6295, 6363, 6409 Perth Street, 6305 Ottawa Street West

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report (Revision 2)

Prepared for:

Caivan Communities
2934 Baseline Road, Suite 302
Ottawa, Ontario, K2H 1B2

Prepared by:

CGH TRANSPORTATION
13 Markham Avenue
Ottawa, ON K2G 3Z1

February 2021

PN: 2019-64

Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

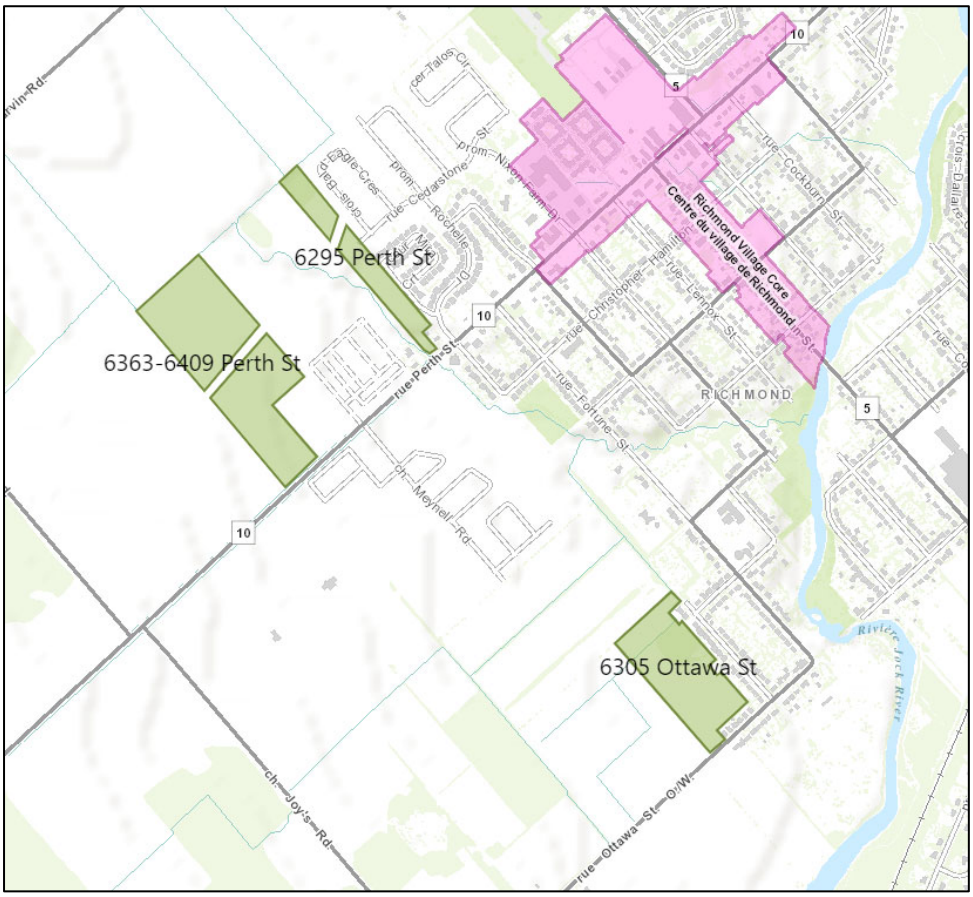
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required through the trip generation and safety triggers. This TIA has been provided to support the zoning bylaw amendment and draft plan of subdivision and the Design Review will be provided for high level context only.

2 Existing and Planned Conditions

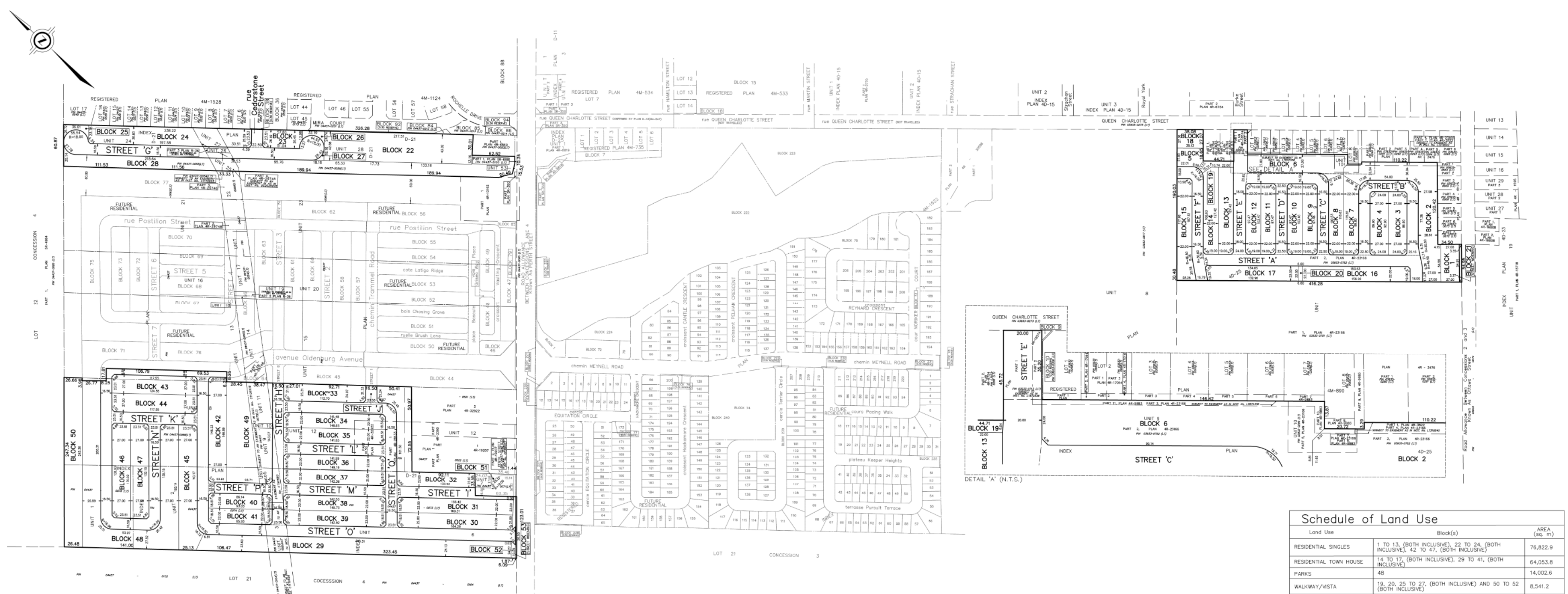
2.1 Proposed Development

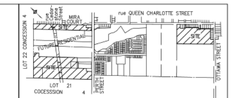
The proposed development, located at 6295, 6363 and 6409 Perth Street and 6305 Ottawa Street, is currently greenfield property designated as Development Reserve (DR1) and is included within the Richmond CDP. The proposed development would include a maximum of 577 residential units, with 119 detached homes and 205 townhomes at 6363-6409 Perth Street, 42 detached homes at 6295 Perth Street, and 42 detached homes and 169 townhomes at 6305 Ottawa Street. Access will be provided through Oldenburg Street, a local road connection to Perth Street (west of roundabout) and local connections to Cedarstone Street, Burke Street, with future connections to future development lands on the north side of Ottawa Street. This study will support the zoning bylaw amendment and draft plan of subdivision applications. Figure 1 illustrates the Study Area Context, and Figure 2 illustrates the proposed draft plan for the north and south development lands.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawabeta/ Accessed: May 28, 2020





KEY PLAN (NOT TO SCALE)

DRAFT PLAN OF SUBDIVISION OF

ALL OF UNITS 1, 2, 3, 4, 5, 6, 9, 10, 11, 24, 25, 26, 27 AND 28 INDEX PLAN D-21

AND

PART OF UNITS 8, 12 AND 13 INDEX PLAN D-21

AND

PART OF UNITS 9 AND 10 INDEX PLAN 4D-25

(GEOGRAPHIC TOWNSHIP OF GOULBOURN)

NOW IN THE

CITY OF OTTAWA

J. D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SCALE 1:2000

50 0 50 100 150 metres

ELEVATION NOTE

1. ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM THE MUNICIPALITY BENCHMARK No. 001196BU124 HAVING A PUBLISHED ELEVATION OF 95.185 METERS.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARK HAS NOT BEEN ALTERED OR DISTRUBED AND THAT ITS' RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.

NOTES

DISTANCES ARE GROUND.

ALL DISTANCES ON CURVES ARE ARC DISTANCES UNLESS OTHERWISE SPECIFIED

ADDITIONAL INFORMATION
As required under section 51(17) of the Planning Act R.S.O. 2001

(a)(b)(e)(f)(g)(j) and (l) - As shown on this Plan.
(c) - As shown on this Draft and Key Plan
(d) - Land to be used in accordance with the Schedule of Land Use.
(h)(k) - Full Municipal Services
(i) - Offshore Marine Deposits of clay, silty clay and silt, Bedrock Ottawa Formation, limestone

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN OUR LETTER DATED.......................,THIS DRAFT PLAN IS APPROVED BY THE CITY OF OTTAWA UNDER SECTION 51 OF THE PLANNING ACT THIS .... DAY OF ...., 2021.

LILY XU, MCIP, RPP, MANAGER
DEVELOPMENT REVIEW SOUTH
PLANNING, INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT,
CITY OF OTTAWA

Schedule of Land Use

Land Use	Block(s)	AREA (sq. m)
RESIDENTIAL SINGLES	1 TO 13, (BOTH INCLUSIVE), 22 TO 24, (BOTH INCLUSIVE), 42 TO 47, (BOTH INCLUSIVE)	76,822.9
RESIDENTIAL TOWN HOUSE	14 TO 17, (BOTH INCLUSIVE), 29 TO 41, (BOTH INCLUSIVE)	64,053.8
PARKS	48	14,002.6
WALKWAY/VISTA	19, 20, 25 TO 27, (BOTH INCLUSIVE) AND 50 TO 52 (BOTH INCLUSIVE)	8,541.2
NATURAL HERITAGE SYSTEM	18, 28, AND 49	23,757.6
STREETS	'A' TO 'Q', (BOTH INCLUSIVE), AND rue Cedarstone Street	70,690.8
STREET WIDENING	21 AND 53	388.0
Total		258,256.9

OWNER'S CERTIFICATE

RICHMOND VILLAGE DEVELOPMENT CORPORATION, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS HEREBY AUTHORIZES J. D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE

FRANK CAIRO
PRESIDENT
(I HAVE THE AUTHORITY TO BIND THE CORPORATION)

RICHMOND VILLAGE DEVELOPMENT CORPORATION

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ARE CORRECTLY SHOWN.

FOR REVIEW

DATE

C.M. FOX
ONTARIO LAND SURVEYOR

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
62 STEACIE DRIVE, SUITE 103, KANATA, ON K2K 2A9
T: (613) 731-7244 F: (613) 254-8659 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS	CF	10-10-314-00 DRAFT
PLOTTED: 2/9/2021		DATED: 01/15/21

FILE: G:\19-10-122\00\Drawing\Draft Plan 2020\19-10-122-00_DraftPlan(Grid).dgn

2.2 Existing Conditions

2.2.1 Area Road Network

Perth Street: Perth Street is a City of Ottawa arterial road with a divided four-lane urban cross-section east of Rochelle Drive/Queen Charlotte Street and transitions to a two-lane rural cross-section to the west. Sidewalks are provided on both sides of the road and the posted speed limit is 50 km/h within the Village Boundary and 80 km/h to the west. The Ottawa Official Plan reserves a 30.0 metre right of way within the Village Boundary. Perth Street is a truck route.

Ottawa Street: Ottawa Street is a City of Ottawa collector road between Joys Road and Fortune Street with a two-lane rural cross-section with gravel shoulders. The posted speed limit changes between 50 km/h and 70 km/h approximately 400 metres west of Queen Charlotte Street. The existing right-of-way is 20.0 metres.

Fortune Street: Fortune Street is a City of Ottawa collector road with a semi-urban cross-section with no curbs on the west side and a sidewalk on the east side. The posted speed limit is 50 km/h, and a school zone is located from north of Royal York Street to south of Burke Street. The existing right-of-way is 20.0 metres.

Meynell Road: Meynell Road, while currently classified as a local road, is to be a City of Ottawa collector road with a two-lane urban cross-section. Sidewalks are provided on both sides of the road and on-street parking is permitted. The unposted speed limit is 50 km/h and the existing right-of-way is 22.0 metres.

Rochelle Drive: Rochelle Drive is a City of Ottawa local road with a two-lane urban cross-section including a sidewalk on the east side. The unposted speed limit is 50 km/h and the existing right-of-way is 20 metres.

Queen Charlotte Street: Queen Charlotte Street is a City of Ottawa local road with a cross-section that is urbanized on the west side on the section north of Christopher Hamilton Street, and fully rural south of Burke Street. The unposted speed limit is 50 km/h, no sidewalks are provided, and the existing right-of-way is 20.0 metres.

Nixon Farm Drive: Nixon Farm Drive is a City of Ottawa local road with a two-lane urban cross-section. The unposted speed limit is 50 km/h, no sidewalks are provided, and the existing right-of-way is 20.0 metres.

Fowler Street: Fowler Avenue is a City of Ottawa local road with a two-lane rural cross-section. The unposted speed limit is 50 km/h, no sidewalks are provided, and the existing right-of-way is 20.0 metres.

Mira Court: Mira Court is a City of Ottawa local road with a two-lane urban cross-section. The unposted speed limit is 50 km/h, no sidewalks are provided, and the existing right-of-way is 20.0 metres.

Cedarstone Street: Cedarstone Street is a City of Ottawa local road with a two-lane urban cross-section. The unposted speed limit is 50 km/h, a sidewalk is provided on the south side of the roadway, and the existing right-of-way is 20.0 metres.

Burke Street: Burke Street is a City of Ottawa local road with a two-lane rural cross-section. The unposted speed limit is 50 km/h, no sidewalks are provided, and the existing right-of-way is 16.0 metres.

2.2.2 Existing Intersections

The existing signalized area intersections within one kilometre of the site have been summarized below:

Perth Street & Meynell Street	The intersection of Perth Street and Meynell Street is an unsignalized intersection with stop-control located on the minor approach of Meynell Street. All approaches currently consist of single lane shared movements. No turn restrictions are noted.

