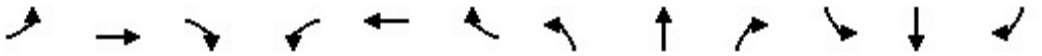
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	846	30	5	686	398	27	28	10	442	17	154
Future Volume (vph)	185	846	30	5	686	398	27	28	10	442	17	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	4.0		6.5			6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.95	1.00
Satd. Flow (prot)	1825	3550		1304	3579	1633		1814			1823	1570
Flt Permitted	0.28	1.00		0.18	1.00	1.00		0.67			0.66	1.00
Satd. Flow (perm)	544	3550		243	3579	1633		1241			1258	1570
Peak-hour factor, PHF	0.89	0.89	0.89	0.90	0.90	0.90	0.61	0.61	0.61	0.90	0.90	0.90
Adj. Flow (vph)	208	951	34	6	762	442	44	46	16	491	19	171
RTOR Reduction (vph)	0	3	0	0	0	0	0	8	0	0	0	51
Lane Group Flow (vph)	208	982	0	6	762	442	0	98	0	0	510	120
Heavy Vehicles (%)	0%	2%	10%	40%	2%	0%	4%	0%	0%	0%	14%	4%
Turn Type	Perm	NA		Perm	NA	Free	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		Free	2			6		6
Actuated Green, G (s)	32.5	32.5		32.5	32.5	80.0		34.5			34.5	34.5
Effective Green, g (s)	32.5	32.5		32.5	32.5	80.0		34.5			34.5	34.5
Actuated g/C Ratio	0.41	0.41		0.41	0.41	1.00		0.43			0.43	0.43
Clearance Time (s)	6.5	6.5		6.5	6.5			6.5			6.5	6.5
Vehicle Extension (s)	4.0	4.0		4.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	221	1442		98	1453	1633		535			542	677
v/s Ratio Prot		0.28			0.21							
v/s Ratio Perm	c0.38			0.02		0.27		0.08			c0.41	0.08
v/c Ratio	0.94	0.68		0.06	0.52	0.27		0.18			0.94	0.18
Uniform Delay, d1	22.8	19.5		14.5	17.9	0.0		14.0			21.8	14.0
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2	47.0	2.6		1.2	1.4	0.4		0.2			26.5	0.6
Delay (s)	69.8	22.1		15.7	19.3	0.4		14.2			48.3	14.6
Level of Service	E	C		B	B	A		B			D	B
Approach Delay (s)		30.4			12.4			14.2			39.8	
Approach LOS		C			B			B			D	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	98.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	10	59	0	49	2	637	57	37	657	2
Future Volume (Veh/h)	7	0	10	59	0	49	2	637	57	37	657	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Hourly flow rate (vph)	8	0	11	83	0	69	2	708	63	45	792	2
Pedestrians								1			1	
Lane Width (m)								3.7			3.7	
Walking Speed (m/s)								1.1			1.1	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh)											2	
Upstream signal (m)								224				
pX, platoon unblocked	0.96	0.96		0.96	0.96	0.96				0.96		
vC, conflicting volume	1696	1658	794	1638	1628	740	794			771		
vC1, stage 1 conf vol	883	883		744	744							
vC2, stage 2 conf vol	814	775		894	884							
vCu, unblocked vol	1706	1665	794	1644	1634	705	794			737		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	97	66	100	83	100			95		
cM capacity (veh/h)	205	257	388	247	272	417	827			830		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	19	152	773	45	794
Volume Left	8	83	2	45	0
Volume Right	11	69	63	0	2
cSH	282	303	827	830	1700
Volume to Capacity	0.07	0.50	0.00	0.05	0.47
Queue Length 95th (m)	1.6	20.1	0.1	1.3	0.0
Control Delay (s)	18.7	28.3	0.1	9.6	0.0
Lane LOS	C	D	A	A	
Approach Delay (s)	18.7	28.3	0.1	0.5	
Approach LOS	C	D			

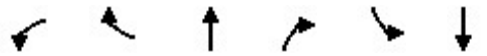
Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	54.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	143	0	36	8	0	11	22	661	14	17	650	87
Future Volume (Veh/h)	143	0	36	8	0	11	22	661	14	17	650	87
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	155	0	39	9	0	12	24	718	15	18	707	95
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (m)								318				
pX, platoon unblocked												
vC, conflicting volume	1568	1572	754	1556	1612	726	802			733		
vC1, stage 1 conf vol	790	790		774	774							
vC2, stage 2 conf vol	778	781		782	838							
vCu, unblocked vol	1568	1572	754	1556	1612	726	802			733		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	41	100	90	96	100	97	97			98		
cM capacity (veh/h)	263	284	409	251	273	425	822			872		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	155	39	21	24	733	18	802
Volume Left	155	0	9	24	0	18	0
Volume Right	0	39	12	0	15	0	95
cSH	263	409	327	822	1700	872	1700
Volume to Capacity	0.59	0.10	0.06	0.03	0.43	0.02	0.47
Queue Length 95th (m)	26.2	2.4	1.6	0.7	0.0	0.5	0.0
Control Delay (s)	36.7	14.7	16.8	9.5	0.0	9.2	0.0
Lane LOS	E	B	C	A		A	
Approach Delay (s)	32.3		16.8	0.3		0.2	
Approach LOS	D		C				

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	60.7%	ICU Level of Service		B
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	80	0	0	49	0	0
Future Volume (Veh/h)	80	0	0	49	0	0
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	0	0	53	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	0	0			53	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0	0			53	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	1023	1085			1553	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	87	53	0
Volume Left	87	0	0
Volume Right	0	53	0
cSH	1023	1700	1700
Volume to Capacity	0.09	0.03	0.00
Queue Length 95th (m)	2.1	0.0	0.0
Control Delay (s)	8.8	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.8	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	7.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBT	NBL	NBT	SBL	SBT	Ø4
Lane Configurations							
Traffic Volume (vph)	39	0	4	468	20	414	
Future Volume (vph)	39	0	4	468	20	414	
Lane Group Flow (vph)	48	33	4	647	22	456	
Turn Type	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		8		2		6	4
Permitted Phases	8		2		6		
Detector Phase	8	8	2	2	6	6	
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.6	22.6	37.4	37.4	37.4	37.4	22.6
Total Split (%)	37.7%	37.7%	62.3%	62.3%	62.3%	62.3%	38%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	Max	Max	Max	Max	None
v/c Ratio	0.25	0.08	0.01	0.44	0.04	0.30	
Control Delay	24.2	0.3	3.2	4.5	3.4	3.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.2	0.3	3.2	4.5	3.4	3.6	
Queue Length 50th (m)	5.4	0.0	0.1	22.0	0.5	13.6	
Queue Length 95th (m)	9.6	0.0	0.8	35.0	2.4	28.5	
Internal Link Dist (m)		295.4		199.8		70.0	
Turn Bay Length (m)	15.0		15.0		25.0		
Base Capacity (vph)	458	697	762	1486	516	1503	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.05	0.01	0.44	0.04	0.30	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 55.5
Natural Cycle: 55
Control Type: Semi Act-Uncoord

