ENGINEERING LIMITED

Updated: January 3rd, 2025

November 15th, 2024

TRAFFIC IMPACT STUDY

MEADOW PARK REZONING – 9153 TWINBERRY DRIVE
LAND LEASED MODULAR HOME COMMUNITY

Client: Westcan Property Ltd.

L&M Project No.: 1546-10

Rezoning No.: RZ100832

L&M Engineering Limited

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Appendices: **A – Figures**
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1.0 INTRODUCTION

On behalf of Westcan Property Ltd., L&M Engineering is pleased to submit a Traffic Impact Study (TIS) in support of the rezoning application (RZ100832) for the property located at 9153 Twinberry Drive. The developer is proposing to rezone a portion of the property to facilitate the construction of a Land Leased Modular Home Community. The subject property is currently split zoned RS2: Single Residential, RM1: Multiple Residential, RM3: Multiple Residential, AG: Greenbelt, AF: Agriculture and Forestry, and W: Water. In order to facilitate the development of a Land Leased Modular Home Community, 10.7 ha of the property is being rezoned to RM9: Manufactured Home Park. The remainder of the property will remain zoned RS2, AG, AF and W.

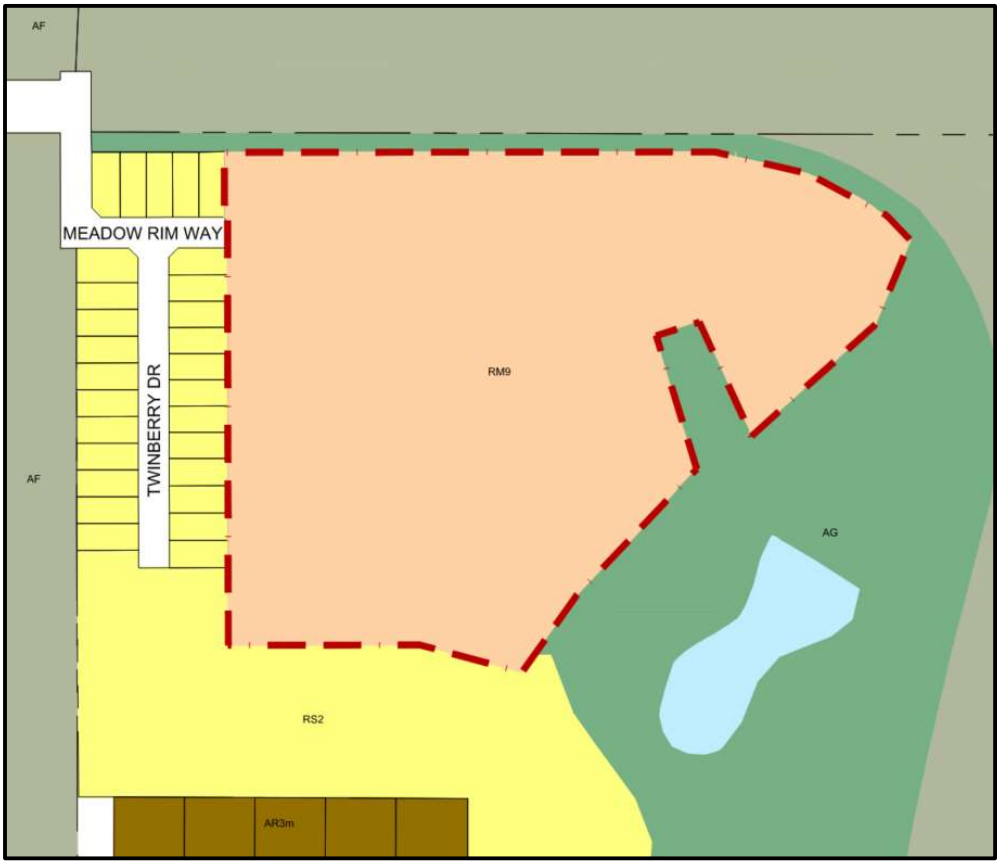

Exhibit 1: Proposed Rezoning Area

The proposed development will be accessed from Highway 97 at the Burgess Road intersection. This intersection is currently used to access a residential subdivision development consisting of 28 single family dwellings. In addition to the development of the Modular Home Community, the plan is to develop the undeveloped RS2 zoned area with single family lots. At this time, it is anticipated that the first phase of the Land Leased

Modular Home Community development will undergo construction in the summer of 2025. The timelines for the future single-family development have not yet been determined.

