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Date: June 2nd, 2025
File: 1509-49

City of Prince George
1100 Patricia Boulevard
Prince George BC, V2L 3V9

Attention: Ms. Mandy Jones, MCIP, RPP
Manager, Development Services and Approving Officer

Reference: Chief Lake Landing – 4922 Chief Lake Road
RZ100735 – Supplementary Traffic Letter

Dear Kali,

On behalf of Kidd Real Estate Holdings Ltd., L&M Engineering Ltd. is pleased to submit this Supplementary Traffic Letter to the Traffic Impact Study (TIS) that was completed for 4922 Chief Lake Road. The TIS was originally submitted on January 23rd, 2023, in support of the rezoning application RZ100735. Refer to Exhibit 1.

Exhibit 1: Subject Site

Following the TIS submission, a covenant was removed from the rezoning application restricting the density. This letter is being written to supplement the TIS and summarize the impacts the proposed changes will have on the TIS recommendations.

1.0 SITE INFORMATION

The Subject Site is approximately 4.0 ha in size and is entirely located within the municipal boundaries of the City of Prince George. The developer is proposing to rezone the property to RM1: Multiple Residential to facilitate the development of single-family dwellings, duplexes, and row housing.

2.0 ZONING CHANGES

The original Servicing Brief assumed that a covenant was to be placed on the parcel with the following two components:

- Following the OCPS's density guidelines of 22 dwelling units per hectare and constructing 88 dwelling units on the property.
- Restricting the percentage of row housing and duplex units to 20% each.

Since the original submission, the covenant was removed from the zoning application. The removal of the proposed covenant is to accommodate the provincial government's new housing initiative referred to as "Small-scale, multi-unit housing." The development now intends to use the standard RM1 zone density of 30 dwellings per hectare and construct 120 multi-family housing dwelling units on the property.

3.0 TRIP GENERATION

Tables 1 – 3 summarize the original TIS trip generation, the revised trip generation caused by the proposed changes, and the difference between the two trip generations. The trip generation estimates for the site were prepared using rates from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition*.

Table 1 – Trip Generation (Original TIS)

Peak Period	Trip Gen. Variable	Projected Trip Gen. Variable Value	Fitted Equation/ Average Rate	Total Trip Gen.	In %	Out %	In (vph)	Out (vph)
Single Detached Housing (ITE Code: 210)								
AM	Dwellings Units	70	T=0.71(X)+4.80	**55**	25	75	14	41
PM			Ln(T)=0.96Ln(X)+0.2	**72**	63	37	45	27
Multi-Family Housing – Low Rise (ITE Code: 220)								
AM	Occupied Dwelling Units	18	Ln(T)=0.92Ln(X)-0.51	**8**	20	80	2	6
PM			Ln(T)=0.98Ln(X)-0.52	**10**	65	35	7	3
Summary								
			AM Peak	**63**			16	47
			PM Peak	**82**			52	30

Table 2 – Trip Generation (Revised Zoning)

Peak Period	Trip Gen. Variable	Projected Trip Gen. Variable Value	Fitted Equation/ Average Rate	Total Trip Gen.	In %	Out %	In (vph)	Out (vph)
Multi-Family Housing – Low Rise (ITE Code: 220)								
AM	Occupied Dwelling Units	120	Ln(T) = 0.92Ln(X) – 0.51	**49**	20	80	10	39
PM			Ln(T) = 0.98Ln(X) – 0.52	**65**	65	35	42	23

Table 3 – Difference in Trip Generations

Peak Period	Trip Gen. Variable	Projected Trip Gen. Variable Value	Fitted Equation/ Average Rate	Total Trip Gen.	In %	Out %	In (vph)	Out (vph)
Single Detached Housing (ITE Code: 210)								
AM	Dwellings Units	-70	T=0.71(X)+4.80	**-55**	25	75	-14	-41
PM			Ln(T)=0.96Ln(X)+0.2	**-72**	63	37	-45	-27
Multi-Family Housing – Low Rise (ITE Code: 220)								
AM	Occupied Dwelling Units	+102	Ln(T)=0.92Ln(X)-0.51	**+42**	20	80	8	34
PM			Ln(T)=0.98Ln(X)-0.52	**+56**	65	35	36	20
Summary								
			AM Peak	**-13**			-6	-7
			PM Peak	**-16**			-9	-7

As illustrated in Table 3, the removal of the covenant and thus moving to only multi-family housing decreases the trips by 13 vehicles per hour during the AM peak and 16 vehicles per hour during the PM Peak. Once these trips are distributed to the various study intersections, they will have little to no impact on the operation of the study intersections.

4.0 SUMMARY

In summary, the removal of the covenant on the proposed rezoning will have little to no impact of the operation of the study intersections. The recommendations made in the TIS are still valid and should be used to guide development at 4922 Chief Lake Road.

Sincerely,
L&M ENGINEERING LIMITED

Prepared by:

Nioma El-fatihi, EIT
Project Engineer

Reviewed by:

Tanner Fjellstrom, P.Eng.
Associate

January 23rd, 2023

TRAFFIC IMPACT STUDY

CHIEF LAKE LANDING – 4922 CHIEF LAKE ROAD RESIDENTIAL DEVELOPMENT

Client: Kidd Real Estate Holdings
L&M Project No.: 1509-38
Rezoning No.: RZ100735

L&M Engineering Limited
1210 Fourth Avenue, Prince George, BC V2L 3J4
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Appendices:
A – Figures
B – Traffic Counts
C – Synchro
D – Warrants & Calculations

1.0 INTRODUCTION

On behalf of Kidd Real Estate Holdings Ltd., L&M Engineering is pleased to provide you with this Traffic Impact Study in support of the rezoning application RZ100741 for the subject property located at 4922 Chief Lake Road.

The subject property is approximately 4.0 hectares in size and is located within the municipal boundaries of the City of Prince George. The subject property is currently designated as Neighbourhood Residential Future Land Use in Schedule B6: Future Land Use of the Official Community Plan (OCP) and is currently zoned RS1m – Single Residential in the City of Prince George Zoning Bylaw No. 7850, 2007.

The developer is proposing to rezone the property to RM1: Multiple Residential to facilitate the development of single-family dwellings, duplexes, and row housing. The development intends to follow the OCP's density guideline of 22 dwelling units per hectare and construct 88 dwelling units on the property. Additionally, the developer has offered to place a covenant on the property restricting the percentage of row housing and duplex units to 20% each. This results in a maximum of 18 row housing units and 18 duplex units.

Exhibit 1: Subject Site

2.0 SCOPE OF STUDY

A scope development meeting was held between Scouten Engineering, the City of Prince George, and L&M Engineering on December 5th, 2022 to determine the scope of this Traffic Impact Study.

2.1 Study Intersections

- Chief Lake Road & Highway 16
- Chief Lake Road & Sparwood Road
- Chief Lake Road & Foothills Boulevard

2.2 Proposed Site Accesses

- One access on Chief Lake Road.
- Potentially one access on Sparwood Road. TIS to include this access for all traffic scenarios.
- Potentially one access to Peter Road/Killy Road through existing road dedication. It is also possible that the road dedication is used for a pedestrian trail. After the scope meeting, it was decided not to use the Peter/Killy Road dedication for vehicular access.

2.3 Study Horizons

- Existing Background Traffic
- Opening Day Traffic (Existing Background + Development Traffic). The approximate size of Phase 1 is 20 dwelling units.
- Projected Background Traffic (Existing Background Projected 15 Years in the Future)
- Total Traffic (Projected Background + Development Traffic)

2.4 Peak Study Periods

- Weekday AM peak 6:30am to 9:30am
- Weekday PM peak 3:00pm to 6:00pm

2.5 Background Traffic Growth Rates

- Permanent Count Station Data (P-42NS) suggests that Prince George has experienced a 1.4% growth rate between 2010 and 2020. We recommend using a 1.5% growth rate which is consistent with past studies.

2.6 Trip Generation

- The Institute of Traffic Engineers (ITE) Trip Generation rates will be used.

2.7 Trip Distribution

- Determine the trip distribution based on the proposed land use and local traffic patterns.

2.8 Pre-Submission

- Trip generation, distribution, background growth rate, seasonal factor and study design horizons were submitted to CoPG and MoTI for approval prior to the analysis and completion of the TIS.

2.9 Analysis

- Analysis to be prepared using Trafficware Synchro software. The Chief Lake access should be looked at to determine whether the access needs to be a right in, right out.
- Review Signal, Left Turn and Right Turn Warrants if applicable.
- Use the 95th percentile for queue lengths. Compare to TAC equation queue lengths.
- 15 min intervals.

2.10 Geometrics

- Review intersection geometry
- Sight Distances
- Left Turn Queue Lengths
- Deceleration Lane Lengths
- Assess the need for the existing flashing warning light situated above the Chief Lake Road and Foothills Boulevard intersection. The City has received complaints about the flashing red light that faces Foothills Boulevard. Drivers have indicated that they get confused, thinking it is a four-way stop intersection. Chris is to provide ICBC accident history for the intersection.

2.11 Pedestrian Connectivity

- Review the pedestrian network in the area.
- Discuss potential pedestrian pathway between the site and Peter Road, through the existing road dedication.

2.12 Report

- Summarize findings in a report to be submitted to the CoPG and MoTI.

3.0 EXISTING BACKGROUND

The following background traffic counts were conducted for the AM and PM Peak Hours:

- Highway 97 & Chief Lake Road (December 8th, 2022)
- Sparwood Road & Chief Lake Road (December 8th, 2022)
- Foothills Boulevard & Chief Lake Road (December 8th, 2022)

The counts were conducted on weekdays from 6:00 am to 9:00 am (AM Peak) and 3:00 pm – 6:00 pm (PM Peak). The counts were categorized by vehicle type and the peak hours were determined. The Existing Background traffic volumes are illustrated in Figure 2.

The traffic counts were conducted in December, outside the peak summer traffic months. To adjust the background traffic volumes to typical summer volumes, the data from the Ministry of Transportation (MoTI) permanent count station was reviewed. The closest permanent count station that includes commuter traffic is Count Station: P-42NS located at the intersection of Highway 16 and Highway 97 in Prince George. Data from 2011 to 2021 produces a seasonal adjustment factor of 11% for December in Prince George. An 11% seasonal adjustment was applied in this study.

4.0 PROJECTED BACKGROUND TRAFFIC

The Prince George Official Community Plan identifies the following three population growth rate scenarios:

- Low – 0.4%
- Medium – 0.8%
- High – 1.2%

The data from the nearest Ministry of Transportation (MoTI) permanent count station was reviewed. The closest permanent count station that includes commuter traffic is Count Station: P-42NS located at the intersection of Highway 16 and Highway 97 in Prince George. Based on the annual average daily traffic volume data from 2010 to 2020, Prince George has experienced an annual growth rate of 1.4%. To remain consistent with other traffic studies completed in the City of Prince George area, this study uses a projected growth rate of 1.5%.

The 2039 Projected Background traffic volumes are illustrated in Figure 3.

5.0 DEVELOPMENT TRAFFIC

The peak hour trip generation for the development was established using the published Institute of Traffic Engineers (ITE) Trip Generation Manual 10th Edition rates, using the maximum traffic density for the proposed zoning.

5.1 Trip Generation

Based on a conceptual site plan for the development and the proposed covenants, the site will consist of approximately 52 single-detached houses, 18 duplex dwelling units and 18 row housing units. Table 1 summarizes the trip generation for the full build-out of the site.

Table 1 – Trip Generation (Full Development)

Peak Period	Trip Gen. Variable	Projected Trip Gen. Variable Value	Fitted Equation/ Average Rate	Total Trip Gen.	In %	Out %	In (vph)	Out (vph)
Single Detached Housing (ITE Code: 210)								
AM	Dwellings Units	70	T=0.71(X)+4.80	**55**	25	75	14	41
PM			Ln(T)=0.96Ln(X)+0.2	**72**	63	37	45	27
Multi-Family Housing – Low Rise (ITE Code: 220)								
PM	Occupied Dwellings	18	Ln(T)=0.92Ln(X)-0.51	**8**	20	80	2	6
AM			Ln(T)=0.98Ln(X)-0.52	**10**	65	35	7	3
Summary								
			AM Peak	**63**			16	47
			PM Peak	**82**			52	30

** Trip Generation for AM & PM Peaks was calculated using the methods and equations outlined in the ITE Trip Generation Manual (10Th Ed).*

Phase 1 of the project is expected to consist of 20 dwelling units. Table 2 summarizes the trip generation for Phase 1.

Table 2 – (Trip Generation Phase 1)

Peak Period	Trip Gen. Variable	Projected Trip Gen. Variable Value	Fitted Equation/ Average Rate	Total Trip Gen.	In %	Out %	In (vph)	Out (vph)
Single Detached Housing (ITE Code: 210)								
AM	Dwellings Units	20	T=0.71(X)+4.80	**19**	25	75	5	14
PM			Ln(T)=0.96Ln(X)+0.2	**22**	63	37	14	8

** Trip Generation for AM & PM Peaks was calculated using the methods and equations outlined in the ITE Trip Generation Manual (10Th Ed).*

5.2 Trip Distribution

The proposed trip distribution for ingress and egress traffic has been developed using the existing intersection percentage splits and engineering judgement for the AM and PM peak hours scenarios. The site access on Chief Lake Road is approximately the same

distance away from Foothills as it is from Highway 97. The traffic counts at Sparwood Road showed that more drivers chose to take Foothills to head into the city centre rather than Highway 97. However, Sparwood is much closer to Foothills Boulevard than it is to Highway 97. The trip distribution for this site assumed that vehicles travelling into the city centre would be evenly distributed between Foothills and Highway 97. The remainder of the traffic was assumed to be travelling north along Highway 97 (either north of town or to Springwood Elementary) or west along Chief Lake Road (toward Ness Lake).

The Trip Distribution percentages are illustrated in Figure 4.

5.3 Trip Assignment Volumes

Based on the trip distribution percentages and utilizing the trip generation volumes illustrated in Tables 1 & 2, the Trip Assignment volumes for the Opening Day and Total Traffic scenarios can be calculated. The Trip Assignment volumes for the Opening Day scenario are illustrated in Figure 5 and the Trip Assignment volumes for the Total Traffic scenario are illustrated in Figure 6.

5.4 2024 Opening Day Volumes

Adding the 2024 Trip Assignment traffic (Figure 5) to the 2024 Existing Background traffic (Figure 2) results in the 2024 Opening Day traffic shown in Figure 7.

5.5 2039 Total Traffic Volumes

Adding the 2039 Trip Assignment traffic (Figure 6) to the 2039 Projected Background traffic (Figure 3) results in the 2039 Total Traffic shown in Figure 8.

6.0 HEAVY VEHICLE PERCENTAGE

The percentage of heavy vehicles on the municipal roads was calculated using the existing percentage of heavy vehicle traffic obtained from the traffic counts. Where the heavy vehicle volumes were zero, a default value of 2% was entered into the Synchro model (see Appendix D).

7.0 CAPACITY ANALYSIS

7.1 Method Analysis

To analyze the performance of the study intersections and calculate the capacity and "level of service" (LOS) of each intersection, Synchro Studio Software (Version 11) has been used. This software was developed by Trafficware Ltd. and is based on the methods and procedures in the Highway Capacity Manual. Computer printouts showing the detailed calculation for each movement at each study intersection are provided in Appendix C.

The concept of "Level of Service" is defined as a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.
The six levels of service are defined in the Highway Capacity Manual as follows:

- **Level of Service A** represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist is excellent.

- **Level of Service B** is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from Level of Service A. The level of comfort and convenience provided is somewhat less than at Level of Service A because the presence of others in the traffic stream begins to affect individual behaviour.

- **Level of Service C** is the range of stable flow but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interaction with others in the traffic stream. The selection of speed is now affected by the presence of others and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

- **Level of Service D** represents high-density, but stable, traffic flow. Speed and freedom to maneuver are severally restricted, and the driver experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

- **Level of Service E** represents operating conditions at, or near, the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult and is generally accomplished by forcing a vehicle to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable because small increases in flow and minor perturbations within the traffic stream will cause breakdowns.

- **Level of Service F** is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queues are characterized by stop-and-go waves, and they are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more and then be required to stop in a cyclic fashion. The Level of Service F is used to describe the operating conditions within the queue, as well as the point of the breakdown.

Levels of Service Criteria, as defined by the Highway Capacity Manual, are illustrated in Table 3.

Table 3 – Level of Service Definitions			
Level of Service	**Impact on Street Traffic**	**Unsignalized Intersection Delay(s)**	**Signalized Intersection Delay(s)**
A	Little or no delays	0 – 10	0 – 10
B	Minor delays	10 – 15	10 – 20
C	Average delays	15 – 25	20 – 35
D	Long delays	25 – 35	35 – 55
E	Very long delays	35 – 50	55 – 80
F	Undesirable	> 50	> 80

7.2 Highway 97 & Chief Lake Road

The Highway 97 and Chief Lake Road intersection is an unsignalized three-way intersection. Highway 97's northbound movement has a through lane and a separate left turn lane. The southbound movement has a through lane and a right-turn deceleration lane. Chief Lake Road is stop-controlled with a left turn lane and a channelized right turn movement. The speed limits along Highway 97 and Chief Lake Road are 70km/hr and 60km/hr, respectively.

A summary of the Synchro analysis for this intersection is shown in Table 4. The analysis shows that all movements operate at a LOS C (average delays) or better except the eastbound movement (Chief Lake Rd.) during the 2039 Total Traffic PM Peak scenario. This movement operates at a LOS D (long delays).

Table 4: Highway 97 & Chief Lake Road Intersection Analysis Summary						
	Chief Lake		Highway 97			
Approach	EB		NBL		SBR	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
AM Peak						
2024 Existing Background	B	14.4	A	8.8	A	0.0
2024 Opening Day	B	14.6	A	8.8	A	0.0
2039 Projected Background	C	18.2	A	9.3	A	0.0
2039 Total Traffic	C	19.6	A	9.4	A	0.0
PM Peak						
2024 Existing Background	C	16.2	A	8.8	A	0.0
2024 Opening Day	C	16.6	A	8.8	A	0.0
2039 Projected Background	C	24.1	A	9.4	A	0.0
2039 Total Traffic	D	28.5	A	9.5	A	0.0

7.3 Sparwood Road & Chief Lake Road

The Sparwood Road and Chief Lake Road intersection is an unsignalized three-way intersection. Sparwood Road is stop-controlled with a 50km/hr speed limit. Chief Lake Road is a two-lane road with a 60km/hr speed limit.

A summary of the Synchro analysis for this intersection is shown in Table 5. The analysis shows that all movements operate at a LOS B (minor delays) or better.

Table 5: Sparwood Road & Chief Lake Road Intersection Analysis Summary						
	Chief Lake				Sparwood	
Approach	EB		WB		SB	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
AM Peak						
2024 Existing Background	A	0.6	A	0.0	A	9.5
2024 Opening Day	A	0.6	A	0.0	B	12.0
2039 Projected Background	A	0.6	A	0.0	A	9.9
2039 Total Traffic	A	0.7	A	0.0	B	10.0
PM Peak						
2024 Existing Background	A	1.0	A	0.0	B	10.6
2024 Opening Day	A	1.0	A	0.0	B	10.6
2039 Projected Background	A	1.1	A	0.0	B	11.3
2039 Total Traffic	A	1.2	A	0.0	B	11.4

7.4 Foothills Boulevard & Chief Lake Road

The Foothills Boulevard and Chief Lake Road intersection is an unsignalized four-way intersection. Foothills Boulevard's northbound and southbound movements each have a through lane and separate left turn lanes. Both movements are stop controlled. Chief Lake Road is a two-lane road with a 60km/hr speed limit. Foothills has a 50km/hr speed limit at this location.