Splits and Phases: 4: William St & Private Access/Pilsbury Dr

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	39	0	27	4	468	30	20	414	1
Future Volume (vph)	0	0	0	39	0	27	4	468	30	20	414	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor				1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes				1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes				1.00	1.00		1.00	1.00		1.00	1.00	
Frt				1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected				0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1690	1601		1789	1824		1559	1847	
Flt Permitted				0.78	1.00		0.50	1.00		0.39	1.00	
Satd. Flow (perm)				1395	1601		936	1824		634	1847	
Peak-hour factor, PHF	0.92	0.92	0.92	0.81	0.92	0.81	0.92	0.77	0.77	0.91	0.91	0.92
Adj. Flow (vph)	0	0	0	48	0	33	4	608	39	22	455	1
RTOR Reduction (vph)	0	0	0	0	30	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	0	48	3	0	4	645	0	22	456	0
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	2%	2%	2%	8%	2%	2%	2%	4%	8%	17%	4%	2%
Turn Type				Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)				5.1	5.1		43.3	43.3		43.3	43.3	
Effective Green, g (s)				5.1	5.1		43.3	43.3		43.3	43.3	
Actuated g/C Ratio				0.09	0.09		0.75	0.75		0.75	0.75	
Clearance Time (s)				4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)				3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				123	142		706	1375		478	1393	
v/s Ratio Prot					0.00			c0.35			0.25	
v/s Ratio Perm				c0.03			0.00			0.03		
v/c Ratio				0.39	0.02		0.01	0.47		0.05	0.33	
Uniform Delay, d1				24.7	23.9		1.7	2.7		1.8	2.3	
Progression Factor				1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2				2.0	0.1		0.0	1.2		0.2	0.6	
Delay (s)				26.7	23.9		1.8	3.8		2.0	2.9	
Level of Service				C	C		A	A		A	A	
Approach Delay (s)		0.0			25.6			3.8			2.9	
Approach LOS		A			C			A			A	

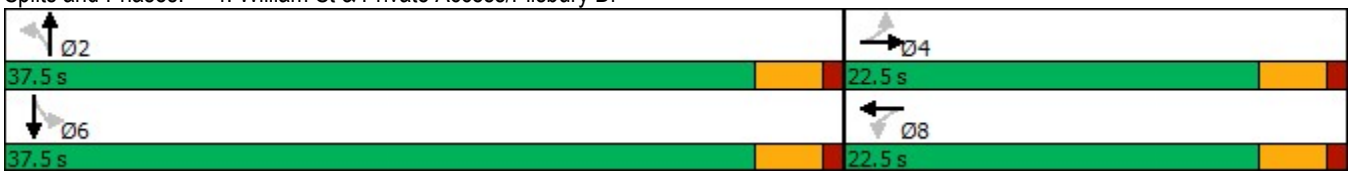
Intersection Summary			
HCM 2000 Control Delay	4.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

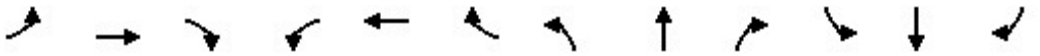
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	7	0	59	0	2	637	37	657
Future Volume (vph)	7	0	59	0	2	637	37	657
Lane Group Flow (vph)	0	19	83	69	2	771	45	794
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	37.5	37.5	37.5	37.5
Total Split (%)	37.5%	37.5%	37.5%	37.5%	62.5%	62.5%	62.5%	62.5%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
v/c Ratio		0.07	0.38	0.16	0.00	0.56	0.11	0.57
Control Delay		9.8	24.3	0.8	3.5	6.6	4.2	6.8
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		9.8	24.3	0.8	3.5	6.6	4.2	6.8
Queue Length 50th (m)		0.1	7.1	0.0	0.1	28.5	1.1	30.3
Queue Length 95th (m)		4.0	12.2	0.0	0.6	66.5	4.0	58.2
Internal Link Dist (m)		58.0		295.4		199.8		70.0
Turn Bay Length (m)			15.0		15.0		25.0	
Base Capacity (vph)		530	478	671	407	1379	424	1404
Starvation Cap Reductn		0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0
Reduced v/c Ratio		0.04	0.17	0.10	0.00	0.56	0.11	0.57

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 54.6
Natural Cycle: 60
Control Type: Semi Act-Uncoord

