Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

REPORT

The Town of Claresholm

Claresholm Area Structure Plan
Traffic Impact Assessment

MARCH 2024

TABLE OF CONTENTS

1 INTRODUCTION

The Town of Claresholm has retained Associated Engineering (AB) Limited (AE) for the development of an Area Structure Plan (ASP) to support future development of approximately 38 acres including a Portion Block 7, Plan 7410624; Linc 0032892564 and Lot 5, Block 8, Plan 0715848. The lands are situated west of Highway 2 and Alberta Road and east of 8th Street W. The ASP will consider and conceptualize residential and commercial growth along the highway corridor and address requirements of the Town and Alberta Transportation

As input to the ASP, a traffic impact assessment (TIA) is required to understand and determine any potential road upgrades needed to support the demand created from the development of the parcels. The TIA will determine the impact of the traffic generated from the proposed area on the surrounding road network and recommend improvements to the adjacent intersections and roadway.

Due to the proximity of the development to Highway 2, The Alberta Ministry of Transportation and Economic Corridors (ATEC), the TIA will be completed to align with the ATEC Traffic Impact Assessment Guidelines[1].

2 STUDY AREA

As part of the study, six intersections will be assessed:

- Highway 2- Township Rd 130
- Township Rd 130 - Alberta Rd
- Highway 2 - Alberta Rd. Highway Access
- Alberta Rd. - Alberta Rd. Highway Access
- Highway 2 – 59 Ave E/W
- Alberta Rd. - 59 Ave W

Highway 2 is a four-lane divided Level 1 provincial highway that provides an important north-south connection. The study area is in the north part of Claresholm. The highway speed transitions from 110km/h to 70km/hr at the Alberta Road Highway Access, and again from 70km/h to 50km/h on the north approach of 59 Avenue. The three study intersections along Highway 2 are fully established, one-way/two-way stop-controlled intersections with dedicated left and right turn lanes with acceleration tapers.

Alberta Road is a service road parallel to Highway 2 to provide access to both existing and future commercial properties.

Figure 2-1 shows the study area.

[1] Traffic Impact Assessment Guidelines, Alberta Transportation, February 2021: https://open.alberta.ca/dataset/0bdbdd46-06f4-4345-8768-d68b8306444e/resource/d5996230-5d08-40d9-a8dc-bec68018b1a4/download/trans-traffic-impact-assessment-guidelines-2021-02.pdf

Figure 2-1 Study Area

* 1 - Township Rd 130 - Highway 2 ; 2-Township Rd 130 - Alberta Rd ; 3 - Alberta Rd. Highway Access - Highway 2 ; 4 - Alberta Rd. - Alberta Rd. Highway Access ; 5 - Highway 2 – 59 Ave E/W ; 6 - Alberta Rd. - 59 Ave W

3 PROPOSED DEVELOPMENT

3.1 Proposed Development

The specific details of the developments in each parcel are currently unknown due to the high-level planning in the ASP stage. Currently, only high-level land use types are proposed as part of the ASP. The ASP proposed parcel development includes medium and high-density residential land use, and highway commercial land use as well as public and municipal land uses as recreation, parks, open space, and a public utility lot. **Figure 3-1** shows a proposed land use plan of the area. **Table 3-1** shows the land use statistics proposed in the ASP while **Table 3-2** shows the proposed population data pertinent to the ASP.

Further studies should be conducted as the parcels undergo development to achieve more precise evaluations of traffic impacts and confirm access requirements.

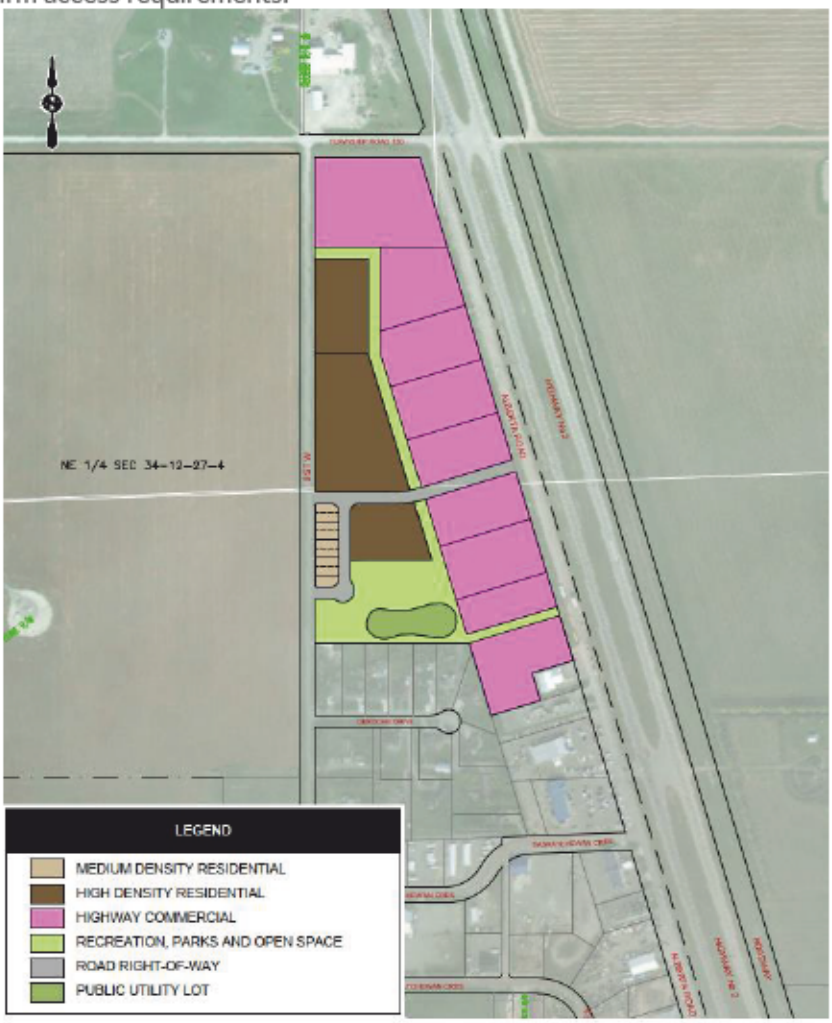


Figure 3-1 ASP Land Use Map

Table 3-1 ASP Land Use Statistics

Land Use	Area (ha)	Area (ac)	% of GDA
Gross Development Area (GDA)	15.2	37.56	100
Medium Density Residential	0.32	0.79	2.1
High Density Residential	3.24	8.01	22.2
Highway Commercial	8.42	20.81	56.6
Recreation, Parks, and Open Space	2.14	5.29	14.1
Road Right-of-way	0.67	1.66	2.3
Stormwater Management	0.41	1.01	2.7

Table 3-2 Residential Land Use Population Data

Land Use	Area Ha	Units/Ha	Total Units	Pop/Unit	Population
High Density Apartments	3.24	87	282	1.8	510
Medium Density Residential	0.32	28	9	2.7	25
Total	3.56		291		535

3.2 Trip Generation

Table 3-3 lists the land use components of the ASP and the corresponding Institute of Transportation Engineers (ITE) land use types, land use codes from the 11th edition of the ITE *Trip Generation Manual (TGM)*, and the trips generated from the developments. The trip generation manual is an industry accepted method of estimating the number of trips a development will generate. The trip generation rates are developed from many studies that determine the number of trips generated at different times of the day, and day of week for a wide variety of land uses.

Due to high level of the ASP planning stage, the specific building uses part of the highway commercial is unknown. All highway commercial parcels will be assessed together using the ITE TGM Shopping Centre land use code. The Shopping Centre land use is for developments with at least 150,000 square feet of gross leasable area (GLA). Specific maximum allowable lot coverage was not given for highway commercial per town of Claresholm Land Use Bylaw No.1525, therefore a percentage of 50% lot coverage of the 20.81 acres[2] was assumed. Information on the ITE TGM land uses is provided in **Appendix A.**

Existing background volumes at the intersection of 50 Ave W and Highway 2, south of the study area, were reviewed and the AM and PM peak hours were very similar along Highway 2[3]. This TIA will only analyze a typical weekday PM peak hour (PM), as the developments are expected to generate more traffic compared to the AM peak hour, and the

[2] 50% GLA of 20.81 acres is 453243 square feet (453 1000sqft GLA)

[3] August 4th 2021, Hwy 2 and 50 Ave W Raw Counts (Counter: 997025), https://www.transportation.alberta.ca/mapping/

Saturday mid day peak hour (MID) as the highway traffic volumes and development generated traffic are expected to be higher.

Table 3-3 List of Proposed Developments

Land Use	Variable	Number	ITE Land Use	ITE Land Use Code	Weekday PM Peak Hour Rates			Saturday MID Peak Hour Rates			Weekday PM Peak Hour Trips			Saturday MID Peak Hour Trips		
					Rate	In	Out	Rate	In	Out	Trips	In	Out	Trips	In	Out
Highway Commercial	1000 Sq. Ft. GLA	453	Shopping Centre	820	3.40	48%	52%	4.40	52%	48%	1540	739	801	1993	1036	957
Medium Density Residential – (Townhomes)	Dwelling Units	28	Single-Family Attached Housing	215	0.57	59%	41%	0.57	50%	50%	16	9	7	16	8	8
High Density Residential (3-Storey Low Rise)	Dwelling Units	87	Multifamily Housing (Low-Rise)	220	0.51	63%	37%	0.51*	50%*	50%*	44	28	16	44	22	22
Total											1600			2053		

* No Saturday peak hour rates and proportions are available in the ITE Trip Generation manual for Multifamily Housing. As Single-Family Attached Housing has the same trip rate for the Saturday peak hour as the PM peak hour and a 50% distribution of trips coming in and out, Multifamily Housing average rate for Saturday peak hour was assumed to be the same as its PM peak with a 50% distribution of inward and outward trips.

Reduction of New Trips based on Geographic Context

Claresholm is a small town with a population of 3,820 residents and is surrounded by The Municipal District of Willow Creek No.26 which has a population of approximately 6081[4]. According to the Claresholm Community Profile, the town has a service area population of approximately 7000[5] made up of the Town population and approximately 3180 residents of The Municipal District of Willow Creek No.26. Other jurisdictions where residents of Municipal District of Willow Creek No.26 may access services include Nanton and Fort Macleod, 42 km and 41 km north and south respectively. Given Claresholm's almost equal distance to the adjacent jurisdictions, the service area is assumed to be an approximately 20km radius. **Figure 3-2** shows the approximate Town of Claresholm service area.

[4] Focus on Geography Series – Willow Creek No. 26, Municipal District, 2021 Census of Population: Focus on Geography Series, 2021 Census - Willow Creek No. 26 (Census subdivision) (statcan.gc.ca)

[5] Community Profile, Town of Claresholm: https://www.claresholm.ca/business/community-profile/demographics#:~:text=The%20Town%20of%20Claresholm%20has,(2011%20National%20Household%20Survey).

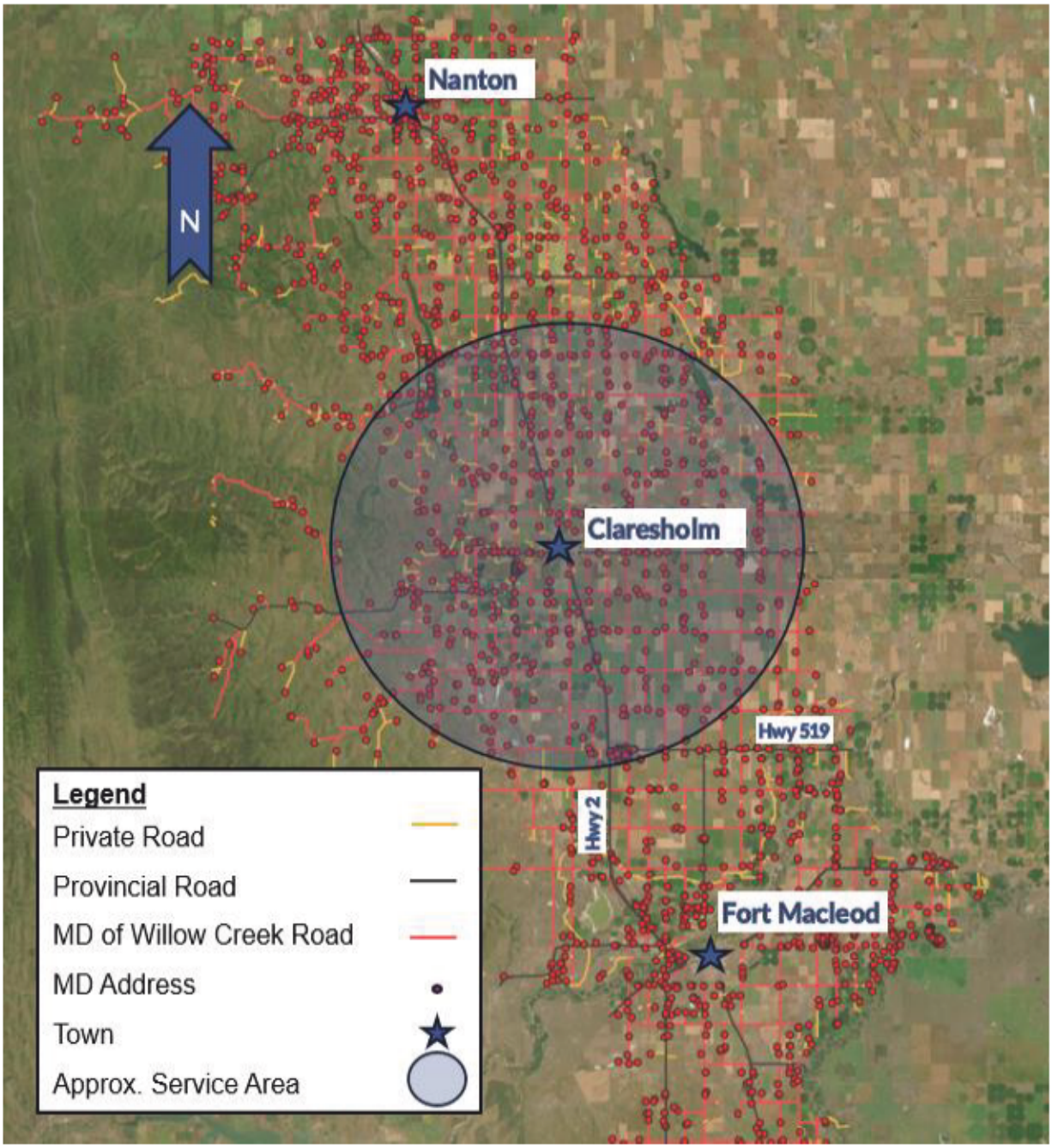


Figure 3-2 Town of Claresholm Service Area

According to Alberta data portal[6], there are approximately 1,130 registered cars in the Town of Claresholm and 2,100 vehicles in the Town service area.[7]. 1,075 residents of the Town drive to work with a vehicle[8]. Approximately 705 residents work in Claresholm and the next largest destination for trips is in the Municipal District of Willow Creek

[6] Motorized vehicle registrations by municipality, Alberta: https://open.alberta.ca/opendata/motorized-vehicle-registrations-by-municipality

[7] Vehicle numbers approximated using the same proportion of vehicle ownership as in Claresholm (approx. 30%)

[8] Commuting Duration, Census Profile, 2021 Town of Claresholm: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=claresholm&GENDERlist=1&STATISTIClist=1&DGUIDlist=2021A00054803022&HEADERlist=0

No.26 with 225 destined trips[9]. The number of trips shown in Table 2-3 of the trips generated by the commercial development using the ITE Trip Generation rates in the weekday PM and Saturday Peak hour represents almost 100% of all registered vehicles in the Town service area. In reality, not everyone who drives would be visiting the proposed development area each day during the peak hour. The ITE Trip Generation rates for this development produce unrealistic volumes and a correction is needed to reduce the estimated trips generated.

The ITE *Trip Generation Manual* does not provide the detailed information about the cities/towns where the trip generation studies were conducted, so adjusting the trip generation rates based on population is challenging. A 2005 study on Trip Generation Rate for Land Use in Rural Alberta[10] identified certain land use types where it is recommended to diverge from the ITE Trip Generation codes and use local context or complete further study. This includes highway commercial sites, strip malls, and big box stores.

For the proposed highway commercial development, a 60% trip reduction is applied to the ITE Trip Generation volumes. This reduction percentage was chosen to better align the generated traffic with the specific characteristics and population of the Service Area. Not applying any reduction would imply that nearly every driver is visiting the development daily during the peak hours.

It is estimated that around 30% of all the vehicles in the Town service area will visit the development during the peak hour. This percentage translates to the 60% reduction in the generated trip volumes. This reduction is a conservative assumption better suited to the high-level ASP process. It represents that only a portion of the vehicles in the Service Area will contribute to the generated trips.

Table 3-4 outlines the applied trip generation reductions.

Table 3-4 Vehicle Trip Generation Reductions

Development	Weekday PM Peak Hour	Saturday Peak Hour
Highway Commercial	60% reduction - has some users but no specific peak usage	60% reduction - has some users but no specific peak usage
Medium Density Residential – (Townhomes)	0% reduction – use ITE values	0% reduction – use ITE values
High Density Residential (3-Storey Low Rise)	0% reduction – use ITE values	0% reduction – use ITE values

The trip reduction factors were applied to the total trips generated by Highway Commercial development during each peak hour. Table 3-5 shows the corrected site trips.

[9] Commuting flow from geography of residence to geography of work by gender: Census subdivisions, Town of Claresholm: https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=9810045901&pickMembers%5B0%5D=1.3920&selectedFlowType=0

[10] Table 6.2, Trip and Parking Generation Rates for Land Use in Rural Alberta, Centre for Transportation Engineering (C-TEP), 2005: https://ctep.ca/wp-content/uploads/2016/11/Trip-Parking-Generation-Rates-for-Land-Use-in-Rural-Alberta.pdf

Table 3-5 Adjusted Vehicle Trip Generation

Development	Weekday PM Peak Hour			Saturday Peak Hour		
	Trips	In	Out	Trips	In	Out
Highway Commercial	616	296	320	797	414	383
Medium Density Residential – (Townhomes)	16	9	7	16	8	8
High Density Residential (3-Storey Low Rise)	44	28	16	44	22	22
Totals Reduced Trip Gen	676	333	343	857	444	413
Percentage of ITE Trip Gen	42%	43%	42%	42%	42%	42%

Reduction of New Trips due to Pass-by Trips

Other factors that relate to the trip generation values are pass-by trips and diverted trips. Pass-by trips are the trips made by the traffic already on the way from an origin to a destination that will make an intermediate stop at the proposed development site without a route diversion. Diverted trips are the trips made by background traffic that is attracted by the proposed development site and divert their path a great extent and add traffic to the study road and driveway volumes but are not an added trip to the road that it was originally routed on. The development is directly adjacent and easily accessed from Highway 2, therefore only pass-by trip reductions are applied for this development.

Pass-by trips are assumed to be made up of highway traffic that already make a trip but may now stop at a business within the commercial site. This is often a stop made on a driver's way to/from work or due to the context of the highway through Claresholm, a highway trip stopover. Pass-by trips are calculated based on the information provided in the ITE *Trip Generation Manual* for Shopping Plaza and taken as the mean of all observations. Table 3-6 shows the summary of the percentage of pass-by trips the land use in the proposed development and Table 3-7 shows the number pass-by trips estimated for this development.

Table 3-6 Pass-by Trips as a Percentage of Total Generated Trips

Development	Weekday PM Peak Hour	Saturday MID Peak Hour
Highway Commercial	40%	31%

Table 3-7 Pass-by Trips Generated by the Proposed Developed

Development	Weekday PM Peak Hour			Saturday Peak Hour		
	Trips	In	Out	Trips	In	Out
Highway Commercial	246	118	128	247	128	119
Medium Density Residential – (Townhomes)	0	0	0	0	0	0
High Density Residential (3-Storey Low Rise)	0	0	0	0	0	0
Totals	**246**	**118**	**128**	**247**	**128**	**119**

Table 3-8 summarises the break-down of total trip generation into the pass-by and primary trips. Primary trips are the trips resulted after removing the pass-by trips from the total trip generation.