A summary of the Synchro analysis for this intersection is shown in Table 6. The analysis shows that all movements operate at a LOS C (average delays) or better except the northbound left turn (Foothills Blvd.) movement during the 2039 PM Peak scenarios. This movement operates at a LOS D (long delays).

Table 6: Foothills Boulevard & Chief Lake Road Intersection Analysis Summary												
Approach	Chief Lake				Foothills							
	EB		WB		Northbound				Southbound			
	L/T/R		L/T/R		NBL		NBT/NBR		SBL		SBT/SBR	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
AM Peak												
2024 Existing Background	A	0.0	A	3.7	C	15.2	B	10.3	B	13.5	B	14.2
2024 Opening Day	A	0.0	A	3.8	C	15.5	B	10.4	B	13.8	B	14.4
2039 Projected Background	A	0.0	A	3.9	C	19.4	B	11.0	C	15.7	C	16.6
2039 Total Traffic	A	0.0	A	4.5	C	21.5	B	11.1	C	17.0	C	17.8
PM Peak												
2024 Existing Background	A	0.1	A	1.8	C	17.6	B	11.6	B	13.6	B	12.6
2024 Opening Day	A	0.1	A	1.8	C	18.0	B	11.6	B	13.8	B	12.7
2039 Projected Background	A	0.1	A	1.9	D	26.7	B	12.8	C	15.7	B	14.0
2039 Total Traffic	A	0.1	A	2.2	D	30.7	B	13.1	C	17.0	B	14.6

In addition to the stop signs controlling the northbound and southbound movements, the intersection contains a flashing warning beacon suspended above the centre of the intersection. The beacon flashes red for the northbound and southbound movements (Foothills Boulevard) and flashes yellow for the eastbound and westbound movements (Chief Lake Road). During the scope development meeting for this TIS, the City indicated that they have received complaints about the flashing red light on Foothills Boulevard. Drivers state that they get confused, thinking that the intersection is a four-way stop intersection.

This intersection has always been a rural intersection with no significant lighting in the area. The warning beacon was likely installed to indicate that a major intersection was up ahead. Over the past couple of years, as part of the development of 5567 Chief Lake Road (southwest quadrant of the intersection), streetlights have been installed along both Foothills Boulevard and Chief Lake Road. The new street lighting provides adequate lighting levels at the intersection. As a result, the flashing warning beacon no longer appears to be necessary.

If the City decides to remove the flashing beacon above the intersection, a concealed road sign (W-6) should be installed on the east and west legs of Chief Lake Road, in

advance of the intersection. It is especially difficult for eastbound drivers along Chief Lake to see approaching vehicles on the north and south legs. Due to trees on both the north and south legs of the intersection, an eastbound driver can not see approaching vehicles until they arrive at the stop bar. The warning beacon has been in place for almost 30 years to help warn motorists of the intersection ahead. If it is removed, adding a W-6 sign would help provide advance warning to motorists that Foothills Boulevard is ahead.

Exhibit 2: W-6 Concealed Road Sign

A W-329 New Tab sign should be installed on the same pole as the W-6 sign. This sign should remain in place for three months until motorists become familiar with the removal of the overhead beacon.

Exhibit 3: W-329 New Tab Sign

8.0 GEOMETRICS

8.1 Sight Distance

The concept of sight distance applies both to vehicles approaching a potential conflict point (typically an intersection) and vehicles departing from a stop at the intersection. Sufficient sight distance should be provided in the design of roads so that drivers can perceive potential conflicts and respond by maneuvering appropriately.

The Transportation Association of Canada (TAC) Geometric Design Guide outlines the criteria for several different types of sight distance, including stopping sight distance, crossing sight distance, turning sight distance, passing sight distance, and decision sight distance. When these criteria apply depends on the specific vehicle maneuvers being considered. At a minimum, sufficient stopping sight distance should be provided so that drivers can perceive, react, and bring the vehicle to a stop or avoid conflicts.

The sight distance criteria for 60 km/hr and 70 km/hr speed limits are outlined in Table 7.

Table 7: Sight Distance Criteria

Sight Distance Type	**Design Speed (Major Road)**	
	60 km/hr	*70 km/hr*
	Minimum Distance Required (m)	
Stopping Sight Distance	85	110
Turning Sight Distance	160	200
Minimum Decision Sight Distance	165	200
Desirable Decision Sight Distance	235	275

A combination of PGMap and field analysis were used to approximate the available sightline distances at the study intersections. Table 8 illustrates a summary of the survey findings.

Table 8: Available Sight Distance

Location	**Direction**	**Measured Sight Distance**	
		Looking West	*Looking East*
Foothills Boulevard & Chief Lake Road			
Stop Bar	SB	≈ 225m	> 235m
4m Ahead of Stop Bar		> 235m	> 235m
Stop Bar	NB	≈ 120m	≈ 200
2m Ahead of Stop Bar		> 235m	> 235
Channelized Right Turn		> 235m	N/A
Foothills Boulevard & Sparwood Road			
2m from Road Edge	SB	≈ 125m	>235m
Highway 97 & Chief Lake Road			
		Looking South	*Looking North*
Stop Bar	EB	> 275m	> 275m
Channelized Right Turn		N/A	> 275m

The sightlines at both the Foothills/Chief Lake and the Highway 97/Chief Lake intersections meet all TAC sightline requirements. The only intersection sightline that does not meet all criteria is the southbound movement at the Sparwood/Chief Lake intersection while looking west. The available sightline is approximately 125m which does meet stopping sight distance requirements.

9.0 AUXILIARY LANES

Auxiliary lanes, as defined by the Transportation Association of Canada (TAC), "serve as storage lanes, deceleration lanes, or a combination of the two." They can be used to minimize hazards and inconvenience, increase capacity, and promote operating efficiency where vehicles exit or enter the roadway.

9.1 Left Turn Warrants

The Harmelink Charts were used to determine if a left turn lane is warranted at the Foothills/Chief Lake intersection or the Sparwood/Chief Lake intersections. Based on the plots, no additional left turns lanes are required at the study intersections. The Harmelink plots are enclosed in Appendix D.

9.2 Required Left Turn Storage

To analyze the left turn storage length, the available (existing) length was first measured from an aerial map. The distance was then compared with the computed Synchro 95th percentile queue storage lengths in addition to the published TAC calculation guidelines. The following TAC equations were utilized.

Unsignalized: $S = N*L/30$

Where: S= Storage Length (m)
N= Left Turn Volumes (veh/hr)
L= Average Vehicle Length (7.5m)

Signalized: $S = (N*L*SF*C)/3600$

Where: S= Storage Length (m)
N= Left Turn Volumes (veh/hr)
L= Average Vehicle Length (7.5m)
SF=Safety Factor. Used 1.5 for < 60km/hr & 2.0 for >60km/hr
C=Cycle Length (s)

9.2.1 Highway 97 & Chief Lake Road

The existing northbound left turn lane has a parallel length of 50m (storage + deceleration) and a 55m bay taper. The current MoTI left turn lane standard (outlined in the BC Supplement to TAC Geometric Design Guide) for a 70km/hr design speed includes a 60m parallel lane with a 40m bay taper plus the required storage. The current lane configuration does not meet the parallel length/storage length requirement.

Table 9 summarizes the storage length requirements based on the Synchro analysis and the TAC calculation. As shown in the table, the TAC storage length and the Synchro storage length differ by a significant amount (differ by 63m in 2039 PM Peak). The Synchro analysis storage length calculation considers gaps in the oncoming traffic, whereas the TAC equation only considers the number of left-turning vehicles that arrive at the intersection within a 2-minute interval. The TAC equation does not consider that the peak hour southbound traffic is relatively light and provides ample gaps in the traffic for left-turning vehicles.

Table 9: Highway 97 & Chief Lake Road Left Turn Storage

Approach	Northbound			
	Existing Length	LT Vol	Tac (m)	Syn (m)
AM Peak				
2024 Existing Background	50m	75	19	<7.5
2024 Opening Day		77	19	<7.5
2039 Projected Background		92	23	<7.5
2039 Total Traffic		98	25	<7.5
PM Peak				
2024 Existing Background	50m	223	56	<7.5
2024 Opening Day		228	57	<7.5
2039 Projected Background		273	68	9
2039 Total Traffic		291	73	10

Due to the large discrepancy between the two storage length calculations, it is recommended to use a storage length in between the two values. The TAC Guidelines recommend a minimum storage length of 30m. 30m of storage should provide sufficient space for vehicles to queue outside of the parallel deceleration lane during both the AM and PM peaks. It is recommended to upgrade the

northbound left turn lane to include 30m of storage, 60m of parallel deceleration, and a 40m bay taper.

The subject development has minimal impact on the required storage length for the left turn lane. Based on the BC Supplement to TAC, the lane should currently be built out to the recommended dimensions. This recommended upgrade should not be the responsibility of the developer.

9.2.2 Foothills Boulevard & Chief Lake Road

The existing northbound and southbound left turn lanes have 40m and 25m of storage, respectively. Based on the TAC and Synchro storage calculations, both of these lanes provide enough storage except the northbound lane during the 2039 PM Peak scenarios; however, the existing northbound lane is only 6m shorter than the recommended TAC value. Neither of the left turn lanes require parallel deceleration as both movements are stop controlled. It should also be noted that the southbound lane is 5m shorter than the TAC recommended minimum 30m. As seen in the traffic counts the southbound left turning movement does not see a high volume of traffic and the existing 25m storage length is sufficient.

Both of these lanes appear to operate adequately under the current dimensions.

Table 10: Foothills Boulevard & Chief Lake Road Left Turn Storage

Approach	Northbound				Southbound			
	Existing Length	LT Vol	Tac (m)	Syn (m)	Existing Length	LT Vol	Tac (m)	Syn (m)
AM Peak								
2024 Existing Background	40m	46	12	<7.5	25m	21	5	<7.5
2024 Opening Day		46	12	<7.5		21	5	<7.5
2039 Projected Background		56	14	8		26	7	<7.5
2039 Total Traffic		56	14	9		26	7	<7.5
PM Peak								
2024 Existing Background	40m	150	38	17	25m	6	2	<7.5
2024 Opening Day		150	38	17		6	2	<7.5
2039 Projected Background		184	46	32		7	2	<7.5
2039 Total Traffic		184	46	37		7	2	<7.5

9.3 Right Turn Deceleration Warrants

The right turn movements were evaluated to determine if a separate right-turn taper or lane was warranted at any of the study intersections. In, B.C., the widely accepted method for evaluating right turns is to utilize the "Warrants for Right Turn Treatment," a chart published in the VDOT Access Management Design Standards for Entrances and Intersections manual.

The proposed site access on Chief Lake Road was plotted on the warrant charts and it was determined that volumes do not warrant a right turn lane during any of the design scenarios.

10.0 SIGNAL WARRANTS

The Ministry of Transportation and Infrastructure has published a set of "Signal Warrants" to evaluate the need to install traffic signals at roadway intersections. These warrants can be found in the MoTI publication "Electrical and Traffic Engineering Manual - Section 400 Signal Design." For this study, three warrants were deemed appropriate:

- Warrant #1: Minimum Vehicular Volume;
- Warrant #2: Interruption of Continuous Traffic; and
- Warrant #3: Combination Warrant.

To evaluate the warrants, the average hourly volume of the seven highest recorded hours must be reviewed. In this case, only 6 hours were counted as part of the traffic counts; therefore, the 6-hour average was used.

The Foothills Boulevard/Chief Lake Road & the Highway 97/Chief Lake Road intersections were analyzed to determine if any signal warrants were met. Based on the MoTI signal warrant criteria neither of these intersections met any of the warrants.

Additionally, the Transportation Association of Canada published the Traffic Signal and Pedestrian Signal Head Warrant Handbook which provides an additional method to determine if a signal is warranted. Based on the TAC method, neither of these intersections met the signal warrant. Refer to Appendix D for the signal warrant calculations.

11.0 PEDESTRIAN CONNECTIVITY

The pedestrian network in the vicinity of the subject site is quite limited and is essentially nonexistent. The OCP Cycle Network plan indicates that the only pedestrian/cycling network in the area is an existing paved shoulder on Foothills Boulevard (approximately 700m away from the subject site).

The main pedestrian attractions for residents living in the proposed development include Springwood Elementary (approx. 2.1km away), Shas Ti Kelly Road Secondary (approx. 1.5km away), the Husky convenience store (approx. 0.6km away), and the Hart Shopping Centre (approx. 3km away). As it currently stands, pedestrians cannot travel to any of these institutions/amenities via an established pedestrian network.

The City of Prince George OCP includes a Pedestrian Network Plan which identifies all existing and proposed sidewalk/trail networks. The document identifies two locations that would be ideal for new trail networks in the vicinity of the subject site. The first is classified as a proposed boulevard trail that would run along the side of Chief Lake Road from the western city limit boundary to the Highway 97 intersection. It is not clear which side of the road the trail would be installed, but it appears that there is more space on the south side of Chief Lake Road to accommodate the trail. A boulevard trail is defined as a multi-use trail located along a road right-of-way and incorporated in lieu of sidewalks where posted speeds generally exceed 60km/hr. The second proposed trail listed in the OCP is a minor trail that connects Chief Lake Road to the Heather Park Elementary School and the Shas Ti Kelly Road Secondary School. The minor trail is proposed to be placed within the existing BC Hydro utility right-of-way.

As the Woodlands Subdivision and Chief Lake Road area continues to develop, the City should consider adding the Chief Lake Road boulevard trail to its capital works plan. Installing a boulevard trail along Chief Lake Road would greatly benefit pedestrians travelling to the secondary school, the Husky and the Hart Shopping Centre. For pedestrians walking to the secondary school or the Hart shopping centre, this trail would allow them to access the Chief Lake/Kelly Road S Frontage Road without having to walk directly on the shoulder of the busy Chief Lake Road. From there the frontage road would provide a low-traffic route for pedestrians to get to Shas Ti Kelly Road and the established sidewalk network on Kelly Road S.

During the Scope Development meeting, there were discussions about potentially providing a pedestrian pathway within the existing City road dedication to the north of the subject property. The road dedication links the subject property to the north end of Peter

Road. The main benefit of this pathway would be for pedestrians walking to Springwood Elementary or the Husky convenience store. Although there is not an established pedestrian network between the site and Springwood Elementary, it is still likely that children and parents will walk/cycle to the school. Providing this pathway would reduce this walking length by 1km and would eliminate the need for pedestrians to walk along Chief Lake Road. The City's Subdivision and Development Servicing Bylaw provides standard detail drawings for different types of trails. For this location it is recommended to install a 1m wide rustic trail as seen in Exhibit 3. The proposed trail locations are shown in Appendix A.

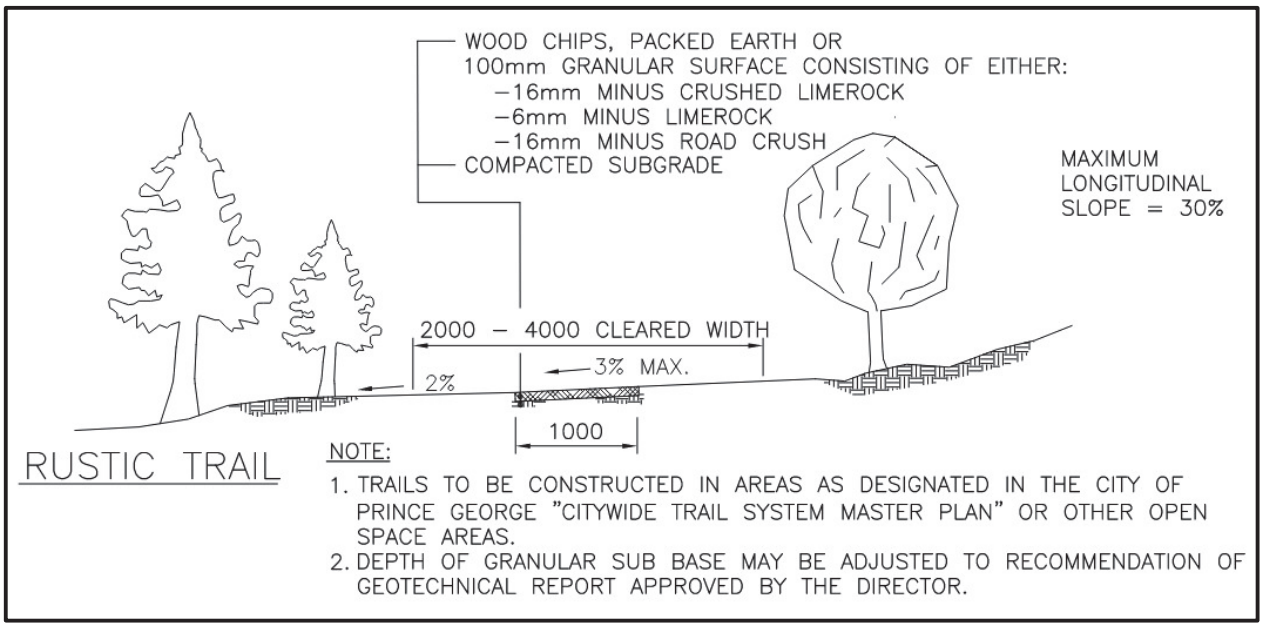

Exhibit 4: CoPG Rustic Trail Standard

12.0 CONCLUSIONS

12.1 Site Accesses

1. The site's main access will be a full movement access directly onto Chief Lake Road. The site should also have a secondary emergency access. The developer has stated that a secondary access could be installed through the neighbouring property to the west and access Sparwood Road. This would require a cross-access agreement across the neighbouring property, which the developer also owns.

12.2 Synchro Analysis

1. The analysis Synchro analysis for the Highway 97 and Chief Lake Road intersection shows that all movements operate at a LOS C (average delays) or better except the

eastbound movement (Chief Lake Rd.) during the 2039 Total Traffic PM Peak scenario. This movement operates at a LOS D (long delays).

2. The Synchro analysis for the Sparwood Road and Chief Lake Road intersection shows that all movements operate at a LOS B (minor delays) or better.

3. The Synchro analysis for the Foothills Boulevard and Chief Lake Road intersection shows that all movements operate at a LOS C (average delays) or better except the northbound left turn (Foothills Blvd.) movement during the 2039 PM Peak scenarios. This movement operates at a LOS D (long delays).

12.3 Left Turn Treatment

1. Based on the Harmelink plots, no additional left turn lanes are required at any of the study intersections.

2. The existing northbound left turn lane at the Highway 97 and Chief Lake Road intersection has a parallel deceleration length of 50m with no additional storage space. The BC Supplement to TAC indicates that the left turn lane should have 60m of parallel deceleration plus additional storage. The TAC and Synchro storage length calculations produce recommended storage lengths of 73m and 10m, respectively. In this situation, the TAC guideline is overestimating the required storage. The recommended storage should meet the TAC minimum of 30m.