Perth Street & Rochelle Drive/Queen Charlotte Street	The intersection of Perth Street and Rochelle Drive/Queen Charlotte Street is an unsignalized intersection with stop-control located on the minor approaches. The north and south bound approaches consist of a shared all movement lane, the westbound approach consists of a left-turn lane and shared through/right-turn lane, and the eastbound approach consists of a shared left-turn/though lane and shared through/right-turn lane. No turn restrictions are noted.
Perth Street & Fortune Street	The intersection of Perth Street and Fortune Street is an unsignalized intersection with stop-control located on the minor approaches of Fortune Street. The northbound approach consists of a shared all movement lane, the eastbound approach consists of a through lane and a shared through/right-turn lane, and the westbound approach consists of a shared left-turn/though lane and a through lane. No turn restrictions are noted.
Perth Street & Nixon Farm Drive/Fowler Street	The intersection of Perth Street and Nixon Farm Drive/Fowler Street is a signalized intersection. The northbound approach consists of a shared all movement lane, and the southbound approach consists of a left-turn lane and shared through/right-turn lane. The westbound and eastbound approaches each consist of a shared left-turn/though lane and shared through/right-turn lane. No turn restrictions are noted.
Cedarstone Street & Rochelle Drive	The intersection of Cedarstone Street and Rochelle Drive is an unsignalized intersection with stop-control located on the minor approaches of Cedarstone Street. All approaches currently consist of single lane shared movements. No turn restrictions are noted.
Mira Court & Rochelle Drive	The intersection of Mira Court and Rochelle Drive is an unsignalized intersection with stop-control located on the minor approach of Mira Court. All approaches currently consist of single lane shared movements. No turn restrictions are noted.
Burke Street & Fortune Street	The intersection of Burke Street and Fortune Street is an unsignalized intersection with stop-control located on the minor approaches of Burke Street. All approaches currently consist of single lane shared movements. No turn restrictions are noted.
Ottawa Street & Queen Charlotte Street	The intersection of Ottawa Street and Queen Charlotte Street is an unsignalized intersection with all-way stop-control. All approaches currently consist of single lane shared movements. No turn restrictions are noted.

2.2.3 Existing Driveways

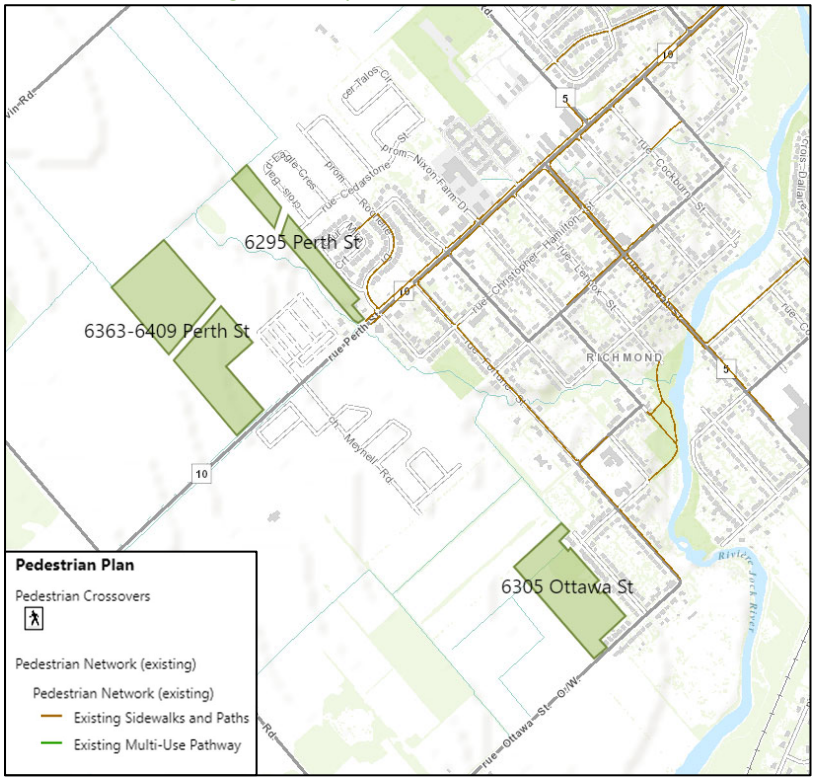
Private residential driveways exist within 200 metres of proposed local road extensions. Adjacent to the Burke Street extension, there are approximately 30 private residential driveways on both sides of Queen Charlotte Street and Burke Street. Adjacent to the Mira Court extension, there are approximately 32 private residential driveways on both sides of Mira Court and Rochelle Drive. Adjacent to the Cedarstone Street extension, there are approximately 40 private residential driveways on both sides of Cedarstone Street and Bald Eagle Crescent. The extension of Trammel Road and Oldenburg Avenue is estimated to include approximately 96 private residential driveways, excluding rear-lane units, based on the Fox Run Phase 2 approved plans.

2.2.4 Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

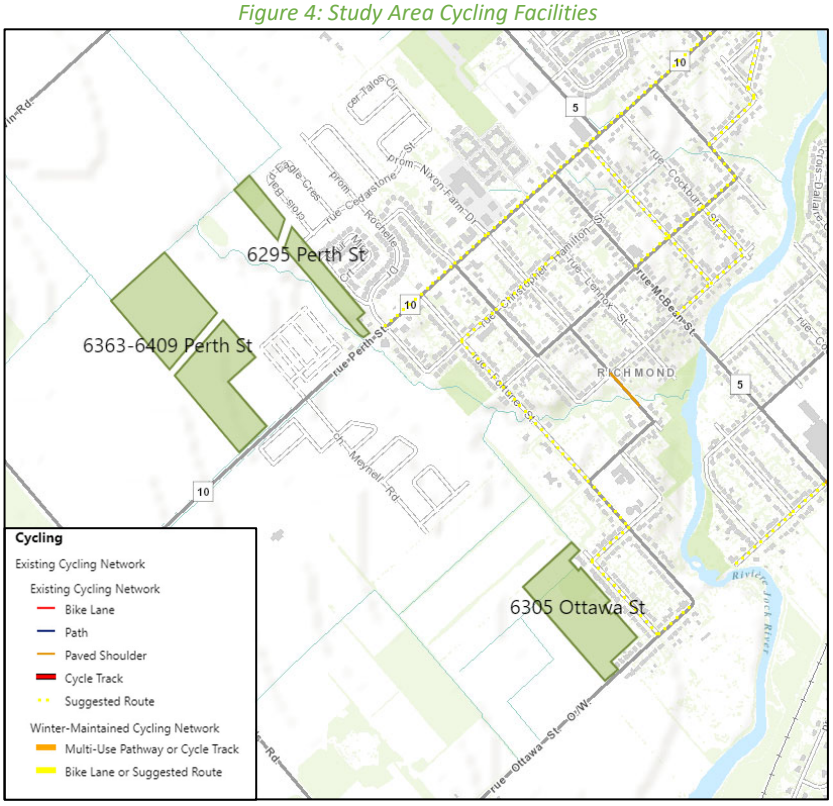
Sidewalks are provided along both sides of Perth Street to the east of Rochelle Drive/Queen Charlotte Drive and a sidewalk is provided on Fortune Street. While not illustrated below, Queen Charlotte Drive also has a sidewalk on the west side between Perth Street and Christopher Hamilton Street, and Cedarstone Street has a sidewalk west of Rochelle Drive. No dedicated cycling facilities are provided in the study area. Perth Street is designated as a cycling spine route to the east of Rochelle Drive/Queen Charlotte Street, and Ottawa Street, Queen Charlotte Street (between Ottawa Street and Burke Street), Burke Street (between Queen Charlotte Street and Fortune Street), Fortune Street (between Burke Street to Christopher Hamilton Street), and Christopher Hamilton Street (east of Fortune Street) are designated as local routes.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawabeta/ Accessed: May 28, 2020

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawabeta/ Accessed: May 28, 2020

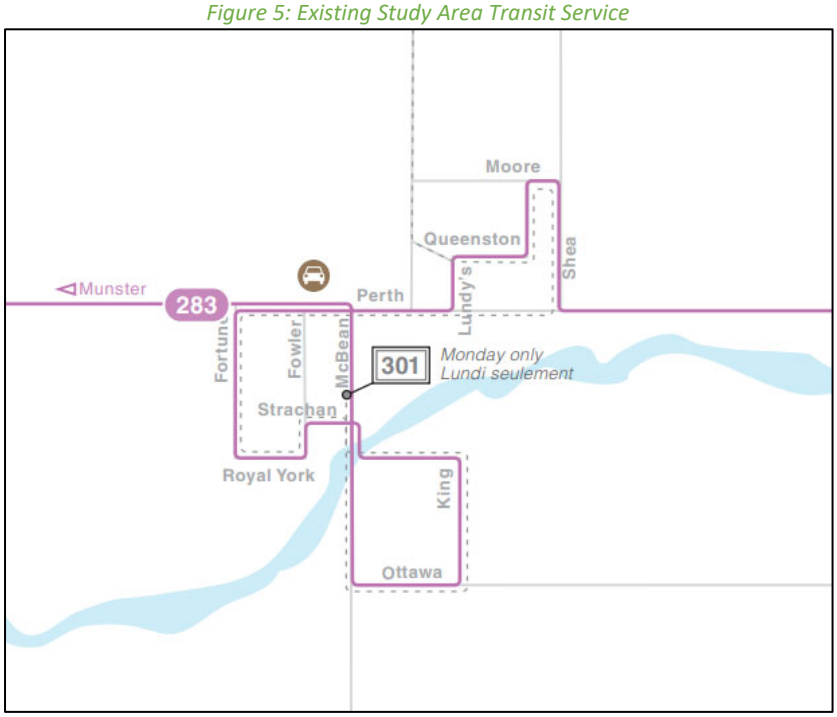
2.2.5 Existing Transit

Within the study area, the routes #283 and 301 provide service to Richmond Village. In the vicinity of the proposed site, stops are located on Fortune Street at Royal York Street, Martin Street, and Christopher Hamilton Street and at Perth Street at Joys Road. The frequency of these routes within proximity of the proposed site currently are (prior to pandemic reduced service changes):

- Route #283 – 30-minute service during the peak hours, with a total of four trips during each peak, and three AM trips traveling from Munster and two PM trips ending in Munster
- Route #301 – Monday only service, with a single AM trip departing at 8:50 AM, and a single trip returning at 3:40 PM

Figure 5 illustrates the transit system map in the study area and Figure 6 illustrates nearby transit stops.

Figure 5: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: May 28, 2020

Figure 6: Existing Study Area Transit Stops

Source: http://www.octranspo.com/ Accessed: May 28, 2020

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from adjacent development studies for the existing study area intersections. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date	Source
Perth Street & Meynell Road	-	Trip Generation of Phase 1
Perth Street & Rochelle Drive/Queen Charlotte Street	May 18, 2016	Transportation Brief, Richmond Oaks Health Centre (6265 Perth Street), June 2016, D.J. Halpenny & Associates Ltd.
Perth Street & Nixon Farm Drive/Fowler Street	August 12, 2015	Transportation Brief, Samara Square (6143 Perth Street), June 2017, D.J. Halpenny & Associates Ltd.

Figure 7 illustrates the existing traffic volumes and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on the TIA Guidelines for the lane movements and HCM average delay for the overall intersection. Detailed turning movement count data is included in Appendix B and the synchro worksheets are provided in Appendix C.

Figure 7: Existing Intersection Volumes

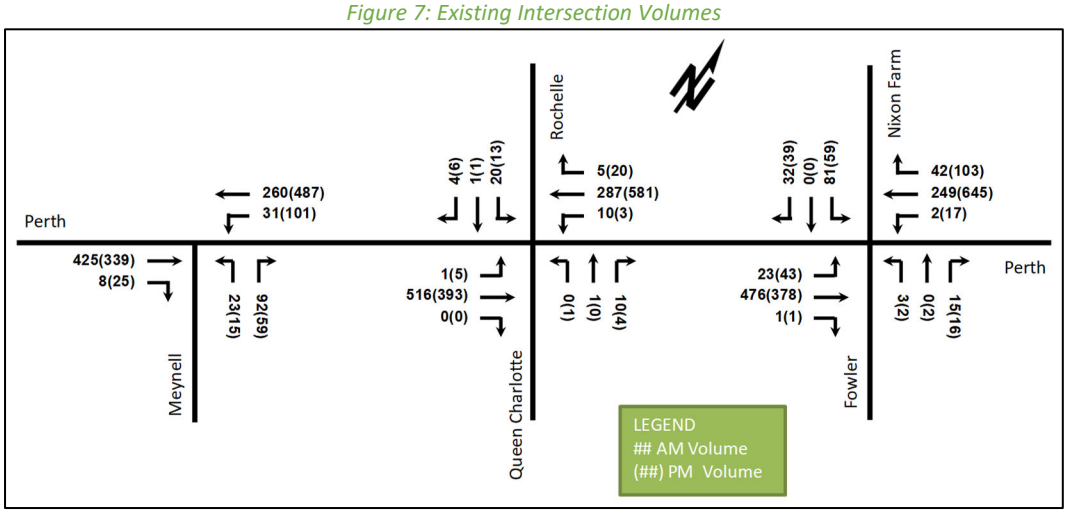


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Meynell Road *Unsignalized*	EBT/R	-	-	-	-	-	-	-	-
	WBL/T	A	0.03	8.4	0.8	A	0.10	8.5	2.3
	NB	B	0.25	14.5	7.5	C	0.19	15.2	5.3
	Overall	**A**	**-**	**2.3**	**-**	**A**	**-**	**2.0**	**-**
Perth Street & Rochelle Drive/Queen Charlotte Street *Unsignalized*	EBL/T	A	0.00	7.9	0.0	A	0.01	8.9	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.01	8.6	0.0	A	0.00	8.2	0.0
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.02	11.0	0.8	B	0.01	13.0	0.0
	SB	B	0.07	14.9	1.5	C	0.08	18.8	2.3
	Overall	**A**	**-**	**0.7**	**-**	**A**	**-**	**0.5**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Nixon Farm Drive/Fowler Street ***Signalized***	EB	A	0.24	4.5	22.5	A	0.23	4.1	17.6
	WB	A	0.14	3.7	12.1	A	0.37	4.6	33.0
	NB	A	0.08	6.6	3.8	A	0.09	14.2	6.0
	SBL	A	0.44	34.0	23.7	A	0.34	31.9	18.6
	SBT/R	A	0.05	0.2	0.0	A	0.12	0.7	0.0
	Overall	**A**	**0.30**	**6.7**	**-**	**A**	**0.39**	**5.7**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 0.90

During both the AM and PM peak hours, the study area intersections operate well. No capacity issues are noted.