Table 3-8 Development Trip Generation Totals

Development	Weekday PM Peak Hour			Saturday MID Peak Hour		
	Trips	In	Out	Trips	In	Out
Pass By Trips	246	118	128	247	128	119
Primary Trips	430	214	215	610	316	294
Total Trips	**676**	**333**	**343**	**857**	**444**	**413**

3.3 Trip Distribution and Assignment

Figure 3-3 shows the trip distribution and assignment considered for primary trips. The trip distribution is consistent for all peak hours. The following distribution and assignment are assumed:

- 30% of vehicles travel to/from the development via Alberta Road to the south. Of those 30%:
  - 70% go to/are from the south along Highway 2
  - 20% go to/are from 59th Ave W
  - 10% go to/are from 59th Ave E
- 50% of vehicles travel to/from the development via the middle access on Alberta Road. Of those 50%:
  - 90% go to/are from the south along Highway 2
  - 10% go to/are from the north along Highway 2
- 20% of vehicles travel to/from the development via the intersection of Alberta Rd and Township Road 130. Of those 20%:
  - 10% go to/are from the west along Township Road
  - 80% go to/are from the south along Highway 2
  - 10% go to/are from the north along Highway 2

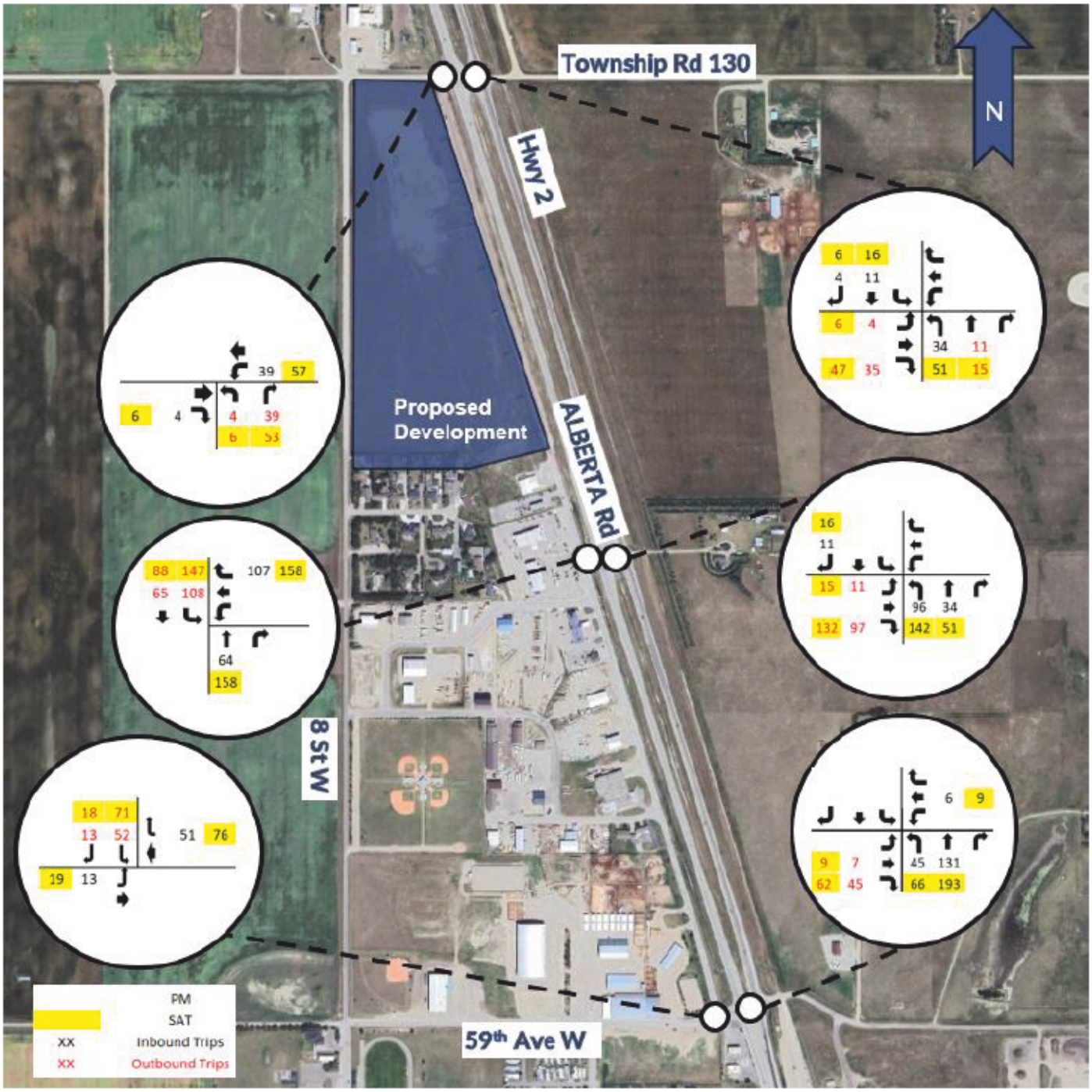


Figure 3-3 Distribution and Assignment of Primary Trips

The distribution and assignment assumptions of the pass by trips along the highway generated by the development are the following:

- 50% of vehicles are travelling northbound. Of those 50%:
  - Vehicles entering the development:
    - 50% reach the development via 59th Avenue
    - 50% reach the development via the middle access on Alberta Road
  - Vehicles leaving the development:
    - 25% re-join the highway via the middle access on Alberta Road
    - 75% re-join the highway via Township Road 130
- 50% of vehicles are travelling southbound. Of those 50%:
  - Vehicles entering the development:
    - 75% reach the development via Township Road 130
    - 25% reach the development via the middle access on Alberta Road
  - Vehicles leaving the development:
    - 75% re-join the highway via the middle access on Alberta Road
    - 25% re-join the highway from 59th Avenue

Figure 3-4 shows the trip distribution and assignment considered for diverted trips.

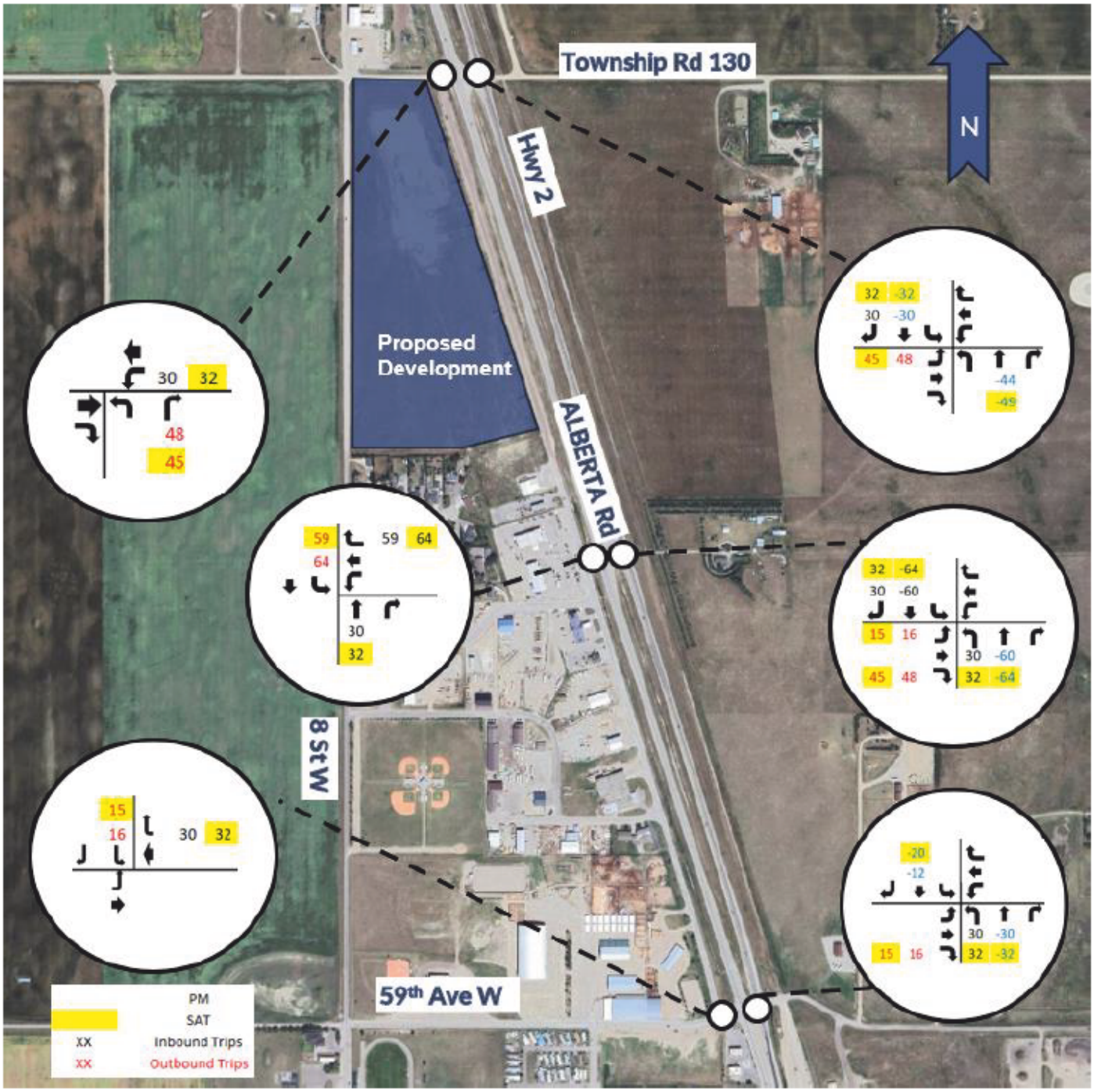


Figure 3-4 Distribution and Assignment of Pass-by Trips

4 TRAFFIC ASSESSMENT

The specific staging details for the proposed development are unknown at the ASP stage. It is assumed the development will commence in 2024 and reach full buildout by 2034. Additional studies may be needed in the future specific to the site developments. The three horizons included in the study are:

- 2024 – Project Commencement (Existing Background Traffic)
- 2034 – Full Build Traffic
- 2044 – 20 Year Horizon

According to the ATEC Volume Data Map[11], there has been negligible growth along the Highway 2 corridor in the past 10 years. To align with the ATEC minimum growth requirements, a 2% average annual non-compounded growth is applied to the background traffic for each planning horizon, which may over-estimate the background traffic growth along the corridor in the future planning horizons. Each planning horizon was analyzed with background traffic volumes only, as well as total traffic (background traffic + development).

4.1 2024 – Project Commencement (Existing Background Traffic)

The following traffic counts were completed for the study area:

- Township Road 130 - Highway 2 – PM Peak (January 25, 2024)
- Township Road 130 - Alberta Road – PM Peak (January 25, 2024)
- Alberta Road Frontage Access - Highway 2 – PM Peak and MID Peak (January 24, 2024 and January 27, 2024 respectively)
- Alberta Road. - Alberta Road Frontage Access - PM Peak and MID Peak (January 24, 2024 and January 27, 2024 respectively)
- Highway 2 – 59 Avenue E/W - PM Peak (January 23, 2024)
- Alberta Road - 59 Avenue W - PM Peak (January 23, 2024)

For traffic counts on Highway 2, only volumes for movements to/from minor legs were recorded. Through traffic volumes along Highway 2 were taken from the ATEC Traffic Volume Data Map at Highway 2 – 50 Avenue. The 2022 volumes were applied to the 2024 background through traffic volumes along the highway. As the data is only available for the PM peak hour, a conversion factor of 1.04 was applied to convert PM peak hours to Saturday MD peak hours.[12]

Figure 4-1 shows the 2024 background volumes at the project commencement date.

[11] Segment 2:08:12 from km36.786 to km40.981

[12] 2022 North-south traffic movement along the highway taken from Reference Number Station: 997025 (Highway 2 – 50 Ave intersection). Weekday to Saturday MID conversion factor taken as the ratio of a typical weekday and typical Saturday from January 2023 Monthly automated traffic recorder station: 60020890

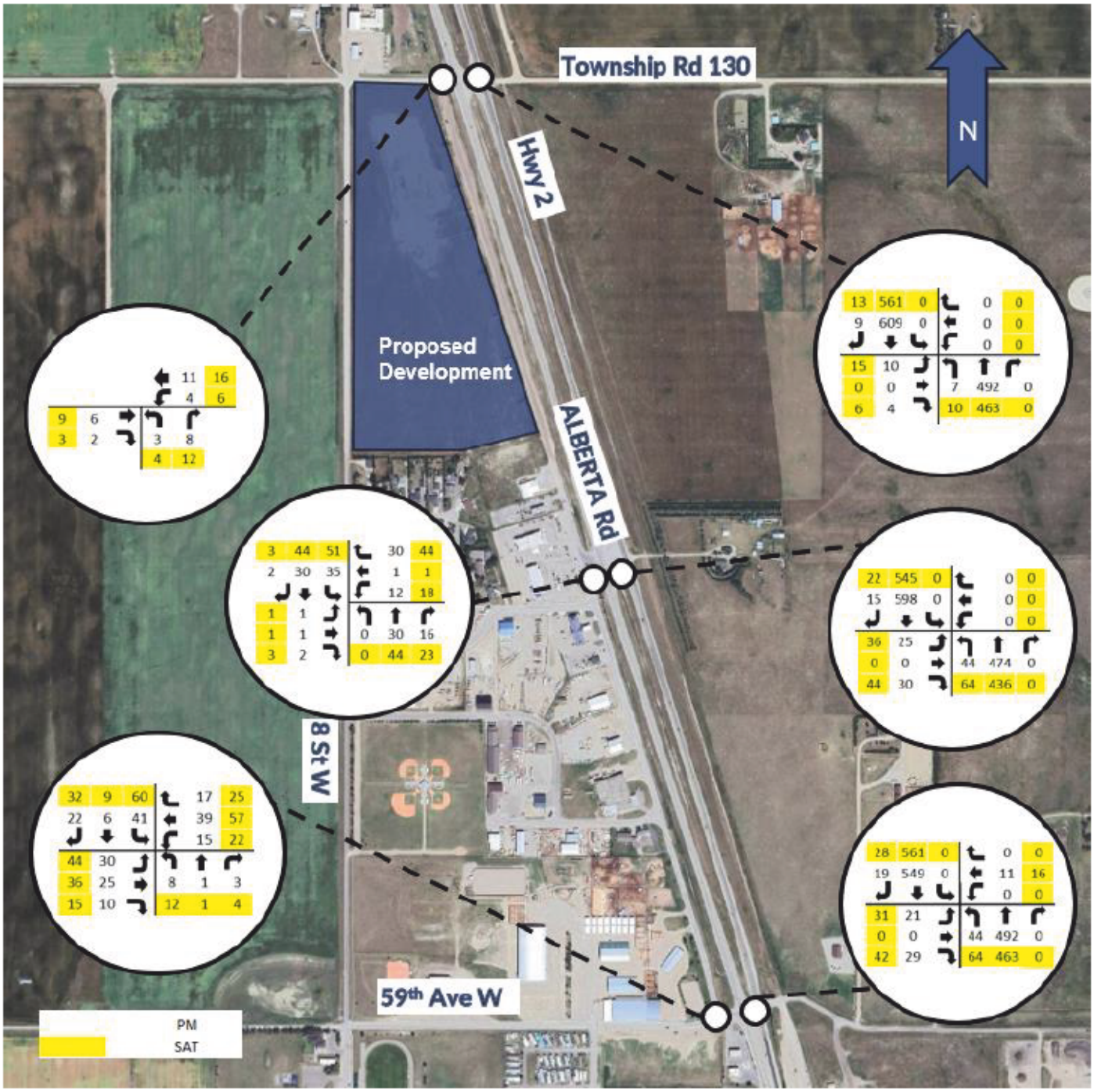


Figure 4-1 2024 Background Intersection Volumes

4.2 2034 - Full Build Horizon

Figure 4-2 shows the background traffic at opening day and Figure 4-3 shows total traffic.

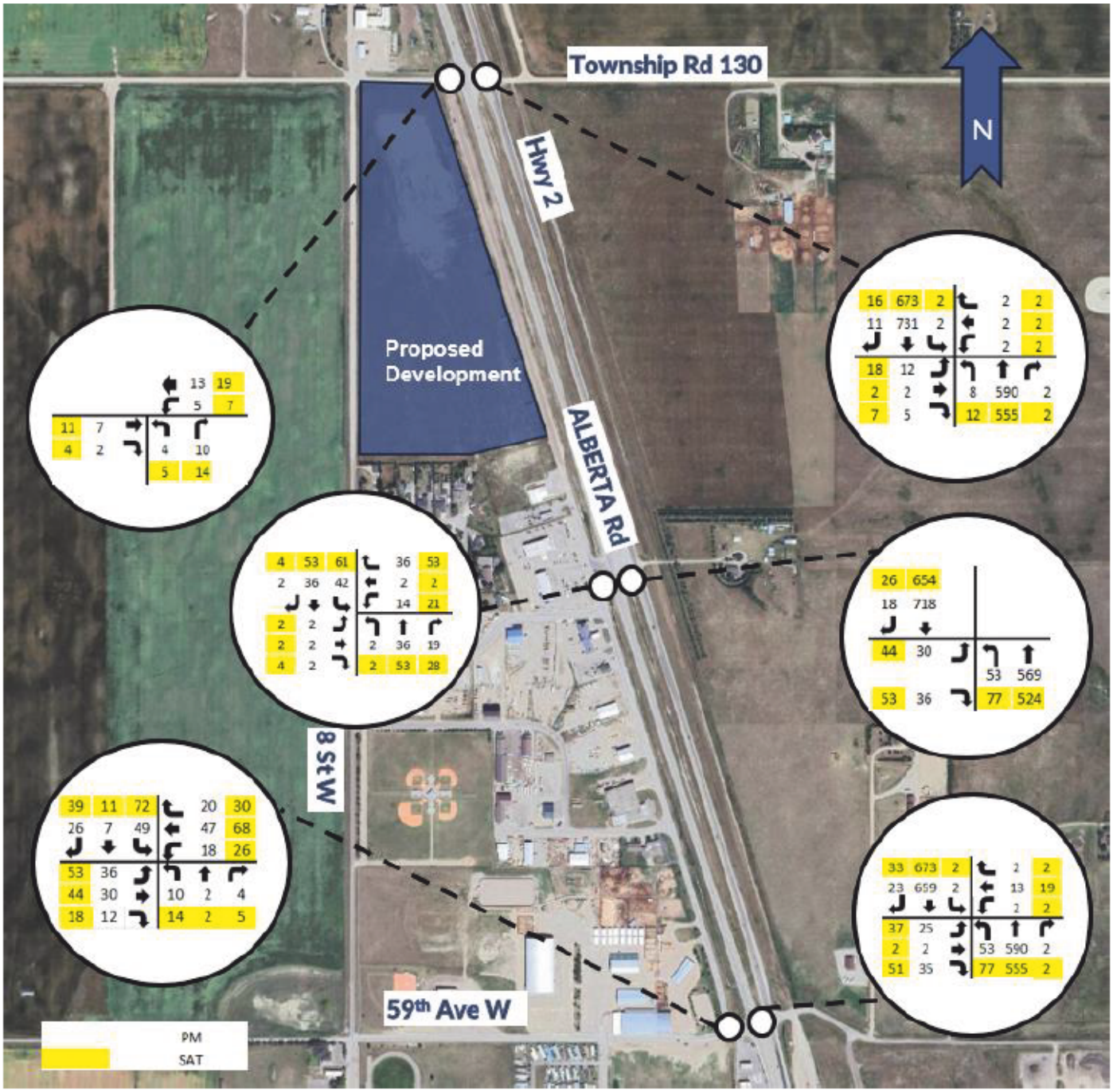


Figure 4-2 2034 – Full Build Background Traffic

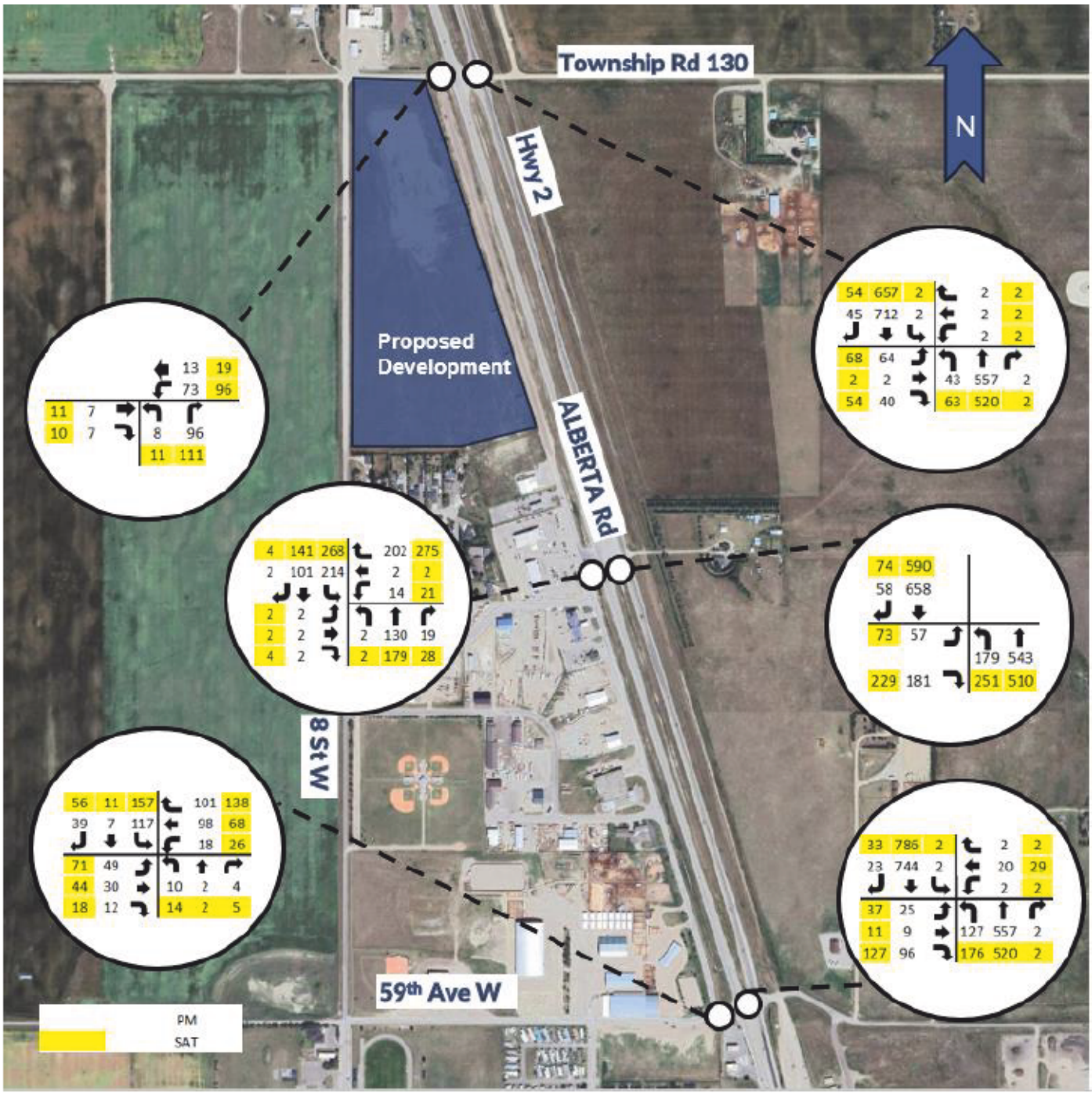


Figure 4-3 Full Build Total Traffic

4.3 2044 - 20-Year Horizon

Figure 4-4 shows the background traffic at the 20-yearhorizon and Figure 4-5 shows the 20-year horizon total traffic.