This TIS report has been prepared to determine the combined impacts to the surrounding road network and to provide guidance for future detailed design works for the development.

2.0 SCOPE OF STUDY

A scope development meeting was held between the City of Prince George, the Ministry of Transportation and Infrastructure, and L&M Engineering on February 22nd, 2023 to determine the scope for this Traffic Impact Study.

2.1 Study Intersections

- Highway 97 & Burgess Road

2.2 Proposed Site Accesses

- One access at the east end of Meadow Rim Way
- Potential for a secondary access at the south end of the rezoning boundary.

2.3 Study Horizons

- 2026 Existing Background
- 2026 Opening Day (Existing Background + Development Traffic)
- 2041 Projected Background (Existing Background projected 15 Years into Future)
- 2041 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

- L&M to review the MoTI permanent count stations to review historic growth rates.

2.6 Trip Generation

- Determine the trip distribution based upon the proposed land use and local traffic patterns. The Institute of Traffic Engineers (ITE) Trip Generation rates will be used.

2.7 Seasonal Adjustment

- Utilize monthly average daily traffic (MADT) from the nearest MoTI permanent count station information to determine the monthly adjustment factor.

2.8 Trip Distribution

- Use distributions from actual counts in conjunction with engineering judgement.

2.9 Pre-Submission

- Submit the trip generation, trip distribution, background growth rate and the seasonal adjustment factor to CoPG and MoTI for approval prior to the analysis and completion of the TIS.

2.10 Analysis

- Analysis to be prepared using Trafficware Synchro software.
- Use 95th percentile for queue lengths. Compare to TAC equation queue lengths.
- 15 min intervals.

2.11 Geometrics

- Sight Distances
- Left Turn Queue Lengths
- Right Turn Lane Dimensions

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 & Burgess Road (March 1, 2023)

The counts were conducted on weekdays from 6:30 am – 9:30 am (AM Peak) and 3:00 pm – 6:00 pm (PM Peak). The counts were categorized by vehicles type and the peak hours were determined. The Existing Background traffic volumes are illustrated on Figure 2.

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 2011 to 2022, Prince George has experienced an annual growth rate of 1.5%. To remain consistent with other traffic studies completed in the Prince George area, this study uses a projected growth rate of 1.5%.

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

The proposed trip generation for the development site was developed using the Institute of Transportation Engineers (ITE) Trip Generation Manual 10th Edition rates according to the proposed land use. Under the proposed RM9 zone, the allowable density is 22 dwelling units per hectare. The developer is volunteering a Section 219 Covenant to limit the density of the proposed rezoning area to 15 dwelling units per hectare. Therefore, the proposed rezoning area (10.7 ha) could yield a maximum of **160 modular home units**.

Additionally, the land area located immediately south of the proposed rezoning area is currently zoned RS2: Single Residential. Based on a conceptual layout of this RS2 area, approximately **47 single-family lots** could be constructed. Since the RS2 area is already

zoned and could be developed without further rezoning, both the existing RS2 and proposed RM9 areas were included in the trip generation.

Table 1 – Trip Generation								
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	47	T=0.71(X)+4.80	38	25	75	10	28
PM			Ln(T)=0.96Ln(X)+0.2	49	63	37	31	18
Mobile Home Park (ITE Code: 240)								
AM	Occupied Dwellings	160	T=0.30(X)+16.58	65	20	80	13	52
PM			T=0.58(X)+2.38	93	62	38	58	35
Summary								
			AM Total	103	22	78	23	80
			PM Total	142	63	37	89	53

** 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 development will consist of approximately 14 modular homes. Table 2 summarizes the trip generation that will be used for the 2026 Opening Day scenario.