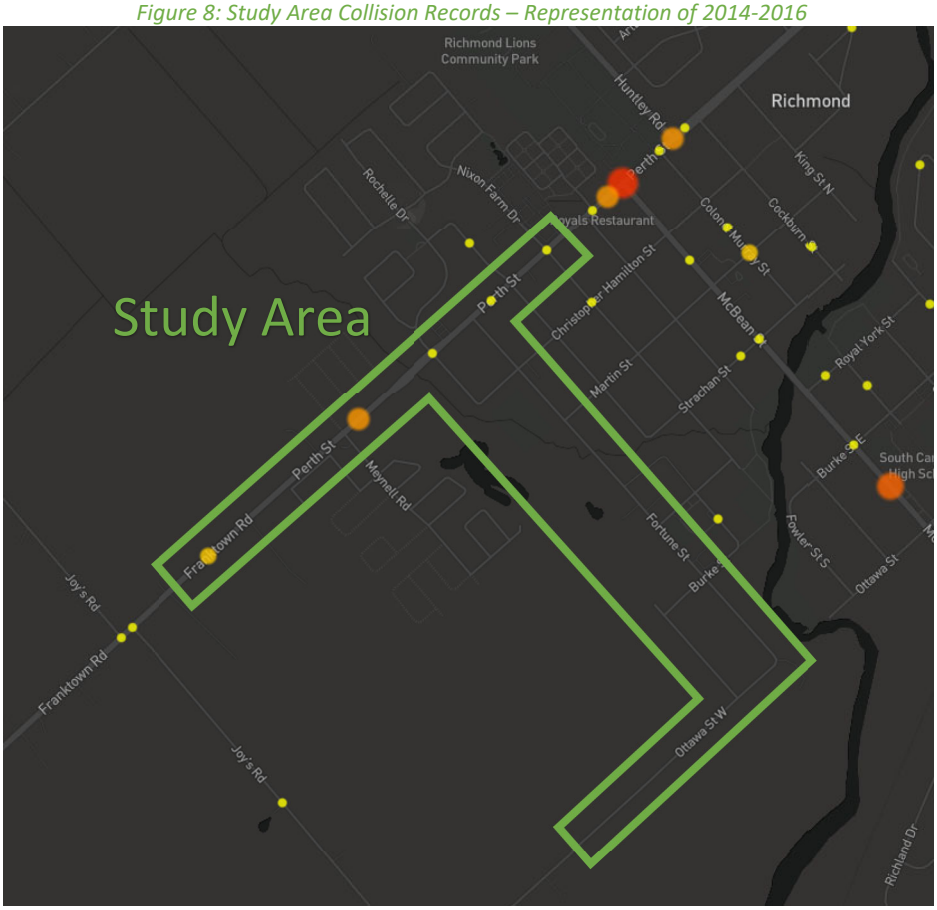
2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study are road network. Table 3 summarizes the collisions types and conditions in the study area, Figure 8 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2014-2018

		Number	%
Total Collisions		16	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	4	25%
	Property Damage Only	12	75%
Initial Impact Type	**Angle**	1	6%
	Rear end	2	13%
	Sideswipe	1	6%
	Turning Movement	3	19%
	SMV Other	9	56%
Road Surface Condition	**Dry**	11	69%
	Wet	2	13%
	Ice	3	19%
Pedestrian Involved		2	13%
Cyclists Involved		0	0%

Figure 8: Study Area Collision Records – Representation of 2014-2016



Source: https://maps.bikeottawa.ca/collisions/ Accessed: May 28, 2020

Table 4: Summary of Collision Locations, 2014-2018

	Number	%
Intersections / Segments	**16**	**100%**
Perth St @ Queen Charlotte St/Rochelle Dr	4	25%
Fowler St/Nixon Farm Dr @ Perth St	1	6%
Fortune St @ Martin St	1	6%
Franktown Rd btwn Joy's Rd & Perth St	2	13%
Perth St btwn Franktown Rd & Rochelle Dr	4	25%
Perth St btwn Fortune St & Tarryn Ter	1	6%
Perth St btwn Tarryn Ter & Nixon Farm Dr	1	6%
Perth St btwn Nixon Farm Dr & Lennox St	1	6%
Fortune St btwn Perth St & Hamilton St	1	6%

Within the study area, no specific localities are noted to have collisions frequencies of concern. Generally, the trend of the study area is having high representation of single motor vehicle (other) collisions, which are typical of rural roads with higher speed limits than their urban counterparts. Specifically, this collision type is the highest represented at both locations with four collisions.

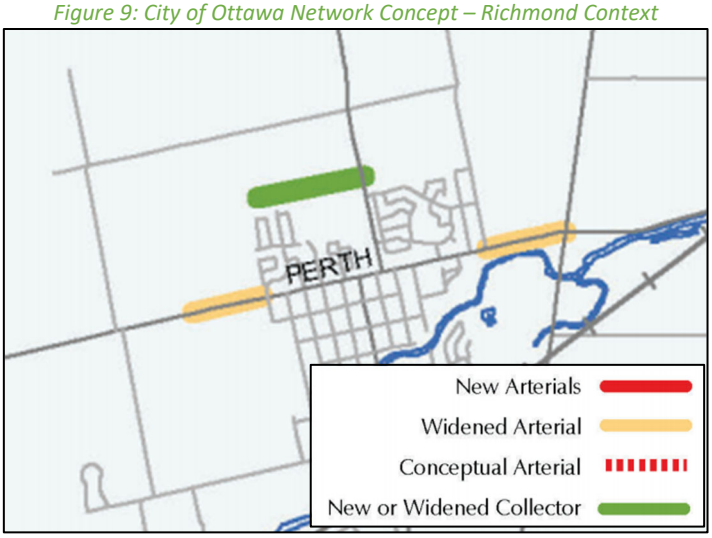
2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the Richmond Village Secondary Plan/Community Design Plan. No improvements are included within the 2031 Affordable Network of the Ottawa TMP. The following projects are currently identified beyond the 2031 horizon in the Network Concept and are illustrated in Figure 9:

- Richmond Village By-Pass: Construct a new two-lane road between Huntley Road and Eagleson Road
- Perth Street Widening: Widen Perth Street to four lanes between Village Boundary and Rochelle Drive/Queen Charlotte Street
- Perth Street Widening: Widen Perth Street to four lanes between Shea Road and Eagleson Road

Figure 9: City of Ottawa Network Concept – Richmond Context



The RMA and detailed design for the new intersection at Perth Street and Meynell Road and the urbanization of Perth Street between Meynell Road and Rochelle Drive/Queen Charlotte Street are included within DC funded project list and are expected to be constructed by 2024/25. The new intersection's ultimate condition will include a roundabout and cycle track that continues to the intersection of Perth Street and Rochelle Drive/Queen Charlotte Street, and the intersection's interim condition will be stop-controlled on the minor approaches.

While not identified in planning documents, a sidewalk will be constructed (by others) on the west side of Nixon Farm Drive from Perth Street to 235 m north of Perth Street in 2020.

2.3.2 Other Study Area Developments

Fox Run Phase 1 - Caivan

The first Phase of the Fox Run development is currently under construction. In total, the subdivision will include a total of 214 single family homes. A new intersection on Perth Street will be provided at Meynell Road.

Fox Run Phase 2/3 - Caivan

The second Phases of Fox Run have been termed Phase 2 North and South and include 386 residential units split on the north side of Perth Street and on the west side of the Phase 1 lands. Servicing is underway and it is expected that this phase will be completed by 2024.

Fox Run Phase 4/5 - Caivan
The final two phases of the Fox Run development are currently planned to begin in 2025. It is envisioned that a total of 205 single family homes is planned to be constructed during 2025-2026.

6240-6431 Ottawa Street – Mattamy Richmond Subdivision
A plan of subdivision application has been submitted for a new residential subdivision along Ottawa Street with 848 single family homes and 252 townhomes estimated to be built-out by 2029 with approximately 100-150 units per year. The proposed site will extend Meynell Road, connect to Ottawa Street, and include additional future connections to Royal York Street and Burke Street.

6265 Perth street – Richmond Oaks Health Centre
The proposed medical centre will be developed in two phases, with Phase 1 completed including a medical clinic and pharmacy, and Phase 2 will include 31 senior apartment units and 10,182 sq. ft. of commercial/retail space. Phase 2 is anticipated to be completed by 2022.

Samara Square
Phase 2 of the Hyde Park Senior Development will include two buildings with 35 rental apartments, 124 senior retirement apartments, and supporting commercial/retail. While not currently included in the development planning, Phase 3 will include an additional 122 apartment units in eight buildings.

471 Sangeet Place
An extension of the existing Jock River Estates development includes an additional 10 homes.

3 Study Area and Time Periods

3.1 Study Area

The TIA guidelines recommend a study area that includes all signalized and roundabout intersections within 1.0 km of the subject lands. Due to the current pandemic conditions, and past construction/closures along Eagleson Road and McBean Street in the last three years, limited data is available and verifiable in the area. It is therefore recommended that the following intersections be included in this study, based on available counts and adjacent area studies:

- Perth Street at Meynell Road/Oldenburg Street
- Perth Street at Rochelle Drive/Queen Charlotte Street
- Perth Street at Nixon Farm Drive/Fowler Street

The many local road intersections will not be able to have data collection completed at this time, as the rate at which to scale these volumes is unknown. A review of the generated volumes can be completed with the inclusion of the Neighbourhood Traffic Management module to the scope of work to gauge the relative impact the specific developments would have on the area road thresholds.

No TRANS screenlines are present in the area, therefore no screenlines will be reviewed as part of this study.

3.2 Time Periods

As the proposed development is composed entirely of residential units the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year of 2025 is assumed for the subject site. As a result, the full build-out plus five years horizon year is 2030.

4 Exemption Review

Table 5 summarizes the exemptions for this TIA.

Table 5: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Exempt
	4.2.3 New Street Networks	Only required for plans of subdivision	Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Exempt
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt (Currently Development Reserve, therefore zoning changes are “worst case”)

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle and person trip rates for the residential components using the TRANS Trip Generation Study Report (2009) for rural areas. Table 6 summarizes the person trip rates for the proposed land uses.

Table 6: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
Single-Detached Dwelling	221	AM	0.62	1.03
		PM	0.92	1.23
Townhomes/Rowhouses	223	AM	0.62	0.85
		PM	0.67	0.91

Using the above Person Trip rates, the total person trip generation has been estimated. Table 7 summarizes the total person trip generation by phase and dwelling type. The unit totals are considered a maximum unit count for

the subdivision and it is recognized that the ultimate unit count may be reduced through layout changes to address technical comments from other disciplines.

Table 7: Total Person Trip Generation

Site	Land Use	Units	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
6363-6409 Perth St.	Single-Detached	119	36	87	123	89	57	146
	Townhomes	205	64	110	174	99	88	187
6295 Perth St.	Single-Detached	42	12	31	43	32	20	52
6305 Ottawa St.	Single-Detached	42	12	31	43	32	20	52
	Townhomes	169	53	91	144	82	72	154
Total Person Trips			**177**	**350**	**527**	**334**	**257**	**591**

Using the most recent National Capital Region Origin-Destination survey (OD Survey), the existing mode shares for Rural Southwest have been determined and compared to various modes share breakdowns identified by City Staff as potential interpretations of the data. Table 8 summarizes these modal shares.

Table 8: Rural Southwest Mode Share

Travel Mode	Rural Southwest	AM From/Within	PM To/Within
Auto Driver	75%	85%	75%
Auto Passenger	15%	10%	15%
Transit	5%	5%	5%
Bicycle	1%	0%	0%
Walk	4%	0%	5%
Total	100%	100%	100%

Per City of Ottawa staff, the AM and PM mode shares and person trip rates have been projected and summarized in Table 9.

Table 9: Trip Generation by Mode

Phase	Travel Mode	Mode Share	In	Out	Total	Mode Share	In	Out	Total
6363-6409 Perth Street	Auto Driver	85%	75	148	223	75%	141	109	250
	Auto Passenger	10%	15	30	44	15%	28	22	50
	Transit	5%	5	10	15	5%	9	7	16
	Bicycle	0%	1	2	3	0%	0	0	0
	Walk	0%	4	7	12	5%	9	7	16
	Total	**100%**	**100**	**197**	**297**	**100%**	**188**	**145**	**333**
6295 Perth Street	Auto Driver	85%	9	23	32	75%	24	15	39
	Auto Passenger	10%	2	5	6	15%	5	3	8
	Transit	5%	1	2	3	5%	2	1	3
	Bicycle	0%	0	0	0	0%	0	0	0
	Walk	0%	0	1	2	5%	2	1	3
	Total	**100%**	**12**	**31**	**43**	**100%**	**32**	**20**	**52**
6305 Ottawa Street	Auto Driver	85%	55	103	159	75%	86	69	155
	Auto Passenger	10%	6	12	18	15%	17	14	31
	Transit	5%	4	7	11	5%	6	5	11
	Bicycle	0%	0	0	0	0%	0	0	0
	Walk	0%	0	0	0	5%	6	5	11
	Total	**100%**	**65**	**122**	**187**	**100%**	**114**	**92**	**206**

As shown above, 527 AM and 591 PM peak hour two-way vehicle trips are projected as a result of the proposed development.

No trip reductions factors (i.e., synergy, pass-by, etc.) have been applied as the subject development is residential.

5.2 Trip Distribution

To understand the travel patterns of the subject development the OD Survey has been reviewed to determine the existing travel patterns. Table 10 below summarizes the distribution.

Table 10: OD Survey Existing Distribution – Rural Southwest

To/From	Percent of Trips	Via
North	55%	Perth St - 45% east, 10% west
South	5%	Perth St/Martin St - 5% east
East	25%	Perth St east
West	15%	Perth St west
Total	100%	

5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network. The new site volumes for 6363-6409 Perth Street, 6295 Perth Street, and 6305 Ottawa Street are illustrated in Figure 10, Figure 11, and Figure 12. Of note for 6305 Ottawa Street, left turns onto Perth Street will be avoided due to the difficulty of making these movements, especially during the peak hours. In a general sense, it is easier to exit Perth Street than it is to enter during the peak hours at non-signalized locations.