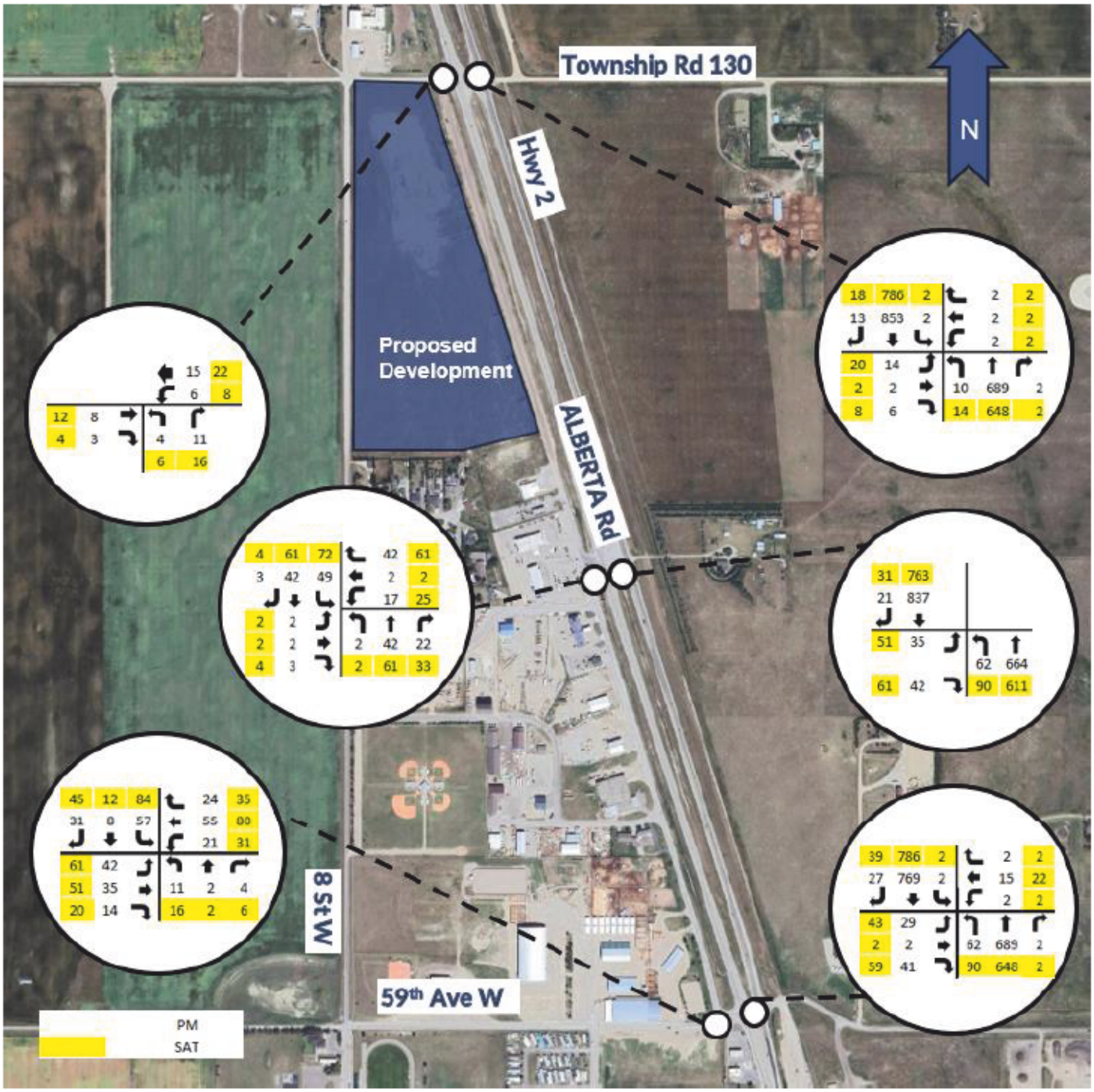


Figure 4-4 2044 – 20-Year Background Traffic

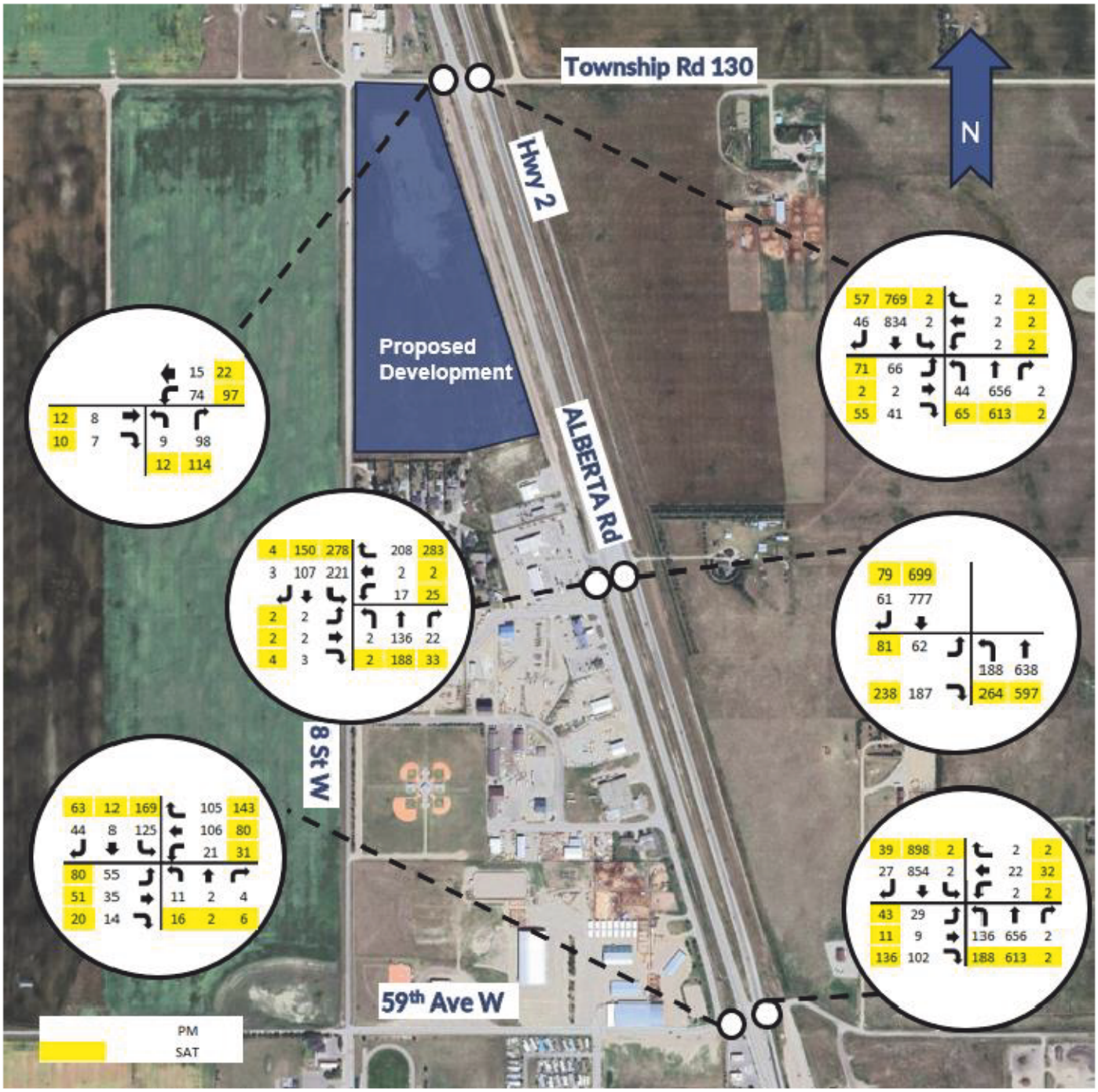


Figure 4-5 2044 – 20-Year Total Traffic

5 INTERSECTION CAPACITY ASSESSMENT

Intersection analysis is completed based on the HCM methodology, using the Synchro 12 and SimTraffic software. This methodology quantifies the intersection performance in terms of level of service (LOS) using the following parameters:

- **Control Delay** – average delay measured in seconds per vehicle on an intersection or movement.
- **Volume to Capacity Ratio (v/c)** – measured in terms of a ratio of demand flow rate (v) to maximum capacity (c).

LOS ranges from A (minimal delay) to F (unacceptable delay).

The LOS of each intersection movement is calculated using the relationship between LOS, control delay and v/c as shown in the **Table 5-1**. For two-way stop control (TWSC) intersections, LOS for movements on major street and for overall intersection are not calculated as disproportionate number of through vehicles on the major street skews the average delays. For all-way stop control (AWSC) intersection, LOS for overall intersection is calculated based on the average control delay of individual movement.

Table 5-1 Unsignalized Intersections - Level of Service Characteristics[13]

Control Delay (seconds/vehicle)	Level of Service	
	v/c ≤ 1	v/c > 1
0-10	A	F
>10 – 15	B	F
>15 – 25	C	F
>25 – 35	D	F
>35 – 50	E	F
>50	F	F

The minimum performance targets for the capacity analysis in the study area is LOS D and v/c 0.80 for individual movements and the overall intersections.

The following is a summary of Synchro and SimTraffic parameters and relevant assumptions used in the analysis:

- The speed limits used in the Synchro model are the same as currently posted.
- Base saturated flow rate of 1,900 veh/hour/lane is used.
- Intersection approach grades are based on existing conditions.
- Default 2% heavy vehicle percentage and 0.92 peak hour factors are considered in the analysis when applicable.
- Default vehicle and driving behaviour parameters are used for SimTraffic.
- Minimum 2 vehicles per movement

[13] Highway Capacity Manual

5.1 Results

Table 5-2 and Table 5-3 show the synchro results for Full Build Horizon (2034) with background traffic only and total traffic respectively. Table 5-4 and Table 5-5 show the synchro results for opening year plus 10 years (2044) with background traffic only and total traffic respectively.

Table 5-2 Intersection Performance - Full Build 2034 Background Traffic

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Highway 2 - Township Rd 130	PM	LOS	D	D	D	D	D	D	A	A	A	A	A	A
		v/c	0.12	0.12	0.12	0.03	0.03	0.03	0.00	0.25	0.01	0.01	0.25	0.13
		Delay (s)	29.1	29.1	29.1	9.7	9.7	9.7	8.8	0.0	0.0	9.7	0.0	0.0
		95th Q (m)	3.0	3.0	3.0	0.3	0.3	0.3	0.0	0.0	0.0	0.3	0.0	0.0
	Sat MID	LOS	D	D	D	C	C	C	A	A	A	A	A	A
		v/c	0.15	0.15	0.15	0.03	0.03	0.03	0.00	0.23	0.01	0.02	0.24	0.12
		Delay (s)	26.7	26.7	26.7	23.0	23.0	23.0	8.7	0.0	0.0	9.4	0.0	0.0
		95th Q (m)	4.0	4.0	4.0	0.7	0.7	0.7	0.0	0.0	0.0	0.4	0.0	0.0
Township Rd 130 - Alberta Rd	PM	LOS		A	A	A	A					A		A
		v/c		0.0	0.0	0.1	0.1					0.1		0.1
		Delay (s)		0.0	0.0	6.3	6.3					8.9		8.9
		95th Q (m)		0.0	0.0	1.2	1.2					2.8		2.8
	Sat MID	LOS		A	A	A	A					A		A
		v/c		0.0	0.0	0.0	0.0					0.0		0.0
		Delay (s)		0.0	0.0	0.0	2.0					8.5		8.5
		95th Q (m)		0.0	0.0	0.0	0.1					0.4		0.4
Highway 2 - Frontage Road Access	PM	LOS	C	C	C					A	A	B	A	
		v/c	0.27	0.27	0.27					0.23	0.01	0.07	0.18	
		Delay (s)	23.1	23.1	23.1					0.0	0.0	10.0	0.0	
		95th Q (m)	7.9	7.9	7.9					0.0	0.0	1.8	0.0	
	Sat MID	LOS	D	D	D					A	A	A	A	
		v/c	0.38	0.38	0.38					0.21	0.02	0.10	0.18	
		Delay (s)	25.2	25.2	25.2					0.0	0.0	9.9	0.0	
		95th Q (m)	12.7	12.7	12.7					0.0	0.0	2.6	0.0	
Alberta Rd - Frontage Road Access	PM	LOS	A	A	A	A	A	A	A	A	A	A	A	A
		v/c	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Delay (s)	7.1	7.1	7.1	7.1	7.1	7.1	7.7	7.7	7.7	7.2	7.2	7.2

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
		95th Q (m)	0.0	0.0	0.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	Sat MID	LOS	A	A	A	B	B	B	C	C	C	B	B	B
		v/c	0.0	0.0	0.0	0.5	0.5	0.5	0.7	0.7	0.7	0.3	0.3	0.3
		Delay (s)	9.3	9.3	9.3	12.7	12.7	12.7	18.2	18.2	18.2	11.3	11.3	11.3
		95th Q (m)	0.0	0.0	0.0	19.3	19.3	19.3	38.6	38.6	38.6	11.6	11.6	11.6
Highway 2 - 59 Ave	PM	LOS	D	D	D	E	E	E	A	A	A	A	A	A
		v/c	0.29	0.29	0.29	0.14	0.14	0.14	0.00	0.21	0.01	0.07	0.19	0.00
		Delay (s)	26.9	26.9	26.9	38.7	38.7	38.7	8.9	0.0	0.0	9.6	0.0	0.0
		95th Q (m)	8.8	8.8	8.8	3.7	3.7	3.7	0.0	0.0	0.0	1.7	0.0	0.0
	Sat MID	LOS	E	E	E	F	F	F	A	A	A	A	A	A
		v/c	0.51	0.51	0.51	0.24	0.24	0.24	0.00	0.22	0.02	0.10	0.19	0.00
		Delay (s)	41.8	41.8	41.8	50.8	50.8	50.8	8.9	0.0	0.0	9.9	0.0	0.0
		95th Q (m)	19.3	19.3	19.3	6.7	6.7	6.7	0.0	0.0	0.0	2.6	0.0	0.0
Alberta Rd - 59 Ave	PM	LOS	A	A	A	A	A	A	B	B	B	B	B	B
		v/c	0.03	0.03	0.03	0.01	0.01	0.01	0.12	0.12	0.12	0.02	0.02	0.02
		Delay (s)	3.5	3.5	3.5	1.7	1.7	1.7	10.3	10.3	10.3	10.2	10.2	10.2
		95th Q (m)	0.6	0.6	0.6	0.3	0.3	0.3	3.0	3.0	3.0	0.6	0.6	0.6
	Sat MID	LOS	A	A	A	A	A	A	B	B	B	B	B	B
		v/c	0.04	0.04	0.04	0.02	0.02	0.02	0.20	0.20	0.20	0.04	0.04	0.04
		Delay (s)	3.6	3.6	3.6	1.6	1.6	1.6	11.7	11.7	11.7	11.3	11.3	11.3
		95th Q (m)	0.9	0.9	0.9	0.4	0.4	0.4	3.0	3.0	3.0	0.9	0.9	0.9

- lane performance threshold not met with background traffic

- lane performance threshold not met with background plus development traffic

Table 5-3 Intersection Performance - Full Build 2034 Total Traffic

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Highway 2 - Township Rd 130	PM	LOS	F	F	F	D	D	D	A	A	A	A	A	A
		v/c	0.64	0.64	0.64	0.04	0.04	0.04	0.00	0.24	0.03	0.06	0.24	0.12
		Delay (s)	55.5	55.5	55.5	10.0	10.0	10.0	8.7	0.0	0.0	10.0	0.0	0.0
		95th Q (m)	28.0	28.0	28.0	1.5	1.5	1.5	0.0	0.0	0.0	1.5	0.0	0.0
		LOS	F	F	F	D	D	D	A	A	A	A	A	A

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
	Sat MID	v/c	0.67	0.67	0.67	0.04	0.04	0.04	0.00	0.22	0.04	0.08	0.22	0.11
		Delay (s)	52.4	52.4	52.4	28.0	28.0	28.0	8.6	0.0	0.0	9.9	0.0	0.0
		95th Q (m)	30.8	30.8	30.8	0.9	0.9	0.9	0.0	0.0	0.0	2.1	0.0	0.0
Township Rd 130 - Alberta Rd	PM	LOS		A	A	A	A					A		A
		v/c		0.01	0.01	0.05	0.05					0.11		0.11
		Delay (s)		0	0	6.30	6.3					8.90		8.9
		95th Q (m)		0	0	1.2	1.2					2.8		2.8
	Sat MID	LOS		A	A	A	A					A		A
		v/c		0.01	0.01	0.07	0.07					0.13		0.13
		Delay (s)		0	0	6.30	6.3					9.10		9.10
		95th Q (m)		0	0	1.6	1.6					3.4		3.4
Highway 2 - Frontage Road Access	PM	LOS	F	F	F					A	A	B	A	
		v/c	0.93	0.93	0.93					0.21	0.04	0.25	0.17	
		Delay (s)	78.7	78.7	78.7					0.0	0.0	11.0	0.0	
		95th Q (m)	66.8	66.8	66.8					0.0	0.0	7.4	0.0	
	Sat MID	LOS	F	F	F					A	A	B	A	
		v/c	1.36	1.36	1.36					0.19	0.05	0.33	0.17	
		Delay (s)	224.4	224.4	224.4					0.0	0.0	11.4	0.0	
		95th Q (m)	134.6	134.6	134.6					0.0	0.0	10.9	0.0	
Alberta Rd - Frontage Road Access	PM	LOS	A	A	A	A	A	A	B	B	B	A	A	A
		v/c	0.01	0.011	0.011	0.31	0.306	0.306	0.47	0.466	0.466	0.22	0.223	0.223
		Delay (s)	8.50	8.5	8.5	9.70	9.7	9.7	12.00	12	12	9.30	9.3	9.3
		95th Q (m)	0.0	0	0	10.04	10.04	10.04	19.31	19.31	19.31	6.18	6.18	6.18
	Sat MID	LOS	A	A	A	B	B	B	C	C	C	B	B	B
		v/c	0.02	0.015	0.015	0.02	0.015	0.015	0.66	0.662	0.662	0.34	0.341	0.341
		Delay (s)	11.30	11.3	11.3	9.30	9.3	9.3	18.20	18.2	18.2	11.30	11.3	11.3
		95th Q (m)	1.5	1.5	1.5	0.0	0.0	0.0	38.6	38.6	38.6	11.6	11.6	11.6
Highway 2 - 59 Ave	PM	LOS	F	F	F	F	F	F	A	A	A	B	B	B
		v/c	0.85	0.85	0.85	0.42	0.42	0.42	0.00	0.24	0.01	0.18	0.22	0.00
		Delay (s)	89.1	89.1	89.1	100.7	100.7	100.7	9.3	0.0	0.0	10.6	0.0	0.0
		95th Q (m)	44.4	44.4	44.4	12.2	12.2	12.2	0.1	0.0	0.0	4.9	0.0	0.0
		LOS	F	F	F	F	F	F	A	A	A	B	B	B