3. The existing northbound left turn lane at the Foothills Boulevard and Chief Lake Road intersection has a storage length of 40m. The TAC and Synchro storage length calculations produce recommended storage lengths of 46m and 37m, respectively. Additional parallel deceleration is not required as the northbound movement is stop-controlled, and vehicles are required to stop regardless of their intersection movement.

4. The existing southbound left turn lane at the Foothills Boulevard and Chief Lake Road intersection has a storage length of 25m. The TAC minimum storage recommendation is 30m. The TAC and Synchro storage length calculations produce recommended storage lengths of 9m and less than 7.5m, respectively. Additional parallel deceleration is not required as the southbound movement is stop-controlled, and vehicles are required to stop regardless of their intersection movement.

12.4 Right Turn Treatment

1. Based on the published *VDOT Access Management Design Standards for Entrances and Intersections Right Turn Warrants,* no additional right turn deceleration lanes are warranted at any of the study intersections.

12.5 Intersection Signalization

1. Based on the Ministry of Transportation and Infrastructure's published signal warrants and the TAC published signal warrants, none of the study intersections meet the applicable signal warrants.

12.6 Pedestrian Connectivity

1. Currently there is no pedestrian network near the subject site. The City of Prince George's Pedestrian Network plan identifies two proposed trail networks in the area. One runs east-west along Chief Lak Road and the other runs north-south from Chief Lake Road to Heather Park Elementary school.

2. The potential for a pedestrian connection between the subject site and Peter Road exists within the existing road dedication to the north of the site. Since the developer is opting not to use the road dedication for vehicular access, it could be beneficial to construct a pedestrian pathway in this area. If this road dedication is not utilized by the subject development, then it will essentially become unusable as it will be surrounded by developed properties.

12.7 Flashing Warning Beacon

1. The Foothills Boulevard and Chief Lake Road intersection has a flashing warning beacon that is suspended above the centre of the intersection. The City has received complaints regarding the flashing beacon stating that it is sometimes confused for a four-way stop light. New streetlights have recently been installed around this intersection as part of a separate development, which provides the intersection with adequate lighting for visibility.

13.0 RECOMMENDATIONS

1. Extend the existing northbound left turn lane at the Highway 97 and Chief Lake Road intersection. The lane should include 60m of parallel deceleration, 30m of additional storage and a 50m taper. The developer should not be responsible for this

improvement as this is an existing issue and the development has minimal impact on the storage length requirement.

2. The City should consider adding the proposed boulevard trail along Chief Lake Road to its Capital Works Plan. This trail connection would provide the largest benefit to the subject development.

3. Install a rustic trail within the road dedication that connects the subject to Peter Road.

4. The City should consider removing the flashing warning beacon above the Foothills Boulevard and Chief Lake Road intersection. If the beacon is removed, then a Concealed Road sign (W-6) should be installed on the east and west approaches of the intersection to indicate that Foothills Boulevard is up ahead. A W-329 New Tab sign should be installed on the same pole for a three month period, until motorists are used to the removal of the warning beacon.

14.0 CLOSURE

This Traffic Impact Study has been prepared for the exclusive use of Kidd Real Estates Holdings Ltd., and the City of Prince George. Any use which a third party makes of this report or any reliance on or decisions to be made based on it are the responsibility of such third parties. L&M Engineering Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this study. The information and data contained within this document represent L&M Engineering Limited's professional judgment in accordance with the knowledge and information available to L&M Engineering Limited at the time of the report preparation. No other warranty, expressed or implied, is made.

Sincerely,
L&M ENGINEERING LIMITED

Prepared by:

Tanner Fjellstrom, P.Eng.
Associate

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NO 1002375
2023-01-25

Reviewed by:

Terry Fjellstrom, P. Eng.
President

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APPENDIX A

FIGURES

LEGEND

DEVELOPMENT BOUNDARY

NO.	DATE (D/M/Y)	REVISION	BY
–	–	–	–

NOT FOR CONSTRUCTION

L&M ENGINEERING LIMITED

CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1509-38
DRAWN: KP	
CHECKED: TF	
ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

STUDY INTERSECTIONS

DRAWING No.

FIG 1

0 120 240 Meters

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LEGEND

DEVELOPMENT BOUNDARY

xxx AM TRAFFIC
(xxx) PM TRAFFIC

NO.	DATE (D/M/Y)	REVISION	BY
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CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1509-38
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ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

2024 EXISTING BACKGROUND

DRAWING No.
FIG 2

0 120 240 Meters

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LEGEND

DEVELOPMENT BOUNDARY

INGRESS
xxx AM TRAFFIC %
(xxx) PM TRAFFIC %

EGRESS
xxx AM TRAFFIC %
(xxx) PM TRAFFIC %

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CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1509–38
DRAWN: KP	
CHECKED: TF	
ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

TRIP DISTRIBUTION

DRAWING No.
FIG 4

0 120 240 Meters

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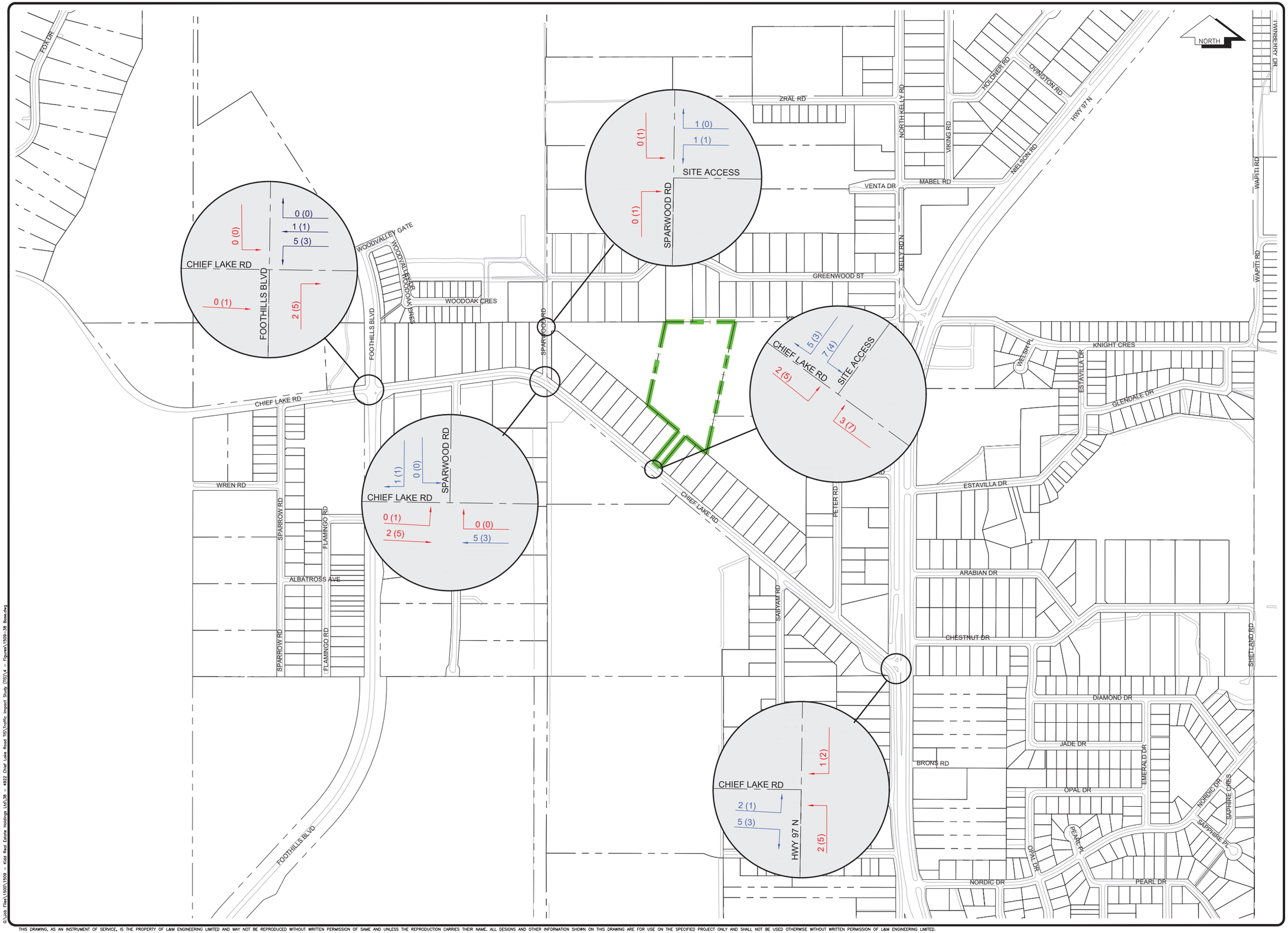

LEGEND

DEVELOPMENT BOUNDARY

INGRESS
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(xxx) PM TRAFFIC %

EGRESS
xxx AM TRAFFIC %
(xxx) PM TRAFFIC %

NO.	DATE (D/M/Y)	REVISION	BY
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CITY OF PRINCE GEORGE
Development Services

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DRAWN: KP	
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ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

2024 OPENING DAY
TRIP ASSIGNMENT

DRAWING No.
FIG 5

0 120 240 Meters

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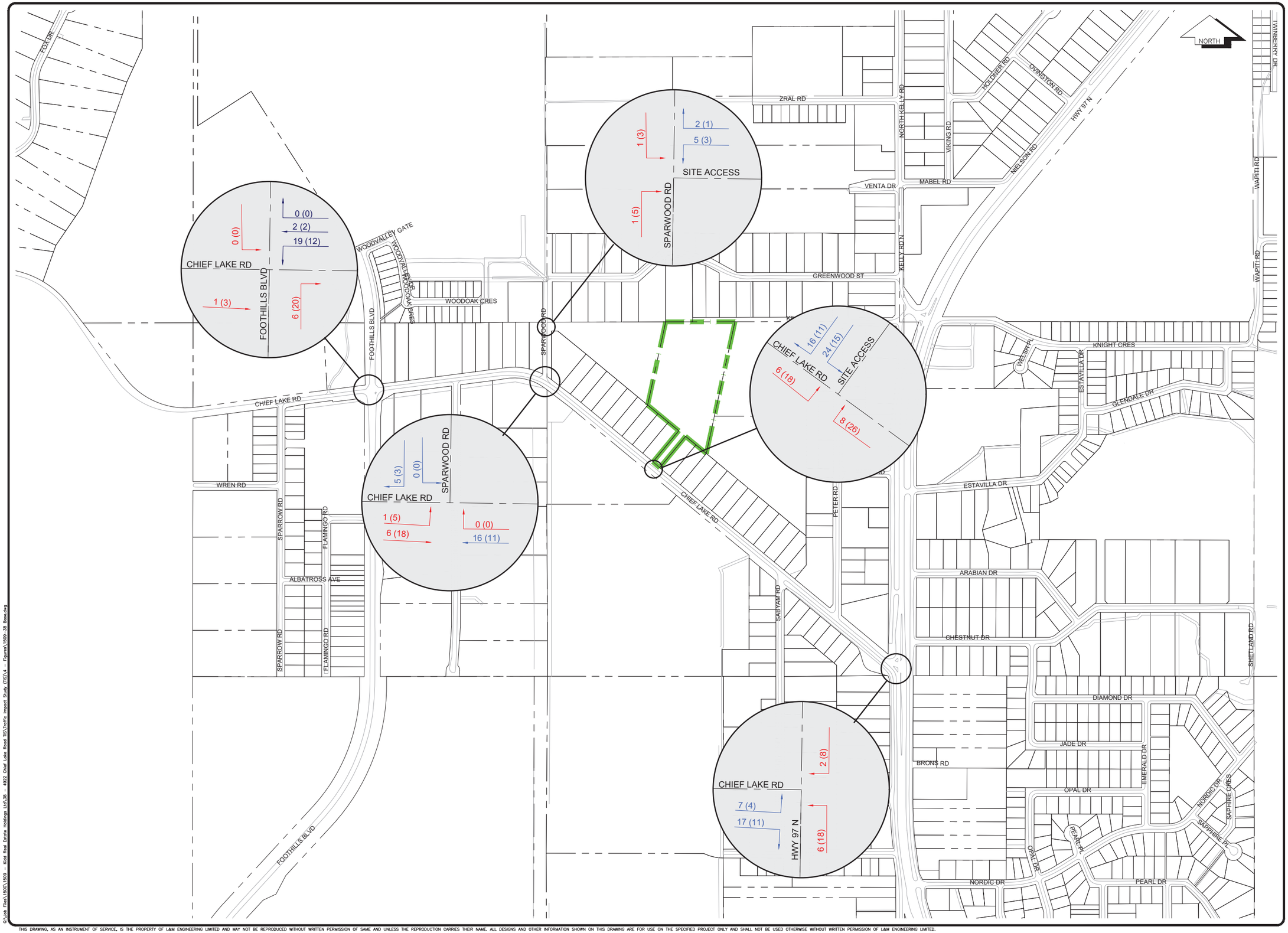

LEGEND

DEVELOPMENT BOUNDARY

INGRESS
xxx AM TRAFFIC %
(xxx) PM TRAFFIC %

EGRESS
xxx AM TRAFFIC %
(xxx) PM TRAFFIC %

NO.	DATE (D/M/Y)	REVISION	BY
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CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1509-38
DRAWN: KP	
CHECKED: TF	
ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

2039 TOTAL TRAFFIC
TRIP ASSIGNMENT

DRAWING No.
FIG 6

0 120 240 Meters

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CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1509–38
DRAWN: KP	
CHECKED: TF	
ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

2024 OPENING DAY

DRAWING No.
FIG 7

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LEGEND

DEVELOPMENT BOUNDARY

xxx AM TRAFFIC
(xxx) PM TRAFFIC

NO.	DATE (D/M/Y)	REVISION	BY
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CITY OF PRINCE GEORGE
Development Services

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CHECKED: TF	
ENGINEER: TF	
DATE: JAN 2023	
SCALES: 1:8000	
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

2039 TOTAL TRAFFIC

DRAWING No.
FIG 8

0 120 240 Meters

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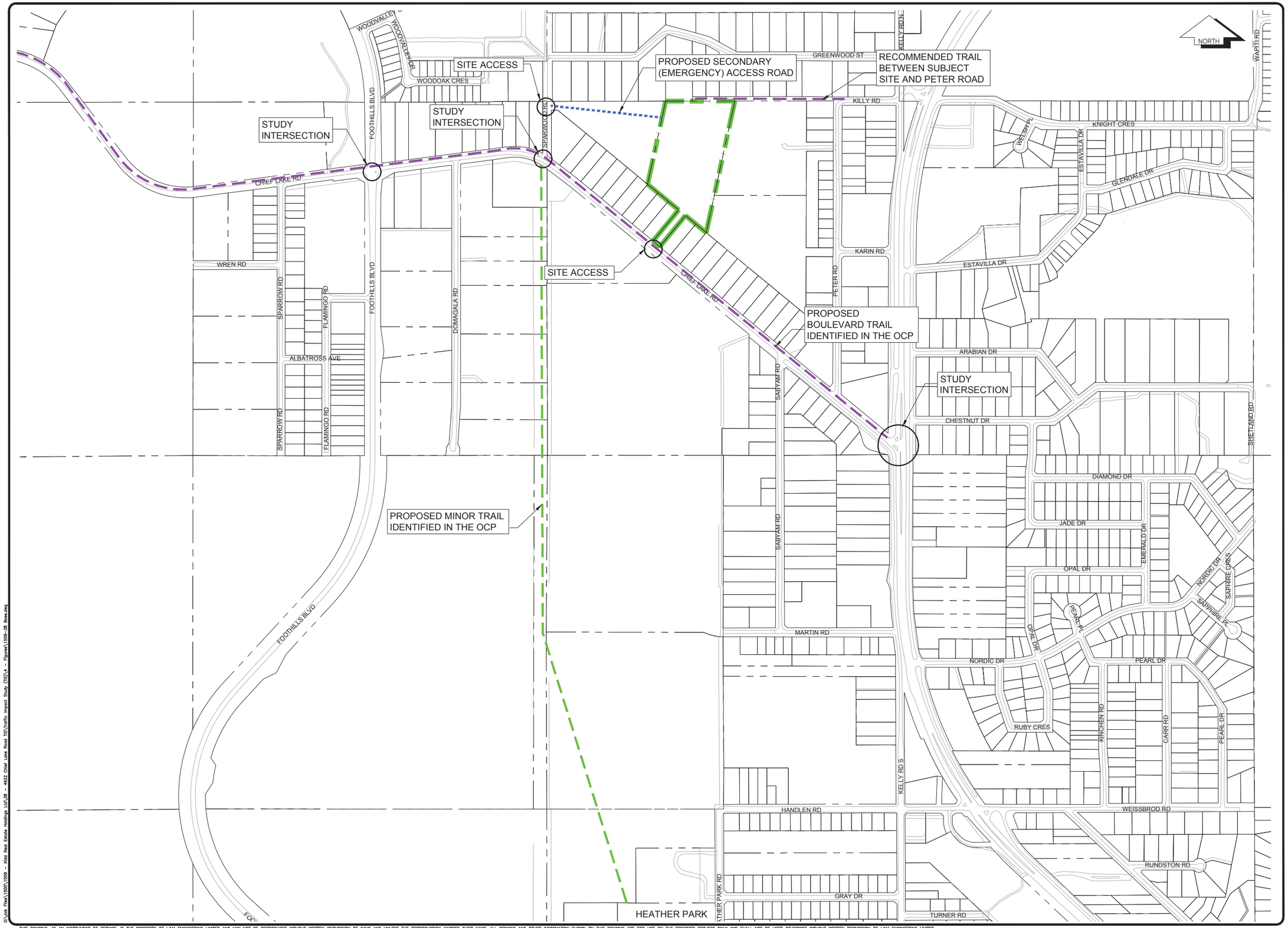

LEGEND

- DEVELOPMENT BOUNDARY
- PR BLVD TRAIL
- PR MINOR TRAIL

NO.	DATE (D/M/Y)	REVISION	BY
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L&M ENGINEERING LIMITED

CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1509–38
DRAWN:	KP
CHECKED:	TF
ENGINEER:	TF
DATE:	JAN 2023
SCALES:	1:8000
SCALES:	

KIDD REAL ESTATE HOLDINGS
4922 CHIEF LAKE ROAD
TRAFFIC IMPACT STUDY

PEDESTRIAN NETWORKS

DRAWING No.