Splits and Phases: 4: William St & Private Access/Pilsbury Dr



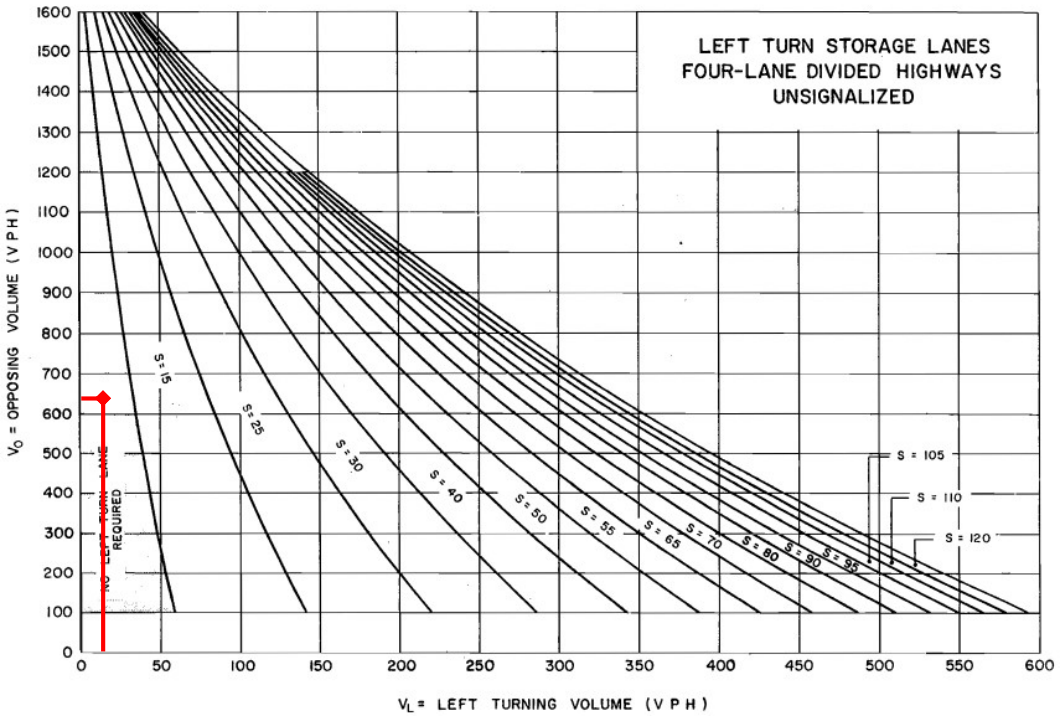


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	10	59	0	49	2	637	57	37	657	2
Future Volume (vph)	7	0	10	59	0	49	2	637	57	37	657	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00		1.00	0.98		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	
Frt		0.92		1.00	0.85		1.00	0.99		1.00	1.00	
Flt Protected		0.98		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1700		1788	1566		1789	1844		1789	1883	
Flt Permitted		0.88		0.75	1.00		0.29	1.00		0.30	1.00	
Satd. Flow (perm)		1520		1402	1566		546	1844		569	1883	
Peak-hour factor, PHF	0.92	0.92	0.92	0.71	0.92	0.71	0.92	0.90	0.90	0.83	0.83	0.92
Adj. Flow (vph)	8	0	11	83	0	69	2	708	63	45	792	2
RTOR Reduction (vph)	0	16	0	0	60	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	3	0	83	9	0	2	768	0	45	794	0
Confl. Peds. (#/hr)				1		1						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.5		7.5	7.5		39.9	39.9		39.9	39.9	
Effective Green, g (s)		7.5		7.5	7.5		39.9	39.9		39.9	39.9	
Actuated g/C Ratio		0.14		0.14	0.14		0.72	0.72		0.72	0.72	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		205		189	212		393	1328		409	1356	
v/s Ratio Prot					0.01			0.42			c0.42	
v/s Ratio Perm		0.00		c0.06			0.00			0.08		
v/c Ratio		0.02		0.44	0.04		0.01	0.58		0.11	0.59	
Uniform Delay, d1		20.8		22.0	20.8		2.2	3.7		2.4	3.7	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0		1.6	0.1		0.0	1.8		0.5	1.9	
Delay (s)		20.8		23.6	20.9		2.2	5.6		2.9	5.6	
Level of Service		C		C	C		A	A		A	A	
Approach Delay (s)		20.8			22.4			5.5			5.5	
Approach LOS		C			C			A			A	

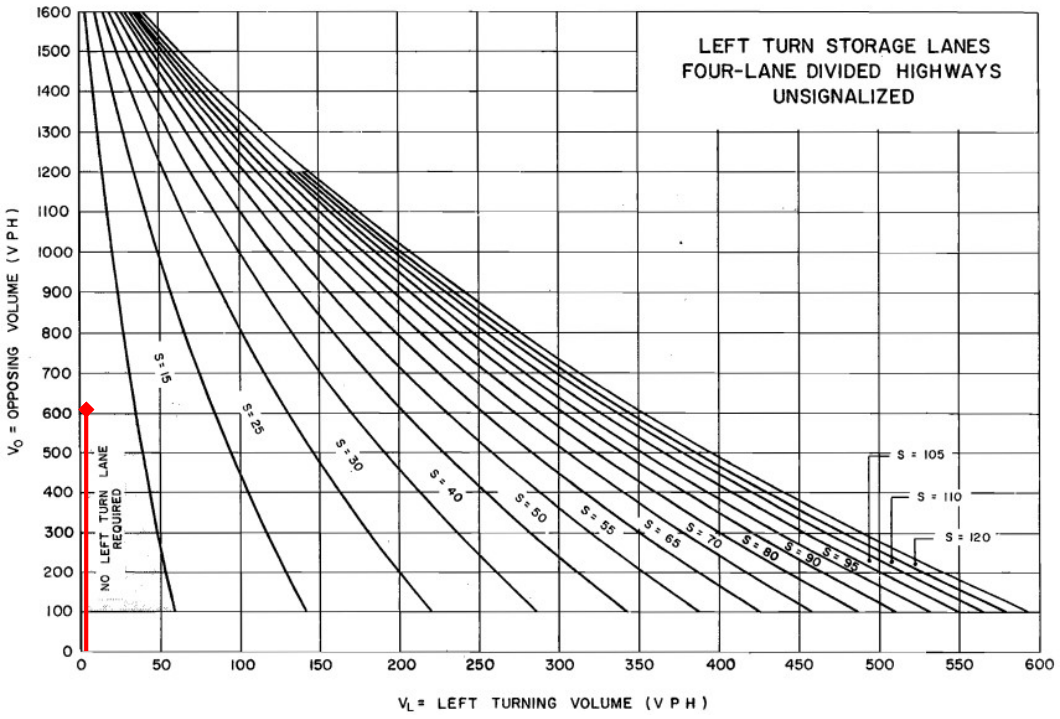
Intersection Summary			
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	55.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