Table 2 – Peak Hour Trip Generation Rates (Phase 1)								
Peak Period	**Trip Gen. Variable**	**Projected Trip Gen. Variable Value**	**Average Rate**	**Total Trip Gen.**	**In %**	**Out %**	**In (vph)**	**Out (vph)**
Mobile Home Park (ITE Code: 240)								
AM	Occupied Dwellings	14	0.41	**6**	20	80	1	5
PM	Occupied Dwellings	14	0.59	**8**	62	38	5	3

** 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.

5.3 Trip Assignment Volumes

Based on the trip distribution percentages and utilizing the trip generation volumes illustrated in Tables 1 and 2, the Trip Assignment volumes were calculated for both the 2026 and 2041 design scenarios.

5.4 2026 Opening Day Volumes

Adding the 2026 Trip Assignment traffic (Figure 5) to the 2026 Existing Background traffic (Figure 2) results in the 2026 Opening Day traffic shown in Figure 7.

5.5 2041 Total Traffic Volumes

Adding the 2041 Trip Assignment traffic (Figure 6) to the 2041 Projected Background traffic (Figure 3) results in the 2041 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 & Burgess Road

The Highway 97/Burgess Road intersection is an unsignalized T-intersection with a stop condition on Burgess Road. Highway 97 is a two-lane arterial highway with a regulatory speed limit of 90km/hr. The highway also has a right turn deceleration lane and a left turn storage lane at the intersection. Burgess Road is a two-lane local road with a 50km/hr speed limit.

A summary of the Synchro analysis shows that during the weekday AM and PM peak hours all intersection movements operate at a LOS B (minor delays) or better.

Table 4: Road A & Road B Intersection Analysis Summary						
	Burgess Rd.		Highway 97			
Approach	WB		NB		SB	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
AM Peak						
2026 Existing Background	B	10.6	A	0.0	A	7.5
2026 Opening Day	B	10.6	A	0.0	A	7.5
2041 Projected Background	B	11.2	A	0.0	A	7.5
2041 Total Traffic	B	12.6	A	0.0	A	7.5
PM Peak						
2026 Existing Background	B	11.6	A	0.0	A	7.6
2026 Opening Day	B	11.8	A	0.0	A	7.6
2041 Projected Background	B	12.7	A	0.0	A	7.7
2041 Total Traffic	B	14.7	A	0.0	A	7.7

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 are outlined in Table 5 for a 90 km/hr speed limit:

Table 5 – Sight Distance Criteria	
	Design Speed (Major Road)
	90 km/hr
Sight Distance Type	*Minimum Distance Required (m)*
Stopping Sight Distance	160
Turning Sight Distance	305
Minimum Decision Sight Distance	270
Desirable Decision Sight Distance	355

When stopped at the stop bar on Burgess Road a driver has an available sightline in excess of 355m in each direction. All TAC sightline requirements are met.

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 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)

9.1.1 Highway 97 & Burgess Road

The existing southbound left turn lane has 80m of parallel lane (deceleration plus storage) and a 50m bay taper. Based on the BC Supplement to TAC standards,

the left turn lane was built to a Rural Collector standard (BC Supplement – Figure 710.G.1). The Rural Collector standard requires 50m of parallel deceleration, 30m of storage (minimum as per TAC), and a 50m bay taper. The TAC and Synchro storage calculations indicate that the required storage length is less than one vehicle length (less than 7.5 metres). Therefore, the default minimum of 30m is sufficient.

It should also be noted that the left turn volumes were plotted on the Harmelink Charts to determine if a left turn lane would be warranted during any of the design horizons. Based on the plots, a left turn lane is not warranted during any of the design horizon scenarios.

9.2 Right Turn Deceleration Lane

The existing northbound right turn deceleration lane has 50m's of parallel deceleration and a 50m taper. Based on the BC Supplement to TAC standards, the right turn lane was built to a Rural Collector standard (BC Supplement - Figure 710.G.1).