PED

0 120 240 Meters

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APPENDIX B

TRAFFIC COUNTS

Vehicle Turning Movement Survey

PASSENGER VEHICLES

N/S Street: ***Highway 97***
E/W Street: ***Chief Lake Rd***
LOCATION: ***Prince George***
DATE: ***January 20, 2019***
WEATHER: ***Clear/ Sunny***
TOTAL HOURS= ***HRS***

Observer:
Notes:

Speed Limit Major Street	***50***
Speed Limit Minor Street	***50***

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15		47	6	7	16					2		37	115	
6:15 - 6:30		34		11	22					1		17	85	
6:30 - 6:45		41	5	13	15					5		30	109	
6:45 - 7:00		65	4	10	30							37	146	455
7:00 - 7:15		77	7	10	27					2		48	171	511
7:15 - 7:30		55	2	19	26					1		28	131	557
7:30 - 7:45		93	12	9	25					3		34	176	624
7:45 - 8:00		77	9	10	40					3		33	172	650
8:00 - 8:15		87	8	15	44					1		31	186	665
8:15 - 8:30		49	5	25	39					5		23	146	680
8:30 - 8:45		41	2	5	24					2		16	90	594
8:45 -9:00		42		9	24					2		22	99	521
SUB TOTAL		**708**	**60**	**143**	**332**					**27**		**356**	**1626**	
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15		43	8	31	63					3		41	189	
15:15 - 15:30		48	5	50	65					5		23	196	385
15:30 - 15:45		50	6	27	59					8		31	181	566
15:45 - 16:00		52	6	41	61					7		22	189	755
16:00 - 16:15		49	10	34	67					4		24	188	754
16:15 - 16:30		57	5	40	51					5		31	189	747
16:30 - 16:45		62	7	45	85					4		20	223	789
16:45 - 17:00		66	9	55	84					6		27	247	847
17:00 - 17:15		60	2	41	70					7		18	198	857
17:15 - 17:30		45	3	48	73					3		20	192	860
17:30 - 17:45		46	6	30	66					2		21	171	808
17:45 - 18:00		35	11	31	65					1		12	155	716
SUB TOTAL		**613**	**78**	**473**	**809**					**55**		**290**	**2318**	

Vehicle Turning Movement Survey

LT + Bus + RV

N/S Street: Highway 97
E/W Street: Chief Lake Rd
LOCATION: Prince George
DATE: January 20, 2019
WEATHER: Clear/ Sunny
TOTAL HOURS= HRS

Observer:
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15		3			3							1	7	
6:15 - 6:30		1		3	3					1			8	
6:30 - 6:45			1							1		1	3	
6:45 - 7:00				2	1								3	21
7:00 - 7:15		2	1		1							1	5	19
7:15 - 7:30		3	1	1	4								9	20
7:30 - 7:45		1										2	3	20
7:45 - 8:00		1	1	2									4	21
8:00 - 8:15		5		1	5							2	13	29
8:15 - 8:30		2	1	1	4								8	28
8:30 - 8:45		1		2	3								6	31
8:45 -9:00					2								2	29
SUB TOTAL		**19**	**5**	**12**	**26**					**2**		**7**	**71**	
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15		2	2	2	4							1	11	
15:15 - 15:30		1		1	2							2	6	17
15:30 - 15:45		1	1		3								5	22
15:45 - 16:00		5	3	1	4								13	35
16:00 - 16:15		2		2	1								5	29
16:15 - 16:30		1	2		1								4	27
16:30 - 16:45		3			1								4	26
16:45 - 17:00		1	2		1							1	5	18
17:00 - 17:15		5		1									6	19
17:15 - 17:30		1	2										3	18
17:30 - 17:45		4											4	18
17:45 - 18:00		1	1		1								3	16
SUB TOTAL		**27**	**13**	**7**	**18**							**4**	**69**	

Vehicle Turning Movement Survey

HEAVY TRUCKS

N/S Street: Highway 97
E/W Street: Chief Lake Rd
LOCATION: Prince George
DATE: January 20, 2019
WEATHER: Clear/ Sunny
TOTAL HOURS= HRS

Observer:
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15				1	7					1		2	11	
6:15 - 6:30		3		2	10							1	16	
6:30 - 6:45		11	1	2	7					1		2	24	
6:45 - 7:00		8		1	9					1			19	70
7:00 - 7:15		3		2	2							2	9	68
7:15 - 7:30		2		1	3							1	7	59
7:30 - 7:45		10		2	6							3	21	56
7:45 - 8:00		4			5								9	46
8:00 - 8:15		7	1		5								13	50
8:15 - 8:30		4		1	3							1	9	52
8:30 - 8:45		5		3	8							1	17	48
8:45 -9:00		4		1	8								13	52
SUB TOTAL		**61**	**2**	**16**	**73**					**3**		**13**	**168**	
PH HEAVY TRUCKS		**25**	**1**	**3**	**19**							**4**		
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15		8		1	5							3	17	
15:15 - 15:30		8		2	5								15	32
15:30 - 15:45		8	1	2	5					1			17	49
15:45 - 16:00		12		1	4								17	66
16:00 - 16:15		10	1	1	5								17	66
16:15 - 16:30		6	1		7					1		1	16	67
16:30 - 16:45		7	1	2	3							1	14	64
16:45 - 17:00		8	1	1	5								15	62
17:00 - 17:15		4	1	2	4								11	56
17:15 - 17:30		3		1	11								15	55
17:30 - 17:45		6	2	1	2								11	52
17:45 - 18:00		2		1	1								4	41
SUB TOTAL		**82**	**8**	**15**	**57**					**2**		**5**	**169**	
PH HEAVY TRUCKS		**21**	**4**	**5**	**22**									

Vehicle Turning Movement Survey

PEDESTRIAN

N/S Street: Highway 97
E/W Street: Chief Lake Rd
LOCATION: Prince George
DATE: January 20, 2019
WEATHER: Clear/ Sunny

Observer:
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

TOTAL HOURS= HRS

TIME	SOUTHBOUND *(North Approach)*	NORTHBOUND *(South Approach)*	WESTBOUND *(East Approach)*	EASTBOUND *(West Approach)*	Total Volume	Hourly Volume
6:00 - 6:15						
6:15 - 6:30						
6:30 - 6:45						
6:45 - 7:00						
7:00 - 7:15						
7:15 - 7:30						
7:30 - 7:45						
7:45 - 8:00				1	1	1
8:00 - 8:15				1	1	2
8:15 - 8:30						2
8:30 - 8:45						2
8:45 -9:00						1
SUB TOTAL				**2**	**2**	

14:30 - 14:45						
14:45 - 15:00						
15:00 - 15:15		1		2	3	
15:15 - 15:30				4	4	7
15:30 - 15:45						7
15:45 - 16:00						7
16:00 - 16:15						4
16:15 - 16:30				1	1	1
16:30 - 16:45						1
16:45 - 17:00						1
17:00 - 17:15						1
17:15 - 17:30						
17:30 - 17:45						
17:45 - 18:00						
SUB TOTAL		**1**		**7**	**8**	

Vehicle Turning Movement Survey

TOTAL

N/S Street: Highway 97
E/W Street: Chief Lake Rd
LOCATION: Prince George
DATE: January 20, 2019
WEATHER: Clear/ Sunny

Observer:
Notes:

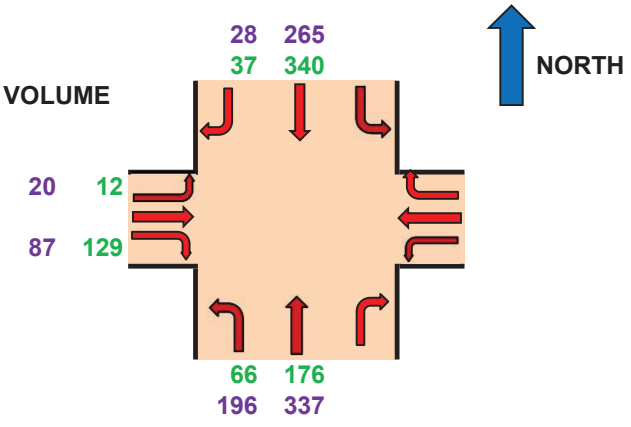
TOTAL HOURS = HRS

Speed Limit Major Street	50
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly	Pedestrian			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume	N	S	E	W
6:00 - 6:15		50	6	8	26					3		40	133					
6:15 - 6:30		38		16	35					2		18	109					
6:30 - 6:45		52	7	15	22					7		33	136					
6:45 - 7:00		73	4	13	40					1		37	168	546				
7:00 - 7:15		82	8	12	30					2		51	185	598				
7:15 - 7:30		60	3	21	33					1		29	147	636				
7:30 - 7:45		104	12	11	31					3		39	200	700				
7:45 - 8:00		82	10	12	45					3		33	185	717				1
8:00 - 8:15		99	9	16	54					1		33	212	744				1
8:15 - 8:30		55	6	27	46					5		24	163	**760**				
8:30 - 8:45		47	2	10	35					2		17	113	673				
8:45 -9:00		46		10	34					2		22	114	**602**				
SUB TOTAL		**788**	**67**	**171**	**431**					**32**		**376**	**1865**					2
PEAK HOUR		**340**	**37**	**66**	**176**					**12**		**129**	**760**					**2**
PHF	**#DIV/0!**	**0.82**	**0.771**	**0.61**	**0.81**	#####	#####	#####	#####	**0.6**	#####	**0.83**						
14:30 - 14:45																		
14:45 - 15:00																		
15:00 - 15:15		53	10	34	72					3		45	217			1		2
15:15 - 15:30		57	5	53	72					5		25	217	434				4
15:30 - 15:45		59	8	29	67					9		31	203	637				
15:45 - 16:00		69	9	43	69					7		22	219	856				
16:00 - 16:15		61	11	37	73					4		24	210	849				
16:15 - 16:30		64	8	40	59					6		32	209	841				1
16:30 - 16:45		72	8	47	89					4		21	241	879				
16:45 - 17:00		75	12	56	90					6		28	267	**927**				
17:00 - 17:15		69	3	44	74					7		18	215	932				
17:15 - 17:30		49	5	49	84					3		20	210	**933**				
17:30 - 17:45		56	8	31	68					2		21	186	878				
17:45 - 18:00		38	12	32	67					1		12	162	773				
SUB TOTAL		**722**	**99**	**495**	**884**					**57**		**299**	**2556**			1		7
PEAK HOUR		**265**	**28**	**196**	**337**					**20**		**87**	**933**					
PHF	**#DIV/0!**	**0.88**	**0.58**	**0.88**	**0.94**	#####	#####	#####	#####	**0.71**	#####	**0.78**						

PEAK HOUR VOLUME

AM PEAK
PM PEAK



Vehicle Turning Movement Survey

PASSENGER VEHICLES

N/S Street: ***Foothills Blvd***
E/W Street: ***Chief Lake Road***
LOCATION: ***Prince George***
DATE: ***December 8th, 2(***
WEATHER: ***Clear/ Sunny***
TOTAL HOURS= ***6***

Observer:
Notes:

Speed Limit Major Street	***60***
Speed Limit Minor Street	***50***

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15	7	2	0	0	0	4	7	4	1	0	28	22	75	
6:15 - 6:30	1	6	0	5	2	5	3	5	1	0	11	15	54	
6:30 - 6:45	1	6	1	2	0	2	8	8	0	0	23	22	73	
6:45 - 7:00	2	7	0	10	1	3	7	12	1	0	26	32	101	303
7:00 - 7:15	4	2	0	16	1	2	12	8	0	1	34	42	122	350
7:15 - 7:30	4	8	0	8	1	1	10	10	3	0	20	26	91	387
7:30 - 7:45	5	8	1	6	1	3	12	6	0	0	27	34	103	417
7:45 - 8:00	6	8	0	8	0	9	12	6	2	0	36	32	119	435
8:00 - 8:15	3	4	0	16	1	4	8	14	3	0	31	24	108	421
8:15 - 8:30	6	6	0	10	2	9	7	17	8	0	16	19	100	430
8:30 - 8:45	2	2	0	5	0	2	3	7	3	0	13	24	61	388
8:45 -9:00	3	3	0	10	1	4	3	5	0	1	20	13	63	332
SUB TOTAL	**44**	**62**	**2**	**96**	**10**	**48**	**92**	**102**	**22**	**2**	**285**	**305**	**1070**	
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:00 - 15:15	6	1	0	19	2	8	10	28	7	1	21	17	120	
15:15 - 15:30	4	1	0	28	4	13	6	22	12	0	13	15	118	238
15:30 - 15:45	1	3	0	23	7	11	12	15	2	0	18	16	108	346
15:45 - 16:00	3	3	1	25	2	17	4	23	2	0	14	18	112	458
16:00 - 16:15	4	4	0	29	7	8	8	24	7	0	14	10	115	453
16:15 - 16:30	4	2	0	38	1	10	6	19	7	1	17	15	120	455
16:30 - 16:45	0	5	0	23	8	12	9	25	8	0	12	13	115	462
16:45 - 17:00	4	1	1	34	4	15	6	32	5	1	23	20	146	496
17:00 - 17:15	1	3	0	28	7	13	6	24	2	1	14	23	122	503
17:15 - 17:30	1	5	1	46	13	13	7	34	7	0	11	13	151	534
17:30 - 17:45	0	3	0	30	6	5	10	21	2	0	13	7	97	516
17:45 - 18:00	6	3	0	21	5	13	7	22	4	0	10	13	104	474
SUB TOTAL	**34**	**34**	**3**	**344**	**66**	**138**	**91**	**289**	**65**	**4**	**180**	**180**	**1428**	

Vehicle Turning Movement Survey

LT + Bus + RV

N/S Street: Foothills Blvd
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8th, 20
WEATHER: Clear/ Sunny
TOTAL HOURS= 6

Observer 0
Notes: 0

Speed Limit Major Street	60
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15	0	0	0	0	0	0	0	0	0	0	0	1	1	
6:15 - 6:30	0	0	0	0	0	0	0	0	0	0	0	1	1	
6:30 - 6:45	0	0	0	1	0	0	1	1	0	0	1	1	5	
6:45 - 7:00	0	0	0	0	0	0	0	1	0	0	0	2	3	10
7:00 - 7:15	0	0	0	0	0	1	1	6	0	0	1	0	9	18
7:15 - 7:30	0	0	1	1	0	1	0	4	2	0	0	0	9	26
7:30 - 7:45	1	0	0	0	0	1	0	1	0	0	2	1	6	27
7:45 - 8:00	0	0	1	0	0	0	1	1	1	0	2	0	6	30
8:00 - 8:15	0	0	0	1	0	0	0	2	0	0	2	0	5	26
8:15 - 8:30	0	0	0	0	0	0	0	1	0	0	0	0	1	18
8:30 - 8:45	0	0	0	0	0	0	0	1	0	0	0	0	1	13
8:45 -9:00	0	0	0	1	0	0	0	1	0	0	0	0	2	9
SUB TOTAL	**1**	**0**	**2**	**4**	**0**	**3**	**3**	**19**	**3**	**0**	**8**	**6**	**49**	
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:00 - 15:15	0	0	1	0	0	0	2	1	0	0	2	0	6	
15:15 - 15:30	0	0	0	2	0	0	0	2	0	0	4	0	8	14
15:30 - 15:45	1	0	0	0	1	1	1	1	0	0	0	1	6	20
15:45 - 16:00	0	0	0	0	0	0	2	3	0	0	0	1	6	26
16:00 - 16:15	0	0	0	1	0	0	0	1	0	0	2	1	5	25
16:15 - 16:30	0	0	0	2	0	0	0	0	0	0	1	2	5	22
16:30 - 16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	16
16:45 - 17:00	0	0	0	0	0	0	2	0	0	0	1	0	3	13
17:00 - 17:15	0	0	0	1	0	1	1	2	0	0	1	0	6	14
17:15 - 17:30	0	0	0	0	0	0	2	0	0	0	0	1	3	12
17:30 - 17:45	0	0	0	1	0	0	0	0	0	0	0	1	2	14
17:45 - 18:00	0	0	0	0	0	0	1	0	0	0	0	0	1	12
SUB TOTAL	**1**	**0**	**1**	**7**	**1**	**2**	**11**	**10**	**0**	**0**	**11**	**7**	**51**	

Vehicle Turning Movement Survey

HEAVY TRUCKS

N/S Street: Foothills Blvd
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8th, 2022
WEATHER: Clear/ Sunny
TOTAL HOURS= 6

Observer: 0
Notes: 0

Speed Limit Major Street	60
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15	0	0	0	0	0	0	0	1	0	0	3	0	4	
6:15 - 6:30	0	0	0	0	0	0	0	0	0	0	1	0	1	
6:30 - 6:45	0	0	0	0	0	0	1	0	0	0	1	0	2	
6:45 - 7:00	0	0	0	0	0	0	0	1	0	0	1	0	2	9
7:00 - 7:15	0	0	0	0	0	0	1	3	0	0	1	0	5	10
7:15 - 7:30	0	0	0	0	0	0	0	1	0	0	1	1	3	12
7:30 - 7:45	0	0	0	0	0	0	0	0	0	0	3	0	3	13
7:45 - 8:00	0	0	0	1	0	0	0	1	0	0	1	0	3	14
8:00 - 8:15	0	0	0	0	0	1	1	0	0	0	0	1	3	12
8:15 - 8:30	0	0	0	0	0	0	2	1	0	0	0	1	4	13
8:30 - 8:45	0	0	0	0	0	0	1	3	0	0	1	0	5	15
8:45 -9:00	0	0	0	2	0	0	0	0	0	0	0	0	2	14
SUB TOTAL	**0**	**0**	**0**	**3**	**0**	**1**	**6**	**11**	**0**	**0**	**13**	**3**	**37**	
PH HEAVY TRUCKS	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**5**	**0**	**0**	**6**	**1**		
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:00 - 15:15	0	0	0	0	0	0	1	0	0	0	3	0	4	
15:15 - 15:30	0	0	0	0	0	0	0	1	0	0	1	0	2	6
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	6
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	6
16:00 - 16:15	0	0	0	0	0	1	1	0	0	0	0	0	2	4
16:15 - 16:30	0	0	0	0	0	0	1	0	0	0	0	0	1	3
16:30 - 16:45	0	0	0	0	0	0	1	3	0	0	1	0	5	8
16:45 - 17:00	0	0	0	0	0	0	0	1	0	0	0	0	1	9
17:00 - 17:15	0	0	0	0	0	0	0	2	0	0	0	0	2	9
17:15 - 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	8
17:30 - 17:45	0	0	0	0	0	0	0	1	0	0	0	0	1	4
17:45 - 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	3
SUB TOTAL	**0**	**0**	**0**	**0**	**0**	**1**	**4**	**8**	**0**	**0**	**5**	**0**	**18**	

Vehicle Turning Movement Survey			PEDESTRIAN			
N/S Street:	Foothills Blvd			Observer:	0	
E/W Street:	Chief Lake Road			Notes:	0	
LOCATION:	Prince George			Speed Limit Major Street		60
DATE:	December 8th, 2022			Speed Limit Minor Street		50
WEATHER:	Clear/ Sunny	TOTAL HOURS=	6			

	SOUTHBOUND *(North Approach)*	**NORTHBOUND** *(South Approach)*	**WESTBOUND** *(East Approach)*	**EASTBOUND** *(West Approach)*	Total Volume	Hourly Volume
TIME						
6:00 - 6:15	0	0	0	0	0	
6:15 - 6:30	0	0	0	0	0	
6:30 - 6:45	0	0	0	0	0	
6:45 - 7:00	0	0	0	0	0	0
7:00 - 7:15	0	0	0	0	0	0
7:15 - 7:30	0	0	0	0	0	0
7:30 - 7:45	0	0	0	0	0	0
7:45 - 8:00	0	0	0	0	0	0
8:00 - 8:15	0	0	0	0	0	0
8:15 - 8:30	0	0	0	0	0	0
8:30 - 8:45	0	0	0	0	0	0
8:45 -9:00	0	0	0	0	0	0
SUB TOTAL	**0**	**0**	**0**	**0**	**0**	
14:30 - 14:45	0	0	0	0	0	
14:45 - 15:00	0	0	0	0	0	
15:00 - 15:15	0	0	0	0	0	
15:15 - 15:30	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0
16:00 - 16:15	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0
16:45 - 17:00	0	0	0	0	0	0
17:00 - 17:15	0	0	0	1	1	1
17:15 - 17:30	0	0	0	0	0	1
17:30 - 17:45	0	0	0	0	0	1
17:45 - 18:00	0	0	0	0	0	1
SUB TOTAL	**0**	**0**	**0**	**1**	**1**	