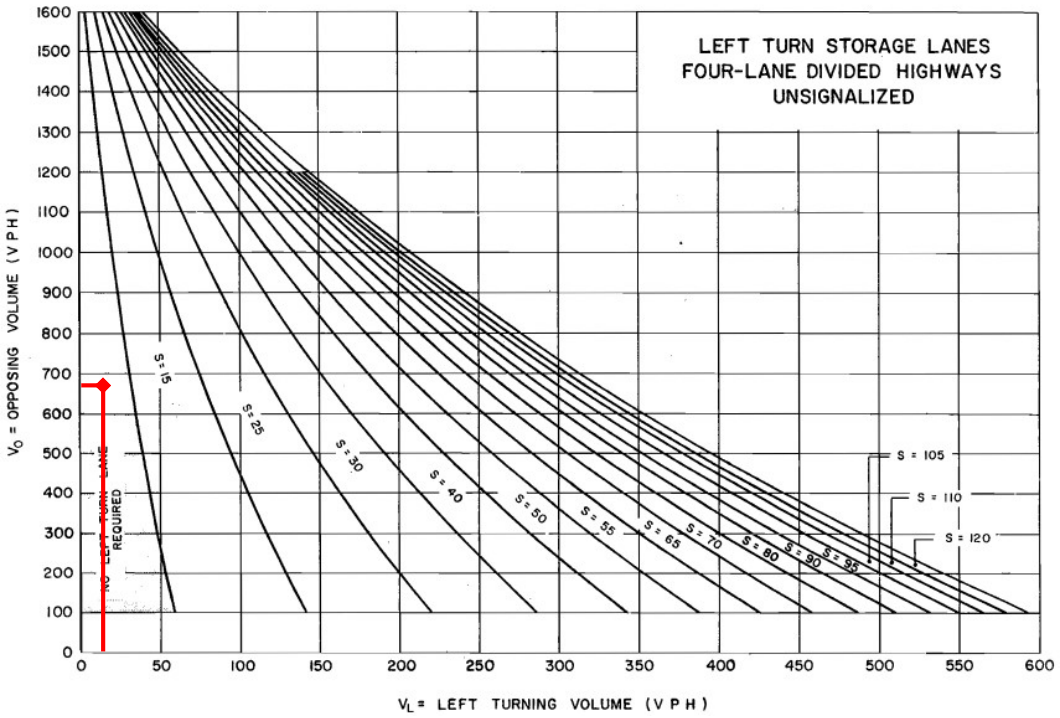
Appendix H –
OTM Signal Justification Sheets



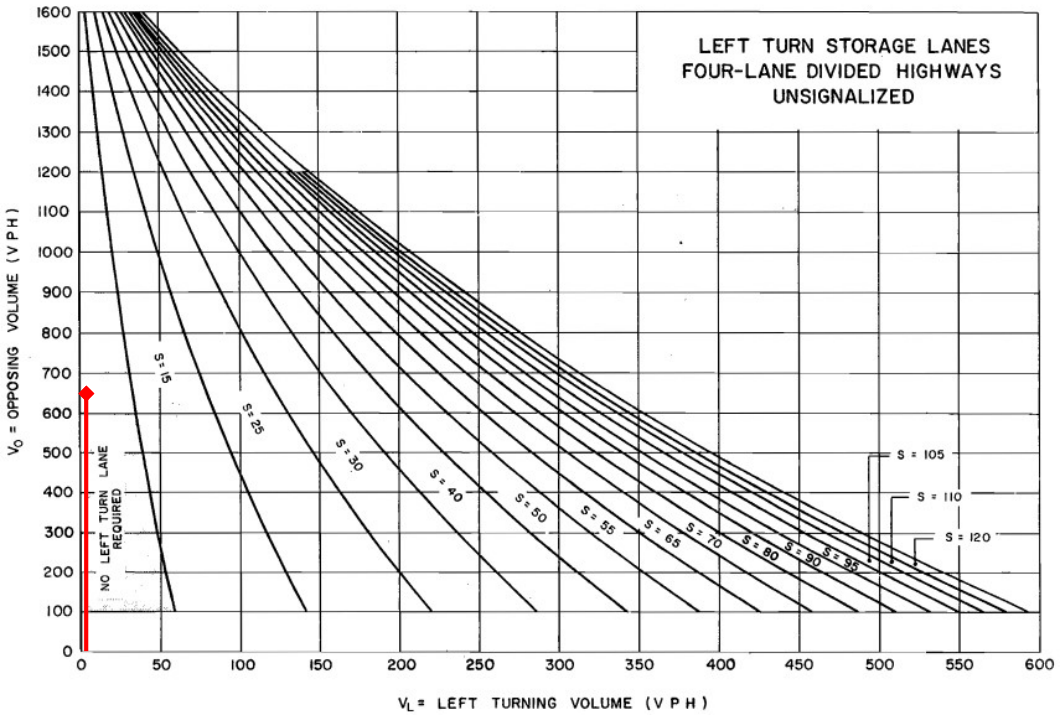
Existing (2020) AM Peak – EB on Highway 12 at Brandon Street



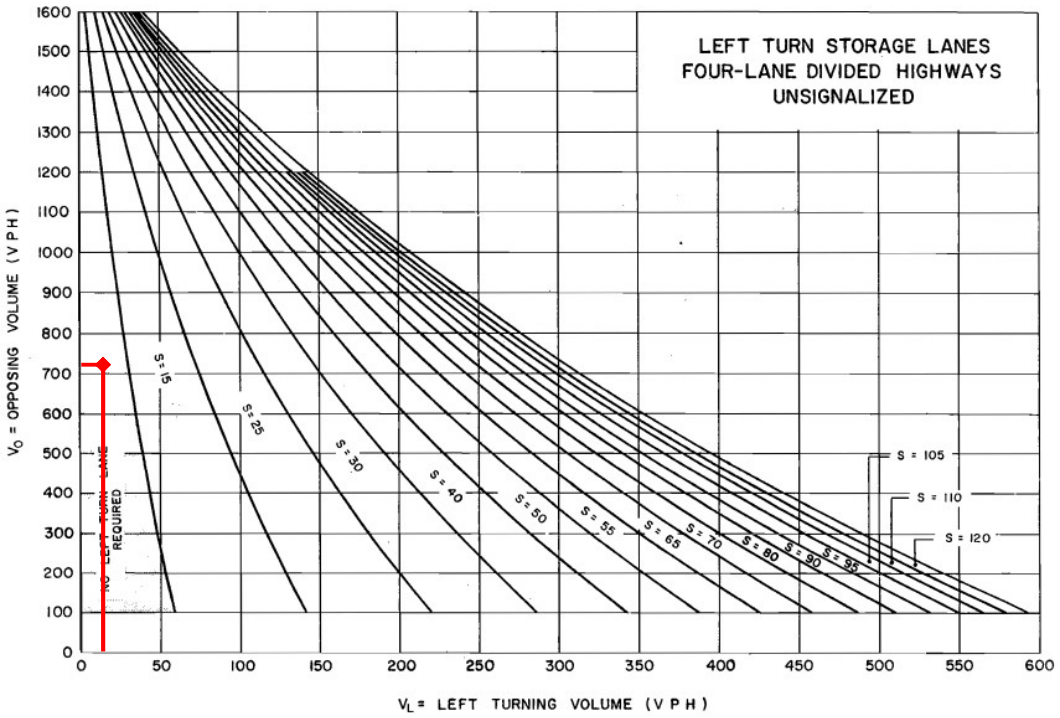
Existing (2020) PM Peak – EB on Highway 12 at Brandon Street