9.3 Right Turn Acceleration Lane

The existing intersection configuration does not have a right turn acceleration lane out of the subdivision. Based on the Colorado Department of Transportation - Warrants for Right-Turn Acceleration Lanes, an intersection movement does not require a right-turn acceleration lane if the peak hour volume is less than 15 vph. This movement is only expected to accommodate 6 to 8 vehicles per hour during the 2041 Total Traffic scenario. As a result, there is no need to install an acceleration lane.

10.0 SECONDARY ACCESSES

Based on the Synchro analysis for the Highway 97 and Burgess Road intersection, the development of the proposed RM9 area and the existing RS2 area can be adequately accommodated by this one access. As the development continues south into the RS2 area there will be potential for a secondary access connection to Fisher Road. Although a second access is not required based on the Synchro analysis, it is recommended to install a connection to Fisher Road once development reaches the Fisher Road right-of-way.

11.0 CONCLUSIONS

11.1 Site Accesses

1. The proposed rezoning site will be accessed from the east end of Meadow Rim Way. There is also potential for an secondary access on the south end of the

rezoning boundary. The secondary access location would be dependant on the future development of the RS2 area.

11.2 Synchro Analysis

1. The Synchro analysis for the Highway 97 and Burgess Road shows that during the weekday AM and PM peak hours all intersection movements operate at a LOS B (minor delays) or better.

11.3 Left Turn Treatment

1. The existing southbound left turn lane was built to a rural collector standard for a 90km/h posted speed. The left turn lane consists of 50m of parallel deceleration, 30m of storage and a 50m bay taper.

11.4 Right Turn Treatment

1. The existing northbound right turn lane was built to a rural collector standard for a 90km/h posted speed. The right turn lane consists of 50m of parallel deceleration and a 50m taper.

2. The current intersection configuration does not include an acceleration lane for right turning vehicles leaving the subdivision. The warrant for a right acceleration lane was not met.

11.5 Sightlines

1. The available sightlines for a vehicle stopped at the Burgess Road stop sign exceed all TAC recommendations.

12.0 RECOMMENDATIONS

1. No offsite traffic improvements are required as a result of the subject rezoning.

13.0 CLOSURE

This Traffic Impact Study has been prepared for the exclusive use of Westcan Property Ltd., the City of Prince George, and the Ministry of Transportation and Infrastructure. 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:

PERMIT TO PRACTICE
NO 1002375
2025-01-03

Tanner Fjellstrom, P.Eng.
Associate

Reviewed by:

Terry Fjellstrom, P. Eng.
President

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APPENDIX A

FIGURES

LEGEND

- DEVELOPMENT BOUNDARY
- SUBJECT PROPERTY BOUNDARY
- RM9 - MANUFACTURED HOME PARK
- RS2 - SINGLE RESIDENTIAL

NO.	DATE (D/M/Y)	REVISION	BY

NOT FOR CONSTRUCTION

L&M ENGINEERING LIMITED

CITY OF PRINCE GEORGE
Development Services

CONSULTANTS PROJECT No.:	1546-08
DRAWN:	KP
CHECKED:	TF
ENGINEER:	TF
DATE:	MARCH 2023
SCALES:	1:2000
SCALES:	

WESTCAN PROPERTY LTD.
MEADOW PARK SUBDIVISION

TRAFFIC IMPACT STUDY
STUDY INSTERSECTIONS

DRAWING No.
FIG 1

0 50 100 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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Development Services

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SCALES:	1:2000
SCALES:	

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MEADOW PARK SUBDIVISION

TRAFFIC IMPACT STUDY
2026 EXISTING BACKGROUND

DRAWING No.
FIG 2

0 50 100 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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Development Services

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CHECKED:	TF
ENGINEER:	TF
DATE:	MARCH 2023
SCALES:	1:2000
SCALES:	

WESTCAN PROPERTY LTD.
MEADOW PARK SUBDIVISION

TRAFFIC IMPACT STUDY
2041 PROJECTED BACKGROUND

DRAWING No.
FIG 3

0 50 100 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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CHECKED:	TF
ENGINEER:	TF
DATE:	MARCH 2023
SCALES:	1:2000
SCALES:	