Vehicle Turning Movement Survey — TOTAL

N/S Street: Foothills Blvd
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8th, 2022
WEATHER: Clear/ Sunny
TOTAL HOURS = 6

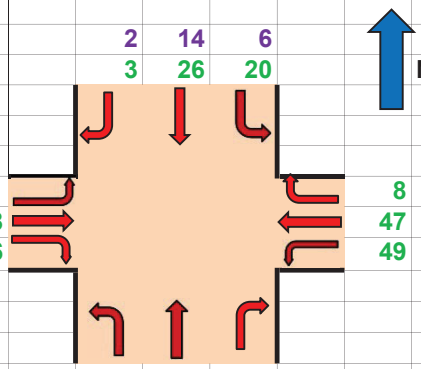
Observer: 0
Notes: 0

Speed Limit Major Street	60
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly	Pedestrian			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume	N	S	E	W
6:00 - 6:15	7	2	0	0	0	4	7	5	1	0	31	23	80		0	0	0	0
6:15 - 6:30	1	6	0	5	2	5	3	5	1	0	12	16	56		0	0	0	0
6:30 - 6:45	1	6	1	3	0	2	10	9	0	0	25	23	80		0	0	0	0
6:45 - 7:00	2	7	0	10	1	3	7	14	1	0	27	34	106	322	0	0	0	0
7:00 - 7:15	4	2	0	16	1	3	14	17	0	1	36	42	136	378	0	0	0	0
7:15 - 7:30	4	8	1	9	1	2	10	15	5	0	21	27	103	425	0	0	0	0
7:30 - 7:45	6	8	1	6	1	4	12	7	0	0	32	35	112	457	0	0	0	0
7:45 - 8:00	6	8	1	9	0	9	13	8	3	0	39	32	128	**479**	0	0	0	0
8:00 - 8:15	3	4	0	17	1	5	9	16	3	0	33	25	116	459	0	0	0	0
8:15 - 8:30	6	6	0	10	2	9	9	19	8	0	16	20	105	461	0	0	0	0
8:30 - 8:45	2	2	0	5	0	2	4	11	3	0	14	24	67	416	0	0	0	0
8:45 -9:00	3	3	0	13	1	4	3	6	0	1	20	13	67	**355**	0	0	0	0
SUB TOTAL	**45**	**62**	**4**	**103**	**10**	**52**	**101**	**132**	**25**	**2**	**306**	**314**	**1156**		0	0	0	0
PEAK HOUR	**20**	**26**	**3**	**40**	**3**	**18**	**49**	**47**	**8**	**1**	**128**	**136**	**479**		**0**	**0**	**0**	**0**
PHF	**0.8333**	**0.81**	**0.75**	**0.63**	**0.75**	**0.5**	**0.875**	**0.691**	**0.4**	**0.25**	**0.821**	**0.81**						
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
15:00 - 15:15	6	1	1	19	2	8	13	29	7	1	26	17	130		0	0	0	0
15:15 - 15:30	4	1	0	30	4	13	6	25	12	0	18	15	128	258	0	0	0	0
15:30 - 15:45	2	3	0	23	8	12	13	16	2	0	18	17	114	372	0	0	0	0
15:45 - 16:00	3	3	1	25	2	17	6	26	2	0	14	19	118	490	0	0	0	0
16:00 - 16:15	4	4	0	30	7	9	9	25	7	0	16	11	122	482	0	0	0	0
16:15 - 16:30	4	2	0	40	1	10	7	19	7	1	18	17	126	480	0	0	0	0
16:30 - 16:45	0	5	0	23	8	12	10	28	8	0	13	13	120	486	0	0	0	0
16:45 - 17:00	4	1	1	34	4	15	8	33	5	1	24	20	150	**518**	0	0	0	0
17:00 - 17:15	1	3	0	29	7	14	7	28	2	1	15	23	130	526	0	0	0	1
17:15 - 17:30	1	5	1	46	13	13	9	34	7	0	11	14	154	**554**	0	0	0	0
17:30 - 17:45	0	3	0	31	6	5	10	22	2	0	13	8	100	534	0	0	0	0
17:45 - 18:00	6	3	0	21	5	13	8	22	4	0	10	13	105	489	0	0	0	0
SUB TOTAL	**35**	**34**	**4**	**351**	**67**	**141**	**106**	**307**	**65**	**4**	**196**	**187**	**1497**		0	0		1
PEAK HOUR	**6**	**14**	**2**	**132**	**32**	**54**	**34**	**123**	**22**	**2**	**63**	**70**	**554**		**0**	**0**	**0**	**1**
PHF	**0.375**	**0.70**	**0.50**	**0.72**	**0.62**	**0.9**	**0.85**	**0.904**	**0.688**	**0.50**	**0.656**	**0.76**						

PEAK HOUR VOLUME

						2	14	6				
						3	26	20				
AM PEAK												
PM PEAK			2	1						8	22	
			63	128						47	123	
			70	136						49	34	
						40	3	18				
						132	32	54				



Vehicle Turning Movement Survey

PASSENGER VEHICLES

N/S Street: ***Sparwood Road***
E/W Street: ***Chief Lake Road***
LOCATION: ***Prince George***
DATE: ***December 8, 2022***
WEATHER: ***Clouds & wind***
TOTAL HOURS= ***HRS***

Observer: ***Megan Hickey***
Notes:

Speed Limit Major Street	***50***
Speed Limit Minor Street	***50***

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15			1					9		2	26		38	
6:15 - 6:30	1							9		1	16		27	
6:30 - 6:45	1		2					14			30		47	
6:45 - 7:00			3					21			31		55	167
7:00 - 7:15	1		4					16			41		62	191
7:15 - 7:30			5					18	1	1	25		50	214
7:30 - 7:45	1		3					14		1	36		55	222
7:45 - 8:00			8					14	1	3	51		77	244
8:00 - 8:15	1		5					21	1	2	40		70	252
8:15 - 8:30			4					28		5	21		58	260
8:30 - 8:45			1					11	1	1	15		29	234
8:45 -9:00								10			28		38	195
SUB TOTAL	**5**		**36**					**185**	**4**	**16**	**360**		**606**	
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15			1					49		2	37		89	
15:15 - 15:30								44		5	29		78	167
15:30 - 15:45	1		2					27		3	22		55	222
15:45 - 16:00			4					42	2	6	35		89	311
16:00 - 16:15	1		1					32		7	16		57	279
16:15 - 16:30	1		3					41	3	3	33		84	285
16:30 - 16:45			3					23		8	8		42	272
16:45 - 17:00	1		1					47	1	5	40		95	278
17:00 - 17:15	1							32	2	7	18		60	281
17:15 - 17:30			3					46		4	24		77	274
17:30 - 17:45			2					32		3	15		52	284
17:45 - 18:00								35	1	10	18		64	253
SUB TOTAL	**5**		**20**					**450**	**9**	**63**	**295**		**842**	

Vehicle Turning Movement Survey

LT + Bus + RV

N/S Street: Sparwood Road
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8, 2022
WEATHER: Clouds & wind
TOTAL HOURS= HRS

Observer: Megan Hickey
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15														
6:15 - 6:30														
6:30 - 6:45								1			2		3	
6:45 - 7:00														3
7:00 - 7:15								3			2		5	8
7:15 - 7:30								7			1		8	16
7:30 - 7:45											4		4	17
7:45 - 8:00								2		1	1		4	21
8:00 - 8:15								2			1		3	19
8:15 - 8:30								1					1	12
8:30 - 8:45								1					1	9
8:45 -9:00								1					1	6
SUB TOTAL								**18**		**1**	**11**		**30**	
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15								1			1		2	
15:15 - 15:30								2			2		4	6
15:30 - 15:45								1			1		2	8
15:45 - 16:00								2					2	10
16:00 - 16:15								1					1	9
16:15 - 16:30														5
16:30 - 16:45														3
16:45 - 17:00								1			1		2	3
17:00 - 17:15								1			2		3	5
17:15 - 17:30								2					2	7
17:30 - 17:45														7
17:45 - 18:00								1					1	6
SUB TOTAL								**12**			**7**		**19**	

Vehicle Turning Movement Survey

HEAVY TRUCKS

N/S Street: Sparwood Road
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8, 2022
WEATHER: Clouds & wind
TOTAL HOURS= HRS

Observer: Megan Hickey
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume
6:00 - 6:15								2			3		5	
6:15 - 6:30											1		1	
6:30 - 6:45								1			1		2	
6:45 - 7:00								1			1		2	10
7:00 - 7:15								4			1		5	10
7:15 - 7:30								1			1		2	11
7:30 - 7:45								1			3		4	13
7:45 - 8:00								1					1	12
8:00 - 8:15			1								2		3	10
8:15 - 8:30	1							3					4	12
8:30 - 8:45								4			1		5	13
8:45 -9:00								1	1				2	14
SUB TOTAL	**1**		**1**					**19**	**1**		**14**		**36**	
PH HEAVY TRUCKS	**1**		**1**					**5**			**5**			

14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15	1							1	1		3		6	
15:15 - 15:30								1			1		2	8
15:30 - 15:45	1								1				2	10
15:45 - 16:00	2							1	2				5	15
16:00 - 16:15	1								1		2		4	13
16:15 - 16:30								3					3	14
16:30 - 16:45								2	1		1		4	16
16:45 - 17:00								2	1				3	14
17:00 - 17:15								2					2	12
17:15 - 17:30														9
17:30 - 17:45								1					1	6
17:45 - 18:00														3
SUB TOTAL	**5**							**13**	**7**		**7**		**32**	

Vehicle Turning Movement Survey

PEDESTRIAN

N/S Street: Sparwood Road
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8, 2022
WEATHER: Clouds & wind

Observer: Megan Hickey
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

TOTAL HOURS= HRS

TIME	**SOUTHBOUND** *(North Approach)*	**NORTHBOUND** *(South Approach)*	**WESTBOUND** *(East Approach)*	**EASTBOUND** *(West Approach)*	Total Volume	Hourly Volume
6:00 - 6:15						
6:15 - 6:30						
6:30 - 6:45						
6:45 - 7:00						
7:00 - 7:15						
7:15 - 7:30						
7:30 - 7:45						
7:45 - 8:00						
8:00 - 8:15						
8:15 - 8:30						
8:30 - 8:45						
8:45 -9:00						
SUB TOTAL						

14:30 - 14:45						
14:45 - 15:00						
15:00 - 15:15						
15:15 - 15:30						
15:30 - 15:45						
15:45 - 16:00						
16:00 - 16:15						
16:15 - 16:30						
16:30 - 16:45						
16:45 - 17:00						
17:00 - 17:15						
17:15 - 17:30						
17:30 - 17:45						
17:45 - 18:00						
SUB TOTAL						

Vehicle Turning Movement Survey

TOTAL

N/S Street: Sparwood Road
E/W Street: Chief Lake Road
LOCATION: Prince George
DATE: December 8, 2022
WEATHER: Clouds & wind

Observer: Megan Hickey
Notes:

Speed Limit Major Street	50
Speed Limit Minor Street	50

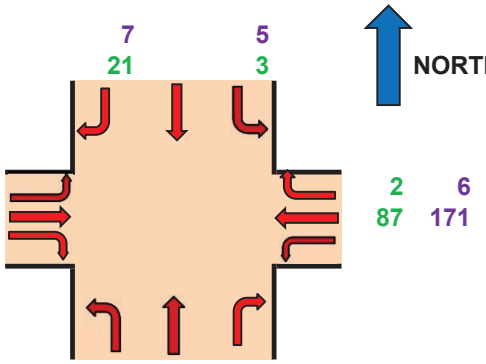
TOTAL HOURS = HRS

	SOUTHBOUND (North Approach)			NORTHBOUND (South Approach)			WESTBOUND (East Approach)			EASTBOUND (West Approach)			Total	Hourly	Pedestrian			
TIME	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	LEFT	THRU	RIGHT	Volume	Volume	N	S	E	W
6:00 - 6:15			1					11		2	29		43					
6:15 - 6:30	1							9		1	17		28					
6:30 - 6:45	1		2					16			33		52					
6:45 - 7:00			3					22			32		57	180				
7:00 - 7:15	1		4					23			44		72	209				
7:15 - 7:30			5					26	1	1	27		60	241				
7:30 - 7:45	1		3					15		1	43		63	252				
7:45 - 8:00			8					17	1	4	52		82	277				
8:00 - 8:15	1		6					23	1	2	43		76	281				
8:15 - 8:30	1		4					32		5	21		63	**284**				
8:30 - 8:45			1					16	1	1	16		35	256				
8:45 -9:00								12	1		28		41	**215**				
SUB TOTAL	**6**		**37**					**222**	**5**	**17**	**385**		**672**					
PEAK HOUR	**3**		**21**					**87**	**2**	**12**	**159**		**284**					
PHF	**0.75**	**#####**	**0.656**	**#####**	**#####**	**#####**	**#####**	**0.68**	**0.5**	**0.6**	**0.764**	**#####**						

14:30 - 14:45																		
14:45 - 15:00																		
15:00 - 15:15	1		1					51	1	2	41		97					
15:15 - 15:30								47		5	32		84	181				
15:30 - 15:45	2		2					28	1	3	23		59	240				
15:45 - 16:00	2		4					45	4	6	35		96	**336**				
16:00 - 16:15	2		1					33	1	7	18		62	301				
16:15 - 16:30	1		3					44	3	3	33		87	304				
16:30 - 16:45			3					25	1	8	9		46	291				
16:45 - 17:00	1		1					50	2	5	41		100	**295**				
17:00 - 17:15	1							35	2	7	20		65	298				
17:15 - 17:30			3					48		4	24		79	290				
17:30 - 17:45			2					33		3	15		53	297				
17:45 - 18:00								36	1	10	18		65	262				
SUB TOTAL	**10**		**20**					**475**	**16**	**63**	**309**		**893**					
PEAK HOUR	**5**		**7**					**171**	**6**	**16**	**131**		**336**					
PHF	**0.625**	**#####**	**0.44**	**#####**	**#####**	**#####**	**#####**	**0.838**	**0.375**	**0.67**	**0.799**	**#####**						

PEAK HOUR VOLUME

AM PEAK
PM PEAK



APPENDIX C

SYNCHRO

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	147	75	201	388	42
Future Volume (Veh/h)	14	147	75	201	388	42
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.83	0.61	0.81	0.82	0.77
Hourly flow rate (vph)	20	177	123	248	473	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	967	473	473			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	967	473	473			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	70	89			
cM capacity (veh/h)	250	589	1073			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	197	123	248	473	55
Volume Left	20	123	0	0	0
Volume Right	177	0	0	0	55
cSH	656	1073	1700	1700	1700
Volume to Capacity	0.30	0.11	0.15	0.28	0.03
Queue Length 95th (m)	10.1	3.1	0.0	0.0	0.0
Control Delay (s)	14.4	8.8	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.4	2.9		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	37.9%	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)	1	146	155	56	54	8	46	3	21	21	27	3
Future Volume (Veh/h)	1	146	155	56	54	8	46	3	21	21	27	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.82	0.81	0.88	0.69	0.70	0.63	0.75	0.70	0.83	0.81	0.75
Hourly flow rate (vph)	1	178	191	64	78	11	73	4	30	25	33	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	89			369			508	492	274	489	582	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	89			369			508	492	274	489	582	84
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 %	100			95			83	99	96	94	92	100
cM capacity (veh/h)	1506			1190			424	451	765	448	401	976

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	370	153	73	34	25	37
Volume Left	1	64	73	0	25	0
Volume Right	191	11	0	30	0	4
cSH	1506	1190	424	707	448	428
Volume to Capacity	0.00	0.05	0.17	0.05	0.06	0.09
Queue Length 95th (m)	0.0	1.4	4.9	1.2	1.4	2.3
Control Delay (s)	0.0	3.7	15.2	10.3	13.5	14.2
Lane LOS	A	A	C	B	B	B
Approach Delay (s)	0.0	3.7	13.7		13.9	
Approach LOS			B		B	

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	42.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	181	99	2	3	22
Future Volume (Veh/h)	12	181	99	2	3	22
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.76	0.68	0.70	0.75	0.70
Hourly flow rate (vph)	17	238	146	3	4	31
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	149				420	148
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	149				420	148
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	99				99	97
cM capacity (veh/h)	1432				529	891

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	255	149	35
Volume Left	17	0	4
Volume Right	0	3	31
cSH	1432	1700	827
Volume to Capacity	0.01	0.09	0.04
Queue Length 95th (m)	0.3	0.0	1.1
Control Delay (s)	0.6	0.0	9.5
Lane LOS	A		A
Approach Delay (s)	0.6	0.0	9.5
Approach LOS			A

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	26.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	152	77	201	388	43
Future Volume (Veh/h)	16	152	77	201	388	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.83	0.61	0.81	0.82	0.77
Hourly flow rate (vph)	23	183	126	248	473	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	973	473	473			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	973	473	473			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	69	88			
cM capacity (veh/h)	247	589	1073			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	206	126	248	473	56
Volume Left	23	126	0	0	0
Volume Right	183	0	0	0	56
cSH	663	1073	1700	1700	1700
Volume to Capacity	0.31	0.12	0.15	0.28	0.03
Queue Length 95th (m)	10.6	3.2	0.0	0.0	0.0
Control Delay (s)	14.6	8.8	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.6	3.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	38.0%	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)	1	146	155	61	55	8	46	3	23	21	27	3
Future Volume (Veh/h)	1	146	155	61	55	8	46	3	23	21	27	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.82	0.81	0.88	0.69	0.70	0.63	0.75	0.70	0.83	0.81	0.75
Hourly flow rate (vph)	1	178	191	69	80	11	73	4	33	25	33	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	91			369			520	504	274	501	594	86
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	91			369			520	504	274	501	594	86
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 %	100			94			82	99	96	94	92	100
cM capacity (veh/h)	1504			1190			415	442	765	436	393	973

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	370	160	73	37	25	37
Volume Left	1	69	73	0	25	0
Volume Right	191	11	0	33	0	4
cSH	1504	1190	415	709	436	420
Volume to Capacity	0.00	0.06	0.18	0.05	0.06	0.09
Queue Length 95th (m)	0.0	1.5	5.1	1.3	1.5	2.3
Control Delay (s)	0.0	3.8	15.5	10.4	13.8	14.4
Lane LOS	A	A	C	B	B	B
Approach Delay (s)	0.0	3.8	13.8		14.1	
Approach LOS			B		B	

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	43.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	183	104	2	3	0
Future Volume (Veh/h)	12	183	104	2	3	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.76	0.68	0.70	0.75	0.70
Hourly flow rate (vph)	17	241	153	3	4	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	156				430	154
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	156				430	154
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	99				99	100
cM capacity (veh/h)	1424				522	884