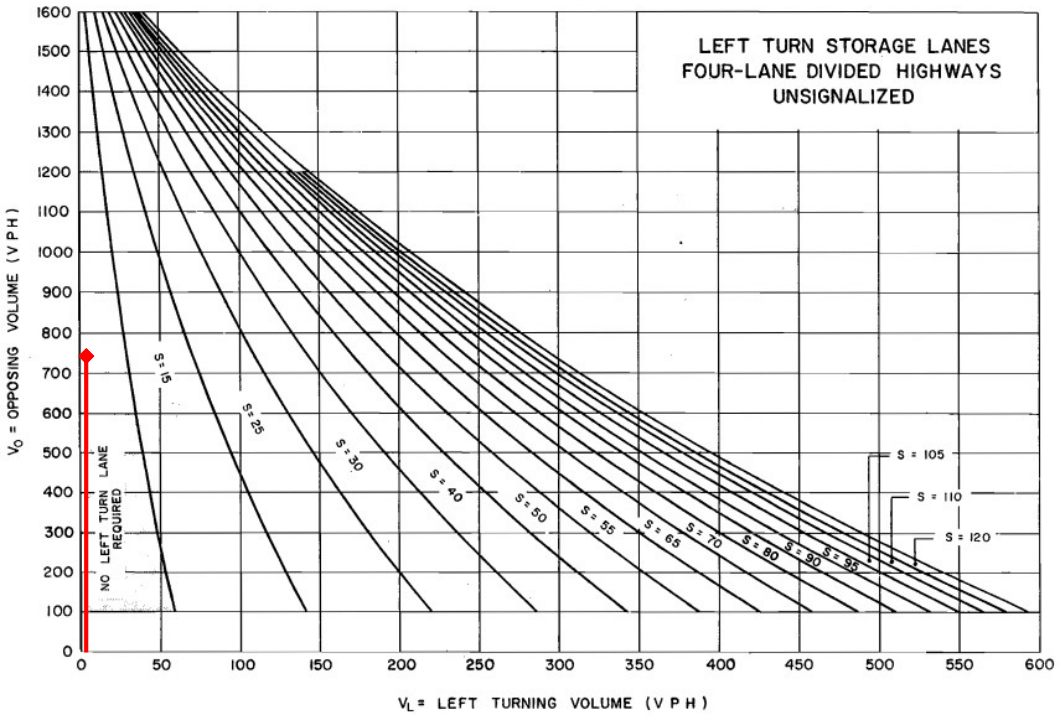
Background (2023) AM Peak – EB on Highway 12 at Brandon Street



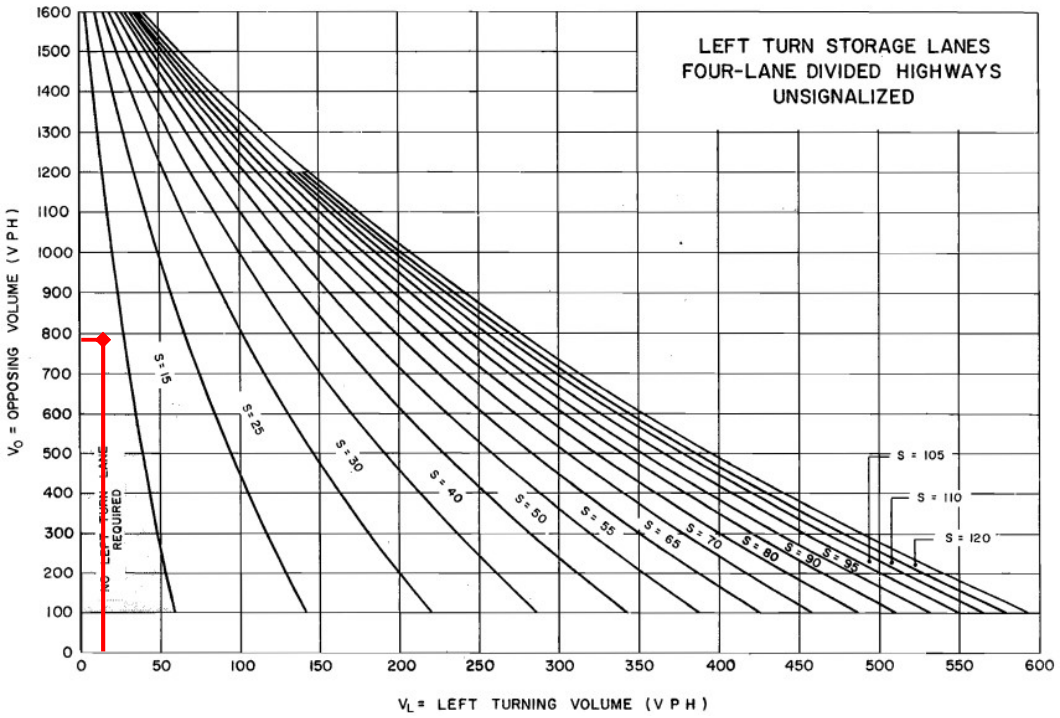
Background (2023) PM Peak – EB on Highway 12 at Brandon Street