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TRAFFIC IMPACT STUDY
TRIP DISTRIBUTION

DRAWING No.
FIG 4

0 50 100 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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CONSULTANTS PROJECT No.:	1546-05
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ENGINEER: TF	
DATE: MARCH 2023	
SCALES: 1:2000	
SCALES:	

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MEADOW PARK SUBDIVISION

TRAFFIC IMPACT STUDY
2026 TRIP ASSIGNMENT

DRAWING No.
FIG 5

0 50 100 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.:	1546-05
DRAWN: KP	
CHECKED: TF	
ENGINEER: TF	
DATE: MARCH 2023	
SCALES: 1:2000	
SCALES:	

WESTCAN PROPERTY LTD.
MEADOW PARK SUBDIVISION

TRAFFIC IMPACT STUDY
2041 TRIP ASSIGNMENT

DRAWING No.
FIG 6

0 50 100 Meters

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LEGEND

DEVELOPMENT BOUNDARY

xxx AM TRAFFIC
(xxx) PM TRAFFIC

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DATE:	MARCH 2023
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SCALES:	

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TRAFFIC IMPACT STUDY
2026 OPENING DAY

DRAWING No.
FIG 7

0 50 100 Meters

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LEGEND

DEVELOPMENT BOUNDARY

xxx AM TRAFFIC
(xxx) PM TRAFFIC

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CITY OF PRINCE GEORGE
Development Services

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DATE: MARCH 2023	
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TRAFFIC IMPACT STUDY
2041 TOTAL TRAFFIC

DRAWING No.
FIG 8

0 50 100 Meters

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APPENDIX B

TRAFFIC COUNTS

Vehicle Turning Movement Survey

PASSENGER VEHICLES

N/S Street: ***Highway 97***
E/W Street: ***Burgess Road***
LOCATION: ***Prince George***
DATE: ***March 1, 2023***
WEATHER: ***Snowing***
TOTAL HOURS= ***6***

Observer: ***Donald***
Notes:

Speed Limit Major Street	***90***
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		13			12	1	2						28	
6:15 - 6:30		14			13	1	2						30	
6:30 - 6:45		24			17	1	11						53	
6:45 - 7:00		33			22		2						57	168
7:00 - 7:15		28			18	1	6						53	193
7:15 - 7:30		32			19	1	4						56	219
7:30 - 7:45		31			12		2						45	211
7:45 - 8:00		29			11	2	5						47	201
8:00 - 8:15		24			16	1	3						44	192
8:15 - 8:30		24			15	1	1						41	177
8:30 - 8:45		27			15	2							44	176
8:45 -9:00		11			17								28	157
SUB TOTAL		**290**			**187**	**11**	**38**						**526**	
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15		23			32	5	2		1				63	
15:15 - 15:30		29			26	2	1						58	121
15:30 - 15:45		13			24	1							38	159
15:45 - 16:00		21			29	2	2						54	213
16:00 - 16:15		29			15	1	1						46	196
16:15 - 16:30		32			30	5	1		1				69	207
16:30 - 16:45		49			30	1							80	249
16:45 - 17:00		50			28	1	1						80	275
17:00 - 17:15	1	22			35	3	3						64	293
17:15 - 17:30		34			26	4	2						66	290
17:30 - 17:45		21			32	1	3						57	267
17:45 - 18:00		20			21	2	2						45	232
SUB TOTAL	**1**	**343**			**328**	**28**	**18**		**2**				**720**	

Vehicle Turning Movement Survey

LT + Bus + RV

N/S Street: Highway 97
E/W Street: Burgess Road
LOCATION: Prince George
DATE: March 1, 2023
WEATHER: Snowing
TOTAL HOURS= 6

Observer Donald
Notes:

Speed Limit Major Street	90
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					4								4	
6:15 - 6:30					1								1	
6:30 - 6:45					2								2	
6:45 - 7:00					1								1	8
7:00 - 7:15		2			4								6	10
7:15 - 7:30	1	1			2		1						5	14
7:30 - 7:45														12
7:45 - 8:00	1				1		1						3	14
8:00 - 8:15		1			1								2	10
8:15 - 8:30		1			2								3	8
8:30 - 8:45					2	1			1				4	12
8:45 -9:00					1								1	10
SUB TOTAL	**2**	**5**			**21**	**1**	**2**		**1**				**32**	
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15					1	1			1				3	
15:15 - 15:30		5				1			1				7	10
15:30 - 15:45		1			1								2	12
15:45 - 16:00		3			3								6	18
16:00 - 16:15		3			1								4	19
16:15 - 16:30		4			1								5	17
16:30 - 16:45		7			1								8	23
16:45 - 17:00		2											2	19
17:00 - 17:15		6											6	21
17:15 - 17:30		6											6	22
17:30 - 17:45		5			1								6	20
17:45 - 18:00		6			1								7	25
SUB TOTAL		**48**			**10**	**2**			**2**				**62**	

Vehicle Turning Movement Survey

HEAVY TRUCKS

N/S Street: Highway 97
E/W Street: Burgess Road
LOCATION: Prince George
DATE: March 1, 2023
WEATHER: Snowing
TOTAL HOURS= 6

Observer: Donald
Notes:

Speed Limit Major Street	90
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			7								14	
6:15 - 6:30		6			5								11	
6:30 - 6:45		2			9								11	
6:45 - 7:00		5			4								9	45
7:00 - 7:15		5			3								8	39
7:15 - 7:30		6			7								13	41
7:30 - 7:45		5			8	1							14	44
7:45 - 8:00		4			3		1						8	43
8:00 - 8:15		3			4								7	42
8:15 - 8:30		6			6								12	41
8:30 - 8:45		6			2								8	35
8:45 -9:00		2			6								8	35
SUB TOTAL		**57**			**64**	**1**	**1**						**123**	
PH HEAVY TRUCKS		**18**			**23**									
14:30 - 14:45														
14:45 - 15:00														
15:00 - 15:15		9			6								15	
15:15 - 15:30		13			4								17	32
15:30 - 15:45		10			8								18	50
15:45 - 16:00		10			6								16	66
16:00 - 16:15		13			1								14	65
16:15 - 16:30		5			7								12	60
16:30 - 16:45		13			3								16	58
16:45 - 17:00		3			8								11	53
17:00 - 17:15		4			6								10	49
17:15 - 17:30		6			8								14	51
17:30 - 17:45		8			1								9	44
17:45 - 18:00		4			4								8	41
SUB TOTAL		**98**			**62**								**160**	
PH HEAVY TRUCKS		**26**			**25**									

Vehicle Turning Movement Survey

PEDESTRIAN

N/S Street: Highway 97
E/W Street: Burgess Road
LOCATION: Prince George
DATE: March 1, 2023
WEATHER: Snowing

Observer: Donald
Notes:

Speed Limit Major Street	90
Speed Limit Minor Street	50

TOTAL HOURS= 6

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: Highway 97
E/W Street: Burgess Road
LOCATION: Prince George
DATE: March 1, 2023
WEATHER: Snowing

Observer: Donald
Notes:

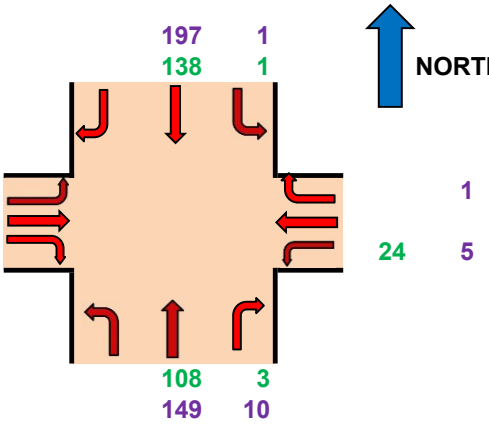
TOTAL HOURS = 6

Speed Limit Major Street	90
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		20			23	1	2						46					
6:15 - 6:30		20			19	1	2						42					
6:30 - 6:45		26			28	1	11						66					
6:45 - 7:00		38			27		2						67	221				
7:00 - 7:15		35			25	1	6						67	242				
7:15 - 7:30	1	39			28	1	5						74	**274**				
7:30 - 7:45		36			20	1	2						59	267				
7:45 - 8:00	1	33			15	2	7						58	258				
8:00 - 8:15		28			21	1	3						53	244				
8:15 - 8:30		31			23	1	1						56	226				
8:30 - 8:45		33			19	3			1				56	223				
8:45 -9:00		13			24								37	**202**				
SUB TOTAL	**2**	**352**			**272**	**13**	**41**		**1**				**681**					
PEAK HOUR	**1**	**138**			**108**	**3**	**24**						**274**					
PHF	**0.25**	**0.88**	#####	#####	**0.96**	**0.75**	**0.545**	#####	#####	#####	#####	#####						
14:30 - 14:45																		
14:45 - 15:00																		
15:00 - 15:15		32			39	6	2		2				81					
15:15 - 15:30		47			30	3	1		1				82	163				
15:30 - 15:45		24			33	1							58	221				
15:45 - 16:00		34			38	2	2						76	297				
16:00 - 16:15		45			17	1	1						64	280				
16:15 - 16:30		41			38	5	1		1				86	284				
16:30 - 16:45		69			34	1							104	330				
16:45 - 17:00		55			36	1	1						93	**347**				
17:00 - 17:15	1	32			41	3	3						80	**363**				
17:15 - 17:30		46			34	4	2						86	**363**				
17:30 - 17:45		34			34	1	3						72	331				
17:45 - 18:00		30			26	2	2						60	298				
SUB TOTAL	**1**	**489**			**400**	**30**	**18**		**4**				**942**					
PEAK HOUR	**1**	**197**			**149**	**10**	**5**		**1**				**363**					
PHF	**0.25**	**0.71**	#####	#####	**0.91**	**0.5**	**0.417**	#####	**0.25**	#####	#####	#####						

PEAK HOUR VOLUME

AM PEAK
PM PEAK



APPENDIX C

SYNCHRO

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	25	0	123	3	1	157
Future Volume (Veh/h)	25	0	123	3	1	157
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.92	0.96	0.75	0.70	0.88
Hourly flow rate (vph)	36	0	128	4	1	178
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	128			128	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	128			128	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			100	
cM capacity (veh/h)	684	922			1458	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	36	128	4	1	178
Volume Left	36	0	0	1	0
Volume Right	0	0	4	0	0
cSH	684	1700	1700	1458	1700
Volume to Capacity	0.05	0.08	0.00	0.00	0.10
Queue Length 95th (m)	1.3	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	0.0	0.0	7.5	0.0
Lane LOS	B			A	
Approach Delay (s)	10.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	30	0	123	4	1	157
Future Volume (Veh/h)	30	0	123	4	1	157
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.92	0.96	0.75	0.70	0.88
Hourly flow rate (vph)	43	0	128	5	1	178
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	128			128	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	128			128	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	100			100	
cM capacity (veh/h)	684	922			1458	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	43	128	5	1	178
Volume Left	43	0	0	1	0
Volume Right	0	0	5	0	0
cSH	684	1700	1700	1458	1700
Volume to Capacity	0.06	0.08	0.00	0.00	0.10
Queue Length 95th (m)	1.6	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	0.0	0.0	7.5	0.0
Lane LOS	B			A	
Approach Delay (s)	10.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	31	0	151	4	1	192
Future Volume (Veh/h)	31	0	151	4	1	192
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.92	0.96	0.75	0.70	0.88
Hourly flow rate (vph)	44	0	157	5	1	218
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	377	157			157	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377	157			157	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	624	889			1423	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	44	157	5	1	218
Volume Left	44	0	0	1	0
Volume Right	0	0	5	0	0
cSH	624	1700	1700	1423	1700
Volume to Capacity	0.07	0.09	0.00	0.00	0.13
Queue Length 95th (m)	1.8	0.0	0.0	0.0	0.0
Control Delay (s)	11.2	0.0	0.0	7.5	0.0
Lane LOS	B			A	
Approach Delay (s)	11.2	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	103	8	151	25	3	192
Future Volume (Veh/h)	103	8	151	25	3	192
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.92	0.96	0.75	0.70	0.88
Hourly flow rate (vph)	147	9	157	33	4	218
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	383	157			157	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	383	157			157	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	99			100	
cM capacity (veh/h)	618	889			1423	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	156	157	33	4	218
Volume Left	147	0	0	4	0
Volume Right	9	0	33	0	0
cSH	629	1700	1700	1423	1700
Volume to Capacity	0.25	0.09	0.02	0.00	0.13
Queue Length 95th (m)	7.8	0.0	0.0	0.1	0.0
Control Delay (s)	12.6	0.0	0.0	7.5	0.0
Lane LOS	B			A	
Approach Delay (s)	12.6	0.0		0.1	
Approach LOS	B				