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	258	156	4
Volume Left	17	0	4
Volume Right	0	3	0
cSH	1424	1700	522
Volume to Capacity	0.01	0.09	0.01
Queue Length 95th (m)	0.3	0.0	0.2
Control Delay (s)	0.6	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	0.6	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		27.0%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	180	92	246	475	51
Future Volume (Veh/h)	17	180	92	246	475	51
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.83	0.61	0.81	0.82	0.77
Hourly flow rate (vph)	24	217	151	304	579	66
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1185	579	579			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1185	579	579			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	58	85			
cM capacity (veh/h)	177	513	980			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	241	151	304	579	66
Volume Left	24	151	0	0	0
Volume Right	217	0	0	0	66
cSH	570	980	1700	1700	1700
Volume to Capacity	0.42	0.15	0.18	0.34	0.04
Queue Length 95th (m)	16.7	4.3	0.0	0.0	0.0
Control Delay (s)	18.2	9.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	18.2	3.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	43.4%	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)	1	179	190	69	66	10	56	4	26	26	33	4
Future Volume (Veh/h)	1	179	190	69	66	10	56	4	26	26	33	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.82	0.81	0.88	0.69	0.70	0.63	0.75	0.70	0.83	0.81	0.75
Hourly flow rate (vph)	1	218	235	78	96	14	89	5	37	31	41	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	110			453			622	604	336	599	714	103
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	110			453			622	604	336	599	714	103
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 %	100			93			74	99	95	92	88	99
cM capacity (veh/h)	1480			1108			339	383	706	367	331	952

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	454	188	89	42	31	46
Volume Left	1	78	89	0	31	0
Volume Right	235	14	0	37	0	5
cSH	1480	1108	339	642	367	357
Volume to Capacity	0.00	0.07	0.26	0.07	0.08	0.13
Queue Length 95th (m)	0.0	1.8	8.3	1.7	2.2	3.5
Control Delay (s)	0.0	3.9	19.4	11.0	15.7	16.6
Lane LOS	A	A	C	B	C	C
Approach Delay (s)	0.0	3.9	16.7		16.2	
Approach LOS			C		C	

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	48.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	222	121	2	4	27
Future Volume (Veh/h)	15	222	121	2	4	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.76	0.68	0.70	0.75	0.70
Hourly flow rate (vph)	21	292	178	3	5	39
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	181				514	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	181				514	180
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	98				99	95
cM capacity (veh/h)	1394				463	856

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	313	181	44
Volume Left	21	0	5
Volume Right	0	3	39
cSH	1394	1700	780
Volume to Capacity	0.02	0.11	0.06
Queue Length 95th (m)	0.4	0.0	1.4
Control Delay (s)	0.6	0.0	9.9
Lane LOS	A		A
Approach Delay (s)	0.6	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	197	98	246	475	53
Future Volume (Veh/h)	24	197	98	246	475	53
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.83	0.61	0.81	0.82	0.77
Hourly flow rate (vph)	34	237	161	304	579	69
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1205	579	579			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1205	579	579			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	54	84			
cM capacity (veh/h)	170	513	980			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	271	161	304	579	69
Volume Left	34	161	0	0	0
Volume Right	237	0	0	0	69
cSH	587	980	1700	1700	1700
Volume to Capacity	0.46	0.16	0.18	0.34	0.04
Queue Length 95th (m)	19.4	4.7	0.0	0.0	0.0
Control Delay (s)	19.6	9.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.6	3.3		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	43.9%	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)	1	180	190	88	68	10	56	4	32	26	33	4
Future Volume (Veh/h)	1	180	190	88	68	10	56	4	32	26	33	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.82	0.81	0.88	0.69	0.70	0.63	0.75	0.70	0.83	0.81	0.75
Hourly flow rate (vph)	1	220	235	100	99	14	89	5	46	31	41	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	113			455			671	652	338	648	763	106
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	113			455			671	652	338	648	763	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 %	100			91			71	99	93	91	87	99
cM capacity (veh/h)	1476			1106			306	352	705	330	304	948

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	456	213	89	51	31	46
Volume Left	1	100	89	0	31	0
Volume Right	235	14	0	46	0	5
cSH	1476	1106	306	642	330	328
Volume to Capacity	0.00	0.09	0.29	0.08	0.09	0.14
Queue Length 95th (m)	0.0	2.4	9.4	2.1	2.5	3.9
Control Delay (s)	0.0	4.5	21.5	11.1	17.0	17.8
Lane LOS	A	A	C	B	C	C
Approach Delay (s)	0.0	4.5	17.7		17.5	
Approach LOS			C		C	

Intersection Summary				
Average Delay	5.4			
Intersection Capacity Utilization	50.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	228	137	2	4	32
Future Volume (Veh/h)	16	228	137	2	4	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.76	0.68	0.70	0.75	0.70
Hourly flow rate (vph)	23	300	201	3	5	46
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	204				548	202
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204				548	202
tC, single (s)	4.1				6.7	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.8	3.3
p0 queue free %	98				99	94
cM capacity (veh/h)	1368				440	831

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	323	204	51
Volume Left	23	0	5
Volume Right	0	3	46
cSH	1368	1700	764
Volume to Capacity	0.02	0.12	0.07
Queue Length 95th (m)	0.4	0.0	1.7
Control Delay (s)	0.7	0.0	10.0
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	10.0
Approach LOS			B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	99	223	384	302	0
Future Volume (Veh/h)	23	99	223	384	302	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.78	0.88	0.94	0.88	0.70
Hourly flow rate (vph)	32	127	253	409	343	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1258	343	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1258	343	343			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	82	79			
cM capacity (veh/h)	149	700	1210			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	159	253	409	343	0
Volume Left	32	253	0	0	0
Volume Right	127	0	0	0	0
cSH	741	1210	1700	1700	1700
Volume to Capacity	0.21	0.21	0.24	0.20	0.04
Queue Length 95th (m)	6.5	6.3	0.0	0.0	0.0
Control Delay (s)	16.2	8.8	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.2	3.3		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	41.6%	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)	2	72	80	39	140	23	150	33	62	6	14	2
Future Volume (Veh/h)	2	72	80	39	140	23	150	33	62	6	14	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.66	0.76	0.85	0.90	0.70	0.72	0.70	0.90	0.70	0.70	0.70
Hourly flow rate (vph)	3	109	105	46	156	33	208	47	69	9	20	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	189			214			445	448	162	456	484	172
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	189			214			445	448	162	456	484	172
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 %	100			97			58	90	92	98	96	100
cM capacity (veh/h)	1385			1356			491	487	883	428	465	871

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	217	235	208	116	9	23
Volume Left	3	46	208	0	9	0
Volume Right	105	33	0	69	0	3
cSH	1385	1356	491	665	428	495
Volume to Capacity	0.00	0.03	0.42	0.17	0.02	0.05
Queue Length 95th (m)	0.1	0.8	16.7	5.0	0.5	1.2
Control Delay (s)	0.1	1.8	17.6	11.6	13.6	12.6
Lane LOS	A	A	C	B	B	B
Approach Delay (s)	0.1	1.8	15.5		12.9	
Approach LOS			C		B	

Intersection Summary				
Average Delay	7.3			
Intersection Capacity Utilization	44.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	149	195	6	5	7
Future Volume (Veh/h)	16	149	195	6	5	7
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.80	0.84	0.70	0.70	0.70
Hourly flow rate (vph)	23	186	232	9	7	10
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	241				468	236
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	241				468	236
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				99	99
cM capacity (veh/h)	1326				529	802

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	209	241	17
Volume Left	23	0	7
Volume Right	0	9	10
cSH	1326	1700	662
Volume to Capacity	0.02	0.14	0.03
Queue Length 95th (m)	0.4	0.0	0.6
Control Delay (s)	1.0	0.0	10.6
Lane LOS	A		B
Approach Delay (s)	1.0	0.0	10.6
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	102	228	384	302	34
Future Volume (Veh/h)	24	102	228	384	302	34
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.78	0.88	0.94	0.88	0.70
Hourly flow rate (vph)	34	131	259	409	343	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1270	343	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1270	343	343			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	81	79			
cM capacity (veh/h)	146	700	1210			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	165	259	409	343	49
Volume Left	34	259	0	0	0
Volume Right	131	0	0	0	49
cSH	708	1210	1700	1700	1700
Volume to Capacity	0.23	0.21	0.24	0.20	0.03
Queue Length 95th (m)	7.2	6.5	0.0	0.0	0.0
Control Delay (s)	16.6	8.8	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.6	3.4		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	41.9%	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)	2	73	80	42	141	23	150	33	67	6	14	2
Future Volume (Veh/h)	2	73	80	42	141	23	150	33	67	6	14	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.66	0.76	0.85	0.90	0.70	0.72	0.70	0.90	0.70	0.70	0.70
Hourly flow rate (vph)	3	111	105	49	157	33	208	47	74	9	20	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	190			216			454	458	164	464	494	174
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	190			216			454	458	164	464	494	174
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 %	100			96			57	90	92	98	96	100
cM capacity (veh/h)	1384			1354			483	480	881	418	458	870

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	219	239	208	121	9	23
Volume Left	3	49	208	0	9	0
Volume Right	105	33	0	74	0	3
cSH	1384	1354	483	666	418	489
Volume to Capacity	0.00	0.04	0.43	0.18	0.02	0.05
Queue Length 95th (m)	0.1	0.9	17.1	5.3	0.5	1.2
Control Delay (s)	0.1	1.8	18.0	11.6	13.8	12.7
Lane LOS	A	A	C	B	B	B
Approach Delay (s)	0.1	1.8	15.6		13.0	
Approach LOS			C		B	

Intersection Summary				
Average Delay	7.4			
Intersection Capacity Utilization	45.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	154	198	6	5	8
Future Volume (Veh/h)	17	154	198	6	5	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.80	0.84	0.70	0.70	0.70
Hourly flow rate (vph)	24	192	236	9	7	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	245				480	240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	245				480	240
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				99	99
cM capacity (veh/h)	1321				520	798

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	216	245	18
Volume Left	24	0	7
Volume Right	0	9	11
cSH	1321	1700	661
Volume to Capacity	0.02	0.14	0.03
Queue Length 95th (m)	0.4	0.0	0.7
Control Delay (s)	1.0	0.0	10.6
Lane LOS	A		B
Approach Delay (s)	1.0	0.0	10.6
Approach LOS			B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	121	273	470	370	39
Future Volume (Veh/h)	28	121	273	470	370	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.78	0.88	0.94	0.88	0.70
Hourly flow rate (vph)	39	155	310	500	420	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1540	420	420			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1540	420	420			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	58	76	73			
cM capacity (veh/h)	92	633	1134			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	194	310	500	420	56
Volume Left	39	310	0	0	0
Volume Right	155	0	0	0	56
cSH	459	1134	1700	1700	1700
Volume to Capacity	0.42	0.27	0.29	0.25	0.03
Queue Length 95th (m)	16.5	8.9	0.0	0.0	0.0
Control Delay (s)	24.1	9.4	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	24.1	3.6		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	47.9%	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)	2	88	98	48	172	28	184	40	76	7	17	2
Future Volume (Veh/h)	2	88	98	48	172	28	184	40	76	7	17	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.66	0.76	0.85	0.90	0.70	0.72	0.70	0.90	0.70	0.70	0.70
Hourly flow rate (vph)	3	133	129	56	191	40	256	57	84	10	24	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	231			262			542	546	198	555	591	211
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	231			262			542	546	198	555	591	211
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 %	100			96			38	87	90	97	94	100
cM capacity (veh/h)	1337			1302			415	425	844	345	401	829

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	265	287	256	141	10	27
Volume Left	3	56	256	0	10	0
Volume Right	129	40	0	84	0	3
cSH	1337	1302	415	603	345	425
Volume to Capacity	0.00	0.04	0.62	0.23	0.03	0.06
Queue Length 95th (m)	0.1	1.1	32.2	7.2	0.7	1.6
Control Delay (s)	0.1	1.9	26.7	12.8	15.7	14.0
Lane LOS	A	A	D	B	C	B
Approach Delay (s)	0.1	1.9	21.8		14.5	
Approach LOS			C		B	

Intersection Summary				
Average Delay	9.9			
Intersection Capacity Utilization	51.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	183	239	7	6	9
Future Volume (Veh/h)	20	183	239	7	6	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.80	0.84	0.70	0.70	0.70
Hourly flow rate (vph)	29	229	285	10	9	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	295				577	290
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	295				577	290
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	98				98	98
cM capacity (veh/h)	1266				455	749

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	258	295	22
Volume Left	29	0	9
Volume Right	0	10	13
cSH	1266	1700	592
Volume to Capacity	0.02	0.17	0.04
Queue Length 95th (m)	0.6	0.0	0.9
Control Delay (s)	1.1	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	1.1	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		36.3%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	132	291	470	370	47
Future Volume (Veh/h)	32	132	291	470	370	47
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.71	0.78	0.88	0.94	0.88	0.70
Hourly flow rate (vph)	45	169	331	500	420	67
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		6				
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1582	420	420			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1582	420	420			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	47	73	71			
cM capacity (veh/h)	85	633	1134			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	214	331	500	420	67
Volume Left	45	331	0	0	0
Volume Right	169	0	0	0	67
cSH	403	1134	1700	1700	1700
Volume to Capacity	0.53	0.29	0.29	0.25	0.04
Queue Length 95th (m)	24.1	9.8	0.0	0.0	0.0
Control Delay (s)	28.5	9.5	0.0	0.0	0.0
Lane LOS	D	A			
Approach Delay (s)	28.5	3.8		0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	48.9%	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)	2	91	98	60	174	28	184	40	96	7	17	2
Future Volume (Veh/h)	2	91	98	60	174	28	184	40	96	7	17	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.66	0.76	0.85	0.90	0.70	0.72	0.70	0.90	0.70	0.70	0.70
Hourly flow rate (vph)	3	138	129	71	193	40	256	57	107	10	24	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					386							
pX, platoon unblocked												
vC, conflicting volume	233			267			578	584	202	592	628	213
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	233			267			578	584	202	592	628	213
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 %	100			95			34	86	87	97	94	100
cM capacity (veh/h)	1335			1297			387	400	838	311	377	827

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	270	304	256	164	10	27
Volume Left	3	71	256	0	10	0
Volume Right	129	40	0	107	0	3
cSH	1335	1297	387	607	311	401
Volume to Capacity	0.00	0.05	0.66	0.27	0.03	0.07
Queue Length 95th (m)	0.1	1.4	36.6	8.7	0.8	1.7
Control Delay (s)	0.1	2.2	30.7	13.1	17.0	14.6
Lane LOS	A	A	D	B	C	B
Approach Delay (s)	0.1	2.2	23.8		15.3	
Approach LOS			C		C	

Intersection Summary				
Average Delay	10.9			
Intersection Capacity Utilization	51.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	201	250	7	6	12
Future Volume (Veh/h)	25	201	250	7	6	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.70	0.80	0.84	0.70	0.70	0.70
Hourly flow rate (vph)	36	251	298	10	9	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	308				626	303
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308				626	303
tC, single (s)	4.1				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.3
p0 queue free %	97				98	98
cM capacity (veh/h)	1253				423	737

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	287	308	26
Volume Left	36	0	9
Volume Right	0	10	17
cSH	1253	1700	586
Volume to Capacity	0.03	0.18	0.04
Queue Length 95th (m)	0.7	0.0	1.1
Control Delay (s)	1.2	0.0	11.4
Lane LOS	A		B
Approach Delay (s)	1.2	0.0	11.4
Approach LOS			B

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		38.9%	ICU Level of Service
Analysis Period (min)		15	

APPENDIX D

WARRANTS & CALCULATIONS

B.C. MINISTRY OF TRANSPORTATION AND HIGHWAYS

TRAFFIC SIGNAL WARRANTS

INTERSECTION LOCATION Foothills & Chief Lake HIGHWAY REGION

CALCULATED BY TF CHECKED BY

TRAFFIC COUNT DATE DEC 2022 WARRANT DATE JAN 2023

- O Posted Speed or 85 Percentile Speed of Major Street Traffic > 70km/h
- O The Population in Built up Area of Isolated Community < 10,000
- O Distance to Nearest Signal Less Than 1000 Meters

WARRANT 1. MIMIMUM VEHICULAR VOLUME

O Satisfied ● Not Satisfied

Number of Lanes for Moving Traffic on Each Approach		Vehicles per Hour Approaching on Major Street (Total of Both Approaches)			Vehicles per Hour Approaching on Higher Volume Minor Street Approach (One Direction Only)		
Major Street	Minor Street	Requirements	Field Value	Percent Filled	Requirements	Field Value	Percent Filled
1	1	500(350)	277	55%	150(105)	119	79%
2 or more	1	600(420)			150(105)		
2 or more	2 or more	600(420)			200(140)		
1	2 or more	500(350)			200(140)		

WARRANT 2. INTERRUPTION OF CONTINUOUS TRAFFIC

O Satisfied ● Not Satisfied

Number of Lanes for Moving Traffic on Each Approach		Vehicles per Hour Approaching on Major Street (Total of Both Approaches)			Vehicles per Hour Approaching on Higher Volume Minor Street Approach (One Direction Only)		
Major Street	Minor Street	Requirements	Field Value	Percent Filled	Requirements	Field Value	Percent Filled
1	1	750(525)	277	37%	75(53)	119	159%
2 or more	1	900(630)			75(53)		
2 or more	2 or more	900(630)			100(70)		
1	2 or more	750(525)			100(70)		

WARRANT 3. COMBINATION OF WARRANTS

O Satisfied ● Not Satisfied

Requirement	Warrants	80% Satisfied	Number of Warrants 80% Satisfied
Warrants 1 & 2 80% satisfied	1 – Minimum Vehicular Volume	Yes O No ●	O
	2 – Interruption of Continuous Traffic	Yes O No ●	

WARRANT 4. ACCIDENT EXPERIENCE

O Satisfied O Not Satisfied

Accident Type :		Accident Severity:
Requirement	A – Adequate trial of less restrictive remedies with satisfactory observance and enforcement has failed to reduce the accident frequency;	Yes O No O
All of A, B, and C Satisfied	B – Five or more reported accidents, of types susceptible to correction by traffic signal control, have occurred within a 12-month period, each accident involving personal injury or property damage to an extent of $1000 or more;	Yes O No O
	C – The signal installation will not seriously disrupt progressive traffic flow	No O Yes O

WARRANT 5. PEAK HOUR LEFT TURN VOLUMES

O Satisfied O Not Satisfied

Requirement	Warrants	Requirements	Field Value	Fulfilled
One or More Warrants Satisfied	Product of Left Turn Vehicles and Opposing Through Vehicles	100,000 (2 Lane)		Yes O No O
		150,000 (4 Lane)		Yes O No O
	Left Turn Volumes	150 Vehicle per Hour, or		Yes O No O
		100 vph for 70 km/h or more		Yes O No O

Notes

1. The right turn traffic is excluded in the traffic count for all warrants.
2. Bracketed figurs are 70% of normal warrant figures. Use when the posted speed or 85 percentile speed of major street traffic exceeds 70 km/h, or when the surrounding areas population is less than 10,000.