Figure 10: New Site Generation Auto Volumes – 6363-6409 Perth Street

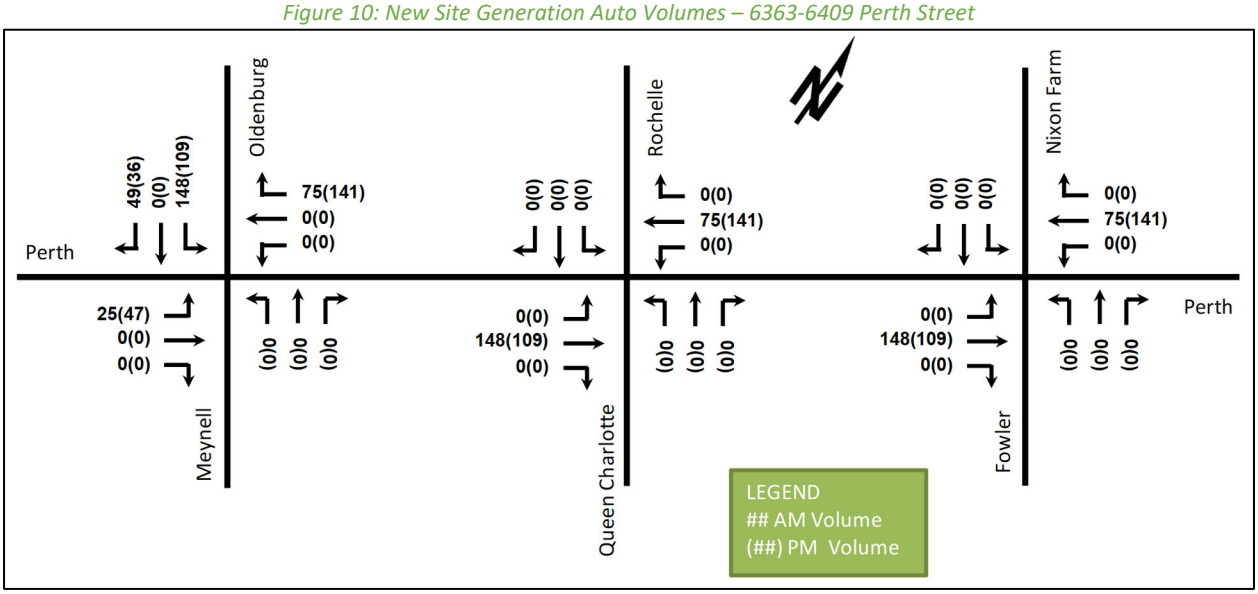


Figure 11: New Site Generation Auto Volumes – 6295 Perth Street

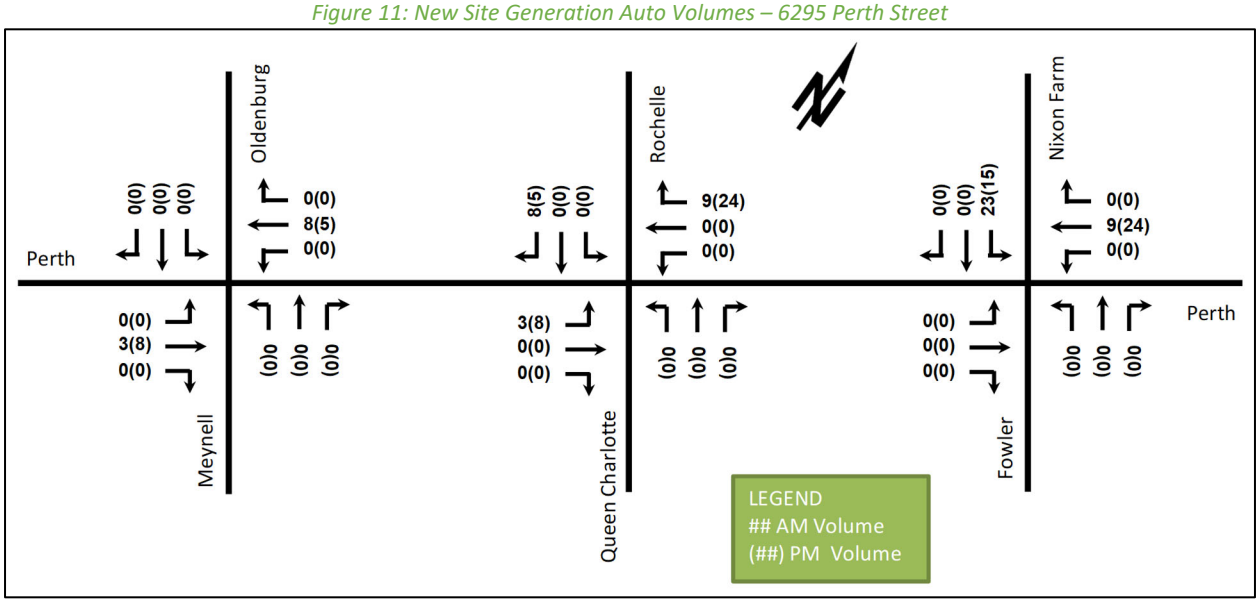
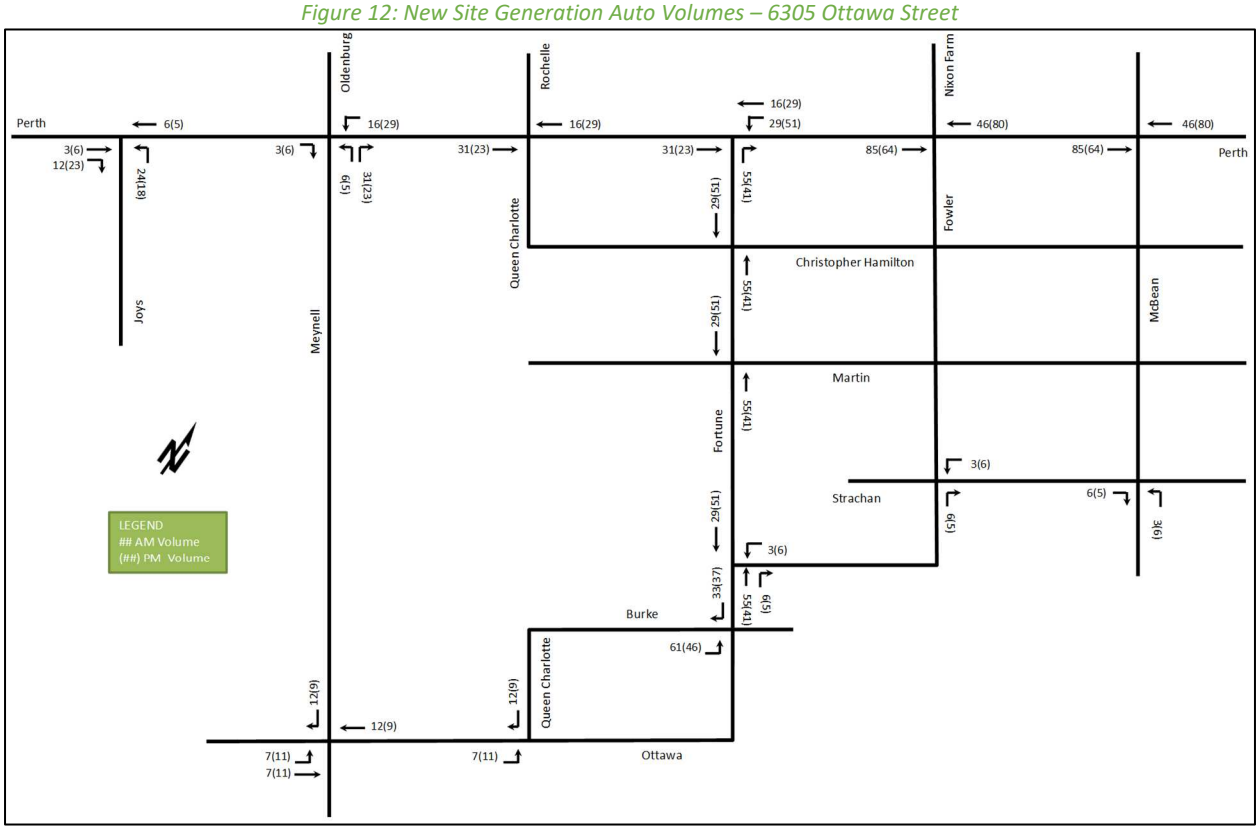


Figure 12: New Site Generation Auto Volumes – 6305 Ottawa Street



6 Background Network Travel Demand

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.

6.2 Background Growth

The background growth identified in adjacent developments ranges from 1.5% to 2.0% along Perth Street. A significant amount of the development within the Village of Richmond has been explicitly accounted for in Section 6.3. Therefore, a background growth rate along Perth Street has been assumed as 1.5% in the peak direction for development beyond the Village of Richmond. The TRANS background projection plots are provided in Appendix E.

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 2.3) include:

- Fox Run Phase 1 - Caivan
- Fox Run Phase 2/3 - Caivan
- Fox Run Phase 4/5 - Caivan
- 6240-6431 Ottawa Street – Mattamy Richmond Subdivision
- 6265 Perth street – Richmond Oaks Health Centre
- Samara Square
- 471 Sangeet Place

Based on the assumed build-out rates of the adjacent developments, the total background development volumes for the 2025 and 2030 horizons are illustrated in Figure 13 and Figure 14.

Figure 13: 2025 Background Development Total Volumes

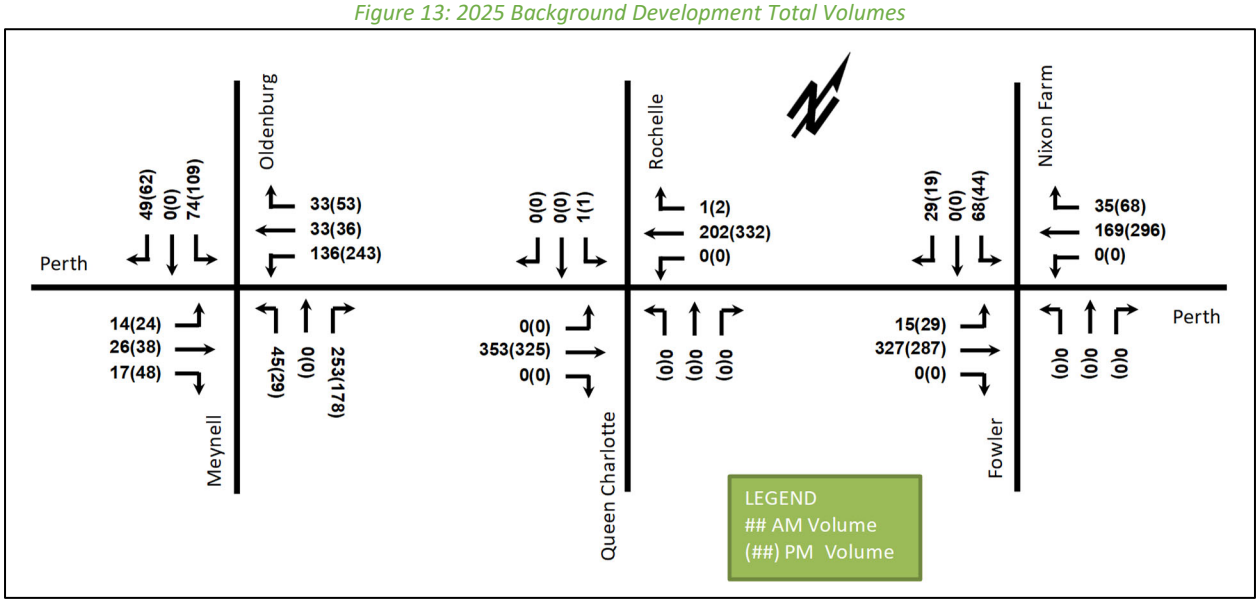
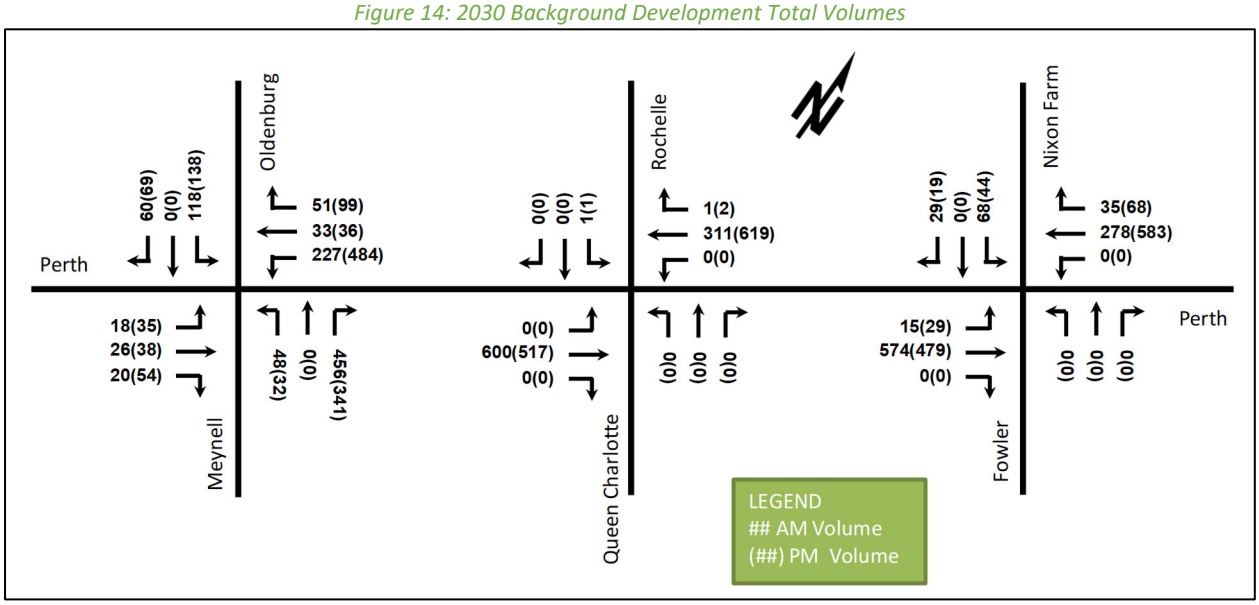


Figure 14: 2030 Background Development Total Volumes



7 Demand Rationalization

7.1 2025 Future Background Conditions

Figure 15 illustrates the 2025 future background volumes and Table 11 summarizes the intersection operations. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. The synchro and sidra worksheets are provided in Appendix F.