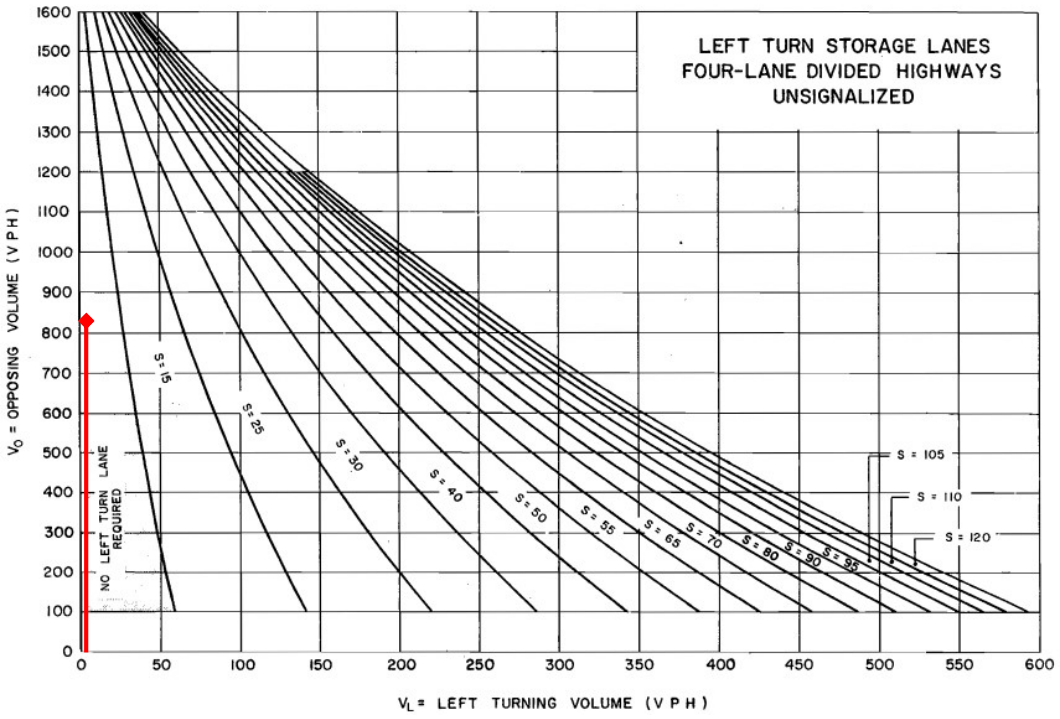
Background (2028) AM Peak – EB on Highway 12 at Brandon Street



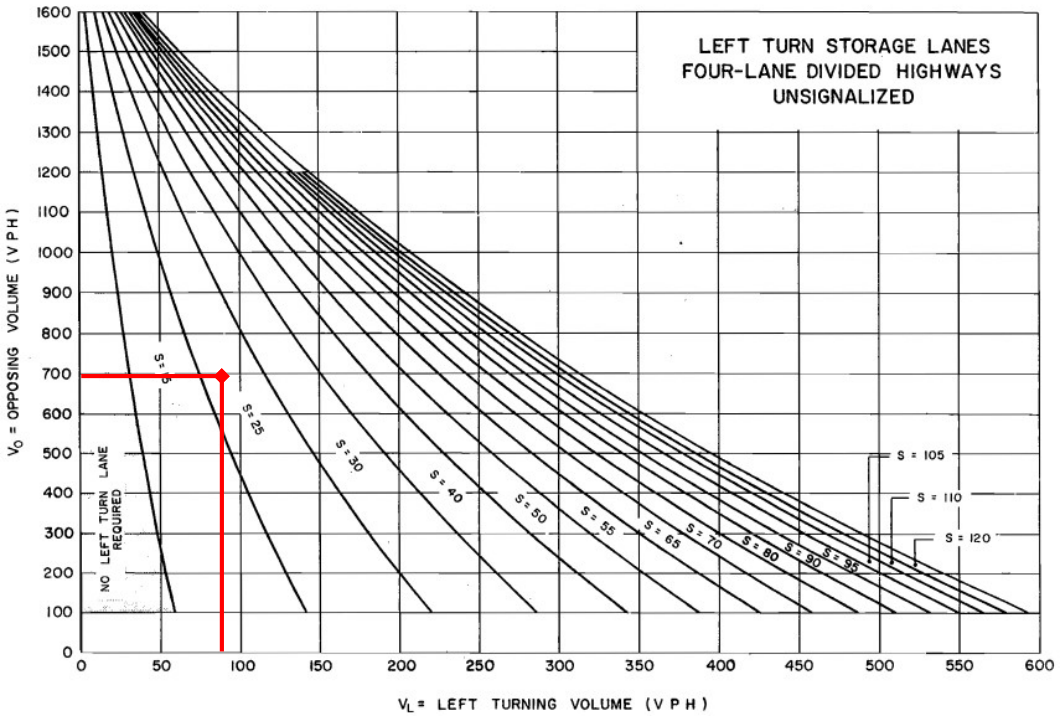
Background (2028) PM Peak – EB on Highway 12 at Brandon Street