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
	Sat MID	v/c	3.24	3.24	3.24	0.93	0.93	0.93	0.00	0.25	0.02	0.26	0.24	0.00
		Delay (s)	Err	Err	Err	282.7	282.7	282.7	9.5	0.0	0.0	11.6	0.0	0.0
		95th Q (m)	Err	Err	Err	26.8	26.8	26.8	0.1	0.0	0.0	7.8	0.0	0.0
Alberta Rd - 59 Ave	PM	LOS	A	A	A	A	A	A	B	B	B	B	B	B
		v/c	0.04	0.04	0.04	0.01	0.01	0.01	0.28	0.28	0.28	0.03	0.03	0.03
		Delay (s)	4.3	4.3	4.3	0.7	0.7	0.7	13.0	13.0	13.0	11.4	11.4	11.4
		95th Q (m)	0.9	0.9	0.9	0.3	0.3	0.3	8.8	8.8	8.8	0.7	0.7	0.7
	Sat MID	LOS	A	A	A	A	A	A	C	C	C	B	B	B
		v/c	0.06	0.06	0.06	0.02	0.02	0.02	0.43	0.43	0.43	0.04	0.04	0.04
		Delay (s)	4.4	4.4	4.4	1.0	1.0	1.0	16.1	16.1	16.1	12.7	12.7	12.7
		95th Q (m)	1.4	1.4	1.4	0.4	0.4	0.4	8.8	8.8	8.8	1.1	1.1	1.1

- lane performance threshold not met with background traffic

- lane performance threshold not met with background plus development traffic

Table 5-4 Intersection Performance 20-Year 2044 Background Traffic

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Highway 2 - Township Rd 130	PM	LOS	E	E	E	D	D	D	B	B	B	B	B	B
		v/c	0.19	0.19	0.19	0.04	0.04	0.04	0.00	0.29	0.01	0.02	0.29	0.15
		Delay (s)	39.8	39.8	39.8	10.3	10.3	10.3	9.2	0.0	0.0	10.3	0.0	0.0
		95th Q (m)	5.0	5.0	5.0	0.4	0.4	0.4	0.1	0.0	0.0	0.4	0.0	0.0
	Sat MID	LOS	E	E	E	D	D	D	A	A	A	A	A	A
		v/c	0.23	0.23	0.23	0.04	0.04	0.04	0.00	0.27	0.01	0.02	0.28	0.14
		Delay (s)	36.8	36.8	36.8	29.6	29.6	29.6	9.1	0.0	0.0	10.0	0.0	0.0
		95th Q (m)	6.3	6.3	6.3	0.9	0.9	0.9	0.1	0.0	0.0	0.5	0.0	0.0
Township Rd 130 - Alberta Rd	PM	LOS		A	A	A	A					A		A
		v/c		0.01	0.01	0.00	0					0.02		0.02
		Delay (s)		0	0	2.20	2.2					8.50		8.5
		95th Q (m)		0	0	0.1	0.1					0.4		0.4
	Sat MID	LOS		A	A	A	A					A		A
		v/c		0.01	0.01	0.01	0.01					0.02		0.02
		Delay (s)		0	0	2.00	2					8.60		8.60

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
		95th Q (m)		0	0	0.1	0.1					0.5		0.5
Highway 2 - Frontage Road Access	PM	LOS	D	D	D					A	A	B	A	
		v/c	0.41	0.41	0.41					0.27	0.01	0.10	0.21	
		Delay (s)	33.8	33.8	33.8					0.0	0.0	10.8	0.0	
		95th Q (m)	13.9	13.9	13.9					0.0	0.0	2.5	0.0	
	Sat MID	LOS	E	E	E					A	A	B	A	
		v/c	0.57	0.57	0.57					0.24	0.02	0.13	0.21	
		Delay (s)	41.7	41.7	41.7					0.0	0.0	10.7	0.0	
		95th Q (m)	23.4	23.4	23.4					0.0	0.0	3.5	0.0	
Alberta Rd - Frontage Road Access	PM	LOS	A	A	A	A	A	A	A	A	A	A	A	A
		v/c	0.01	0.006	0.006	0.07	0.071	0.071	0.12	0.12	0.12	0.08	0.077	0.077
		Delay (s)	7.30	7.3	7.3	7.20	7.2	7.2	7.80	7.8	7.8	7.30	7.3	7.3
		95th Q (m)	1.5	1.5	1.5	1.5	1.5	1.5	3.1	3.1	3.1	1.5	1.5	1.5
	Sat MID	LOS	A	A	A	A	A	A	A	A	A	A	A	A
		v/c	0.01	0.011	0.011	0.11	0.11	0.11	0.18	0.18	0.18	0.12	0.116	0.116
		Delay (s)	7.40	7.4	7.4	7.60	7.6	7.6	8.30	8.3	8.3	7.60	7.6	7.6
		95th Q (m)	0.0	0.0	0.0	3.1	3.1	3.1	4.6	4.6	4.6	3.1	3.1	3.1
Highway 2 - 59 Ave	PM	LOS	E	E	E	F	F	F	A	A	A	B	B	B
		v/c	0.49	0.49	0.49	0.24	0.24	0.24	0.00	0.25	0.02	0.09	0.22	0.00
		Delay (s)	46.7	46.7	46.7	60.1	60.1	60.1	9.3	0.0	0.0	10.2	0.0	0.0
		95th Q (m)	17.7	17.7	17.7	6.4	6.4	6.4	0.1	0.0	0.0	2.2	0.0	0.0
	Sat MID	LOS	F	F	F	F	F	F	A	A	A	B	B	B
		v/c	0.95	0.95	0.95	0.41	0.41	0.41	0.00	0.25	0.02	0.13	0.22	0.00
		Delay (s)	137.9	137.9	137.9	91.4	91.4	91.4	9.3	0.0	0.0	10.7	0.0	0.0
		95th Q (m)	46.7	46.7	46.7	12.2	12.2	12.2	0.1	0.0	0.0	3.5	0.0	0.0
Alberta Rd - 59 Ave	PM	LOS	A	A	A	A	A	A	B	B	B	B	B	B
		v/c	0.03	0.03	0.03	0.01	0.01	0.01	0.14	0.14	0.14	0.03	0.03	0.03
		Delay (s)	3.6	3.6	3.6	1.6	1.6	1.6	10.7	10.7	10.7	10.5	10.5	10.5
		95th Q (m)	0.7	0.7	0.7	0.3	0.3	0.3	3.8	3.8	3.8	0.6	0.6	0.6
	Sat MID	LOS	A	A	A	A	A	A	B	B	B	B	B	B
		v/c	0.05	0.05	0.05	0.02	0.02	0.02	0.24	0.24	0.24	0.05	0.05	0.05
		Delay (s)	3.7	3.7	3.7	1.7	1.7	1.7	12.6	12.6	12.6	11.8	11.8	11.8

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
		95th Q (m)	1.1	1.1	1.1	0.5	0.5	0.5	3.8	3.8	3.8	1.1	1.1	1.1

- lane performance threshold not met with background traffic

- lane performance threshold not met with background plus development traffic

Table 5-5 Intersection Performance - 20-Year 2044 Total Traffic

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Highway 2 - Township Rd 130	PM	LOS	F	F	F	E	E	E	B	B	B	B	B	B
		v/c	0.92	0.92	0.92	0.05	0.05	0.05	0.00	0.28	0.03	0.07	0.28	0.14
		Delay (s)	122.7	122.7	122.7	10.7	10.7	10.7	9.1	0.0	0.0	10.7	0.0	0.0
		95th Q (m)	45.9	45.9	45.9	1.7	1.7	1.7	0.1	0.0	0.0	1.7	0.0	0.0
	Sat MID	LOS	F	F	F	E	E	E	A	A	A	B	B	B
		v/c	0.94	0.94	0.94	0.05	0.05	0.05	0.00	0.26	0.04	0.10	0.26	0.13
		Delay (s)	117.0	117.0	117.0	37.3	37.3	37.3	8.9	0.0	0.0	10.6	0.0	0.0
		95th Q (m)	50.6	50.6	50.6	1.2	1.2	1.2	0.0	0.0	0.0	2.5	0.0	0.0
Township Rd 130 - Alberta Rd	PM	LOS		A	A	A	A					A		A
		v/c		0.01	0.01	0.05	0.05					0.11		0.11
		Delay (s)		0	0	6.20	6.2					8.90		8.9
		95th Q (m)		0	0	1.2	1.2					2.9		2.9
	Sat MID	LOS		A	A	A	A					A		A
		v/c		0.01	0.01	0.07	0.07					0.14		0.14
		Delay (s)		0	0	6.10	6.1					9.10		9.10
		95th Q (m)		0	0	1.6	1.6					3.6		3.6
Highway 2 - Frontage Road Access	PM	LOS	F	F	F					A	A	B	A	
		v/c	1.33	1.33	1.33					0.25	0.04	0.29	0.20	
		Delay (s)	222.1	222.1	222.1					0.0	0.0	12.2	0.0	
		95th Q (m)	114.2	114.2	114.2					0.0	0.0	9.2	0.0	
	Sat MID	LOS	F	F	F					A	A	B	A	
		v/c	2.04	2.04	2.04					0.22	0.05	0.39	0.20	
		Delay (s)	532.2	532.2	532.2					0.0	0.0	12.9	0.0	
		95th Q (m)	204.7	204.7	204.7					0.0	0.0	13.9	0.0	
	PM	LOS	A	A	A	A	A	A	B	B	B	A	A	A

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Alberta Rd - Frontage Road Access		v/c	0.01	0.007	0.007	0.32	0.322	0.322	0.49	0.49	0.49	0.24	0.236	0.236
		Delay (s)	8.40	8.4	8.4	9.90	9.9	9.9	12.50	12.5	12.5	9.50	9.5	9.5
		95th Q (m)	0.0	0.0	0.0	10.8	10.8	10.8	20.8	20.8	20.8	6.9	6.9	6.9
	Sat MID	LOS	A	A	A	B	B	B	C	C	C	B	B	B
		v/c	0.02	0.016	0.016	0.50	0.498	0.498	0.71	0.705	0.705	0.37	0.37	0.37
		Delay (s)	9.50	9.5	9.5	13.50	13.5	13.5	20.40	20.4	20.4	11.80	11.8	11.8
		95th Q (m)	0.0	0.0	0.0	21.6	21.6	21.6	44.8	44.8	44.8	13.1	13.1	13.1
Highway 2 - 59 Ave	PM	LOS	F	F	F	F	F	F	A	A	A	B	B	B
		v/c	1.64	1.64	1.64	0.69	0.69	0.69	0.00	0.27	0.02	0.21	0.25	0.00
		Delay (s)	410.2	410.2	410.2	203.0	203.0	203.0	9.7	0.0	0.0	11.6	0.0	0.0
		95th Q (m)	92.6	92.6	92.6	19.3	19.3	19.3	0.1	0.0	0.0	6.1	0.0	0.0
	Sat MID	LOS	F	F	F	F	F	F	A	A	A	B	B	B
		v/c	3.24	3.24	3.24	1.63	1.63	1.63	0.00	0.29	0.02	0.31	0.28	0.00
		Delay (s)	Err	Err	Err	658.2	658.2	658.2	10.0	0.0	0.0	12.9	0.0	0.0
		95th Q (m)	Err	Err	Err	37.1	37.1	37.1	0.1	0.0	0.0	10.0	0.0	0.0
Alberta Rd - 59 Ave	PM	LOS	A	A	A	A	A	A	B	B	B	B	B	B
		v/c	0.04	0.04	0.04	0.01	0.01	0.01	0.30	0.30	0.30	0.03	0.03	0.03
		Delay (s)	4.2	4.2	4.2	1.3	1.3	1.3	12.9	12.9	12.9	11.3	11.3	11.3
		95th Q (m)	1.0	1.0	1.0	0.3	0.3	0.3	9.4	9.4	9.4	0.7	0.7	0.7
	Sat MID	LOS	A	A	A	A	A	A	C	C	C	B	B	B
		v/c	0.07	0.07	0.07	0.02	0.02	0.02	0.51	0.51	0.51	0.06	0.06	0.06
		Delay (s)	4.5	4.5	4.5	1.1	1.1	1.1	18.8	18.8	18.8	13.4	13.4	13.4
		95th Q (m)	1.6	1.6	1.6	0.5	0.5	0.5	9.4	9.4	9.4	1.4	1.4	1.4

- lane performance threshold not met with background traffic

- lane performance threshold not met with background plus development traffic

The Synchro reports for the analysis are found in **Appendix B.**

The MD peak hour is the critical peak hour due to higher background volumes and higher development generated traffic.

By the Full Build Horizon (2034) the minor approaches at the 59 Avenue - Highway 2 intersection fail during the MD peak hour based on the background traffic volumes only. The background and development volumes in the Full Build Horizon cause failure of the eastbound approaches at the Highway 2 - Township Road and Highway 2 - Alberta Frontage Road Access intersections in the MD peak hour.

By the 20-Year Horizon (2044), the eastbound approaches at all the intersections with Highway 2 fail with only the background volumes during the MD peak hour.

The Synchro results indicate that the eastbound movements will generally fail under the background volume only scenario by 2044. The eastbound legs at the intersections with Highway 2 are anticipated to fail due to long delays waiting for gaps in the through traffic volumes on Highway 2. The current design and layout of the Highway 2 intersections allow drivers to execute two-stage left turns. The intersection geometry enables a left-turning vehicle to cross the SB direction of vehicle travel and wait in the median until there is a gap in the northbound traffic. Synchro 12 software does not account for this two-stage style turn in its intersection analysis and may therefore report a lower level of service compared to actual operations At Highway 2 – Township Road 130, the left-turning traffic volume is low and the delay may be considered acceptable. Due to the higher left-turn volumes at the Frontage Road Access and at 59th Avenue, the delay is not acceptable.

5.2 Mitigation Measures

Improvements to the intersections with failing LOS is recommended to maintain traffic operations.

One option would be to reassess the speed limit transition zone where the speed changes from 110km/h down to 50km/hr at a later date as the sites start to develop. Currently the speed limit changes from 110km/h to 70km/hr at the Alberta Road Access intersection. As the study area develops, a shift of the posted 70km/h speed limit north of Township Road 130 may improve opportunities for left-turning traffic to enter onto Highway 2.

Signalizing the intersection of Highway 2 – 59 Avenue E/W is a potential improvement that will provide a safe opportunity for vehicles to make a left-turn to travel north on Highway 2. Instead of vehicles waiting at any of the three intersections for gaps in highway traffic, they can utilize signals at 59 Avenue E/W. For this configuration its recommended left-turn movements from the side streets onto Highway 2 northbound become prohibited. Providing a signal and encouraging all Highway 2 northbound destined traffic to access the Highway from 59 Avenue will reduce conflicts with left-turning vehicles at Township Road 130 and the Alberta Road Access intersections.

A signal warrant analysis was conducted and found a signal at the 59 Avenue - Highway 2 intersection to be warranted by 2044 with total traffic. The signal warrant, found in **Appendix C**, confirms the need for a signal at the Highway 2 – 59th Avenue intersection.

A synchro analysis of the signalization mitigation measure was conducted, and the results are found in **Table** 5-6. The scenario analysis assumed a protected-permissive NB left turning movement. As there is no signal timing plan for the proposed future mitigation scenario, the default synchro optimization was used. Future signal timings will differ and need to be adjusted based on future traffic conditions. The performance indicators reported for the future scenario are a best estimate at this stage. With the implementation of a signal at the Highway 2 – 59 Avenue intersection, all of the movements are expected to perform with a satisfactory LOS and minimal eastbound queueing is expected to spill over to the adjacent Alberta Road – 59 Avenue intersection.

Table 5-6 Intersection Performance – 20 Year 2044 Signalization

Intersection	Peak Time	Measure	EB Approach			WB Approach			SB Approach			NB Approach		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Highway 2 - 59 Ave	PM	LOS	B	B	B	B	B	B	A	B	A	A	A	A
		Volume	78	9	102	2	22	2	2	854	27	136	797	2
		v/c	0.60	0.60	0.60	0.09	0.09	0.09	0.01	0.61	0.03	0.39	0.44	0
		Delay (s)	17.7	17.7	17.7	16.4	16.4	16.4	9.50	13.2	0.1	7.50	6	0
		95th Q (m)	23.8	23.8	23.8	6.8	6.8	6.8	1.1	60.7	0	12.5	36.2	0
		Storage Length (m)	25	30	30	25	25	25	110	-	-	110	-	-
	Sat MID	LOS	C	C	C	B	B	B	B	C	A	B	A	A
		Volume	114	11	136	2	32	2	2	898	39	188	861	2
		v/c	0.71	0.71	0.71	0.09	0.09	0.09	0.01	0.77	0.06	0.63	0.51	0
		Delay (s)	22.8	22.8	22.8	15.7	15.7	15.7	11.0	20.2	0.2	17.3	8.1	0.0
		95th Q (m)	37.3	37.3	37.3	8.5	8.5	8.5	1.2	#82.6	0.3	#25.7	46.4	0
		Storage Length (m)	25	30	30	25	25	25	110	-	-	110	-	-

95th percentile volume exceeds capacity, queue may be longer

Further studies should be conducted as the sites develop, leading up to 2044, to understand traffic operational requirements.

6 HIGHWAY GEOMETRIC AND SAFETY REVIEW

As all intersections on Highway 2 have sufficient turn lanes and storage, no intersection treatment warrants are needed.

Collision data from 2015 to 2019 for the study area was downloaded from Alberta Transportation TIMS[14] and is summarized in Figure 6-1.

Between 2015 and 2019 there were 16 collisions along the corridor, with the highest concentration (three incidents) occurring at the Highway 2 – Frontage Road Access intersection. Out of seven accidents recorded at intersections, five involved a scenario where a vehicle was either turning onto the highway or waiting to do so and was hit by highway traffic. One collision was between two southbound vehicles, and another incident involved two vehicles turning onto the highway. Along the study corridor, wildlife was a factor in five collisions. Lastly, one rear-end collision was attributed to the speed limit change to 50 km/h.

[14] Data was downloaded for Highway 2 Control Section 08 from KM: 36.786 to KM: 40.981 and plotted using a Linear reference System Builder.

Figure 6-1 2015 to 2019 Collisions

7 ILLUMINATION WARRANT ANALYSIS

An illumination analysis was undertaken based on the Transportation Association of Canada (TAC) guidelines. According to TAC Illumination guidelines, the need for illumination is indicated by comparing the point-score obtained in four categories: Geometric, Operational, Environmental, and Collision. The following is the point-score criteria:

- Full illumination is warranted where a total point-score of 240 or more points is achieved
- Partial illumination is warranted between 120-240 points
- No illumination is warranted for a point-score below 120.

The current illumination status is as follows:

- Highway 2- Township Rd 130 No Illumination
- Highway 2 – Alberta Rd Highway Access No Illumination
- Highway 2 – 59 Ave E/W Full Illumination

An illumination warrant analysis has been completed for the two unilluminated intersections for each horizon. Table 7-1 summarises the results of the analysis. The warrant sheets are included in **Appendix D**.

Table 7-1 Summary of Illumination Warrant Analysis Results

Intersection	2024 Background	2034 Background	2044 Background	2044 Total Traffic
Highway 2 – Township Rd 130	No Illumination	Partial Illumination	Partial Illumination	Partial Illumination
Highway 2 – Alberta Rd Highway Access	Partial Illumination	Partial Illumination	Partial Illumination	Partial Illumination

Full illumination is not warranted at any intersection at any horizon. Partial illumination is currently warranted at the Highway 2 – Alberta Rd. Highway Access intersection and warranted at Highway 2 - Township Rd 130 in 2034.

8 FINDINGS AND RECOMMENDATIONS

8.1 Findings

The proposed development as proposed in the Claresholm ASP consists of high-density apartments, medium density apartments, and highway commercial land use. Together these will generate approximately 676 trips (333 in and 343 out) in the PM Peak hour and 857 trips (444 in and 413 out) in the Saturday MD peak hour. The analysis for the study area under the planning year horizons resulted in the following:

2034 Background Traffic Scenario:

- LOS E and LOS F for the eastbound and westbound lanes at the 59th Avenue - Highway 2 intersection during the MD peak hour.
- Partial Illumination warranted at Highway 2 – Alberta Rd. Highway Access

2034 Total Traffic Scenario:

- LOS F for the eastbound lanes at the Frontage Road Access - Highway 2 intersection and the Township Road 130 - Highway 2 intersection during the MD peak hour
- Partial Illumination warranted at Highway 2 – Alberta Rd. Highway Access

2044 Background Traffic scenario:

- LOS E or lower for eastbound lanes at the following intersections:
  - Highway 2 - Township Road 130
  - Highway 2 - Alberta Rd. Highway Access
  - Highway 2 - 59th Avenue

- Partial Illumination warranted at Highway 2 – Alberta Rd. Highway Access and Highway 2 – Township Rd. 130

2044 Total Traffic Scenario:

- LOS F for the WB lane at the Highway 2 - 59th Avenue intersection
- Partial Illumination warranted at Highway 2 – Alberta Rd. Highway Access and Highway 2 – Township Rd. 130

8.2 Recommendations

The intersections surrounding the proposed development site were assessed to understand the impacts of the proposed development on the network.