Figure 15: 2025 Future Background Traffic Volumes

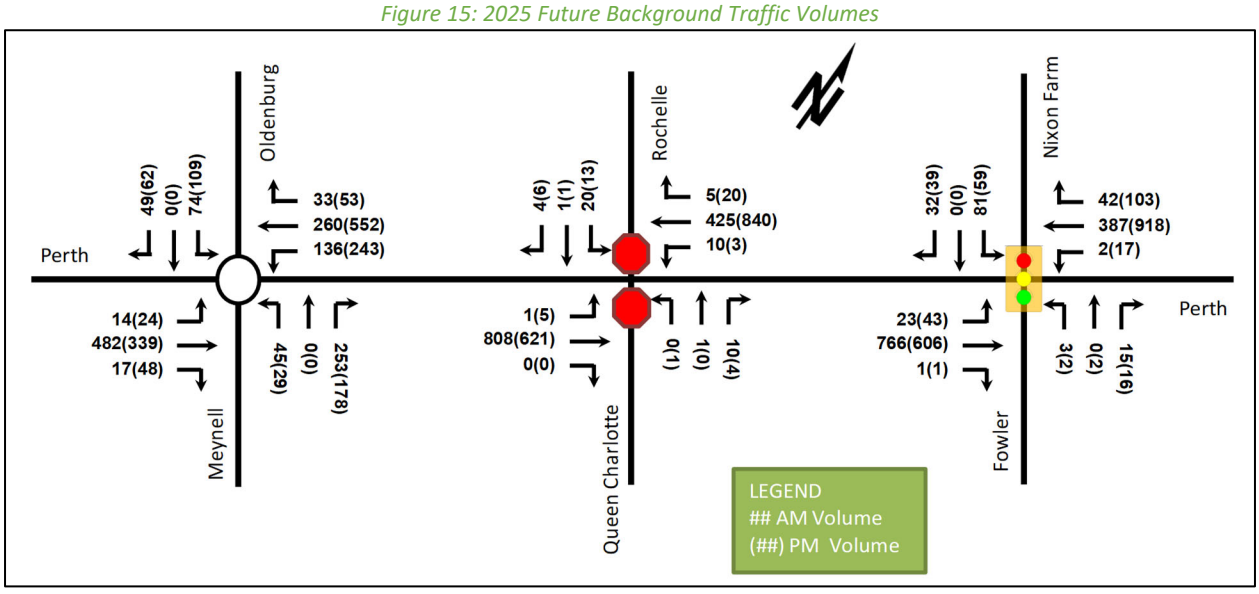


Table 11: 2025 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Meynell Road *Roundabout*	EB	A	0.45	5.8	22.9	A	0.42	6.9	20.0
	WB	A	0.32	5.9	16.0	A	0.59	5.8	41.5
	NB	A	0.38	8.7	18.5	A	0.24	7.5	10.7
	SB	A	0.14	9.2	5.3	A	0.28	13.4	13.0
	Overall	**A**	**0.45**	**6.8**	-	**A**	**0.59**	**7.1**	-
Perth Street & Rochelle Drive/Queen Charlotte Street *Unsignalized*	EBL/T	A	0.00	8.2	0.0	C	0.02	17.4	0.8
	EBT/R	-	-	-	-	-	-	-	-
	WBL	A	0.01	9.5	0.0	A	0.00	8.8	0.0
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.02	12.6	0.8	C	0.02	17.4	0.8
	SB	C	0.09	19.3	2.3	D	0.11	27.1	3.0
	Overall	**A**	-	**0.6**	-	**A**	-	**0.5**	-
Perth Street & Nixon Farm Drive/Fowler Street *Signalized*	EB	A	0.34	4.8	30.7	A	0.31	4.4	23.0
	WB	A	0.18	3.9	15.0	A	0.44	5.1	40.1
	NB	A	0.07	5.7	3.0	A	0.09	14.9	5.6
	SBL	A	0.41	33.4	20.2	A	0.31	31.6	16.0
	SBT/R	A	0.06	0.2	0.0	A	0.13	1.5	1.2
	Overall	**A**	**0.38**	**6.1**	-	**A**	**0.45**	**5.8**	-

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

Overall, the study area intersections will operate like the existing conditions during the 2025 future background horizon. No improvements or mitigation is required.

7.2 2030 Future Background Conditions

Figure 16 illustrates the 2030 future background volumes and Table 12 summarizes the intersection operations. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. The synchro and sidra worksheets are provided in Appendix G.

Figure 16: 2030 Future Background Traffic Volumes

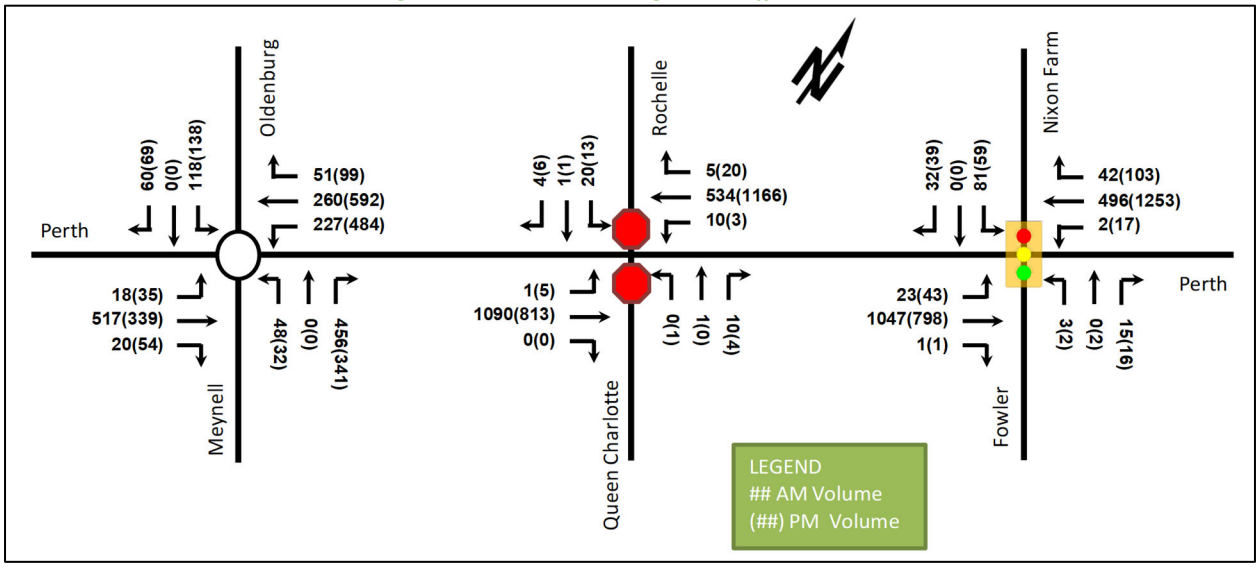


Table 12: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Meynell Road *Roundabout*	EB	A	0.56	7.6	33.0	A	0.59	12.1	40.2
	WB	A	0.40	6.5	22.9	D	0.83	7.1	109.3
	NB	C	0.72	16.2	64.1	A	0.47	8.4	25.7
	SB	A	0.22	10.4	9.1	A	0.58	29.8	40.5
	Overall	**C**	**0.72**	**10.0**	**-**	**D**	**0.83**	**10.5**	**-**
Perth Street & Rochelle Drive/Queen Charlotte Street *Unsignalized*	EBL/T	A	0.00	8.5	0.0	B	0.01	11.2	0.0
	EBT/R	-	-	-	-	-	-	-	-
	WBL	B	0.02	10.7	0.0	A	0.00	9.4	0.0
	WBT/R	-	-	-	-	-	-	-	-
	NB	C	0.03	15.5	0.8	D	0.03	30.2	0.8
	SB	D	0.14	27.6	3.8	**F**	**0.22**	**54.0**	**6.0**
	Overall	**A**	**-**	**0.6**	**-**	**A**	**-**	**0.7**	**-**
Perth Street & Nixon Farm Drive/Fowler Street *Signalized*	EB	A	0.46	5.7	46.6	A	0.41	5.1	32.8
	WB	A	0.23	4.1	19.2	A	0.59	6.6	63.7
	NB	A	0.07	5.7	3.0	A	0.09	14.9	5.6
	SBL	A	0.41	33.4	20.2	A	0.31	31.6	16.0
	SBT/R	A	0.07	0.3	0.0	A	0.16	12.2	7.5
	Overall	**A**	**0.48**	**6.4**	**-**	**A**	**0.58**	**6.9**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

Overall, the study area intersections at the 2030 future background horizon will operate similarly to the existing and 2025 future background conditions. The southbound left-turn at the Perth Street and Rochelle Drive/Queen Charlotte Street intersection will experience delays approaching one minute during the PM peak. It is anticipated that the 13 turning vehicles will shift to the Nixon Farm Drive/Fowler Street intersection. No improvements or mitigation is required.

7.3 Modal Share Sensitivity

Capacity constraints have been noted at the Rochelle Drive/Queen Charlotte Street intersection for the northbound and southbound movements. As this is a function of the left-turns, the left-turns will likely move to the Nixon Farm Drive/Fowler Street signalized intersection. This will be modified in the future total conditions.

No additional capacity constraints are noted in the background horizons.

The transit service is at an achievable level and any improvement may also increase service within the Richmond Village as a whole and considered a net benefit for the City.

8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a residential subdivision where each dwelling will include a driveway and garage. Bicycle parking is assumed to be within the individual units. Figure 17 and Figure 18 illustrates the pedestrian concept network with connections to adjacent pedestrian facilities and both collector and arterial roadways. These are conceptual only and meant as guidance once the subdivision proceeds to future approvals beyond the rezoning.

Figure 17: Concept Pedestrian and Cycling Network – 6295, 6363, 6409 Perth Street

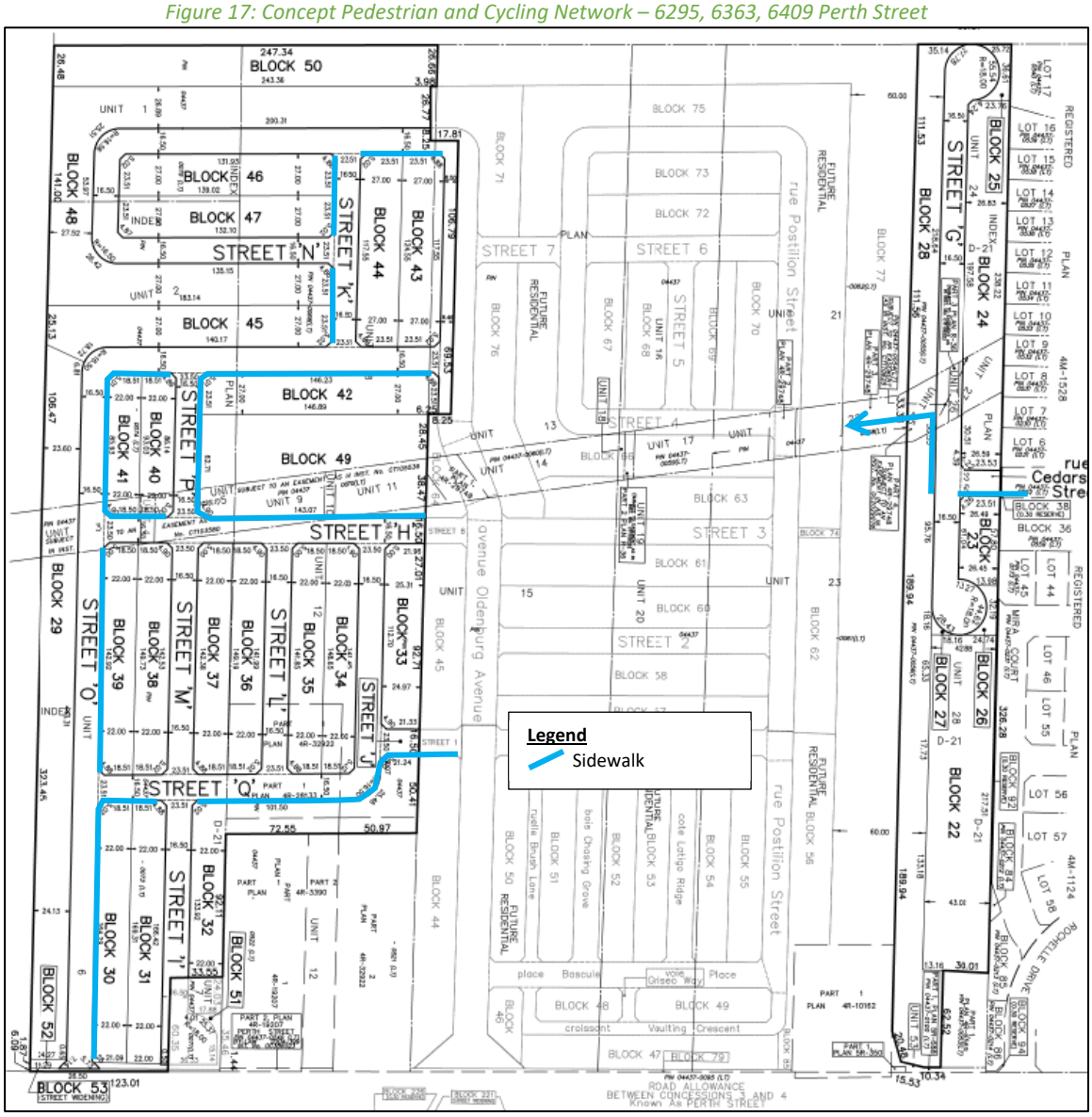
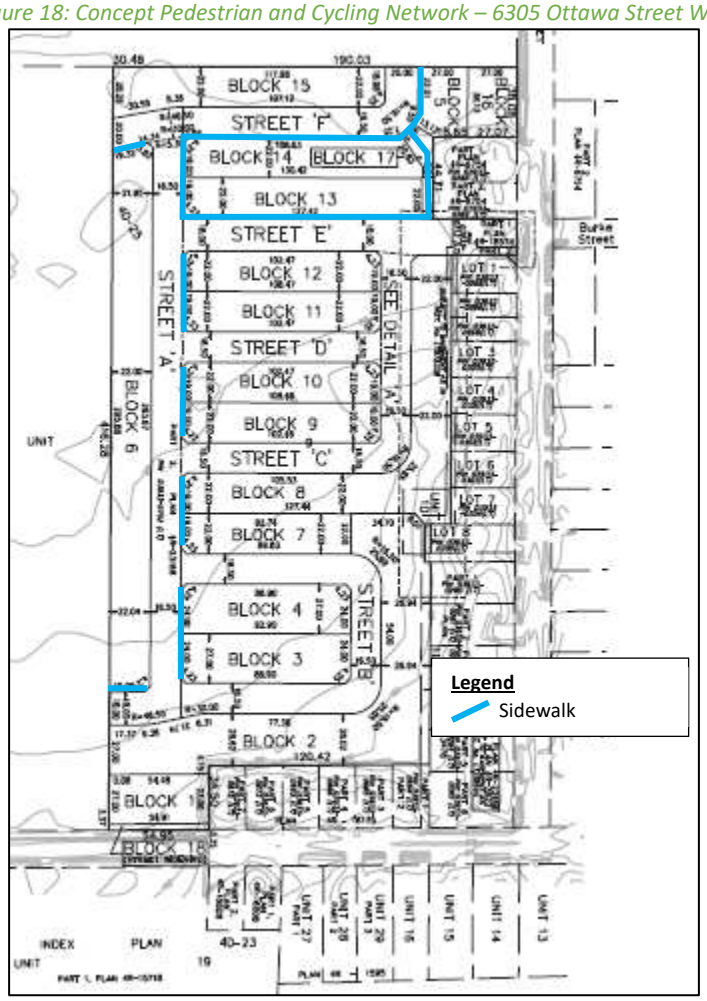


Figure 18: Concept Pedestrian and Cycling Network – 6305 Ottawa Street West



8.2 New Street Networks

The planned street network will include a mix of 16.5 and 18.0 metre local roadways, and 20.0 metre local road connections to adjacent local roadways. The local roads will provide the opportunity for parking on one side of the roadway. The subdivision is considered to be designed for 30 km/h roadways.