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	1	169	10	1	224
Future Volume (Veh/h)	5	1	169	10	1	224
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.70	0.91	0.70	0.70	0.71
Hourly flow rate (vph)	7	1	186	14	1	315
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	503	186			186	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	503	186			186	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	528	856			1388	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	186	14	1	315
Volume Left	7	0	0	1	0
Volume Right	1	0	14	0	0
cSH	554	1700	1700	1388	1700
Volume to Capacity	0.01	0.11	0.01	0.00	0.19
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	7.6	0.0
Lane LOS	B			A	
Approach Delay (s)	11.6	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	1	169	15	1	224
Future Volume (Veh/h)	8	1	169	15	1	224
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.70	0.91	0.70	0.70	0.71
Hourly flow rate (vph)	11	1	186	21	1	315
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	503	186			186	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	503	186			186	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	528	856			1388	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	186	21	1	315
Volume Left	11	0	0	1	0
Volume Right	1	0	21	0	0
cSH	545	1700	1700	1388	1700
Volume to Capacity	0.02	0.11	0.01	0.00	0.19
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	7.6	0.0
Lane LOS	B			A	
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	21.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	1	207	12	1	274
Future Volume (Veh/h)	6	1	207	12	1	274
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.70	0.91	0.70	0.70	0.71
Hourly flow rate (vph)	9	1	227	17	1	386
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	615	227			227	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	615	227			227	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	454	812			1341	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	227	17	1	386
Volume Left	9	0	0	1	0
Volume Right	1	0	17	0	0
cSH	475	1700	1700	1341	1700
Volume to Capacity	0.02	0.13	0.01	0.00	0.23
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	12.7	0.0	0.0	7.7	0.0
Lane LOS	B			A	
Approach Delay (s)	12.7	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	6	207	92	10	274
Future Volume (Veh/h)	54	6	207	92	10	274
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.70	0.70	0.91	0.70	0.70	0.71
Hourly flow rate (vph)	77	9	227	131	14	386
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	641	227			227	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	641	227			227	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	99			99	
cM capacity (veh/h)	434	812			1341	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	86	227	131	14	386
Volume Left	77	0	0	14	0
Volume Right	9	0	131	0	0
cSH	457	1700	1700	1341	1700
Volume to Capacity	0.19	0.13	0.08	0.01	0.23
Queue Length 95th (m)	5.5	0.0	0.0	0.3	0.0
Control Delay (s)	14.7	0.0	0.0	7.7	0.0
Lane LOS	B			A	
Approach Delay (s)	14.7	0.0		0.3	
Approach LOS	B				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	24.4%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX D

CALCULATIONS

Design Horizon	VA	VO
AM 2025 Existing Background	158	126
AM 2040 Projected Background	193	175
AM 2025 Opening Day	158	127
AM 2040 Total Traffic	195	175
PM 2025 Existing Background	225	179
PM 2040 Projected Background	275	219
PM 2025 Opening Day	225	184
PM 2040 Total Traffic	283	296