Based on the capacity analysis at the intersection in the study horizon years, it was found that the development traffic has minimal impact on intersection performances, and the recommended improvements are mainly due to the projected growth in background traffic. If traffic along Highway 2 has a slower growth rate than assumed for this study, the need for improvements may be delayed.

Consider lighting improvements Highway 2 – Alberta Rd. Highway Access intersection based on current traffic demands, and at Highway 2 - Township Rd 130 based on background traffic in 2034.

The following improvements are recommended by 2044:

- Review of speed zone transition from 110km/h to 70km/hr to 50km/hr to better accommodate turning vehicles as the sites start to develop.
- Signalization of the intersection of Highway 2 - 59th Avenue (warranted with total traffic).
- Restrict left turning movements at the Highway 2 - Township Road 130 intersection and the Highway 2 and frontage road access to funnel traffic through the newly signalized intersection.
- Conduct additional studies in conjunction with new developments to confirm operational requirements.

CLOSURE

This report was prepared for The Town of Claresholm to assess traffic impacts from the proposed development.

The services provided by Associated Engineering Alberta Ltd. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,

Associated Engineering Alberta Ltd.

Digitally signed by John Crawford
DN: cn=John Crawford, ou=Lethbridge-Users, email=crawfordj@ae.ca
Date: 2024.03.28 12:55:38 -06'00'

John Crawford
Project Manager

PROFESSIONAL ENGINEER ALBERTA
BREANNA D. JACKSON
ID 230508

2024-03-27

Breanna Jackson, P.Eng (AB)
Transportation Planning Engineer

PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.

RM Signature _____ 2024 Mar 28
Ben Leusink ID 236711

PERMIT NUMBER: P 03979
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

PERMIT STAMP

APPENDIX A - ITE LAND USE INFORMATION

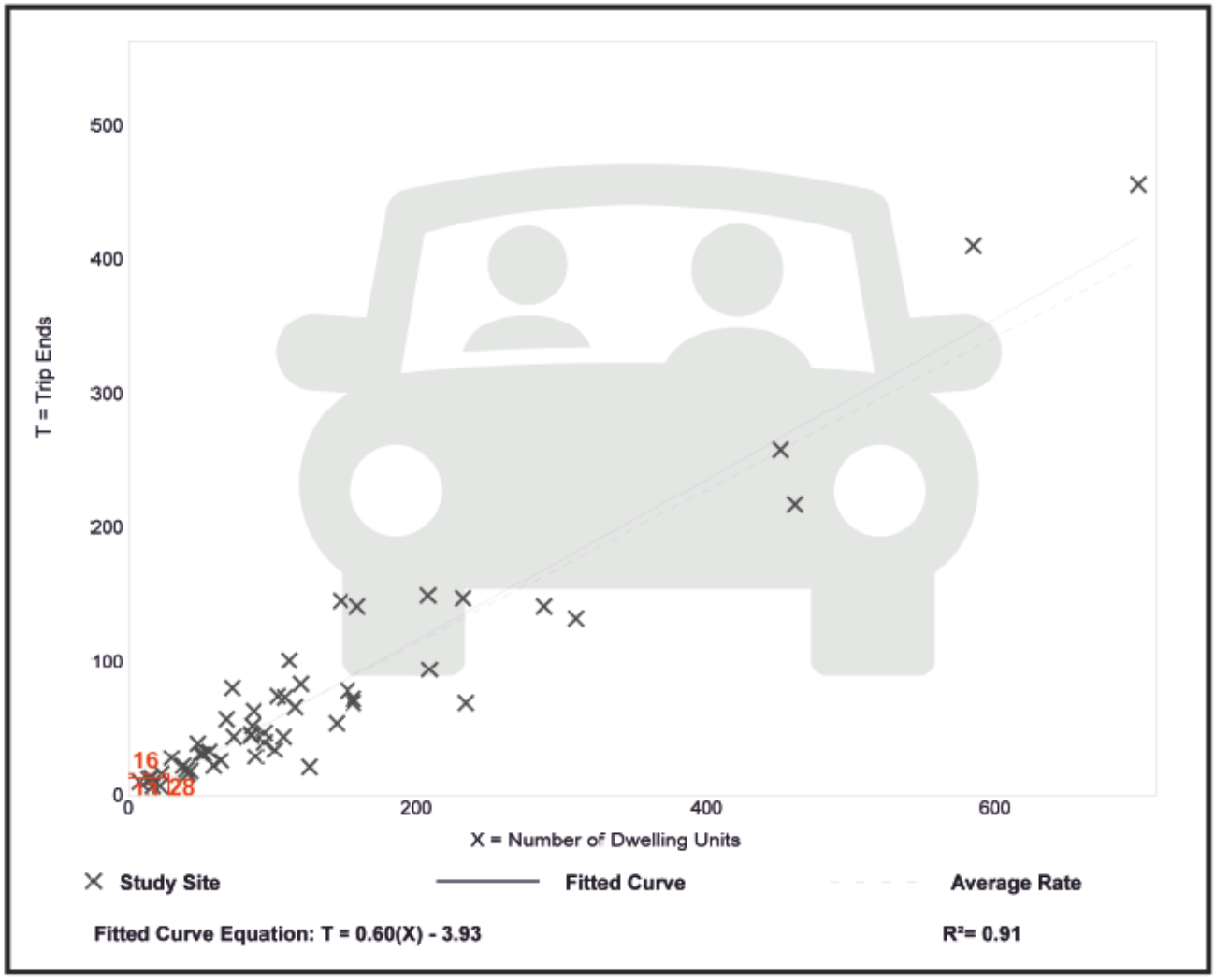
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs:	**Dwelling Units**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	51
Avg. Num. of Dwelling Units:	136
Directional Distribution:	59% entering, 41% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



Single-Family Attached Housing
(215)

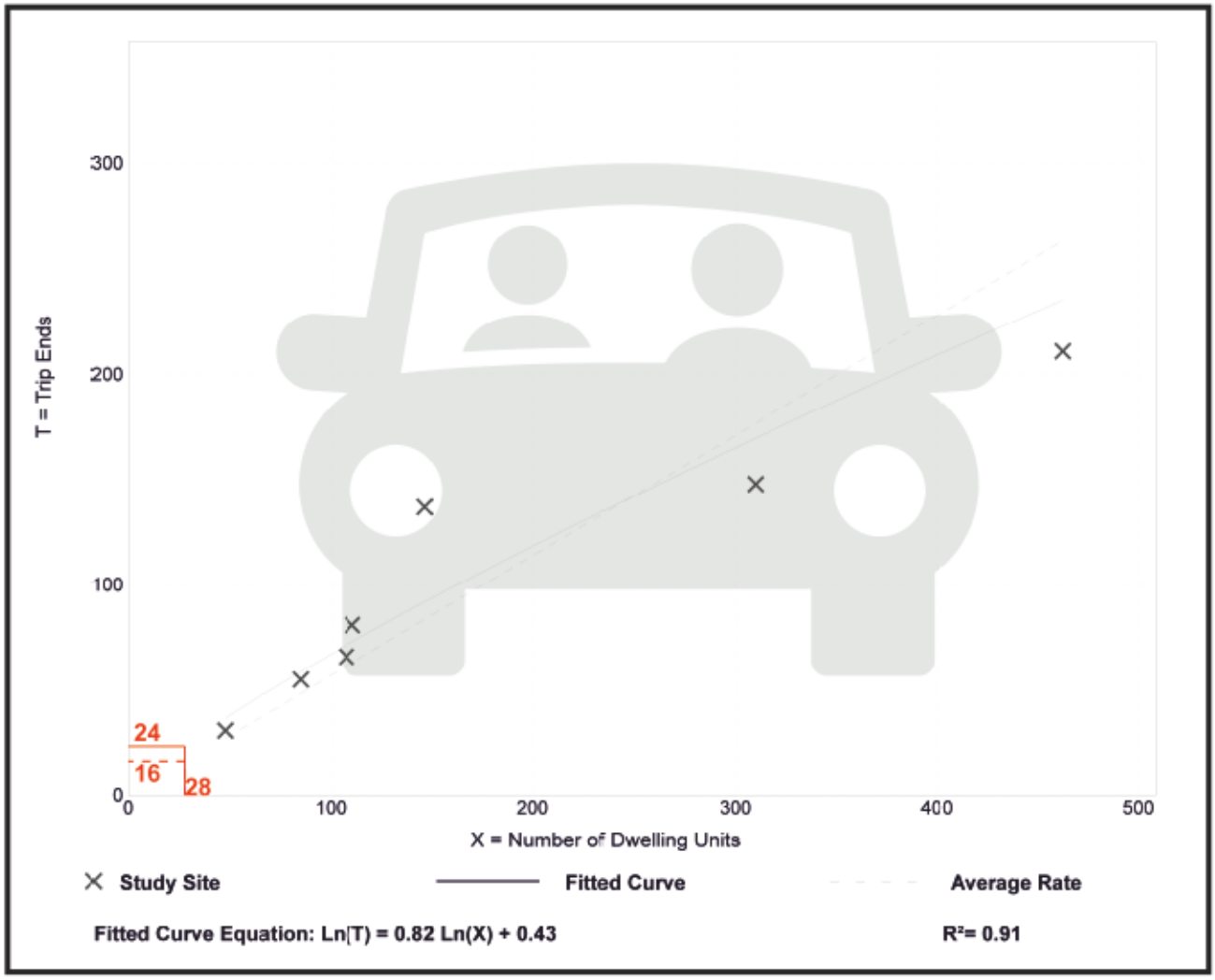
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 7
Avg. Num. of Dwelling Units: 182
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.46 - 0.93	0.17

Data Plot and Equation



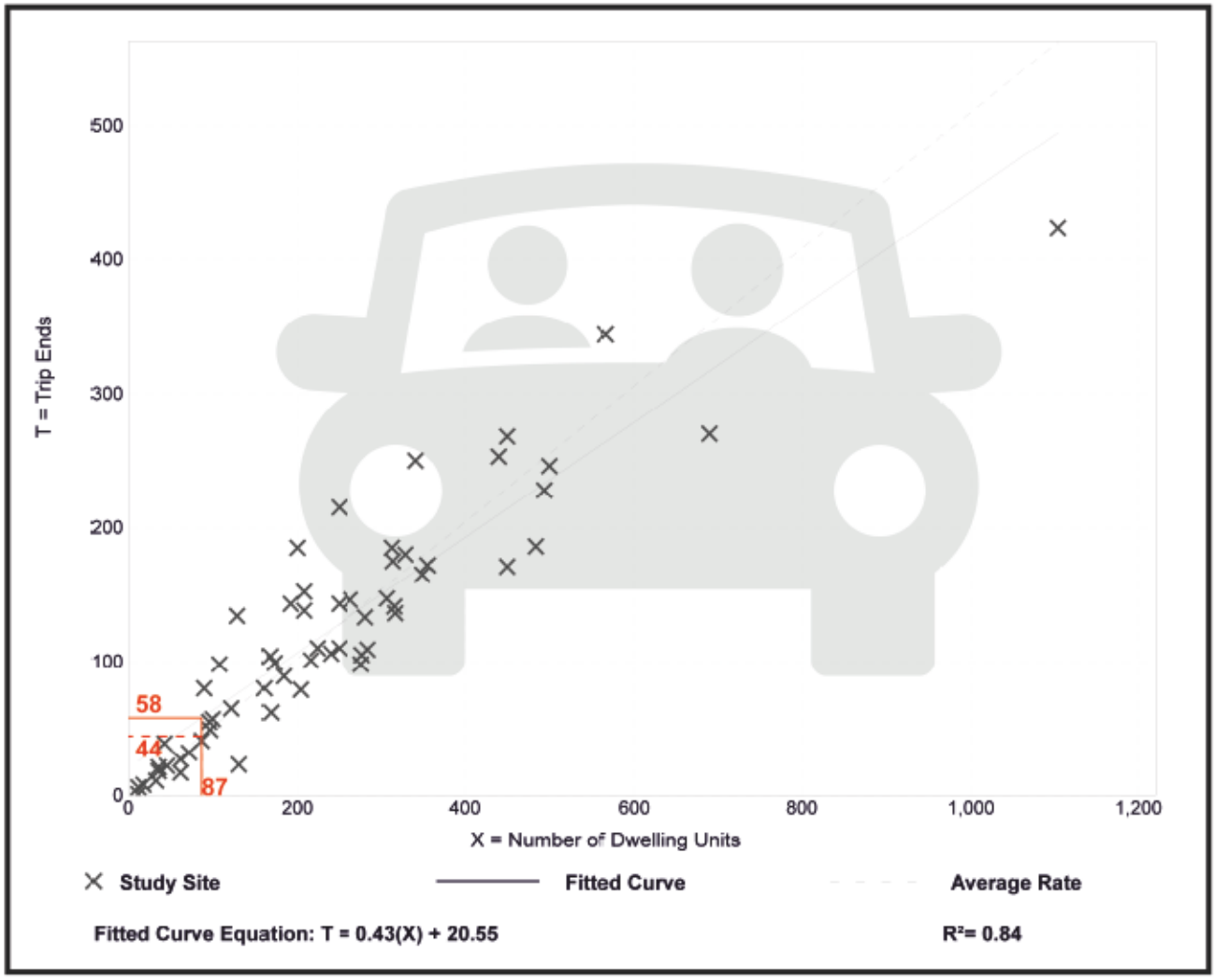
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 59
Avg. Num. of Dwelling Units: 241
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



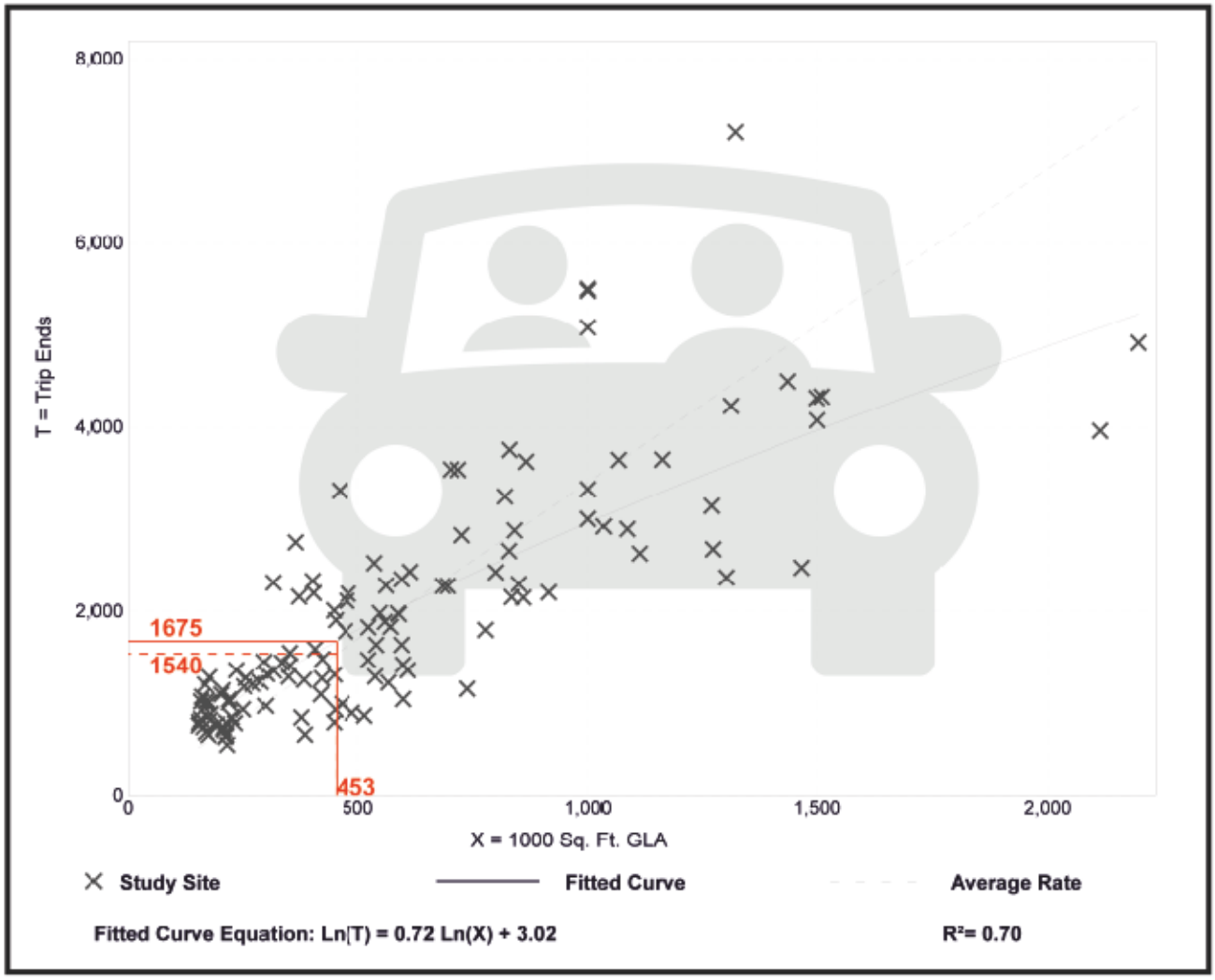
Shopping Center (>150k)
(820)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 126
Avg. 1000 Sq. Ft. GLA: 581
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.40	1.57 - 7.58	1.26

Data Plot and Equation



Shopping Center (>150k)
(820)

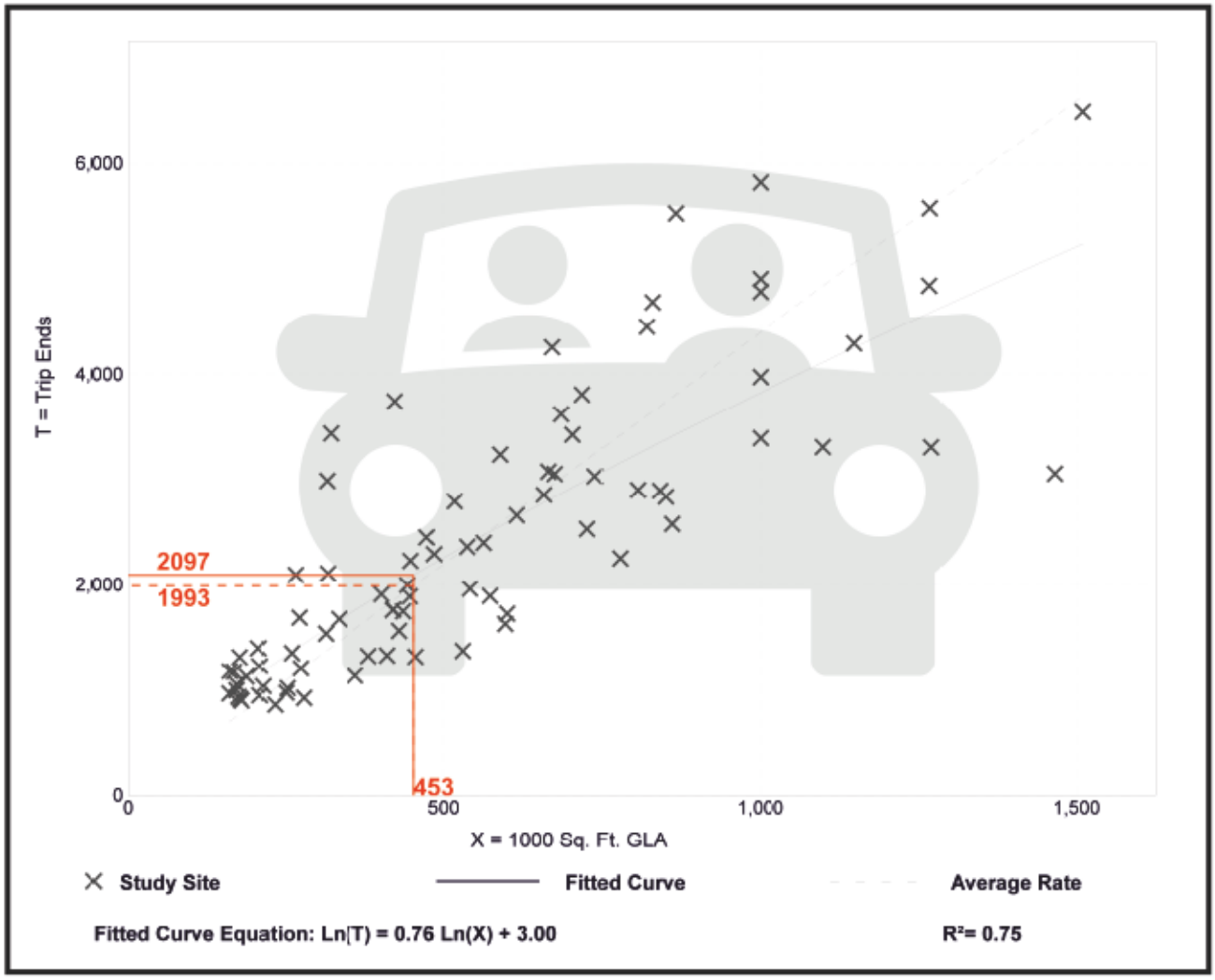
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 81
Avg. 1000 Sq. Ft. GLA: 559
Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
4.40	2.09 - 10.75	1.41