Traffic calming elements are recommended at the internal intersections, including bulb-outs to narrow each approach to the intersection (e.g., reduced crossing distance). On-street parking is undefined within these concepts. Once the road network pattern and lotting concepts are confirmed, the on-street parking can be outlined in the geometric roadway design. Figure 19 illustrates the proposed locations. These are conceptual only and meant as guidance once the subdivision proceeds to future approvals beyond the rezoning.

Figure 19: Concept Traffic Calming Plan – 6295, 6363, 6409 Perth Street

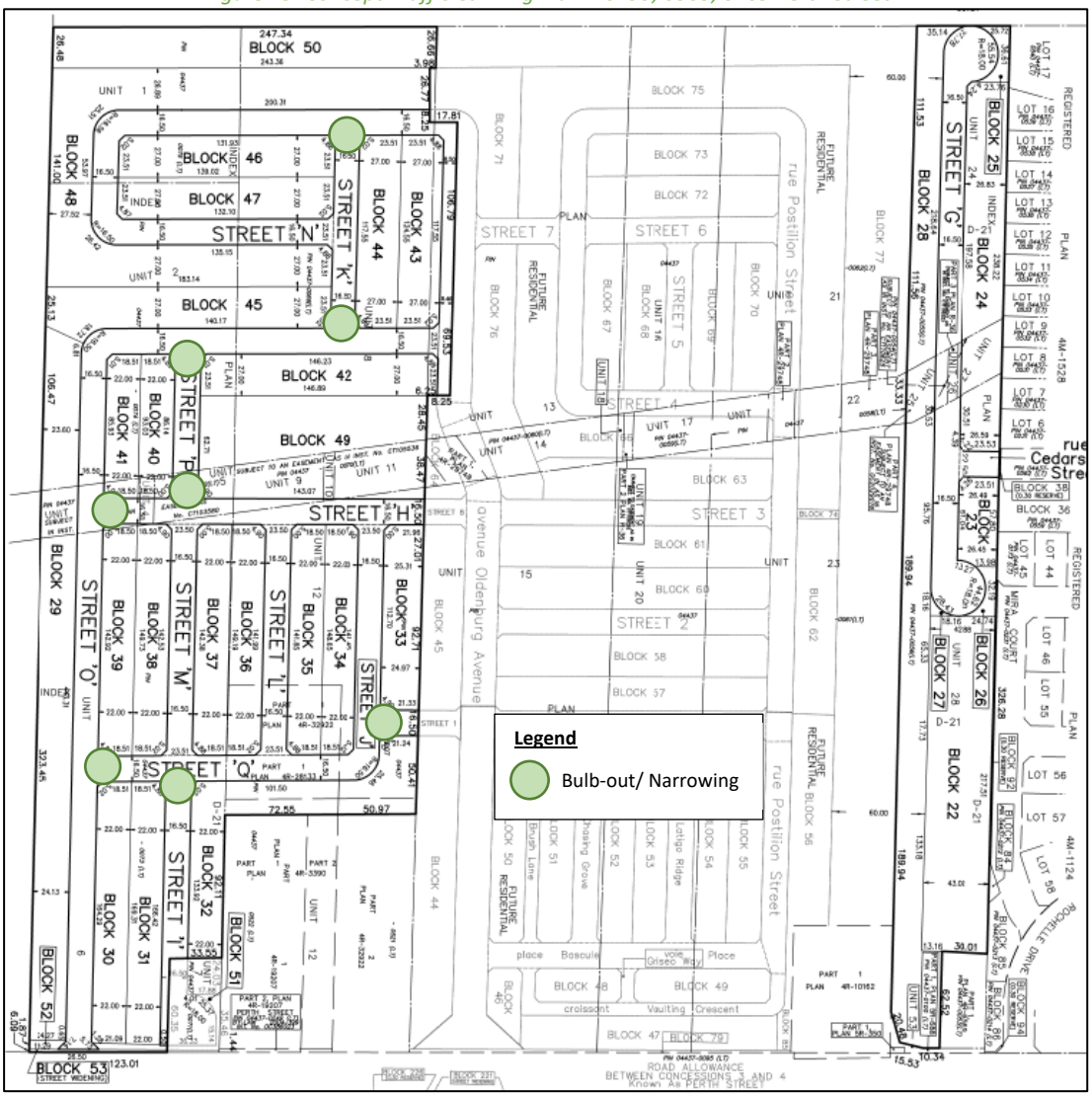
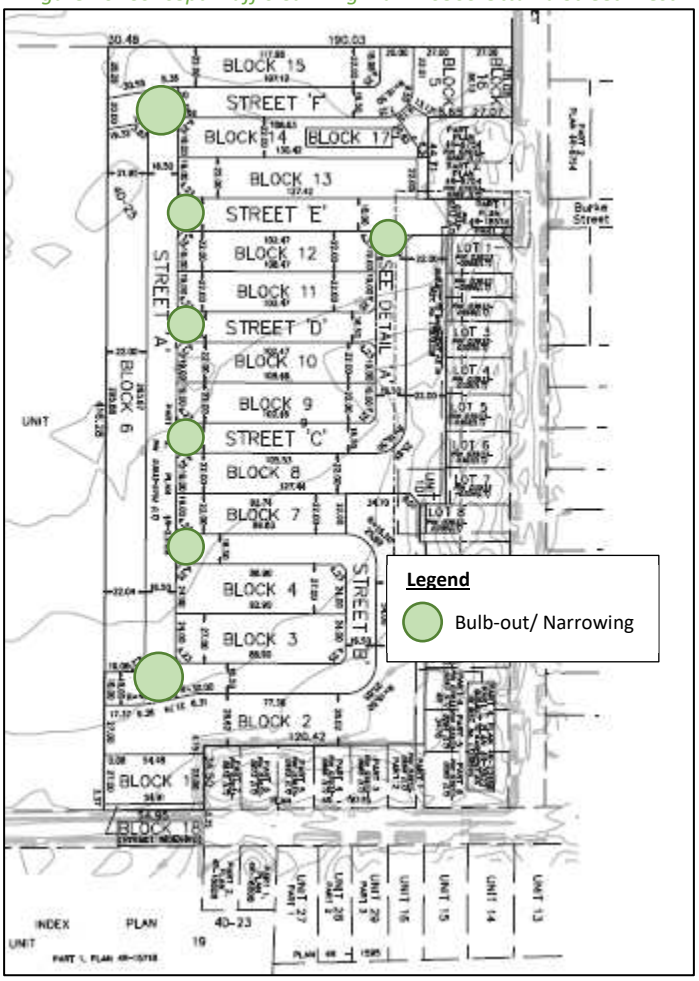


Figure 20: Concept Traffic Calming Plan – 6305 Ottawa Street West



9 Boundary Street Design

Table 13 summarizes the MMLOS analysis for the boundary street network. Perth Street and Ottawa Street are noted for future improvement and thus the existing and future conditions have been assessed in separate rows where the remaining roadways' existing and future conditions are considered in the same row. The analysis is based on the policy area of Village. The MMLOS worksheets has been provided in Appendix H.

Table 13: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
Perth (existing)	F	C	F	C	D	N/A	C	D
Perth (interim)	C	C	A/C	B	D	N/A	C	D
Perth (interim)	C	C	A	B	D	N/A	C	D
Ottawa (existing)	F	C	F	B	D	N/A	N/A	N/A
Ottawa (future)	E	C	D	B	D	N/A	N/A	N/A
Meynell	C	C	A	D	D	N/A	N/A	N/A
Oldenburg	C	C	A	D	N/A	N/A	N/A	N/A
Mira	-	C	A	D	N/A	N/A	N/A	N/A
Cedarstone	E	C	A	D	N/A	N/A	N/A	N/A
Burke	-	C	A	B	N/A	N/A	N/A	N/A

Cedarstone Street, Perth Street and Ottawa Street do not meet the pedestrian LOS targets for Richmond Village. The existing Perth Street and Ottawa Street do not have any pedestrian facilities. Cedarstone Street would require a wider sidewalk (1.8 metres) or a boulevard of 0.5 metres or greater to meet the area targets. In the future, Ottawa Street is assumed to include a sidewalk and is limited by the traffic volumes and speeds anticipated along the roadway. No mitigation is recommended for: Perth Street as it is a rural arterial roadway and connections can be provided through the subdivision; for Ottawa Street as the road design is subject to the subdivision work included in 6240-6431 Ottawa Street or, on Cedarstone Street due to limited space for shifting the existing sidewalks.

Similar to the pedestrian conditions, existing Perth Street and Ottawa Street do not have any dedicated cycling facilities and fail to meet the bicycle LOS. The interim south side of Perth Street will have a shoulder facility but still not meet the BLOS target. The future Ottawa Street remains undefined, but the assumption of mixed traffic will not meet the area targets. Along Ottawa Street, it is recommended that the City investigate the ability to place separated facilities for cyclists during the approvals of 6240-6431 Ottawa Street. This is the direction the MMLOS analysis dictates for the roadway, even if it is not ultimately required given the location at the limits of the Village.

10 Access Intersections Design

10.1 Location and Design of Access

The residential accesses will connect to the adjacent road network via local roads and adjacent collector roads of Oldenburg Avenue, Fortune Street and Ottawa Street, and a local road connection to Perth Street. Within the subdivision, no turn lanes are proposed for the internal intersections which will be controlled by minor stop control.

10.2 Intersection Control

The intersection of Street O at Perth Street is considered as a minor stop control and no turn lanes are proposed.

10.3 Access Intersection Design

10.3.1 2025 Future Total Access Intersection Operations

The 2025 future total access intersection volumes are illustrated above in Figure 21 and intersection operations are summarized below in Table 14. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. The synchro and sidra worksheets have been provided in Appendix I.

Figure 21: 2025 Future Total Volumes

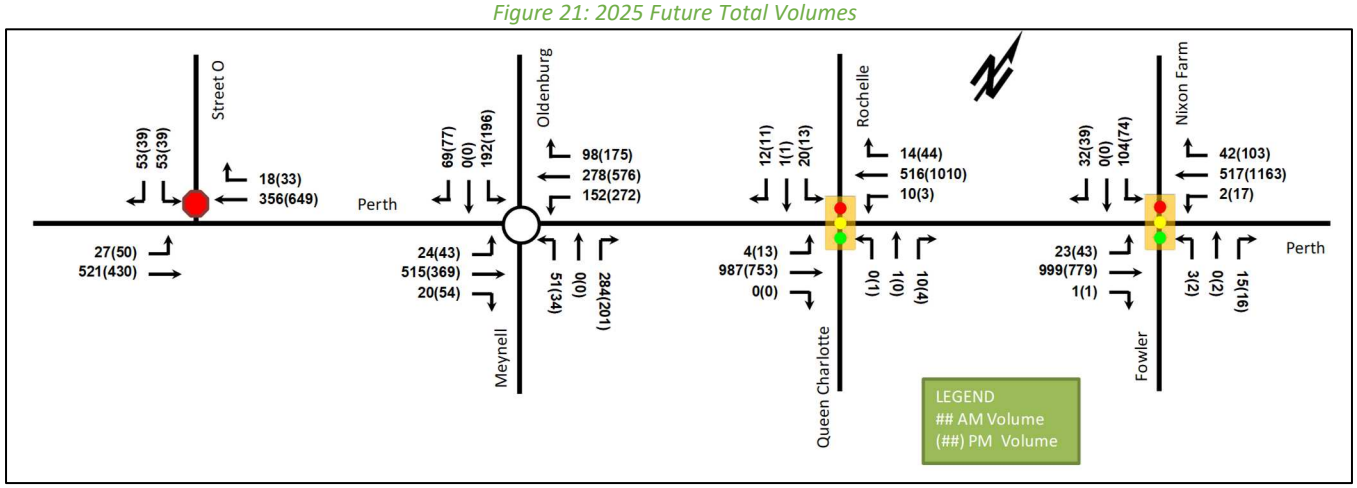


Table 14: 2025 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Street O *Unsignalized*	EB	A	0.02	8.1	0.8	A	0.06	9.2	1.5
	WB	-	-	-	-	-	-	-	-
	SB	C	0.26	17.2	7.5	C	0.29	23.7	9.0
	Overall	**A**	**-**	**2.0**	**-**	**A**	**-**	**1.9**	**-**

Overall, the access intersection will operate well during the 2025 future total horizon. No improvements or mitigation are required.

10.3.2 2030 Future Total Access Intersection Operations

The 2030 future total access intersection volumes are illustrated above in Figure 22 and intersection operations are summarized below in Table 15. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. The synchro and sidra worksheets have been provided in Appendix J.

Figure 22: 2030 Future Total Volumes

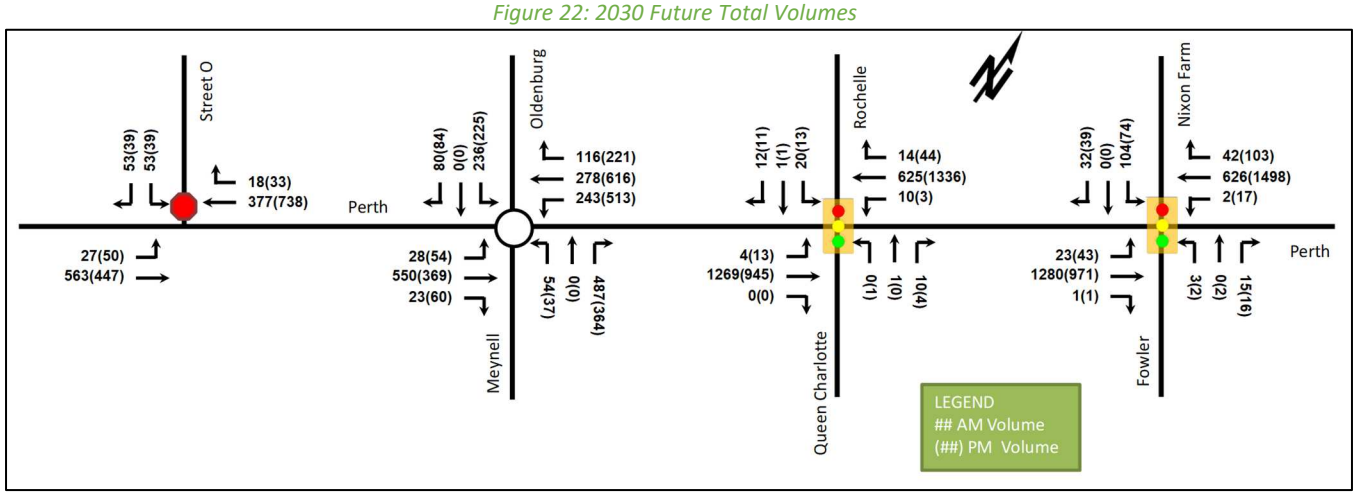


Table 15: 2030 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Street O ***Unsignalized***	EB	A	0.02	8.2	0.8	A	0.06	9.5	1.5
	WB	-	-	-	-	-	-	-	-
	SB	C	0.29	18.5	9.0	D	0.34	28.0	10.5
	Overall	**A**	**-**	**2.0**	**-**	**A**	**-**	**2.0**	**-**

Overall, the access intersection will operate well during the 2030 future total horizon. No improvements or mitigation are required.