B.C. MINISTRY OF TRANSPORTATION AND HIGHWAYS

TRAFFIC SIGNAL WARRANTS

INTERSECTION LOCATION HIGHWAY 97 & CHIEF LAKE HIGHWAY REGION _____

CALCULATED BY TF CHECKED BY _____

TRAFFIC COUNT DATE DEC 2022 WARRANT DATE JAN 2023

- O Posted Speed or 85 Percentile Speed of Major Street Traffic > 70km/h
- O The Population in Built up Area of Isolated Community < 10,000
- O Distance to Nearest Signal Less Than 1000 Meters

WARRANT 1. MIMIMUM VEHICULAR VOLUME

O Satisfied ● Not Satisfied

Number of Lanes for Moving Traffic on Each Approach		Vehicles per Hour Approaching on Major Street (Total of Both Approaches)			Vehicles per Hour Approaching on Higher Volume Minor Street Approach (One Direction Only)		
Major Street	Minor Street	Requirements	Field Value	Percent Filled	Requirements	Field Value	Percent Filled
1	1	500(350)	789	158%	150(105)	26	17%
2 or more	1	600(420)			150(105)		
2 or more	2 or more	600(420)			200(140)		
1	2 or more	500(350)			200(140)		

WARRANT 2. INTERRUPTION OF CONTINUOUS TRAFFIC

O Satisfied ● Not Satisfied

Number of Lanes for Moving Traffic on Each Approach		Vehicles per Hour Approaching on Major Street (Total of Both Approaches)			Vehicles per Hour Approaching on Higher Volume Minor Street Approach (One Direction Only)		
Major Street	Minor Street	Requirements	Field Value	Percent Filled	Requirements	Field Value	Percent Filled
1	1	750(525)	789	105%	75(53)	26	35%
2 or more	1	900(630)			75(53)		
2 or more	2 or more	900(630)			100(70)		
1	2 or more	750(525)			100(70)		

WARRANT 3. COMBINATION OF WARRANTS

O Satisfied ● Not Satisfied

Requirement	Warrants	80% Satisfied	Number of Warrants 80% Satisfied
Warrants 1 & 2 80% satisfied	1 – Minimum Vehicular Volume	Yes O No ●	0
	2 – Interruption of Continuous Traffic	Yes O No ●	

WARRANT 4. ACCIDENT EXPERIENCE

O Satisfied O Not Satisfied

Accident Type :		Accident Severity:
Requirement	A – Adequate trial of less restrictive remedies with satisfactory observance and enforcement has failed to reduce the accident frequency;	Yes O No O
All of A, B, and C Satisfied	B – Five or more reported accidents, of types susceptible to correction by traffic signal control, have occurred within a 12-month period, each accident involving personal injury or property damage to an extent of $1000 or more;	Yes O No O
	C – The signal installation will not seriously disrupt progressive traffic flow	No O Yes O

WARRANT 5. PEAK HOUR LEFT TURN VOLUMES

O Satisfied O Not Satisfied

Requirement	Warrants	Requirements	Field Value	Fulfilled
One or More Warrants Satisfied	Product of Left Turn Vehicles and Opposing Through Vehicles	100,000 (2 Lane)		Yes O No O
		150,000 (4 Lane)		Yes O No O
	Left Turn Volumes	150 Vehicle per Hour, or		Yes O No O
		100 vph for 70 km/h or more		Yes O No O

Notes

1. The right turn traffic is excluded in the traffic count for all warrants.
2. Bracketed figurs are 70% of normal warrant figures. Use when the posted speed or 85 percentile speed of major street traffic exceeds 70 km/h, or when the surrounding areas population is less than 10,000.

CoPG - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Chief Lake Road	Direction (EW or NS)	EW	Road Authority:	CoPG
Side Street (name)	Foothills Boulevard	Direction (EW or NS)	NS	City:	Prince George
Quadrant / Int #		Comments	Enter Comments about the analysis here.	Analysis Date:	2023 Jan 06, Fri
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2022 Dec 08, Thu
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Chief Lake Road	WB				1			n	3,000	1			
Chief Lake Road	EB				1			n	3,000	1			
Foothills Boulevard	NB	1				1		y	3,000	1			
Foothills Boulevard	SB	1				1		n	3,000	1			

Are the Foothills Boulevard NB right turns significantly impeded by through movements?	(y/n)	n
Are the Foothills Boulevard SB right turns significantly impeded by through movements?	(y/n)	n
Are the Chief Lake Road WB right turns significantly impeded by through movements?	(y/n)	n
Are the Chief Lake Road EB right turns significantly impeded by through movements?	(y/n)	n

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

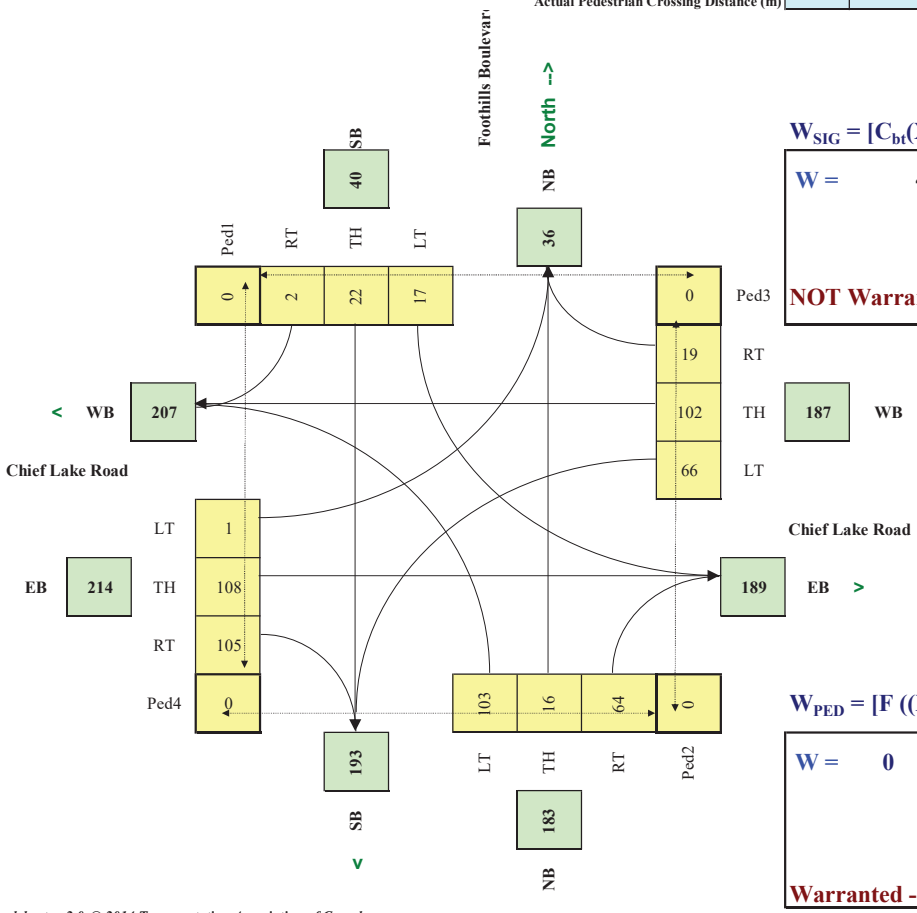
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	70,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Chief Lake Road	EW	60	2.0%	y	0.0
Foothills Boulevard	NS	50	2.0%	n	0.0

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS W Side	Ped2 NS E Side	Ped3 EW N Side	Ped4 EW S Side
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT				
6:30 - 7:30	24.57	3.765	39.11	13.805	28.665	1.365	55.855	47.045	3.765	0	122.225	120.48				
	54.6	3.765	44.57	25.1	35.49	4.095	85.885	66.155	10.04	1.255	163.64	170.68				
	61.425	5.02	47.3	17.57	20.475	0	53.125	72.98	17.57	1.255	107.165	102.91				
	132.405	20.08	88.25	18.825	10.92	2.73	70.87	133.04	28.865	1.255	98.38	85.34				
	173.355	25.1	82.79	15.06	16.38	1.365	65.41	145.325	33.885	2.51	92.105	76.555				
	173.355	38.905	81.425	10.04	19.11	1.365	65.41	146.69	18.825	1.255	64.495	72.79	1			
Total (6-hour peak)	**620**	**97**	**383**	**100**	**131**	**11**	**397**	**611**	**113**	**8**	**648**	**629**	**1**	**0**	**0**	**0**
Average (6-hour peak)	**103**	**16**	**64**	**17**	**22**	**2**	**66**	**102**	**19**	**1**	**108**	**105**	**0**	**0**	**0**	**0**
Actual Pedestrian Crossing Distance (m)																

Average 6-hour Peak Turning Movements



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

W =	43	43	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

CoPG - Traffic Signal & Pedestrian Signal Head Warrant Analysis

Main Street (name)	Highway 97	Direction (EW or NS)	NS	Road Authority:	CoPG
Side Street (name)	Chief Lake Road	Direction (EW or NS)	EW	City:	Prince George
Quadrant / Int #		Comments	Enter Comments about the analysis here.	Analysis Date:	2023 Jan 06, Fri
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET			Count Date:	2022 Dec 08, Thu
				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	RT Channelization (y/n)	UpStream Signal (m)	# of Thru Lanes	LT Phase Type	RTOR Allowed (y/n)	Actuated Thru Phase
Highway 97	NB	1		1				n	3,000	1			
Highway 97	SB			1			1	y	850	1			
Chief Lake Road	WB							n	3,000	0			
Chief Lake Road	EB				1			y	3,000	1			
Are the Chief Lake Road EB right turns significantly impeded by through movements? (y/n)							n						
							n						
							n						
							n						

Saturation Flow Rates (if not default) (vphpl)		Default Saturation Flow Rates (vphpl)
Left Turn		1,650
Through		1,800
Right Turn		1,500

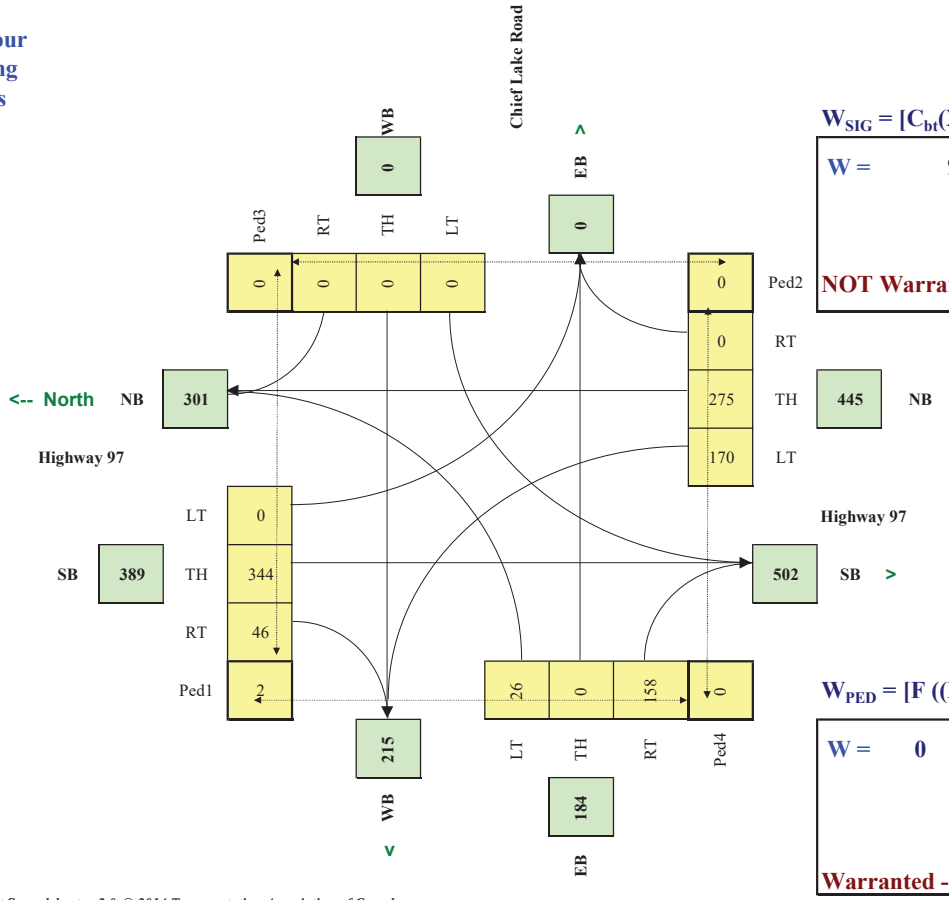
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	70,000
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 97	NS	70	2.0%	y	0.0
Chief Lake Road	EW	60	2.0%	y	0.0

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
6:30 - 7:30	88.98	154.365	0	0	290.745	31.205				23.315	0	177.64				
	94.44	174.445	0	0	447.72	53.045				18.295	0	207.76	1			
	103.995	212.095	0	0	337.155	31.205				19.55	0	137.48	1			
	235.035	351.4	0	0	324.87	51.68				37.12	0	171.365	6			1
	263.7	390.305	0	0	371.28	61.235				32.1	0	148.775	1			
	230.94	367.715	0	0	289.38	46.22				23.315	0	106.105				
Total (6-hour peak)	**1,017**	**1,650**	**0**	**0**	**2,061**	**275**	**0**	**0**	**0**	**154**	**0**	**949**	**9**	**0**	**0**	**1**
Average (6-hour peak)	**170**	**275**	**0**	**0**	**344**	**46**	**0**	**0**	**0**	**26**	**0**	**158**	**2**	**0**	**0**	**0**
													Actual Pedestrian Crossing Distance (m)			

Average 6-hour Peak Turning Movements



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

W =	92	92	0
		Veh	*Ped*

NOT Warranted

RESET SHEET

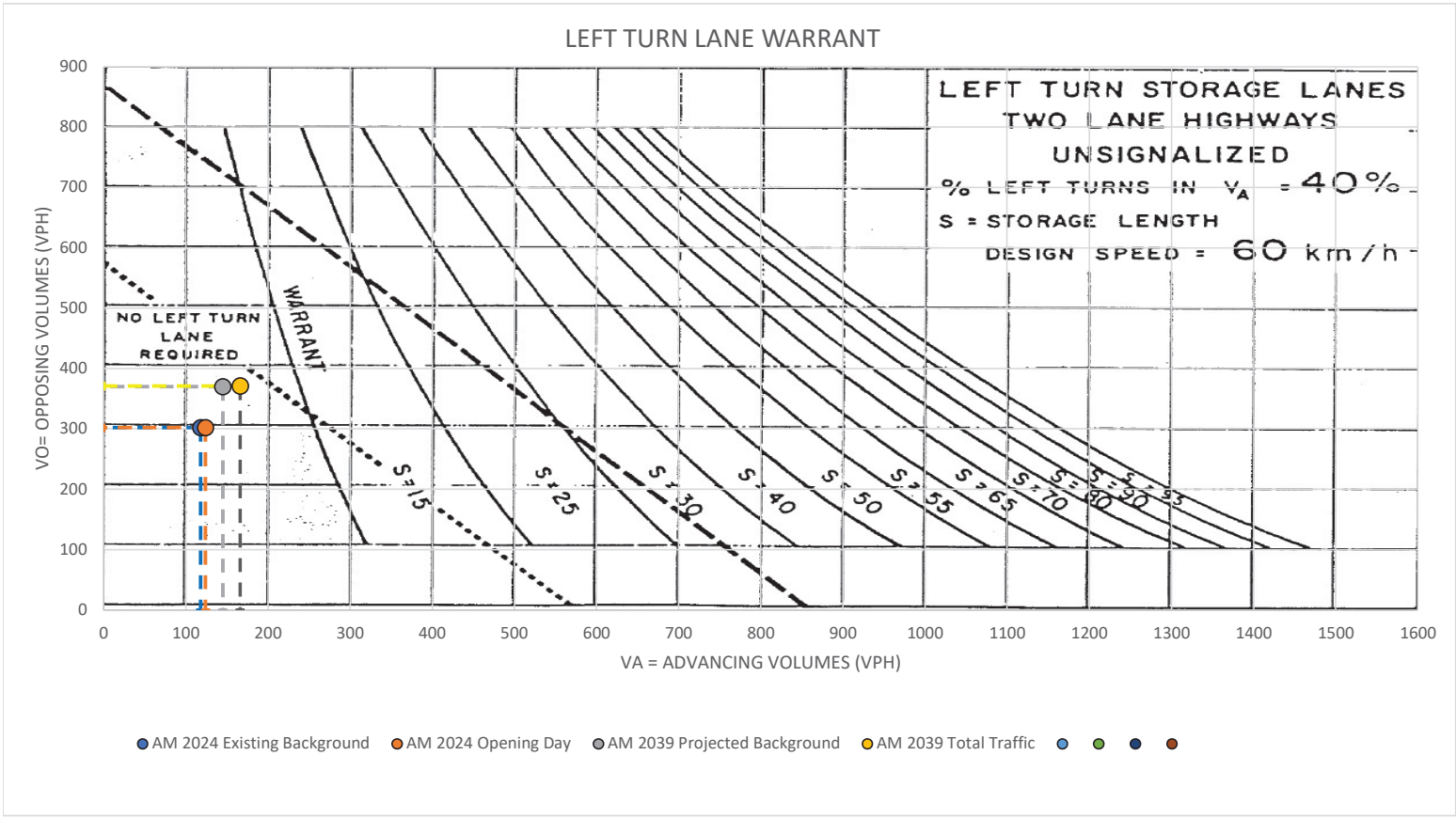
$W_{PED} = [F ((Xped_m)d_m/K_2) + (Xped_s)d_s/K_3)]$