Data Plot and Equation



APPENDIX B - SYNCHRO OUTPUTS

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	4	21	2	275	0	179	28	268	141	4
Future Vol, veh/h	2	2	4	21	2	275	0	179	28	268	141	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	2	4	23	2	299	0	195	30	291	153	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	9.3	12.7	11.3	18.2
HCM LOS	A	B	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	25%	7%	65%
Vol Thru, %	86%	25%	1%	34%
Vol Right, %	14%	50%	92%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	207	8	298	413
LT Vol	0	2	21	268
Through Vol	179	2	2	141
RT Vol	28	4	275	4
Lane Flow Rate	225	9	324	449
Geometry Grp	1	1	1	1
Degree of Util (X)	0.34	0.015	0.466	0.663
Departure Headway (Hd)	5.44	6.111	5.174	5.317
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	659	582	693	678
Service Time	3.486	4.182	3.218	3.355
HCM Lane V/C Ratio	0.341	0.015	0.468	0.662
HCM Control Delay, s/veh	11.3	9.3	12.7	18.2
HCM Lane LOS	B	A	B	C
HCM 95th-tile Q	1.5	0	2.5	5

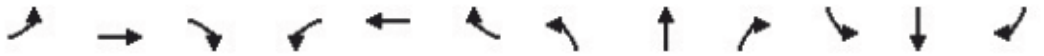
HCM Unsignalized Intersection Capacity Analysis
3: Hwy 2 & Township Rd 130

03-05-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	0	54	0	0	0	63	520	0	0	657	54
Future Volume (Veh/h)	68	0	54	0	0	0	63	520	0	0	657	54
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	0.87	0.87	0.87
Hourly flow rate (vph)	74	0	59	0	0	0	68	565	0	0	755	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)												
pX, platoon unblocked												
vC, conflicting volume	1174	1456	378	1138	1518	283	817			565		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1174	1456	378	1138	1518	283	817			565		
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 %	46	100	90	100	100	100	92			100		
cM capacity (veh/h)	138	118	620	132	108	714	807			1003		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	133	0	68	377	188	0	378	378	62
Volume Left	74	0	68	0	0	0	0	0	0
Volume Right	59	0	0	0	0	0	0	0	62
cSH	210	1700	807	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.63	0.00	0.08	0.22	0.11	0.00	0.22	0.22	0.04
Queue Length 95th (m)	28.3	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	47.6	0.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	A	A						
Approach Delay (s/veh)	47.6	0.0	1.1			0.0			
Approach LOS	E	A							

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	38.7%	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)	37	9	127	0	29	0	176	761	0	0	786	33
Future Volume (Veh/h)	37	9	127	0	29	0	176	761	0	0	786	33
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)	40	10	138	0	32	0	191	827	0	0	854	36
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	1666	2063	427	1779	2099	414	890			827		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1666	2063	427	1779	2099	414	890			827		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	0	75	76	100	16	100	74			100		
cM capacity (veh/h)	15	40	576	26	38	588	739			800		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	188	32	191	551	276	427	427	36
Volume Left	40	0	191	0	0	0	0	0
Volume Right	138	0	0	0	0	0	0	36
cSH	61	38	739	1700	1700	1700	1700	1700
Volume to Capacity	3.08	0.84	0.26	0.32	0.16	0.25	0.25	0.02
Queue Length 95th (m)	Err	23.6	7.8	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	Err	256.9	11.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	B					
Approach Delay (s/veh)	Err	256.9	2.2			0.0		
Approach LOS	F	F						

Intersection Summary				
Average Delay	888.3			
Intersection Capacity Utilization	58.5%	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)	71	44	18	26	68	138	14	2	5	157	11	56
Future Volume (Veh/h)	71	44	18	26	68	138	14	2	5	157	11	56
Sign Control		Free			Free			Stop			Stop	
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)	77	48	20	28	74	150	15	2	5	171	12	61
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	224			68			484	492	58	423	427	149
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	224			68			484	492	58	423	427	149
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			98			96	100	100	66	98	93
cM capacity (veh/h)	1345			1533			425	442	1008	506	481	898

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	145	252	22	244
Volume Left	77	28	15	171
Volume Right	20	150	5	61
cSH	1345	1533	492	566
Volume to Capacity	0.06	0.02	0.04	0.43
Queue Length 95th (m)	1.4	0.4	1.1	16.4
Control Delay (s/veh)	4.4	1.0	12.7	16.1
Lane LOS	A	A	B	C
Approach Delay (s/veh)	4.4	1.0	12.7	16.1
Approach LOS			B	C

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	45.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	73	229	251	510	590	74
Future Volume (Veh/h)	73	229	251	510	590	74
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)	79	249	273	554	641	80
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	1464	321	721			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1464	321	721			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	1	63	67			
cM capacity (veh/h)	80	675	832			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	328	273	277	277	321	321	80
Volume Left	79	273	0	0	0	0	0
Volume Right	249	0	0	0	0	0	80
cSH	242	832	1700	1700	1700	1700	1700
Volume to Capacity	1.36	0.33	0.16	0.16	0.19	0.19	0.05
Queue Length 95th (m)	134.6	10.9	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	224.4	11.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s/veh)	224.4	3.8			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	40.9		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	11	10	96	19	11	111
Future Volume (Veh/h)	11	10	96	19	11	111
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	11	104	21	12	121
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			23		247	18
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			23		247	18
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		98	89
cM capacity (veh/h)			1592		693	1061

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	23	125	133
Volume Left	0	104	12
Volume Right	11	0	121
cSH	1700	1592	1013
Volume to Capacity	0.01	0.07	0.13
Queue Length 95th (m)	0.0	1.6	3.4
Control Delay (s/veh)	0.0	6.3	9.1
Lane LOS		A	A
Approach Delay (s/veh)	0.0	6.3	9.1
Approach LOS			A

Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	4	21	2	53	0	53	28	61	53	4
Future Vol, veh/h	2	2	4	21	2	53	0	53	28	61	53	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	2	4	23	2	58	0	58	30	66	58	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.3	7.5	7.5	8.1
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	25%	28%	52%
Vol Thru, %	65%	25%	3%	45%
Vol Right, %	35%	50%	70%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	81	8	76	118
LT Vol	0	2	21	61
Through Vol	53	2	2	53
RT Vol	28	4	53	4
Lane Flow Rate	88	9	83	128
Geometry Grp	1	1	1	1
Degree of Util (X)	0.097	0.01	0.093	0.151
Departure Headway (Hd)	3.984	4.246	4.055	4.243
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	888	848	889	839
Service Time	2.06	2.248	2.055	2.304
HCM Lane V/C Ratio	0.099	0.011	0.093	0.153
HCM Control Delay, s/veh	7.5	7.3	7.5	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0.3	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	0	7	0	0	0	12	555	0	0	673	16
Future Volume (Veh/h)	18	0	7	0	0	0	12	555	0	0	673	16
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	0.87	0.87	0.87
Hourly flow rate (vph)	20	0	8	0	0	0	13	603	0	0	774	18
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	1102	1403	387	1024	1421	302	792			603		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1102	1403	387	1024	1421	302	792			603		
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	99	100	100	100	98			100		
cM capacity (veh/h)	164	136	611	185	133	695	824			971		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	28	0	13	402	201	0	387	387	18
Volume Left	20	0	13	0	0	0	0	0	0
Volume Right	8	0	0	0	0	0	0	0	18
cSH	208	1700	824	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.13	0.00	0.02	0.24	0.12	0.00	0.23	0.23	0.01
Queue Length 95th (m)	3.5	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	25.0	0.0	9.4	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	A	A						
Approach Delay (s/veh)	25.0	0.0	0.2			0.0			
Approach LOS	D	A							

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	28.6%	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)	37	0	51	0	19	0	77	601	0	0	673	33
Future Volume (Veh/h)	37	0	51	0	19	0	77	601	0	0	673	33
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)	40	0	55	0	21	0	84	653	0	0	732	36
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	1237	1553	366	1242	1589	327	768			653		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1237	1553	366	1242	1589	327	768			653		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	61	100	91	100	78	100	90			100		
cM capacity (veh/h)	102	101	631	110	96	669	822			930		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	95	21	84	435	218	366	366	36
Volume Left	40	0	84	0	0	0	0	0
Volume Right	55	0	0	0	0	0	0	36
cSH	198	96	822	1700	1700	1700	1700	1700
Volume to Capacity	0.48	0.22	0.10	0.26	0.13	0.22	0.22	0.02
Queue Length 95th (m)	17.9	5.9	2.6	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	39.0	52.8	9.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F	A					
Approach Delay (s/veh)	39.0	52.8	1.1			0.0		
Approach LOS	E	F						

Intersection Summary				
Average Delay	3.5			
Intersection Capacity Utilization	44.7%	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)	53	44	18	26	68	30	14	2	5	72	11	39
Future Volume (Veh/h)	53	44	18	26	68	30	14	2	5	72	11	39
Sign Control		Free			Free			Stop			Stop	
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)	58	48	20	28	74	33	15	2	5	78	12	42
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	107			68			369	337	58	327	331	91
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	107			68			369	337	58	327	331	91
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			98			97	100	100	87	98	96
cM capacity (veh/h)	1484			1533			529	551	1008	595	555	967

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	126	135	22	132
Volume Left	58	28	15	78
Volume Right	20	33	5	42
cSH	1484	1533	596	673
Volume to Capacity	0.04	0.02	0.04	0.20
Queue Length 95th (m)	0.9	0.4	0.9	5.5
Control Delay (s/veh)	3.6	1.6	11.3	11.7
Lane LOS	A	A	B	B
Approach Delay (s/veh)	3.6	1.6	11.3	11.7
Approach LOS			B	B

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	27.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	44	53	77	524	654	26
Future Volume (Veh/h)	44	53	77	524	654	26
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)	48	58	84	570	711	28
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	1164	356	739			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1164	356	739			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	71	91	90			
cM capacity (veh/h)	168	641	818			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	106	84	285	285	356	356	28
Volume Left	48	84	0	0	0	0	0
Volume Right	58	0	0	0	0	0	28
cSH	282	818	1700	1700	1700	1700	1700
Volume to Capacity	0.38	0.10	0.17	0.17	0.21	0.21	0.02
Queue Length 95th (m)	12.7	2.6	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	25.2	9.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	A					
Approach Delay (s/veh)	25.2	1.3			0.0		
Approach LOS	D						

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	38.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	11	4	7	19	5	14
Future Volume (Veh/h)	11	4	7	19	5	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	4	8	21	5	15
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			16		51	14
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			16		51	14
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1602		953	1066

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	29	20
Volume Left	0	8	5
Volume Right	4	0	15
cSH	1700	1602	1035
Volume to Capacity	0.01	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s/veh)	0.0	2.0	8.5
Lane LOS		A	A
Approach Delay (s/veh)	0.0	2.0	8.5
Approach LOS			A

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		17.1%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Intersection Delay, s/veh	10.7
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	2	14	2	202	2	130	19	214	101	2
Future Vol, veh/h	2	2	2	14	2	202	2	130	19	214	101	2
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	2	2	15	2	220	2	141	21	233	110	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.5	9.7	9.3	12
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	33%	6%	68%
Vol Thru, %	86%	33%	1%	32%
Vol Right, %	13%	33%	93%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	151	6	218	317
LT Vol	2	2	14	214
Through Vol	130	2	2	101
RT Vol	19	2	202	2
Lane Flow Rate	164	7	237	345
Geometry Grp	1	1	1	1
Degree of Util (X)	0.221	0.01	0.303	0.462
Departure Headway (Hd)	4.851	5.349	4.608	4.831
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	734	662	775	741
Service Time	2.921	3.44	2.665	2.893
HCM Lane V/C Ratio	0.223	0.011	0.306	0.466
HCM Control Delay, s/veh	9.3	8.5	9.7	12
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	0.8	0	1.3	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	0	40	0	0	0	43	557	0	0	712	45
Future Volume (Veh/h)	64	0	40	0	0	0	43	557	0	0	712	45
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	0.87	0.87	0.87
Hourly flow rate (vph)	70	0	43	0	0	0	47	605	0	0	818	52
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	1215	1517	409	1151	1569	303	870			605		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1215	1517	409	1151	1569	303	870			605		
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 %	47	100	93	100	100	100	94			100		
cM capacity (veh/h)	131	111	592	135	103	694	770			969		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	113	0	47	403	202	0	409	409	52
Volume Left	70	0	47	0	0	0	0	0	0
Volume Right	43	0	0	0	0	0	0	0	52
cSH	186	1700	770	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.61	0.00	0.06	0.24	0.12	0.00	0.24	0.24	0.03
Queue Length 95th (m)	25.7	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	50.4	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	A	A						
Approach Delay (s/veh)	50.4	0.0	0.7			0.0			
Approach LOS	F	A							

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	39.0%	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)	25	7	96	0	20	0	127	698	0	0	744	23
Future Volume (Veh/h)	25	7	96	0	20	0	127	698	0	0	744	23
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)	27	8	104	0	22	0	138	759	0	0	809	25
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	1476	1844	405	1548	1869	380	834			759		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1476	1844	405	1548	1869	380	834			759		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	50	87	83	100	63	100	82			100		
cM capacity (veh/h)	54	61	596	50	59	618	776			848		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	139	22	138	506	253	405	405	25
Volume Left	27	0	138	0	0	0	0	0
Volume Right	104	0	0	0	0	0	0	25
cSH	173	59	776	1700	1700	1700	1700	1700
Volume to Capacity	0.80	0.37	0.18	0.30	0.15	0.24	0.24	0.01
Queue Length 95th (m)	41.0	10.5	4.9	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	78.7	99.0	10.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	B					
Approach Delay (s/veh)	78.7	99.0	1.6			0.0		
Approach LOS	F	F						

Intersection Summary				
Average Delay	7.7			
Intersection Capacity Utilization	51.9%	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)	49	30	12	18	98	101	10	1	4	117	7	39
Future Volume (Veh/h)	49	30	12	18	98	101	10	1	4	117	7	39
Sign Control		Free			Free			Stop			Stop	
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)	53	33	13	20	107	110	11	1	4	127	8	42
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	217			46			394	403	40	352	354	162
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	217			46			394	403	40	352	354	162
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			98	100	100	78	99	95
cM capacity (veh/h)	1353			1562			512	509	1032	576	542	883

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	99	237	16	177
Volume Left	53	20	11	127
Volume Right	13	110	4	42
cSH	1353	1562	586	626
Volume to Capacity	0.04	0.01	0.03	0.28
Queue Length 95th (m)	0.9	0.3	0.6	8.8
Control Delay (s/veh)	4.3	0.7	11.3	13.0
Lane LOS	A	A	B	B
Approach Delay (s/veh)	4.3	0.7	11.3	13.0
Approach LOS			B	B

Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	37.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	181	179	543	658	58
Future Volume (Veh/h)	57	181	179	543	658	58
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)	62	197	195	590	715	63
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	1400	358	778			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1400	358	778			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	37	69	75			
cM capacity (veh/h)	99	639	790			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	259	195	295	295	358	358	63
Volume Left	62	195	0	0	0	0	0
Volume Right	197	0	0	0	0	0	63
cSH	277	790	1700	1700	1700	1700	1700
Volume to Capacity	0.93	0.25	0.17	0.17	0.21	0.21	0.04
Queue Length 95th (m)	66.8	7.4	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	78.7	11.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s/veh)	78.7	2.7			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	12.4		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	7	7	73	13	8	96
Future Volume (Veh/h)	7	7	73	13	8	96
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	8	79	14	9	104
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			16		184	12
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			16		184	12
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		99	90
cM capacity (veh/h)			1602		766	1069

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	16	93	113
Volume Left	0	79	9
Volume Right	8	0	104
cSH	1700	1602	1036
Volume to Capacity	0.01	0.05	0.11
Queue Length 95th (m)	0.0	1.2	2.8
Control Delay (s/veh)	0.0	6.3	8.9
Lane LOS		A	A
Approach Delay (s/veh)	0.0	6.3	8.9
Approach LOS			A

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	2	14	1	36	0	36	19	42	36	2
Future Vol, veh/h	1	1	2	14	1	36	0	36	19	42	36	2
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	2	15	1	39	0	39	21	46	39	2
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.1	7.1	7.2	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	25%	27%	53%
Vol Thru, %	65%	25%	2%	45%
Vol Right, %	35%	50%	71%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	4	51	80
LT Vol	0	1	14	42
Through Vol	36	1	1	36
RT Vol	19	2	36	2
Lane Flow Rate	60	4	55	87
Geometry Grp	1	1	1	1
Degree of Util (X)	0.065	0.005	0.059	0.101
Departure Headway (Hd)	3.896	3.979	3.82	4.173
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	915	887	926	857
Service Time	1.939	2.058	1.89	2.205
HCM Lane V/C Ratio	0.066	0.005	0.059	0.102
HCM Control Delay, s/veh	7.2	7.1	7.1	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0	0.2	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	0	5	0	0	0	8	590	0	0	731	11
Future Volume (Veh/h)	12	0	5	0	0	0	8	590	0	0	731	11
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	0.87	0.87	0.87
Hourly flow rate (vph)	13	0	5	0	0	0	9	641	0	0	840	13
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	1179	1499	420	1084	1512	321	853			641		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1179	1499	420	1084	1512	321	853			641		
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 %	91	100	99	100	100	100	99			100		
cM capacity (veh/h)	145	120	582	168	118	675	782			939		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	18	0	9	427	214	0	420	420	13
Volume Left	13	0	9	0	0	0	0	0	0
Volume Right	5	0	0	0	0	0	0	0	13
cSH	183	1700	782	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.10	0.00	0.01	0.25	0.13	0.00	0.25	0.25	0.01
Queue Length 95th (m)	2.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	26.8	0.0	9.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	A	A						
Approach Delay (s/veh)	26.8	0.0	0.1			0.0			
Approach LOS	D	A							

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	30.2%	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)	25	0	35	0	13	0	53	596	0	0	659	23
Future Volume (Veh/h)	25	0	35	0	13	0	53	596	0	0	659	23
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)	27	0	38	0	14	0	58	648	0	0	716	25
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	1163	1480	358	1160	1505	324	741			648		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1163	1480	358	1160	1505	324	741			648		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	79	100	94	100	87	100	93			100		
cM capacity (veh/h)	128	116	638	134	112	672	842			934		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	65	14	58	432	216	358	358	25
Volume Left	27	0	58	0	0	0	0	0
Volume Right	38	0	0	0	0	0	0	25
cSH	241	112	842	1700	1700	1700	1700	1700
Volume to Capacity	0.27	0.13	0.07	0.25	0.13	0.21	0.21	0.01
Queue Length 95th (m)	8.0	3.2	1.7	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	25.4	41.7	9.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	E	A					
Approach Delay (s/veh)	25.4	41.7	0.8			0.0		
Approach LOS	D	E						

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	41.8%	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)	36	30	12	18	47	20	10	1	4	49	7	26
Future Volume (Veh/h)	36	30	12	18	47	20	10	1	4	49	7	26
Sign Control		Free			Free			Stop			Stop	
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)	39	33	13	20	51	22	11	1	4	53	8	28
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	73			46			252	231	40	224	226	62
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	73			46			252	231	40	224	226	62
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			98	100	100	93	99	97
cM capacity (veh/h)	1527			1562			656	644	1032	707	648	1003

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	85	93	16	89
Volume Left	39	20	11	53
Volume Right	13	22	4	28
cSH	1527	1562	721	772
Volume to Capacity	0.03	0.01	0.02	0.12
Queue Length 95th (m)	0.6	0.3	0.5	3.0
Control Delay (s/veh)	3.5	1.7	10.1	10.3
Lane LOS	A	A	B	B
Approach Delay (s/veh)	3.5	1.7	10.1	10.3
Approach LOS			B	B

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	20.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	36	53	569	718	18
Future Volume (Veh/h)	30	36	53	569	718	18
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)	33	39	58	618	780	20
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	1205	390	800			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1205	390	800			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	80	94	93			
cM capacity (veh/h)	163	609	775			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	72	58	309	309	390	390	20
Volume Left	33	58	0	0	0	0	0
Volume Right	39	0	0	0	0	0	20
cSH	270	775	1700	1700	1700	1700	1700
Volume to Capacity	0.27	0.07	0.18	0.18	0.23	0.23	0.01
Queue Length 95th (m)	7.9	1.8	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	23.1	10.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	B					
Approach Delay (s/veh)	23.1	0.9			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	7	2	5	13	4	10
Future Volume (Veh/h)	7	2	5	13	4	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	2	5	14	4	11
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			10		33	9
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			10		33	9
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1610		977	1073