11 Transportation Demand Management

11.1 Context for TDM

The mode shares used within the TIA are representative of the area and no major improvements are anticipated to shift these modes.

The subject site is not within a design priority area.

Total bedrooms within the development are subject to the final unit count and layout selections by purchasers. No age restrictions are noted.

11.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel. The study area intersections are anticipated to have residual capacity and if transit service is increased in the area, there may be a shift from auto that is possible.

11.3 TDM Program

The "suite of post occupancy TDM measures" has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix K. The key TDM measures recommended include:

- Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels (subdivision)
- Provide the option to include a 1-month Presto card for first time new home purchase, with a set time frame for this offer (e.g., 6-months) from the initial offering of units for each phase/registration
- Provide a multimodal travel option information package to new residents
- Offer personalized trip planning to new residents

The OC Transpo early service and Presto card recommendations will not be required if the City will not consider changing the transit service in Richmond Village.

12 Neighbourhood Traffic Management

The proposed development will connect to the arterial road network through the adjacent local and collector road network which requires a review of the traffic thresholds for the roadways, as stipulated within the TIA guidelines. In general, the TIA thresholds are too low for local and collector roadways when considered as two-way volumes. The thresholds may be more applicable as one-way volumes, although they will still be too low for application when considering areas with limited collector road connectivity to arterial roads or where a single collector is accessed by multiple local roadways.

Given the two-way volume definitions, Oldenburg Avenue will be approaching capacity in 2025 background conditions and is forecasted to exceed the TIA threshold prior to 2030 background conditions. Once 6363-6409 Perth Street is built-out, Oldenburg Avenue will increase to over double the threshold by 2030. Operationally, see Section 15.2, the roundabout may experience some constraints on the Oldenburg Avenue leg given the increase of volumes along Perth Street. This is quirk of the roundabout capacity and Perth Street volumes more than an indication that Oldenburg Avenue is suffering due to exceeding the TIA thresholds for a collector road.

For 6295 Perth Street, Rochelle Drive will be under the local road thresholds. Nixon Farm Drive is currently over the local road thresholds and operates more closely as a collector roadway for all the residential area north of Perth Street west of Huntley Road. Nixon Farm Drive is below the collector road thresholds.

For 6305 Ottawa Street, the forecasted trips would theoretically exceed a single local road threshold. Given the access configuration (Street B, Street E to Burke Street and Street F) these impacts are distributed across multiple roads. Due to the recent pandemic, data collection was limited, and the City has not been able to provide Streetlight data to approximate the area volumes and validate the impact of 6305 Ottawa Street on Burke Street, Fortune Street and Ottawa Street.

Stepping back from the specific roadway thresholds and volumes, the rural nature within Richmond Village limits the ability to feasibly provide solutions beyond the proposed subdivision and boundary roads. Additionally, the under classification of roadways (e.g., Nixon Farm Street) or convoluted routing of the available collector (e.g., Fortune-Royal York-Fowler) will increase the perceived impacts of the volumes on adjacent roadways and contribute to the thresholds being met, currently or in the future. The roadways likely to be impacts are the aforementioned Fortune to Royal York to Fowler route to Perth Street, and two routes to McBean Street via Fortune to Martin or Royal York to Fowler to Strachan. Overall, the development of the Richmond Village West Development Lands is going to have a relative impact on the local and collector road volumes. The increase in traffic from the subject lands at 6295, 6363, 6409 Perth Street and 6305 Ottawa Street West, while exceeding the TIA Guidelines two-way volume thresholds, is not anticipated to have undue impacts on the roads and can be supported.

13 Transit

13.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 16 summarizes the transit trip generation.

Table 16: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Transit	5%	10	19	29	17	13	30

The proposed development is anticipated to generate an additional 29 AM peak hour transit trips and 30 PM peak hour transit trips. Of these trips, 19 outbound AM trips and 17 inbound PM trips are anticipated. Given the routes along Perth Street, it is likely majority of these trips will be to the east. It is unlikely any trips will be west to Munster.

Overall, the forecasted new transit trips would result in the need for approximately half of a single bus (55-person capacity) during the AM and PM peak hours for local service.

13.2 Transit Priority

No transit priority is required explicitly for this study.

14 Network Concept

The background and forecasted site trips do not exceed the anticipated lane capacities on the boundary road network. The development aligns with the development concepts contemplated in the Richmond CDP and planned infrastructure noted therein.

15 Network Intersection Design

15.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

15.2 Network Intersection Design

15.2.1 2025 Future Total Network Intersection Operations

The 2025 future total intersection operations are summarized below in Table 17. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. The synchro and sidra worksheets have been provided in Appendix I.

Table 17: 2025 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Meynell Road *Roundabout*	EB	A	0.57	7.7	35.3	A	0.53	9.0	31.6
	WB	A	0.40	5.9	22.1	C	0.73	6.2	68.5
	NB	A	0.52	12.7	32.5	A	0.32	8.8	15.2
	SB	A	0.30	10.6	13.2	A	0.51	18.3	31.8
	Overall	**A**	**0.57**	**8.6**	**-**	**C**	**0.73**	**8.8**	**-**
Perth Street & Rochelle Drive/Queen Charlotte Street *Unsignalized*	EBL/T	A	0.00	8.5	0.0	B	0.02	10.6	0.8
	EBT/R	-	-	-	-	-	-	-	-
	WBL	B	0.01	10.2	0.0	A	0.00	9.2	0.0
	WBT/R	-	-	-	-	-	-	-	-
	NB	B	0.03	14.5	0.8	C	0.03	24.6	0.8
	SB	C	0.14	22.5	3.8	E	0.19	37.9	5.3
	Overall	**A**	**-**	**0.6**	**-**	**A**	**-**	**0.7**	**-**
Perth Street & Nixon Farm Drive/Fowler Street *Signalized*	EB	A	0.44	6.0	47.8	A	0.40	5.2	33.7
	WB	A	0.24	4.6	22.0	A	0.55	6.5	60.2
	NB	A	0.07	5.5	2.9	A	0.08	14.4	5.4
	SBL	A	0.49	35.0	25.0	A	0.38	32.7	18.9
	SBT/R	A	0.07	0.3	0.0	A	0.15	8.7	6.1
	Overall	**A**	**0.49**	**7.2**	**-**	**A**	**0.56**	**7.0**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00
$: Delay exceeds 300s

The network intersection operations for the 2025 future total horizon operate similar to the 2025 future background conditions. No improvements or mitigation is required.

15.2.2 2030 Future Total Network Intersection Operations

The 2030 future total intersection operations are summarized below in Table 18. The level of service for signalized intersections is based on the TIA Guidelines for volume to capacity ratio of the lane movements and HCM average delay for the overall intersection, and HCM average delay for unsignalized intersections. The synchro and sidra worksheets have been provided in Appendix J.

Table 18: 2030 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Perth Street & Meynell Road *Roundabout*	EB	B	0.70	12.1	59.1	C	0.77	20.2	75.3
	WB	A	0.48	6.4	29.8	E	0.99	12.7	330.9
	NB	E	0.96	57.4	190.9	A	0.57	11.2	37.4
	SB	A	0.40	11.7	19.1	**F**	**1.23**	**280.1**	**386.6**
	Overall	**E**	**0.96**	**22.0**	**-**	**F**	**1.23**	**46.5**	**-**
Perth Street & Rochelle Drive/Queen Charlotte Street *Unsignalized*	EBL/T	A	0.00	8.8	0.0	B	0.03	12.5	0.8
	EBT/R	-	-	-	-	-	-	-	-
	WBL	B	0.02	11.7	0.8	A	0.00	10.0	0.0
	WBT/R	-	-	-	-	-	-	-	-
	NB	C	0.04	18.5	0.8	**F**	**0.06**	**51.1**	**1.5**
	SB	D	0.21	33.3	5.3	**F**	**0.37**	**86.0**	**10.5**
	Overall	**A**	**-**	**0.8**	**-**	**A**	**-**	**1.2**	**-**
Perth Street & Nixon Farm Drive/Fowler Street *Signalized*	EB	A	0.57	7.4	70.5	A	0.50	6.2	46.8
	WB	A	0.29	4.9	27.2	B	0.70	8.7	95.7
	NB	A	0.07	5.5	2.9	A	0.08	14.4	5.4
	SBL	A	0.49	35.0	25.0	A	0.38	32.7	18.9
	SBT/R	A	0.08	0.4	0.0	A	0.16	12.6	7.6
	Overall	**A**	**0.59**	**7.4**	**-**	**B**	**0.69**	**8.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

The network intersection operations for the 2030 future total horizon will see a degradation of the southbound approaches along Perth Street at Oldenburg Avenue and at Rochelle Drive. Perth Street at Rochelle Drive/Queen Charlotte Street does not meet signal warrants and the warrant is provided in Appendix L.

The decrease in the PM peak operations on Oldenburg Avenue to a v/c of 0.99 is due to the increase in traffic along Perth Street to the westbound left-turn movement. The continued build-out of 6240-6431 Ottawa Street is the primary reason for the increase in westbound left-turn volumes which reduce potential gaps for the southbound traffic to access the roundabout. The traffic projections assumed within this TIA did not alter the 2019 TIA (Stantec) for 6240-6431 Ottawa Street which applied over 75% of all development traffic to Meynell Road. A greater utilization of Ottawa Street is anticipated and will need to be reassessed by those development lands once they proceed. As an example, if the westbound through and left-turn volumes were decreased by 100 vehicles, the v/c ratio for the southbound approach would improve to 1.00, and at 125 vehicles would improve to 0.92. Therefore, the development traffic associated with 6295, 6363, 6409 Perth Street and 6305 Ottawa Street West can be accommodated by the road network in the 2030 horizon and no mitigation is recommended as part of this study.

The southbound approach at the Perth Street and Rochelle Drive/Queen Charlotte Street intersection is also subject to the increased volumes along Perth Street, limiting the ability for southbound left-turns to be completed. The Nixon Farm Drive/Fowler Street signalized intersection has residual capacity and can accommodate these additional left-turns. The City may investigate the need to implement signage limiting

southbound left-turns during the PM peak hours to encourage the use of Nixon Farm Drive and act as an enforcement tool to avoid this constrained movement. As the northbound left-turn movement is a single vehicle, it is anticipated that there will be a vehicle that will attempt to make this movement but does not require any mitigation.

As a sensitivity, Table 19 summarizes the intersection operations if 125 westbound left-turns and 12 southbound left-turns are shifted to the Perth Street and Nixon Farm Drive/Fowler Street intersection to illustrate that the road network has residual capacity to accommodate all the development lands in west Richmond Village. The westbound queuing is not anticipated to reach the previous intersection at Lennox Street. The synchro and sidra worksheets are provided in Appendix M.

Table 19: 2030 Future Total Network Intersection Operations – PM Peak Diverted Volumes

Intersection	Lane	PM Peak Hour			
		LOS	V/C	Delay	Q (95th)
Perth Street & Meynell Road *Roundabout*	EB	B	0.67	14.0	53.5
	WB	D	0.90	7.4	147.9
	NB	A	0.58	12.2	39.5
	SB	E	0.92	72.3	121.1
	Overall	**E**	**0.92**	**17.8**	**-**
Perth Street & Rochelle Drive/Queen Charlotte Street *Unsignalized*	EBL/T	B	0.02	11.7	0.8
	EBT/R	-	-	-	-
	WBL	B	0.00	10.0	0.0
	WBT/R	-	-	-	-
	NB	E	0.05	42.1	1.5
	SB	D	0.09	33.1	2.3
	Overall	**A**	**-**	**0.5**	
Perth Street & Nixon Farm Drive/Fowler Street *Signalized*	EB	A	0.50	6.4	48.5
	WB	B	0.70	9.2	101.1
	NB	A	0.08	14.2	5.4
	SBL	A	0.43	33.6	21.4
	SBT/R	A	0.15	12.2	7.6
	Overall	**B**	**0.70**	**9.0**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
PHF = 1.00

15.2.3 Network Intersection MMLOS

Table 20 summarizes the MMLOS analysis for the network intersections of Perth Street at Nixon Farm Drive/Fowler Street. The existing and future conditions will be the same and are considered in one row. The intersection analysis is based on the policy area of village arterial. The MMLOS worksheets has been provided in Appendix H.

Table 20: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Perth Street & Nixon Farm Drive/Fowler Street	D	C	D	C	N/A	N/A	F	D	B	D

The MMLOS targets will not be met for the pedestrian, bicycle, and truck LOS. The pedestrian level of service would require a maximum of three lanes at a crossing to meet a LOS C. The mixed traffic approaches for cyclists

govern the bicycle LOS and require improvements on the approach geometry to meet the target LOS. The truck LOS is not met due to turning radii off of Perth Street and the single receiving lanes to the north and south.

No mitigation is recommended as part of this study. The City may investigate the complete reconstruction of the intersection to improve BLOS and TrLOS and the feasibility of lane reductions along Perth Street to improve the PLOS.

While no target is designated for transit in the Village setting, a transit route does travel along Perth Street and would receive a TLOS B.