W = 0

Warranted - Complex Intersection

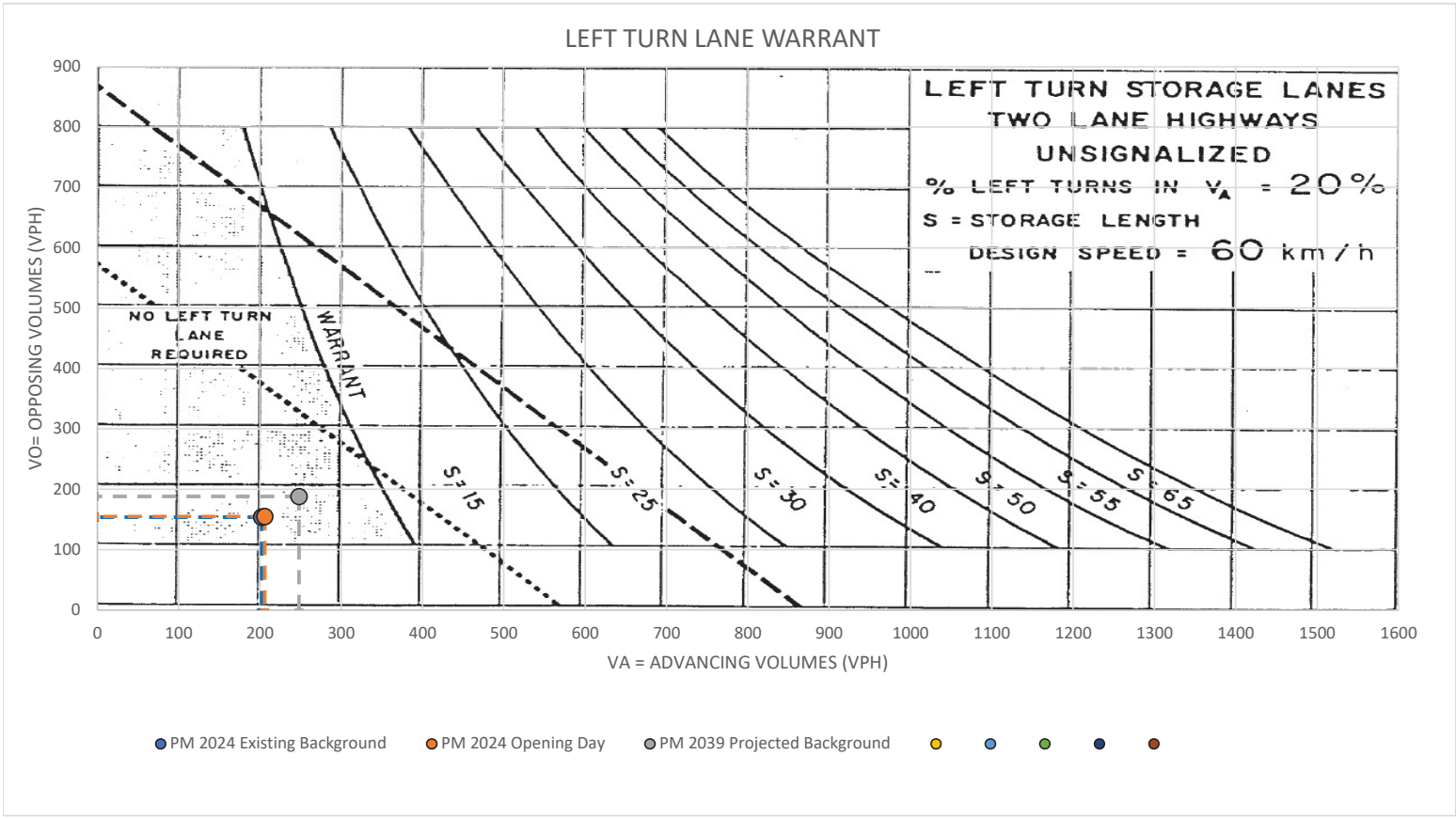
Foothills & Chief Lake
WBL

Design Horizon	VA	VO
AM 2024 Existing Background	118	302
AM 2024 Opening Day	124	302
AM 2039 Projected Background	145	370
AM 2039 Total Traffic	166	371



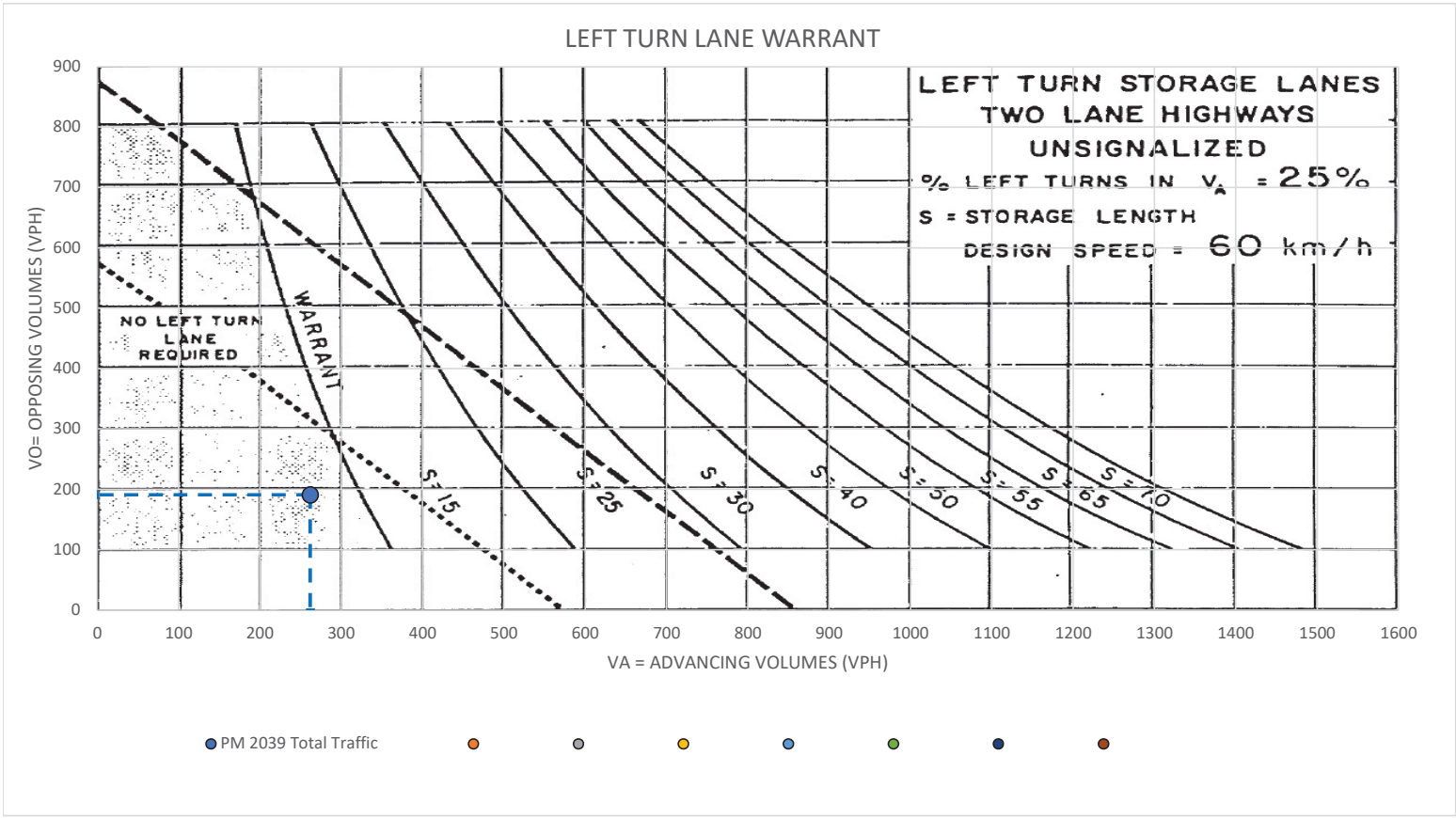
Foothills & Chief Lake
WBL

Design Horizon	VA	VO
PM 2024 Existing Background	202	154
PM 2024 Opening Day	206	155
PM 2039 Projected Background	248	188



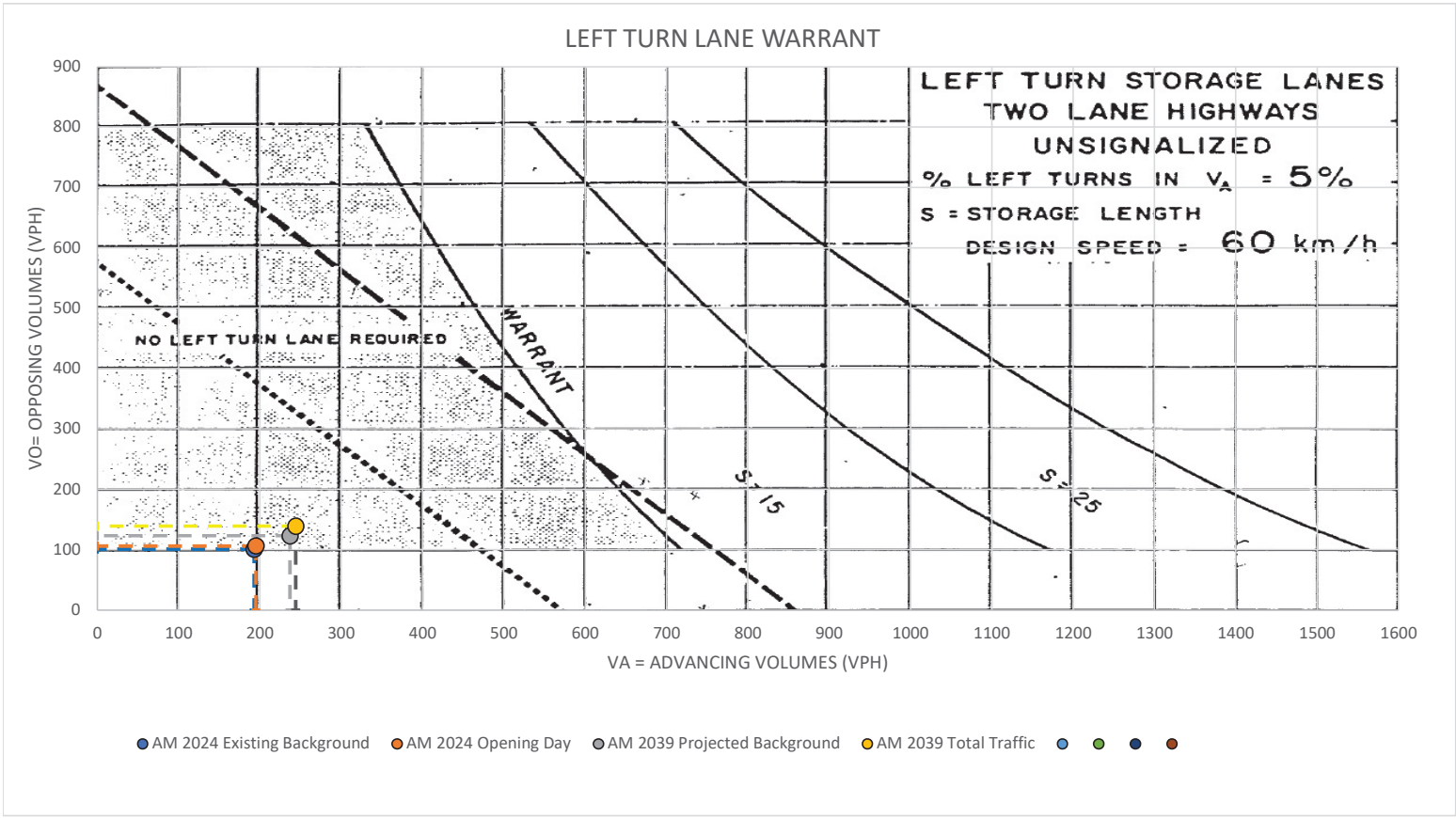
Foothills & Chief Lake
WBL

Design Horizon	VA	VO
PM 2039 Total Traffic	262	191



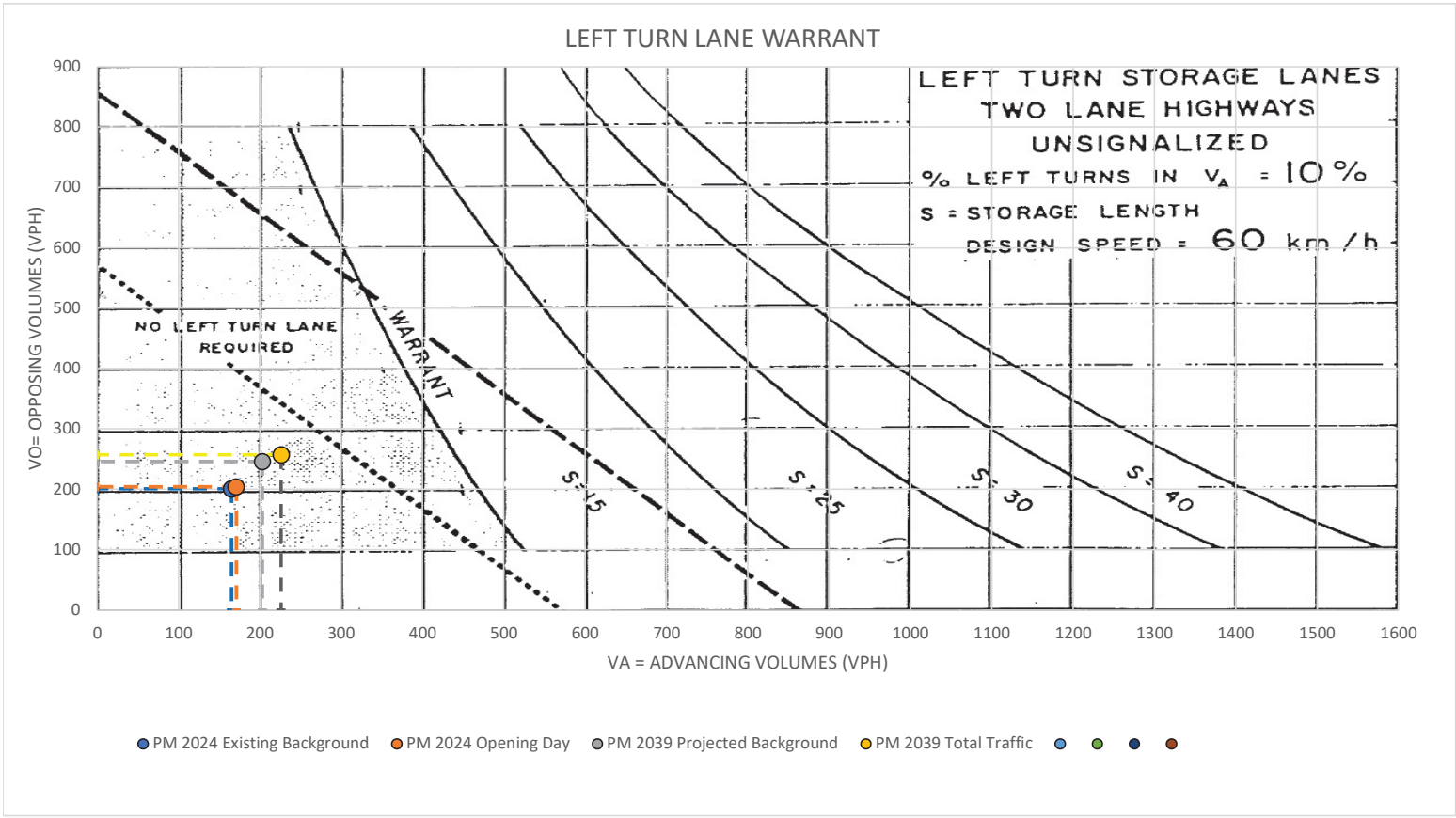
Sparwood Road & Chief Lake Road
EBL

Design Horizon	VA	VO
AM 2024 Existing Background	193	101
AM 2024 Opening Day	195	106
AM 2039 Projected Background	237	123
AM 2039 Total Traffic	244	139



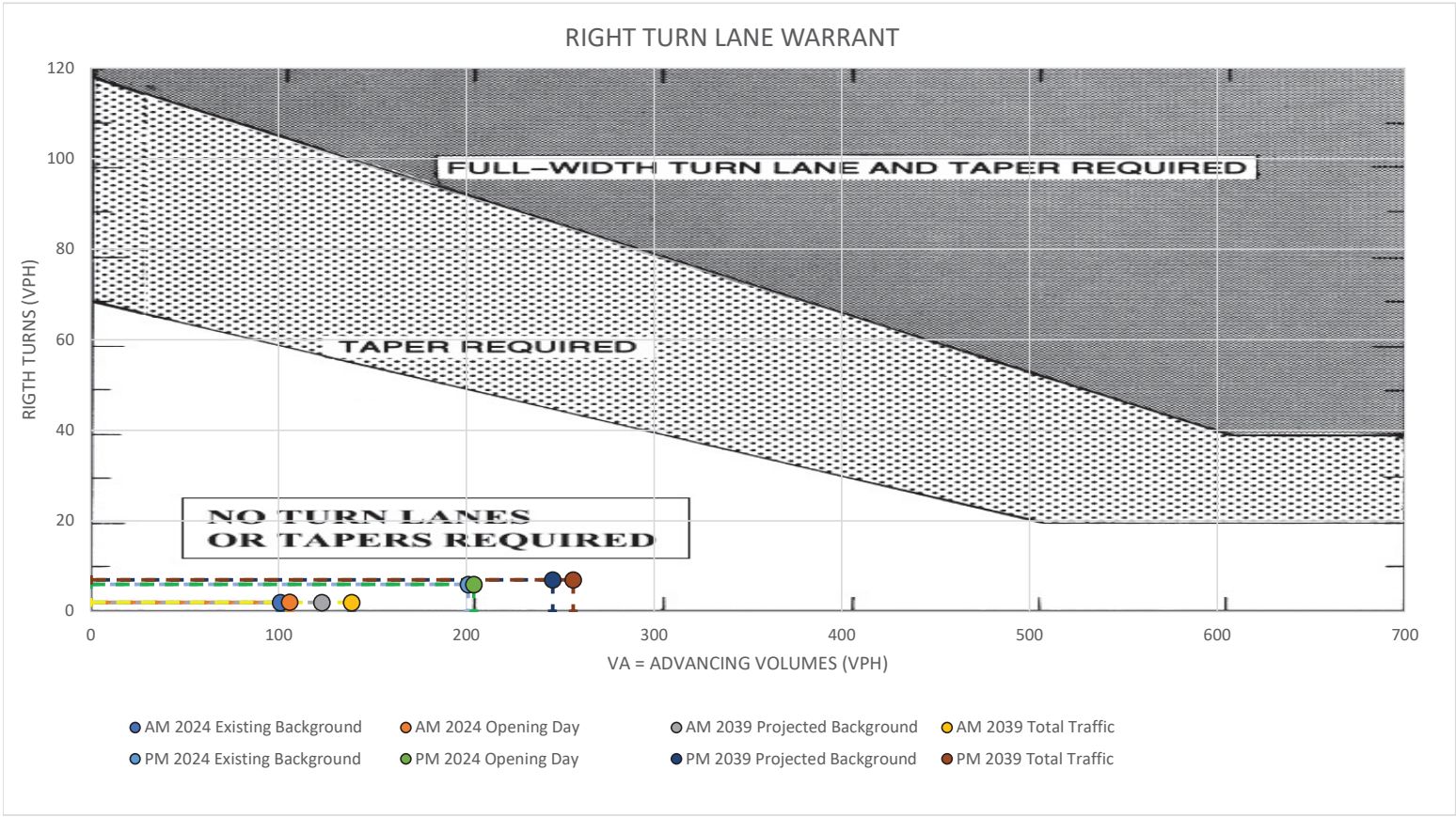
Sparwood Road & Chief Lake Road
EBL

Design Horizon	VA	VO
PM 2024 Existing Background	165	201
PM 2024 Opening Day	171	204
PM 2039 Projected Background	203	246
PM 2039 Total Traffic	226	257



Intersection: Sparwood Road & Chief Lake Road
Direction: WB

Design Horizon	VA	RT
AM 2024 Existing Background	101	2
AM 2024 Opening Day	106	2
AM 2039 Projected Background	123	2
AM 2039 Total Traffic	139	2
PM 2024 Existing Background	201	6
PM 2024 Opening Day	204	6
PM 2039 Projected Background	246	7
PM 2039 Total Traffic	257	7



Intersection: Driveway & Chief Lake Road
Direction: WB

Design Horizon	VA	RT
AM 2024 Opening Day	104	3
AM 2039 Total Traffic	131	8
PM 2024 Opening Day	208	7
PM 2039 Total Traffic	272	26