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	10	19	15
Volume Left	0	5	4
Volume Right	2	0	11
cSH	1700	1610	1046
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (m)	0.0	0.1	0.3
Control Delay (s/veh)	0.0	1.9	8.5
Lane LOS		A	A
Approach Delay (s/veh)	0.0	1.9	8.5
Approach LOS			A

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		15.1%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Intersection Delay, s/veh	16.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	4	25	2	283	0	188	33	278	150	4
Future Vol, veh/h	2	2	4	25	2	283	0	188	33	278	150	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	2	4	27	2	308	0	204	36	302	163	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	9.5	13.5	11.8	20.4
HCM LOS	A	B	B	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	25%	8%	64%
Vol Thru, %	85%	25%	1%	35%
Vol Right, %	15%	50%	91%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	221	8	310	432
LT Vol	0	2	25	278
Through Vol	188	2	2	150
RT Vol	33	4	283	4
Lane Flow Rate	240	9	337	470
Geometry Grp	1	1	1	1
Degree of Util (X)	0.369	0.015	0.495	0.705
Departure Headway (Hd)	5.536	6.288	5.291	5.407
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	649	565	677	667
Service Time	3.587	4.372	3.342	3.446
HCM Lane V/C Ratio	0.37	0.016	0.498	0.705
HCM Control Delay, s/veh	11.8	9.5	13.5	20.4
HCM Lane LOS	B	A	B	C
HCM 95th-tile Q	1.7	0	2.8	5.8

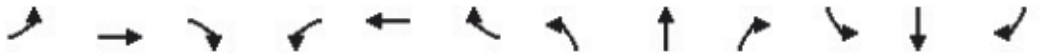
HCM Unsignalized Intersection Capacity Analysis
3: Hwy 2 & Township Rd 130

03-05-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	0	55	0	0	0	65	613	0	0	769	57
Future Volume (Veh/h)	71	0	55	0	0	0	65	613	0	0	769	57
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	0.87	0.87	0.87
Hourly flow rate (vph)	77	0	60	0	0	0	71	666	0	0	884	66
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	1359	1692	442	1310	1758	333	950			666		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1359	1692	442	1310	1758	333	950			666		
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 %	22	100	89	100	100	100	90			100		
cM capacity (veh/h)	99	83	563	96	76	663	719			919		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	137	0	71	444	222	0	442	442	66
Volume Left	77	0	71	0	0	0	0	0	0
Volume Right	60	0	0	0	0	0	0	0	66
cSH	155	1700	719	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.88	0.00	0.10	0.26	0.13	0.00	0.26	0.26	0.04
Queue Length 95th (m)	46.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	101.4	0.0	10.6	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	A	B						
Approach Delay (s/veh)	101.4	0.0	1.0			0.0			
Approach LOS	F	A							

Intersection Summary				
Average Delay	8.0			
Intersection Capacity Utilization	42.2%	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)	43	9	136	0	32	0	188	861	0	0	898	39
Future Volume (Veh/h)	43	9	136	0	32	0	188	861	0	0	898	39
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)	47	10	148	0	35	0	204	936	0	0	976	42
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	1870	2320	488	1985	2362	468	1018			936		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1870	2320	488	1985	2362	468	1018			936		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	0	61	72	100	0	100	69			100		
cM capacity (veh/h)	0	26	526	14	24	542	659			727		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	205	35	204	624	312	488	488	42
Volume Left	47	0	204	0	0	0	0	0
Volume Right	148	0	0	0	0	0	0	42
cSH	0	24	659	1700	1700	1700	1700	1700
Volume to Capacity	Err	1.45	0.31	0.37	0.18	0.29	0.29	0.02
Queue Length 95th (m)	Err	33.2	10.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	Err	586.3	12.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	B					
Approach Delay (s/veh)	Err	586.3	2.3			0.0		
Approach LOS	F	F						

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	63.1%	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)	80	51	20	31	80	143	16	2	6	169	12	63
Future Volume (Veh/h)	80	51	20	31	80	143	16	2	6	169	12	63
Sign Control		Free			Free			Stop			Stop	
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)	87	55	22	34	87	155	17	2	7	184	13	68
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	242			77			547	550	66	481	484	165
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	242			77			547	550	66	481	484	165
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			98			95	100	99	60	97	92
cM capacity (veh/h)	1324			1522			377	404	998	458	441	880

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	164	276	26	265
Volume Left	87	34	17	184
Volume Right	22	155	7	68
cSH	1324	1522	456	521
Volume to Capacity	0.07	0.02	0.06	0.51
Queue Length 95th (m)	1.6	0.5	1.4	21.7
Control Delay (s/veh)	4.5	1.1	13.4	18.8
Lane LOS	A	A	B	C
Approach Delay (s/veh)	4.5	1.1	13.4	18.8
Approach LOS			B	C

Intersection Summary				
Average Delay	8.7			
Intersection Capacity Utilization	48.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	81	238	264	597	699	79
Future Volume (Veh/h)	81	238	264	597	699	79
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)	88	259	287	649	760	86
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	1659	380	846			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1659	380	846			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	0	58	61			
cM capacity (veh/h)	54	618	744			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	347	287	325	325	380	380	86
Volume Left	88	287	0	0	0	0	0
Volume Right	259	0	0	0	0	0	86
cSH	170	744	1700	1700	1700	1700	1700
Volume to Capacity	2.04	0.39	0.19	0.19	0.22	0.22	0.05
Queue Length 95th (m)	204.7	13.9	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	532.2	12.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s/veh)	532.2	3.9			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	88.5		
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	10	97	22	12	114
Future Volume (Veh/h)	12	10	97	22	12	114
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	11	105	24	13	124
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			24		253	19
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			24		253	19
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			93		98	88
cM capacity (veh/h)			1591		687	1060

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	24	129	137
Volume Left	0	105	13
Volume Right	11	0	124
cSH	1700	1591	1008
Volume to Capacity	0.01	0.07	0.14
Queue Length 95th (m)	0.0	1.6	3.6
Control Delay (s/veh)	0.0	6.1	9.1
Lane LOS		A	A
Approach Delay (s/veh)	0.0	6.1	9.1
Approach LOS			A

Intersection Summary			
Average Delay	7.0		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	2	4	25	2	61	0	61	33	72	61	4
Future Vol, veh/h	2	2	4	25	2	61	0	61	33	72	61	4
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	2	4	27	2	66	0	66	36	78	66	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.4	7.6	7.6	8.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	25%	28%	53%
Vol Thru, %	65%	25%	2%	45%
Vol Right, %	35%	50%	69%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	94	8	88	137
LT Vol	0	2	25	72
Through Vol	61	2	2	61
RT Vol	33	4	61	4
Lane Flow Rate	102	9	96	149
Geometry Grp	1	1	1	1
Degree of Util (X)	0.114	0.01	0.11	0.177
Departure Headway (Hd)	4.02	4.344	4.139	4.283
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	877	828	871	828
Service Time	2.114	2.347	2.139	2.357
HCM Lane V/C Ratio	0.116	0.011	0.11	0.18
HCM Control Delay, s/veh	7.6	7.4	7.6	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0	0.4	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	8	0	0	0	14	648	0	0	786	18
Future Volume (Veh/h)	20	0	8	0	0	0	14	648	0	0	786	18
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	0.87	0.87	0.87
Hourly flow rate (vph)	22	0	9	0	0	0	15	704	0	0	903	21
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	1285	1637	452	1195	1658	352	924			704		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1285	1637	452	1195	1658	352	924			704		
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 %	82	100	98	100	100	100	98			100		
cM capacity (veh/h)	120	98	555	138	95	644	735			890		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	31	0	15	469	235	0	452	452	21
Volume Left	22	0	15	0	0	0	0	0	0
Volume Right	9	0	0	0	0	0	0	0	21
cSH	155	1700	735	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.00	0.02	0.28	0.14	0.00	0.27	0.27	0.01
Queue Length 95th (m)	5.4	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	33.9	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	A	A						
Approach Delay (s/veh)	33.9	0.0	0.2			0.0			
Approach LOS	D	A							

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	31.7%	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)	43	0	59	0	22	0	90	701	0	0	786	39
Future Volume (Veh/h)	43	0	59	0	22	0	90	701	0	0	786	39
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)	47	0	64	0	24	0	98	762	0	0	854	42
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	1443	1812	427	1449	1854	381	896			762		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1443	1812	427	1449	1854	381	896			762		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	21	100	89	100	62	100	87			100		
cM capacity (veh/h)	59	67	576	73	63	617	735			846		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	111	24	98	508	254	427	427	42
Volume Left	47	0	98	0	0	0	0	0
Volume Right	64	0	0	0	0	0	0	42
cSH	123	63	735	1700	1700	1700	1700	1700
Volume to Capacity	0.90	0.38	0.13	0.30	0.15	0.25	0.25	0.02
Queue Length 95th (m)	43.7	10.8	3.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	124.0	93.0	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	B					
Approach Delay (s/veh)	124.0	93.0	1.2			0.0		
Approach LOS	F	F						

Intersection Summary				
Average Delay	9.0			
Intersection Capacity Utilization	49.4%	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)	61	51	20	31	80	35	16	2	6	84	12	45
Future Volume (Veh/h)	61	51	20	31	80	35	16	2	6	84	12	45
Sign Control		Free			Free			Stop			Stop	
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)	66	55	22	34	87	38	17	2	7	91	13	49
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	125			77			428	391	66	380	383	106
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125			77			428	391	66	380	383	106
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			98			96	100	99	83	97	95
cM capacity (veh/h)	1462			1522			475	508	998	543	514	948

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	143	159	26	153
Volume Left	66	34	17	91
Volume Right	22	38	7	49
cSH	1462	1522	556	626
Volume to Capacity	0.05	0.02	0.05	0.24
Queue Length 95th (m)	1.1	0.5	1.1	7.3
Control Delay (s/veh)	3.7	1.7	11.8	12.6
Lane LOS	A	A	B	B
Approach Delay (s/veh)	3.7	1.7	11.8	12.6
Approach LOS			B	B

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	29.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	51	61	90	611	763	31
Future Volume (Veh/h)	51	61	90	611	763	31
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)	55	66	98	664	829	34
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	1357	415	863			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1357	415	863			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	55	89	87			
cM capacity (veh/h)	121	587	732			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	121	98	332	332	415	415	34
Volume Left	55	98	0	0	0	0	0
Volume Right	66	0	0	0	0	0	34
cSH	214	732	1700	1700	1700	1700	1700
Volume to Capacity	0.57	0.13	0.20	0.20	0.24	0.24	0.02
Queue Length 95th (m)	23.4	3.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	41.7	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	B					
Approach Delay (s/veh)	41.7	1.4			0.0		
Approach LOS	E						

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	12	4	8	22	6	16
Future Volume (Veh/h)	12	4	8	22	6	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	4	9	24	7	17
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			17		57	15
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		57	15
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	98
cM capacity (veh/h)			1600		945	1065

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	33	24
Volume Left	0	9	7
Volume Right	4	0	17
cSH	1700	1600	1027
Volume to Capacity	0.01	0.01	0.02
Queue Length 95th (m)	0.0	0.1	0.5
Control Delay (s/veh)	0.0	2.0	8.6
Lane LOS		A	A
Approach Delay (s/veh)	0.0	2.0	8.6
Approach LOS			A

Intersection Summary			
Average Delay		3.7	
Intersection Capacity Utilization		18.2%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	17	1	208	0	136	22	221	107	3
Future Vol, veh/h	1	1	3	17	1	208	0	136	22	221	107	3
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	3	18	1	226	0	148	24	240	116	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	8.4	9.9	9.5	12.5
HCM LOS	A	A	A	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	20%	8%	67%
Vol Thru, %	86%	20%	0%	32%
Vol Right, %	14%	60%	92%	1%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	158	5	226	331
LT Vol	0	1	17	221
Through Vol	136	1	1	107
RT Vol	22	3	208	3
Lane Flow Rate	172	5	246	360
Geometry Grp	1	1	1	1
Degree of Util (X)	0.233	0.008	0.319	0.486
Departure Headway (Hd)	4.885	5.341	4.668	4.861
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	728	674	764	734
Service Time	2.964	3.341	2.732	2.93
HCM Lane V/C Ratio	0.236	0.007	0.322	0.49
HCM Control Delay, s/veh	9.5	8.4	9.9	12.5
HCM Lane LOS	A	A	A	B
HCM 95th-tile Q	0.9	0	1.4	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	0	41	0	0	0	44	656	0	0	834	46
Future Volume (Veh/h)	66	0	41	0	0	0	44	656	0	0	834	46
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	0.87	0.87	0.87
Hourly flow rate (vph)	72	0	45	0	0	0	48	713	0	0	959	53
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	1412	1768	480	1334	1821	357	1012			713		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1412	1768	480	1334	1821	357	1012			713		
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 %	22	100	92	100	100	100	93			100		
cM capacity (veh/h)	93	77	532	97	71	640	681			883		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	117	0	48	475	238	0	480	480	53
Volume Left	72	0	48	0	0	0	0	0	0
Volume Right	45	0	0	0	0	0	0	0	53
cSH	136	1700	681	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.86	0.00	0.07	0.28	0.14	0.00	0.28	0.28	0.03
Queue Length 95th (m)	42.1	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	106.1	0.0	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	A	B						
Approach Delay (s/veh)	106.1	0.0	0.7			0.0			
Approach LOS	F	A							

Intersection Summary				
Average Delay	6.8			
Intersection Capacity Utilization	42.6%	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)	29	7	102	0	22	0	136	797	0	0	854	27
Future Volume (Veh/h)	29	7	102	0	22	0	136	797	0	0	854	27
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)	32	8	111	0	24	0	148	866	0	0	928	29
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	1669	2090	464	1741	2119	433	957			866		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1669	2090	464	1741	2119	433	957			866		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	0	80	80	100	39	100	79			100		
cM capacity (veh/h)	28	41	545	32	39	571	696			773		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	151	24	148	577	289	464	464	29
Volume Left	32	0	148	0	0	0	0	0
Volume Right	111	0	0	0	0	0	0	29
cSH	97	39	696	1700	1700	1700	1700	1700
Volume to Capacity	1.56	0.61	0.21	0.34	0.17	0.27	0.27	0.02
Queue Length 95th (m)	88.5	16.7	6.1	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	373.8	191.0	11.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	F	B					
Approach Delay (s/veh)	373.8	191.0	1.7			0.0		
Approach LOS	F	F						

Intersection Summary				
Average Delay	29.2			
Intersection Capacity Utilization	56.1%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	62	187	188	638	777	61
Future Volume (Veh/h)	62	187	188	638	777	61
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)	67	203	204	693	845	66
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	1600	423	911			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1600	423	911			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	2	65	71			
cM capacity (veh/h)	69	580	701			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	270	204	347	347	423	423	66
Volume Left	67	204	0	0	0	0	0
Volume Right	203	0	0	0	0	0	66
cSH	204	701	1700	1700	1700	1700	1700
Volume to Capacity	1.33	0.29	0.20	0.20	0.25	0.25	0.04
Queue Length 95th (m)	114.2	9.2	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	222.1	12.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	F	B					
Approach Delay (s/veh)	222.1	2.8			0.0		
Approach LOS	F						

Intersection Summary			
Average Delay	30.1		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	8	7	74	15	9	98
Future Volume (Veh/h)	8	7	74	15	9	98
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	8	80	16	10	107
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			17		189	13
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			17		189	13
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		99	90
cM capacity (veh/h)			1600		760	1067

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	17	96	117
Volume Left	0	80	10
Volume Right	8	0	107
cSH	1700	1600	1032
Volume to Capacity	0.01	0.05	0.11
Queue Length 95th (m)	0.0	1.2	2.9
Control Delay (s/veh)	0.0	6.2	8.9
Lane LOS		A	A
Approach Delay (s/veh)	0.0	6.2	8.9
Approach LOS			A

Intersection Summary			
Average Delay		7.1	
Intersection Capacity Utilization		24.8%	ICU Level of Service A
Analysis Period (min)		15	

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	17	1	42	0	42	22	49	42	3
Future Vol, veh/h	1	1	3	17	1	42	0	42	22	49	42	3
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1	3	18	1	46	0	46	24	53	46	3
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay, s/veh	7.1	7.2	7.3	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	20%	28%	52%
Vol Thru, %	66%	20%	2%	45%
Vol Right, %	34%	60%	70%	3%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	64	5	60	94
LT Vol	0	1	17	49
Through Vol	42	1	1	42
RT Vol	22	3	42	3
Lane Flow Rate	70	5	65	102
Geometry Grp	1	1	1	1
Degree of Util (X)	0.076	0.006	0.07	0.119
Departure Headway (Hd)	3.929	3.962	3.87	4.196
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	906	888	912	852
Service Time	1.979	2.054	1.951	2.234
HCM Lane V/C Ratio	0.077	0.006	0.071	0.12
HCM Control Delay, s/veh	7.3	7.1	7.2	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0	0.2	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	6	0	0	0	10	689	0	0	853	13
Future Volume (Veh/h)	14	0	6	0	0	0	10	689	0	0	853	13
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	0.87	0.87	0.87
Hourly flow rate (vph)	15	0	7	0	0	0	11	749	0	0	980	15
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	1377	1751	490	1268	1766	375	995			749		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1377	1751	490	1268	1766	375	995			749		
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 %	85	100	99	100	100	100	98			100		
cM capacity (veh/h)	103	83	524	122	82	623	691			856		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	22	0	11	499	250	0	490	490	15
Volume Left	15	0	11	0	0	0	0	0	0
Volume Right	7	0	0	0	0	0	0	0	15
cSH	138	1700	691	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.16	0.00	0.02	0.29	0.15	0.00	0.29	0.29	0.01
Queue Length 95th (m)	4.2	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	35.9	0.0	10.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	A	B						
Approach Delay (s/veh)	35.9	0.0	0.1			0.0			
Approach LOS	E	A							

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	33.6%	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)	29	0	41	0	15	0	62	696	0	0	769	27
Future Volume (Veh/h)	29	0	41	0	15	0	62	696	0	0	769	27
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)	32	0	45	0	16	0	67	757	0	0	836	29
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	1357	1727	418	1354	1756	379	865			757		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1357	1727	418	1354	1756	379	865			757		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			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 %	62	100	92	100	79	100	91			100		
cM capacity (veh/h)	85	80	584	93	77	619	755			850		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	77	16	67	505	252	418	418	29
Volume Left	32	0	67	0	0	0	0	0
Volume Right	45	0	0	0	0	0	0	29
cSH	169	77	755	1700	1700	1700	1700	1700
Volume to Capacity	0.46	0.21	0.09	0.30	0.15	0.25	0.25	0.02
Queue Length 95th (m)	16.1	5.5	2.2	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	43.0	63.9	10.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	E	F	B					
Approach Delay (s/veh)	43.0	63.9	0.8			0.0		
Approach LOS	E	F						

Intersection Summary				
Average Delay	2.8			
Intersection Capacity Utilization	45.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	42	62	664	837	21
Future Volume (Veh/h)	35	42	62	664	837	21
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)	38	46	67	722	910	23
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	1405	455	933			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1405	455	933			
tC, single (s)	6.8	6.9	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.3			
p0 queue free %	68	92	90			
cM capacity (veh/h)	118	552	687			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	84	67	361	361	455	455	23
Volume Left	38	67	0	0	0	0	0
Volume Right	46	0	0	0	0	0	23
cSH	207	687	1700	1700	1700	1700	1700
Volume to Capacity	0.41	0.10	0.21	0.21	0.27	0.27	0.01
Queue Length 95th (m)	13.9	2.5	0.0	0.0	0.0	0.0	0.0
Control Delay (s/veh)	33.8	10.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	D	B					
Approach Delay (s/veh)	33.8	0.9			0.0		
Approach LOS	D						

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	8	3	6	15	4	11
Future Volume (Veh/h)	8	3	6	15	4	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	3	7	16	4	12
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			12		41	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			12		41	11
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1607		967	1071

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	12	23	16
Volume Left	0	7	4
Volume Right	3	0	12
cSH	1700	1607	1043
Volume to Capacity	0.01	0.00	0.02
Queue Length 95th (m)	0.0	0.1	0.4
Control Delay (s/veh)	0.0	2.2	8.5
Lane LOS		A	A
Approach Delay (s/veh)	0.0	2.2	8.5
Approach LOS			A