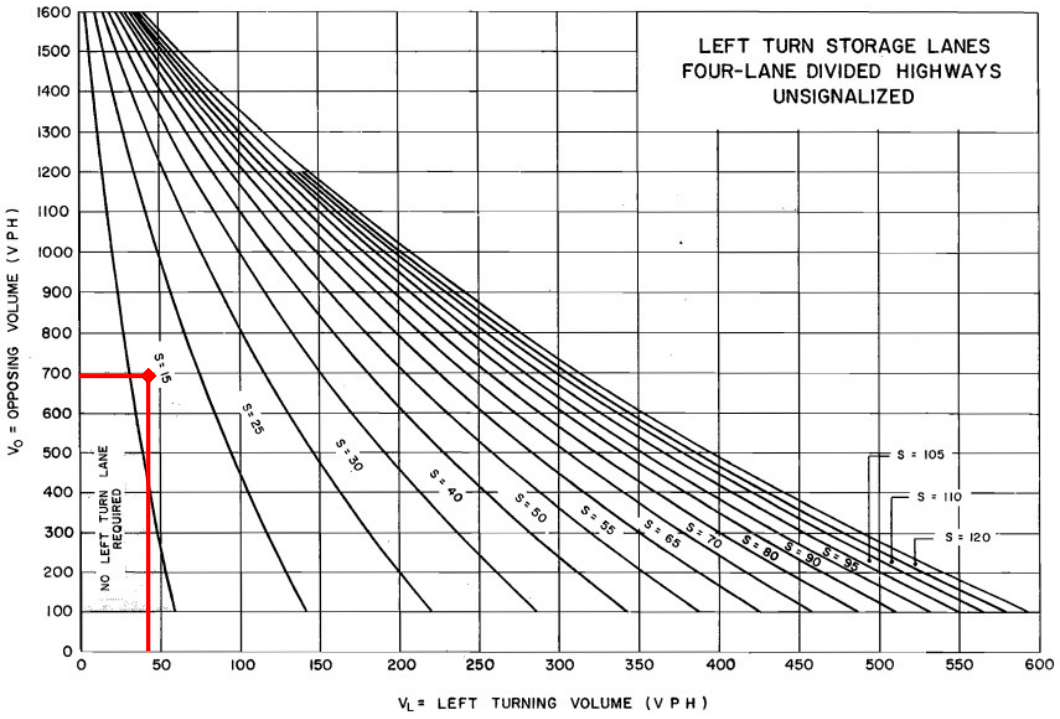
Background (2033) AM Peak – EB on Highway 12 at Brandon Street



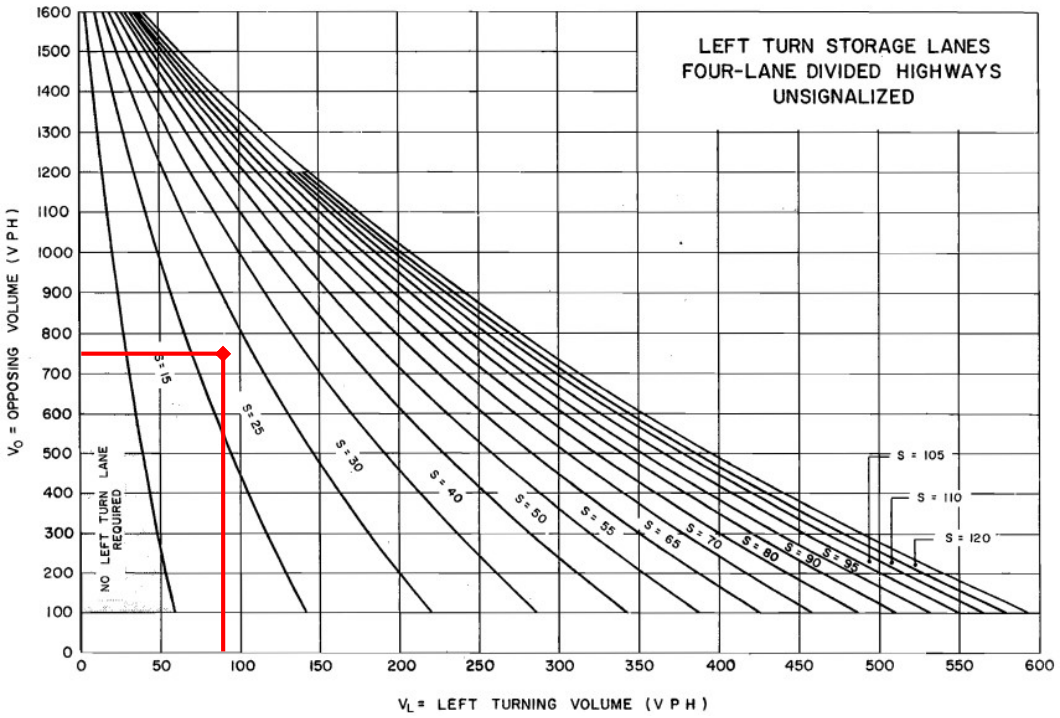
Background (2033) PM Peak – EB on Highway 12 at Brandon Street



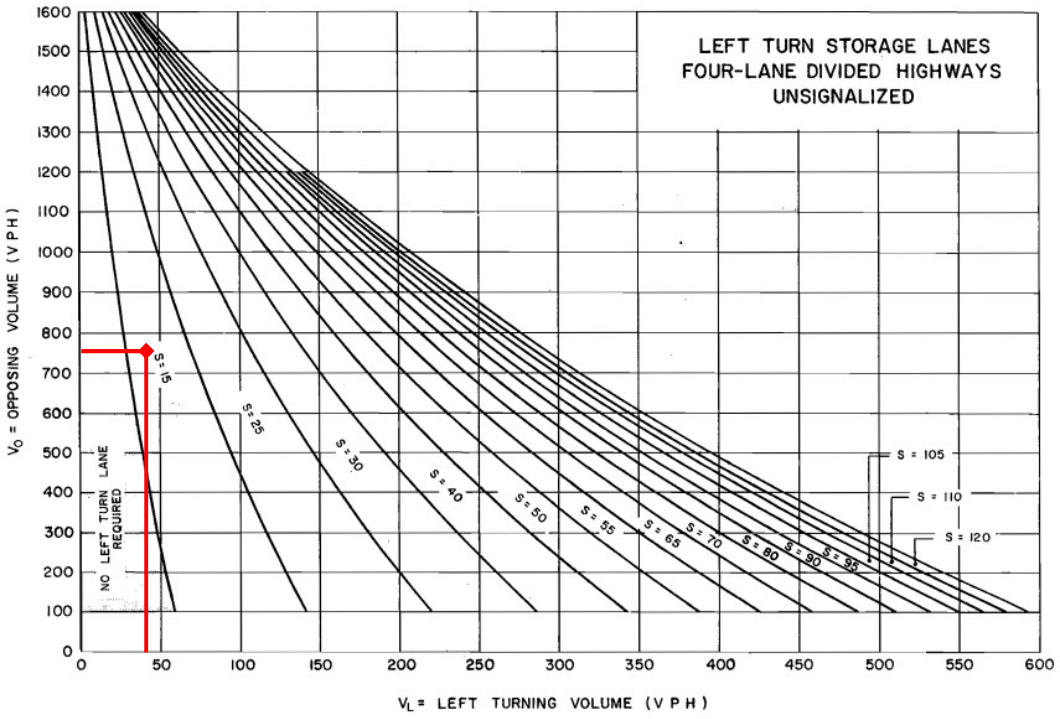
Total (2023) AM Peak – EB on Highway 12 at Brandon Street