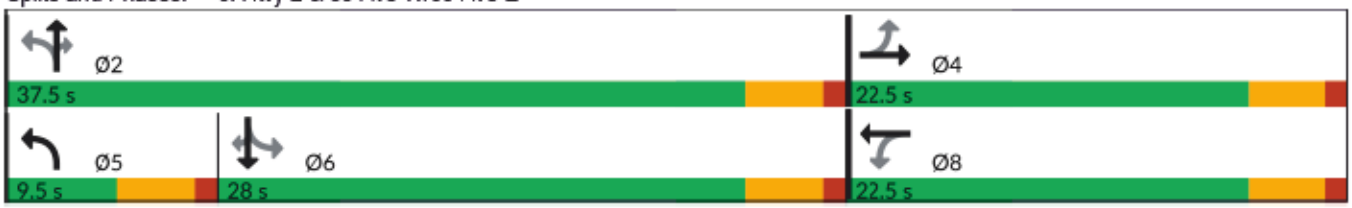
Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	16.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	78	9	102	2	22	2	136	797	2	2	854	27
Future Volume (vph)	78	9	102	2	22	2	136	797	2	2	854	27
Satd. Flow (prot)	0	1711	0	0	1857	0	1738	2992	1601	1789	2992	1601
Flt Permitted		0.853			0.981		0.211			0.327		
Satd. Flow (perm)	0	1489	0	0	1829	0	386	2992	1601	616	2992	1601
Satd. Flow (RTOR)		100			2				27			109
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	22%	2%	2%	22%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	85	10	111	2	24	2	148	866	2	2	928	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	206	0	0	28	0	148	866	2	2	928	29
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Total Split (s)	22.5	22.5		22.5	22.5		9.5	37.5	37.5	28.0	28.0	28.0
Total Lost Time (s)		4.5			4.5		4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)		9.7			9.7		35.9	35.9	35.9	28.0	28.0	28.0
Actuated g/C Ratio		0.18			0.18		0.66	0.66	0.66	0.51	0.51	0.51
v/c Ratio		0.60			0.09		0.39	0.44	0.00	0.01	0.61	0.03
Control Delay (s/veh)		17.7			16.4		7.5	6.0	0.0	9.5	13.2	0.1
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		17.7			16.4		7.5	6.0	0.0	9.5	13.2	0.1
LOS		B			B		A	A	A	A	B	A
Approach Delay (s/veh)		17.7			16.4			6.2			12.8	
Approach LOS		B			B			A			B	
Stops (vph)		91			20		51	359	0	3	598	0
Fuel Used(l)		6			1		5	31	0	0	89	2
CO Emissions (g/hr)		104			18		98	582	1	5	1663	35
NOx Emissions (g/hr)		20			3		19	112	0	1	321	7
VOC Emissions (g/hr)		24			4		23	134	0	1	383	8
Dilemma Vehicles (#)		0			0		0	0	0	0	79	0
Queue Length 50th (m)		8.7			2.0		4.1	16.4	0.0	0.1	32.3	0.0
Queue Length 95th (m)		23.8			6.8		12.5	36.2	0.0	1.1	60.7	0.0
Internal Link Dist (m)		29.5			54.5			233.9			599.4	
Turn Bay Length (m)							110.0		110.0	225.0		225.0
Base Capacity (vph)		561			608		378	1966	1061	315	1532	873
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		0.37			0.05		0.39	0.44	0.00	0.01	0.61	0.03

Intersection Summary

Cycle Length: 60	
Actuated Cycle Length: 54.6	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay (s/veh): 10.3	Intersection LOS: B
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Hwy 2 & 59 Ave W/59 Ave E



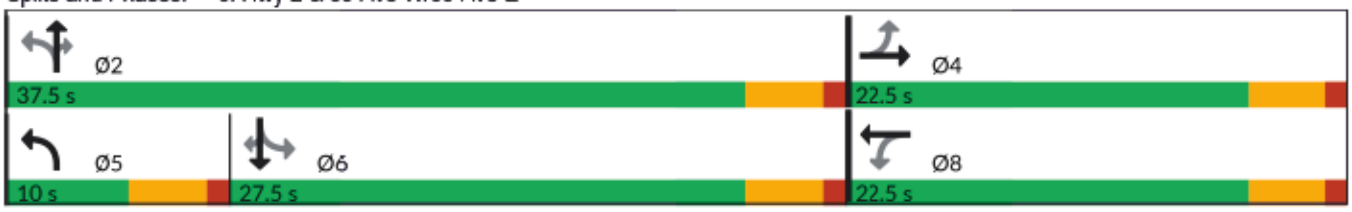
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	11	136	2	32	2	188	861	2	2	898	39
Future Volume (vph)	114	11	136	2	32	2	188	861	2	2	898	39
Satd. Flow (prot)	0	1715	0	0	1865	0	1738	2992	1601	1789	2992	1601
Flt Permitted		0.841			0.983		0.161			0.305		
Satd. Flow (perm)	0	1473	0	0	1838	0	295	2992	1601	574	2992	1601
Satd. Flow (RTOR)		93			2				27			109
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
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
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	22%	2%	2%	22%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	124	12	148	2	35	2	204	936	2	2	976	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	284	0	0	39	0	204	936	2	2	976	42
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Total Split (s)	22.5	22.5		22.5	22.5		10.0	37.5	37.5	27.5	27.5	27.5
Total Lost Time (s)		4.5			4.5		4.5	4.5	4.5	4.5	4.5	4.5
Act Effct Green (s)		12.2			12.2		33.2	33.2	33.2	23.1	23.1	23.1
Actuated g/C Ratio		0.22			0.22		0.61	0.61	0.61	0.42	0.42	0.42
v/c Ratio		0.71			0.09		0.63	0.51	0.00	0.01	0.77	0.06
Control Delay (s/veh)		22.8			15.7		17.3	8.1	0.0	11.0	20.2	0.2
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)		22.8			15.7		17.3	8.1	0.0	11.0	20.2	0.2
LOS		C			B		B	A	A	B	C	A
Approach Delay (s/veh)		22.8			15.7			9.8			19.3	
Approach LOS		C			B			A			B	
Stops (vph)		153			28		74	454	0	3	691	0
Fuel Used(l)		9			1		9	37	0	0	101	3
CO Emissions (g/hr)		173			25		163	682	1	5	1880	50
NOx Emissions (g/hr)		33			5		31	132	0	1	363	10
VOC Emissions (g/hr)		40			6		38	157	0	1	434	12
Dilemma Vehicles (#)		0			0		0	0	0	0	79	0
Queue Length 50th (m)		16.7			2.9		7.6	23.6	0.0	0.1	41.1	0.0
Queue Length 95th (m)		37.3			8.5		#25.7	46.4	0.0	1.2	#82.6	0.3
Internal Link Dist (m)		29.5			54.5			233.9			599.4	
Turn Bay Length (m)							110.0		110.0	225.0		225.0
Base Capacity (vph)		551			612		326	1823	986	243	1270	742
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		0.52			0.06		0.63	0.51	0.00	0.01	0.77	0.06

Intersection Summary

Cycle Length: 60	
Actuated Cycle Length: 54.5	
Control Type: Semi Act-Uncoord	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay (s/veh): 15.3	Intersection LOS: B
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 6: Hwy 2 & 59 Ave W/59 Ave E



APPENDIX C - SIGNAL WARRANT SHEETS

Alberta Transportation Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Highway 2
Side Street (name)	59th Avenue
Quadrant / Int #	NW
	CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	2044 Background Traffic Signal Warrant Analysis

Road Authority:	Alberta Transportation
City:	Claresholm
Analysis Date:	2024 Mar 01, Fri
Count Date:	2024 Jan 23, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Highway 2	NB	1		2	0		1	900	2
Highway 2	SB	1		2			1	40,000	2
59th Avenue	WB				1				
59th Avenue	EB				1				

Demographics		
Elem. School/Mobility Impaired	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	7,000
Central Business District	(y/n)	n

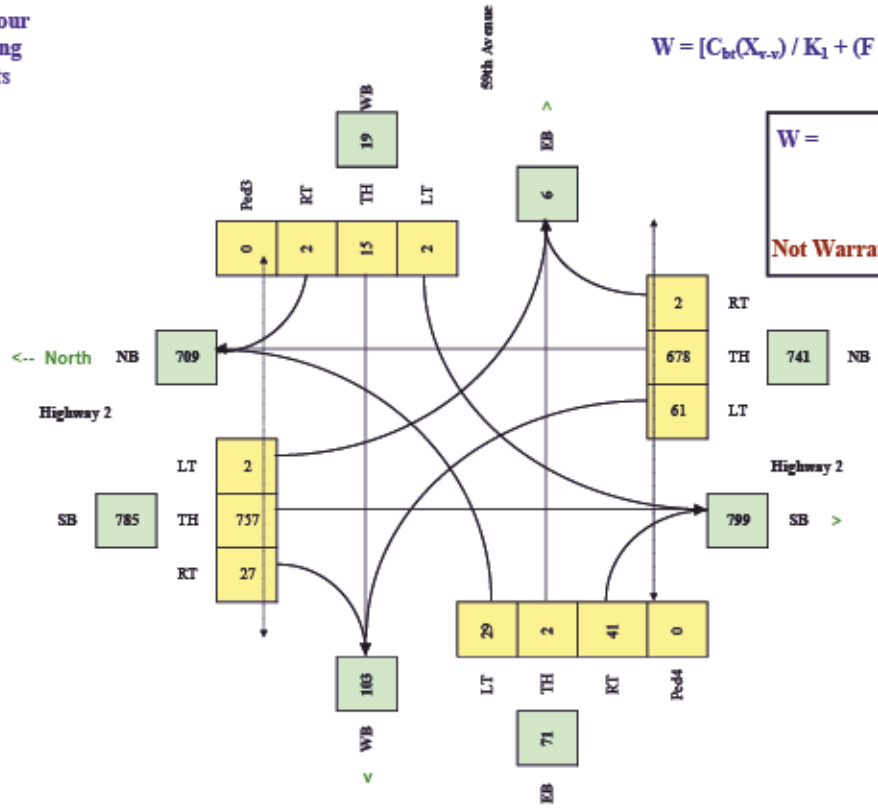
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 2	NS	50	22.0%	n	
59th Avenue	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	60	667	2	2	744	26	2	15	2	28	2	40	0	0	0	0
8:00 - 9:00	60	667	2	2	744	26	2	15	2	28	2	40	0	0	0	0
9:00 - 10:00	60	667	2	2	744	26	2	15	2	28	2	40	0	0	0	0
14:00 - 15:00	62	689	2	2	769	27	2	15	2	29	2	41	0	0	0	0
15:00 - 16:00	62	689	2	2	769	27	2	15	2	29	2	41	0	0	0	0
16:00 - 17:00	62	689	2	2	769	27	2	15	2	29	2	41	0	0	0	0
Total (6-hour peak)	366	4,068	12	12	4,539	159	12	90	12	171	12	243	0	0	0	0
Average (6-hour peak)	61	678	2	2	757	27	2	15	2	29	2	41	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	102	102	0
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

Alberta Transportation Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Highway 2
Side Street (name)	59th Avenue
Quadrant / Int #	NW
	CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	2044 Total Traffic Signal Warrant Analysis

Road Authority:	Alberta Transportation
City:	Claresholm
Analysis Date:	2024 Mar 01, Fri
Count Date:	2024 Jan 23, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Highway 2	NB	1		2	0		1	900	2
Highway 2	SB	1		2			1	40,000	2
59th Avenue	WB				1				
59th Avenue	EB				1				

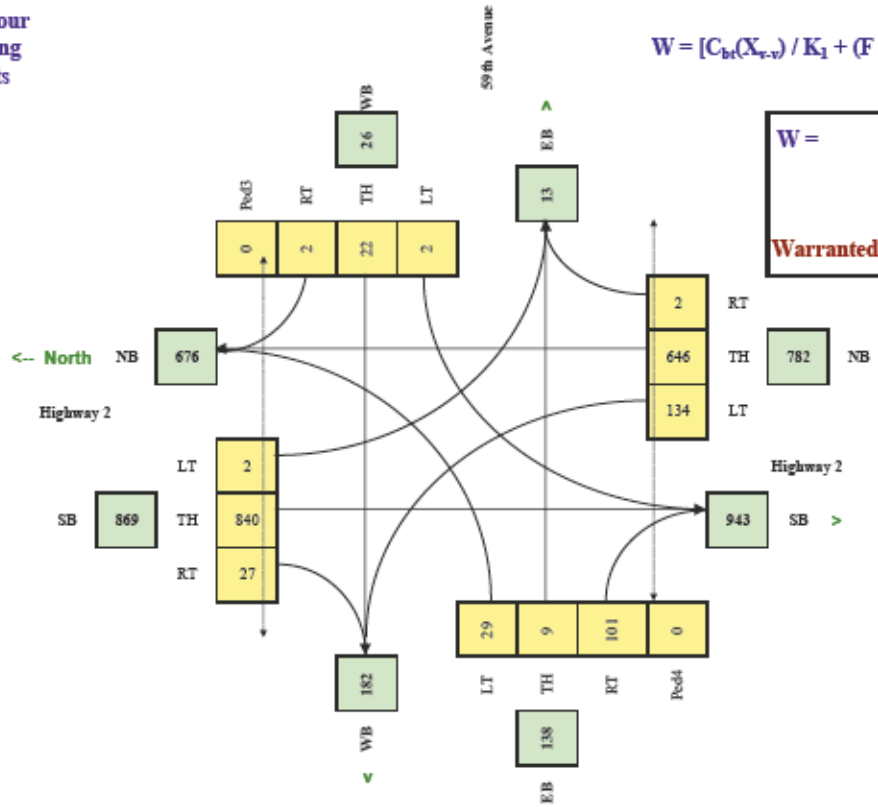
Demographics		
Elem. School/Mobility Impaired	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	7,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 2	NS	50	22.0%	n	
59th Avenue	EW	50	2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
7:00 - 8:00	132	635	2	2	826	26	2	21	2	28	9	99	0	0	0	0
8:00 - 9:00	132	635	2	2	826	26	2	21	2	28	9	99	0	0	0	0
9:00 - 10:00	132	635	2	2	826	26	2	21	2	28	9	99	0	0	0	0
14:00 - 15:00	136	656	2	2	854	27	2	22	2	29	9	102	0	0	0	0
15:00 - 16:00	136	656	2	2	854	27	2	22	2	29	9	102	0	0	0	0
16:00 - 17:00	136	656	2	2	854	27	2	22	2	29	9	102	0	0	0	0
Total (6-hour peak)	804	3,873	12	12	5,040	159	12	129	12	171	54	603	0	0	0	0
Average (6-hour peak)	134	646	2	2	840	27	2	22	2	29	9	101	0	0	0	0

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	202	202	0
		Veh	*Ped*

Warranted

RESET SHEET

APPENDIX D - ILLUMINATION WARRANT ANALYSIS

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Hwy 2
Minor Road :	Township 130
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	1-2024-Background

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	3	15
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	0	0
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	2	6
									Subtotal Geometric Factors (G)	31
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	0	0
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	4	20
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	80
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	0	0
									Subtotal Environmental Factors (E)	0
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	0
									Total Warranting Points (G+O+E+A)	111

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Hwy 2
Minor Road :	Township 130
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	1-2034-Background

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	4	20
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	0	0
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	2	6
									Subtotal Geometric Factors (G)	**36**
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	1	20
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant Is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	4	20
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	**100**
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	0	0
									Subtotal Environmental Factors (E)	**0**
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	**0**
									Total Warranting Points (G+O+E+A)	**136**

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Hwy 2
Minor Road :	Township 130
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	1-2044-Background

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	4	20
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	0	0
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	2	6
									Subtotal Geometric Factors (G)	**36**
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	1	20
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	4	20
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	**100**
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	0	0
									Subtotal Environmental Factors (E)	**0**
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	**0**
									Total Warranting Points (G+O+E+A)	**136**

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Hwy 2
Minor Road :	Township 130
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	1-2044-FULL

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	4	20
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	0	0
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	2	6
									Subtotal Geometric Factors (G)	**36**
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	3	60
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	4	20
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	**160**
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	0	0
									Subtotal Environmental Factors (E)	**0**
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	**0**
									Total Warranting Points (G+O+E+A)	**176**

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Highway 2
Minor Road :	Alberta Rd Highway Access
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	2-2024-Buildout

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	3	15
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	3	15
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	1	3
									Subtotal Geometric Factors (G)	**43**
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	2	40
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	2	10
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	**110**
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	1	5
									Subtotal Environmental Factors (E)	**5**
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	**0**
									Total Warranting Points (G+O+E+A)	**158**

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Highway 2
Minor Road :	Alberta Rd Highway Access
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	2-2034-Background

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	3	15
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	3	15
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	1	3
									Subtotal Geometric Factors (G)	**43**
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	2	40
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	2	10
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	**110**
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	1	5
									Subtotal Environmental Factors (E)	**5**
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	**0**
									Total Warranting Points (G+O+E+A)	**158**

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Highway 2
Minor Road :	Alberta Rd Highway Access
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	2-2044-Background

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	3	15
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	3	15
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	1	3
									Subtotal Geometric Factors (G)	43
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	3	60
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	2	10
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	130
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	1	5
									Subtotal Environmental Factors (E)	5
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	0
									Total Warranting Points (G+O+E+A)	178

Guide for the Design of Raodway Lighting - Volume 2, Transportation Association of Canada, 2006

Major Road :	Highway 2
Minor Road :	Alberta Rd Highway Access
City/Town :	Claresholm

Company	AE
Date :	March 11, 2024
Scenario :	2-2044-FULL

Item No.	Classification Factor	Rating Factor 'R'					Weight Subcategory	Weight 'W'	Enter 'R'	Score 'R'x'W'
		0	1	2	3	4				
Geometric Factors (G)										
1	Channelization	None	Right and/or Left Turn Lanes on Minor Approach Only	Right Turn Lane(s) Only on Major Leg(s)	Left Turn Lane(s) on Major Leg(s)	Left and Right Turn Lanes on All Legs	Raised and Operating Speed Less than 70 km/h on at least one channelized approach	15	0	0
							Raised and Operating Speed Less than 70 km/h or more on at least one channelized approach or	20	0	0
							Painted Only	5	3	15
2	Approach Sight Distance on the Most Constrained Approach (Relative to the Recommended Minimum Intersection Sight Distance)	100% or More	75% to 99%	50% to 74%	25% to 49%	<25%		10	1	10
3	Horizontal curvature (Radius) at or Immidiately Before Intersection on Any Leg for Posted Speed Limit of: 110 km/h	Tangent	>1800 m	1150 to 1800 m	750 to 1150 m	<750 m		5	0	0
	90 or 100 km/h	Tangent	>1400 m	950 to 1400 m	600 to 950 m	<600m		5	0	0
	70 or 80 km/h	Tangent	>950 m	550 to 950 m	340 to 550 m	<340 m		5	0	0
	60 km/h	Tangent	>575m	320 to 575 m	190 to 320 m	<190 m		5	3	15
4	Angle of Intersection or Offset Intersection	90 Degree Angle	80 or 100 Degree Angle	-	70 or 110 Degree Angle	<70 or >110 Degree or Offset Intersection		5	0	0
5	Downhill Approach Grades at or Immediately Before Intersection on Any Leg	<3.0%	3.1 to 3.9% and Meets Design Guidelines for Type and Speed of Road	4.0 to 4.9% and Meets Design Guidelines for Type and Speed of Road	5.0 to 7.0% and Meets Design Guidelines for Type and Speed of Road	>7.0% or Exceeds Maximum Gradient for Type and Speed of Road		3	0	0
6	Number of Legs	-	3	4	5	6 or More		3	1	3
									Subtotal Geometric Factors (G)	**43**
Operational Factors (O)										
7	Either: AADT (2-Way): On Major Road	<1000	1000-2000	2000-3000	3000-5000	>5000		10	4	40
	And On Minor Road	<500	500-1000	1000-1500	1500-2000	>2000		20	4	80
	Or: Signalization Warrant	Intersection Not Signalized and Volume-Based Signal Warrant Is Less than 20% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is 20% to 40% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is 40% to 60% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is 60% to 80% Satisfied	Intersection Not Signalized and Volume-Based Warrant Is Over 80% Satisfied		30	0	0
8	Regular Nighttime Hourly Pedestrian Volume	No Pedestrian	Up to 10	10 to 30	30 to 50	Over 50		10	0	0
9	Intersection Roadway Classification	No Primary Road Involved	Primary/Rural Major, Primary Rural Minor, or Primary/Designated Community Access	Primary/Secondary	Primary/Primary	Intersection Includes Divided Highway		5	4	20
10	Operating Speed or Posted Speed Limit on Major Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	2	10
11	Operating Speed or Posted Speed Limit on Minor Road	50 km/h or Less	60 km/h	70 km/h	80 km/h	90 km/h or Over		5	0	0
									Subtotal Operational Factors (O)	**150**
Environmental Factors (E)										
12	Lighted Development Within 150 m Radius of Intersection	-	In One Quadrant	In Two Quadrants	In Three Quadrants	In Four Quadrants	5	5	2	10
									Subtotal Environmental Factors (E)	**10**
Collision Factors (A)										
13	Average Annual Nighttime Collision Frequency or Rate over Last Three Year (Only Collisions Potentially Attributable to Inadequate Lighting)	0 Collisions per Year	1 Collisions per Year	-	3 or More Collisions per Year Or At Least 1.5 Collisions per Million Entering Vehicles per Year and an		1 or 2 Collisions per Year	15	0	0
							3 or More Collisions per Year or Rate >=1.5 Collisions/MEV	30	0	0
									Subtotal Collision Factors (A)	**0**
									Total Warranting Points (G+O+E+A)	**203**