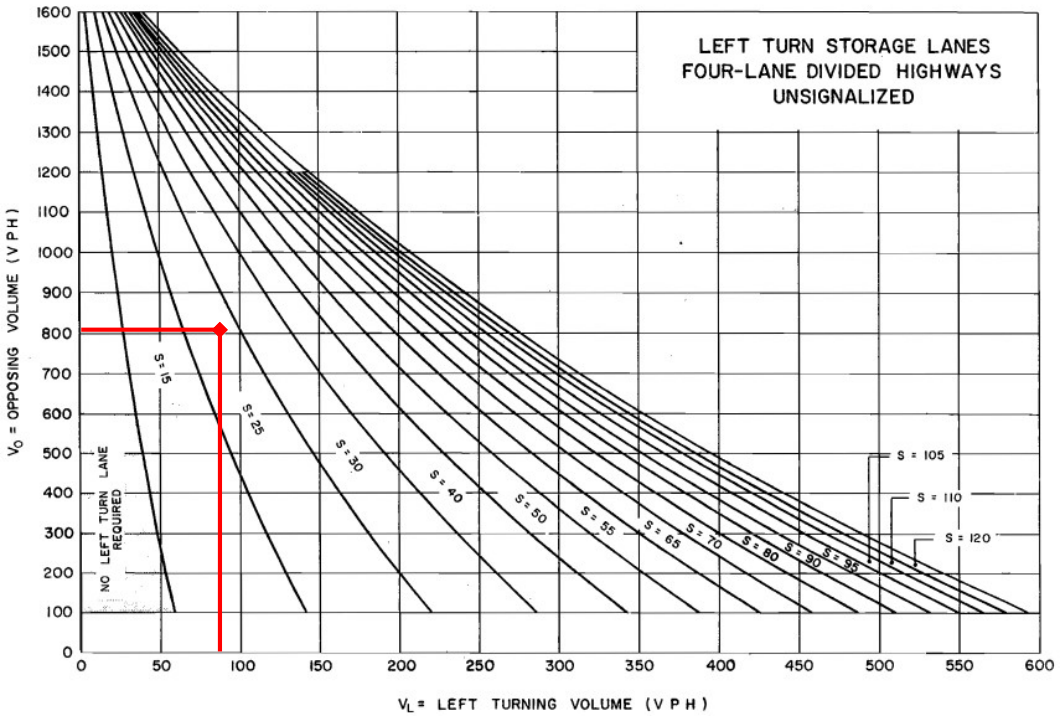
Total (2023) PM Peak – EB on Highway 12 at Brandon Street



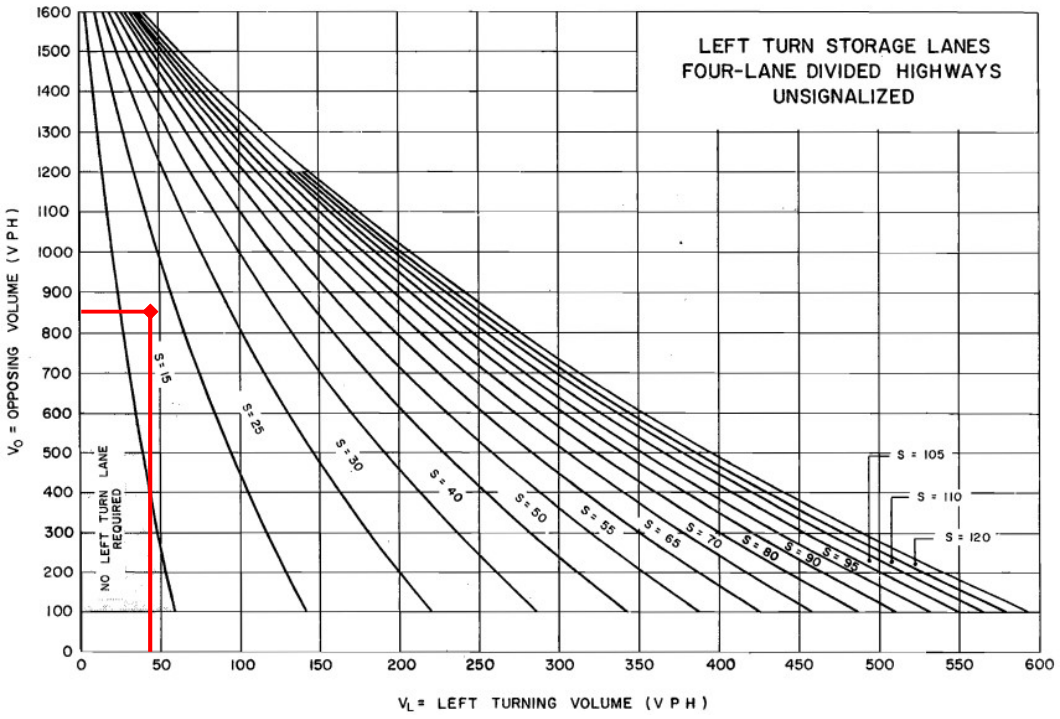
Total (2028) AM Peak – EB on Highway 12 at Brandon Street



Total (2028) PM Peak – EB on Highway 12 at Brandon Street



Total (2033) AM Peak – EB on Highway 12 at Brandon Street



Total (2033) PM Peak – EB on Highway 12 at Brandon Street

Appendix I –
MTO Left Turn Analysis

Justification No. 7 - Total (2033) Traffic

Brandon Street / Highway 12

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	900	896	100%	16%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	255	48	19%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	900	811	90%	5%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	170	11	6%		NO	NO

Justification No. 7 - Total (2033) Traffic

William Street / Pillsbury Drive & Private Access

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	630	87%	23%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	170	48	28%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	559	78%	29%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	26	35%		NO	NO

Justification No. 7 - Total (2033) Traffic

William Street / Coral Springs Lane & East Access

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	695	97%	28%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	170	72	42%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	564	78%	47%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	53	71%		NO	NO