15.2.4 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

16 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes 119 detached homes and 205 townhomes at 6363-6409 Perth Street, 42 detached homes at 6295 Perth Street, and 42 detached homes and 169 townhomes at 6305 Ottawa Street
- Accesses will be provided through the extension of existing local roads of Burke Street, Mira Court, Cedarstone Street and Oldenburg Avenue/Trammel Road
- The development is proposed to be completed as separate phases
- The trip generation and safety triggers were met for the TIA Screening, and the Design Review modules will be provided for high level context only

Existing Conditions

- Perth Street is an arterial road, and Ottawa Street, Fortune Street and Meynell Road are collector roads in the study area
- Future roadways include local roads and the extensions of the existing local roads
- Sidewalks are provided on Rochelle Drive, Cedarstone Street, Fortune Street and both sides of Perth Street
- A low number of collisions were noted on the road network and no patterns were noted
- The existing network intersections operate well during both peaks

Development Generated Travel Demand

- The proposed development is forecasted produce 297 two-way people trips during the AM peak hour and 333 two-way people trips during the PM peak hour from 6363-6409 Perth Street, 43 two-way people trips during the AM peak hour and 52 two-way people trips during the PM peak hour from 6295 Perth Street, and 187 two-way people trips during the AM peak hour and 206 two-way people trips during the PM peak hour from 6305 Ottawa Street
- Of the forecasted people trips, 414 two-way trips will be vehicle trips during the AM peak hour and 444 two-way trips will be vehicle trips during the PM peak hour based on an 85% modal share target
- Of the forecasted trips, 55% are anticipated to travel north, 25% to the east, 15% to the west, and 5% to the south

Background Conditions

- The background developments were explicitly included in the background conditions, along with a total background growth of 1.5% per annum along the peak direction mainline volumes
- The study area intersections will operate similar to the existing conditions

Development Design

- The bike and auto parking areas are to be located at each dwelling unit
- Pedestrian connections will be made to Oldenburg Avenue, Perth Street and Cedarstone Street, with future connections to the adjacent Mattamy development along Ottawa Street
- The conceptual traffic calming elements are recommended at the future internal road intersections including bulb-outs to narrow each approach to the intersection and reduce pedestrian crossing distances and on-street parking ultimately alternative sides to the north of the existing phases

Boundary Street Design

- The boundary streets of Perth Street (existing), Ottawa Street and Cedarstone Street will not meet pedestrian MMLOS targets, due to boulevard spacing and auto volumes and/or posted speed limits
- The bicycle LOS targets will not be met on Perth Street (existing and south side interim) and Ottawa Street due to lack of facilities and require the implementation of separated facilities
- No improvements are recommended as part of the proposed subdivisions

Access Intersections Design

- The accesses are proposed as extensions of adjacent local roads and a local road connection to Perth Street
- No specific recommendations or design elements are required outside of typical plan of subdivision requirements and City standards

TDM

- Supportive TDM measures to be included within the proposed development should include:
  - Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels (subdivision)
  - Provide the option to include a 1-month Presto card for first time new home purchase, with a set time frame for this offer (e.g., 6-months) from the initial offering of units for each phase/registration
  - Provide a multimodal travel option information package to new residents
  - Offer personalized trip planning to new residents
- The early service and Presto card TDM measures are contingent on the City providing improved transit service to Richmond Village

Neighbourhood Traffic Management

- In general, the TIA thresholds are too low for local and collector roadways when considered as two-way volumes and may be more applicable as one-way volumes, although they will still be too low for applications when considering areas with limited collector road connectivity to arterial roads or where a single collector is accessed by multiple local roadways
- While forecasted volumes will exceed the TIA Guidelines two-way volume thresholds, is not anticipated to have undue impacts on the roads and can be supported.

Transit

- Transit service is currently provided along Perth Street in the peak direction
- To meet forecasted transit use, half a single bus, or equivalent capacity, would be required for peak hour service on local routes
- No specific transit priority measures were considered as part of this development

Network Concept

- The background and forecasted site trips do not exceed the anticipated lane capacities on the boundary road network
- The development aligns with the development concepts contemplated in the Richmond CDP and planned infrastructure noted therein

Network Intersection Design

- Generally, the network intersections will operate well during the 2025 future total conditions and the Perth Street at Meynell Road roundabout will reach capacity by 2030
- This capacity analysis assumes a significant percentage of the future Mattamy lands utilizing the roundabout to access Meynell Road, while it is likely this volume will divert to Ottawa Street
- A sensitivity of 75 trips diverting to Ottawa Street would result in the roundabout operating within capacity thresholds
- It is also noted that the southbound left0turn from Rochelle Drive will ultimately divert to Nixon Farm Drive and the signal has residual capacity to facilitate an additional 12 southbound left-turn movements
- The MMLOS targets will not be met for the pedestrian, bicycle, and truck LOS at Perth Street & Nixon Farm Drive/Fowler Street
- No mitigation is recommended as part of this study, as the City would be required to reduce Perth Street to a maximum of a three-lane cross section to meet the PLOS, require separated bike facilities for the BLOS larger radii for any truck movements

17 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Reviewed By:

Christopher Gordon, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

13 Markham Avenue
Ottawa ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 04-Jun-20
Project Number: 2019-64
Project Reference: Green & Laffin Lands

1.1 Description of Proposed Development	
Municipal Address	6409, 6363, 6295 Perth Street, 6305 Ottawa Street West
Description of Location	Existing farm land within the Village of Richmond
Land Use Classification	Development Reserve (DR1)
Approximate Development Size	6406 & 6363 Perth St: 116 singles, 204 towns 6295 Perth St: 41 singles 6305 Ottawa St W: 200 singles
Accesses	6406 & 6363 Perth St: Connectivity through Fox Run North 6295 Perth St: New connection to Mira Court 6305 Ottawa St W: New connection to Queen Charlotte Street at Burke Street
Phase of Development	6406 & 6363 Perth St: One or two phases 6295 Perth St: Single phase 6305 Ottawa St W: Single phase
Buildout Year	2027
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Single-family homes	
Development Size	577	Units
Trip Generation Trigger	Yes	(Approx. 204 townhomes, 357 singles)

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	No
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	No
Location Trigger	No

1.4. Safety Triggers	
Are posted speed limits on a boundary street 80 km/hr or greater?	Yes
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes
Is the proposed driveway within auxiliary lanes of an intersection?	No
Does the proposed driveway make use of an existing median break that serves an existing site?	No
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No
Does the development include a drive-thru facility?	No
Safety Trigger	Yes

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering √ or transportation planning □.

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at ___Ottawa_____ this __20__ day of _____September_____, 2018.
(City)

Name: _____Andrew Harte_____
(Please Print)

Professional Title: _____Professional Engineer_____

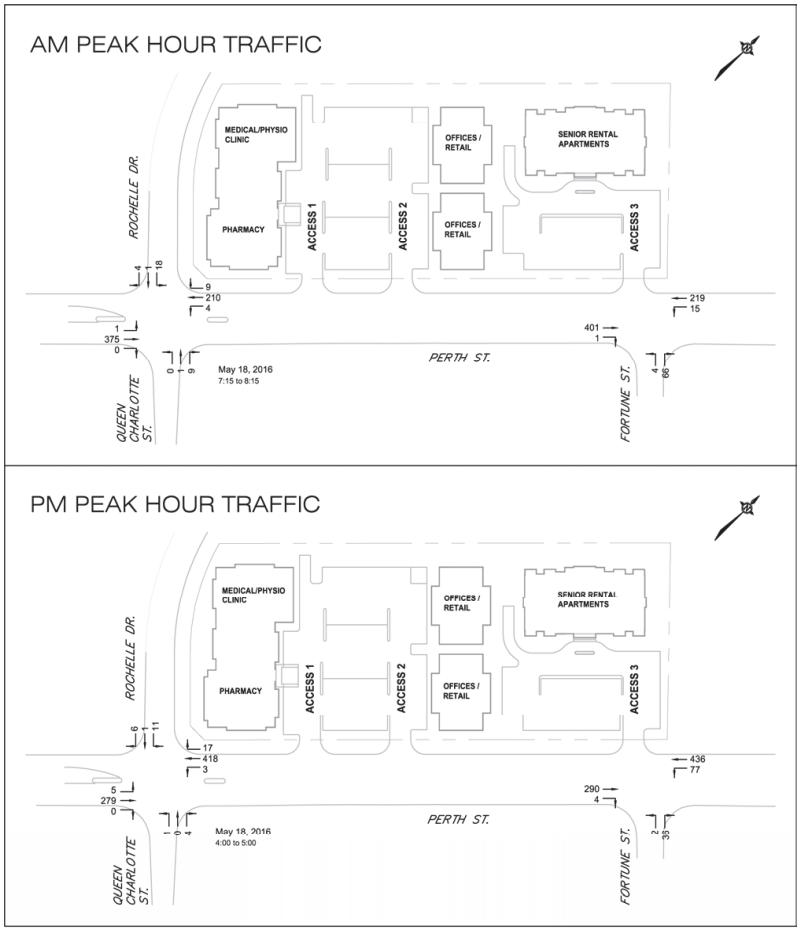
_____
Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

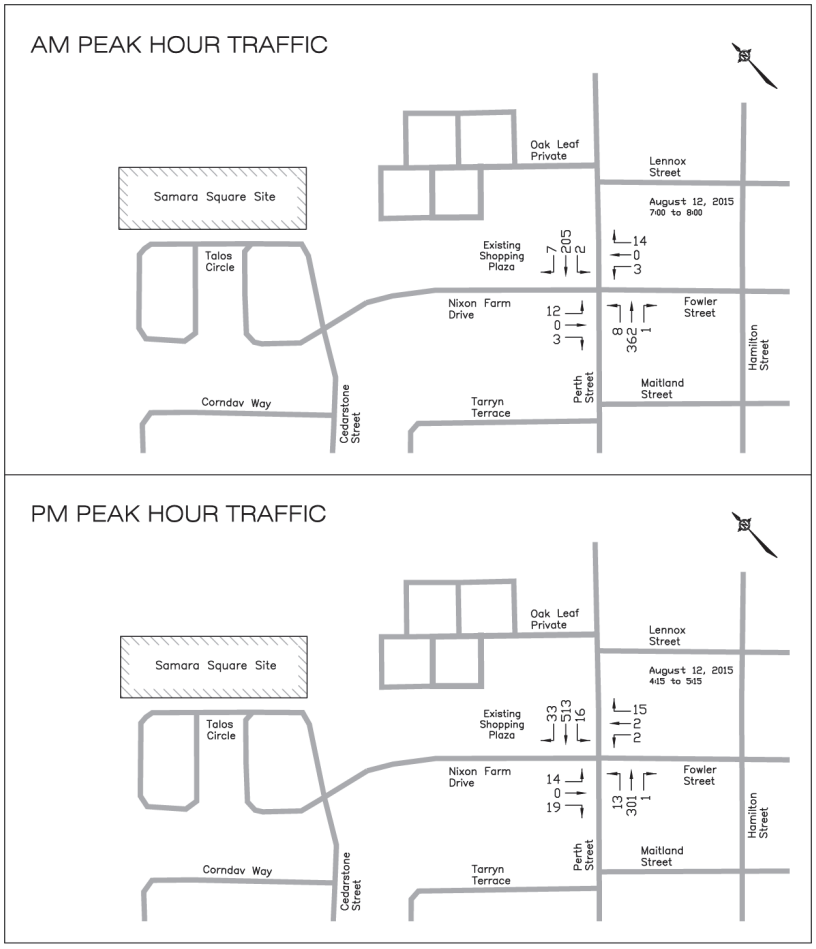
Turning Movement Counts

FIGURE 2.1
EXISTING 2016 WEEKDAY PEAK AM AND PM HOUR TRAFFIC COUNTS



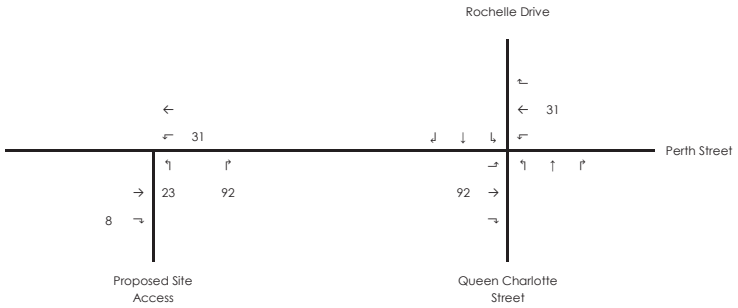
NOT TO SCALE

FIGURE 2.1
YEAR 2015 WEEKDAY PEAK AM AND PM HOUR TRAFFIC COUNTS

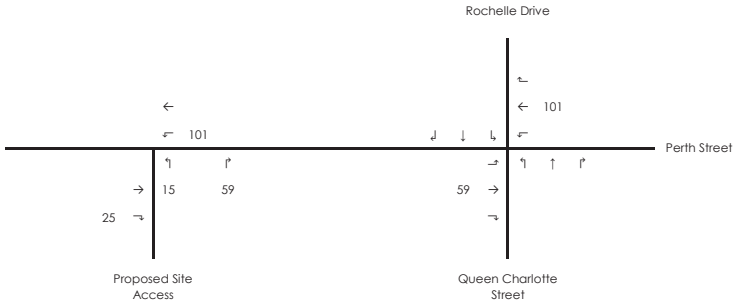


NOT TO SCALE

AM Peak Hour



PM Peak Hour



Stantec

Richmond Village Development Corporation
Richmond Village - Phase 1
Figure 7
Site Traffic

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	516	0	10	287	5	0	1	10	20	1	4
Future Volume (vph)	1	516	0	10	287	5	0	1	10	20	1	4
Satd. Flow (prot)	0	3316	0	1658	1740	0	0	1529	0	0	1643	0
Flt Permitted				0.950							0.961	
Satd. Flow (perm)	0	3316	0	1658	1740	0	0	1529	0	0	1643	0
Lane Group Flow (vph)	0	574	0	11	325	0	0	12	0	0	27	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 31.1%		ICU Level of Service A	
Analysis Period (min) 15			

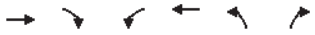
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	516	0	10	287	5	0	1	10	20	1	4
Future Vol, veh/h	1	516	0	10	287	5	0	1	10	20	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	573	0	11	319	6	0	1	11	22	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	325	0	0	573	0	0	922	922	287	633	919	322
Stage 1	-	-	-	-	-	-	575	575	-	344	344	-
Stage 2	-	-	-	-	-	-	347	347	-	289	575	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1233	-	-	998	-	-	238	269	710	378	270	718
Stage 1	-	-	-	-	-	-	471	502	-	671	636	-
Stage 2	-	-	-	-	-	-	668	634	-	695	502	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1233	-	-	998	-	-	234	266	710	367	267	718
Mov Cap-2 Maneuver	-	-	-	-	-	-	234	266	-	367	267	-
Stage 1	-	-	-	-	-	-	471	501	-	670	629	-
Stage 2	-	-	-	-	-	-	655	627	-	682	501	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	11	14.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	616	1233	-	-	998	-	-	392
HCM Lane V/C Ratio	0.02	0.001	-	-	0.011	-	-	0.071
HCM Control Delay (s)	11	7.9	0	-	8.6	-	-	14.9
HCM Lane LOS	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	425	8	31	260	23	92
Future Volume (vph)	425	8	31	260	23	92
Satd. Flow (prot)	1740	0	0	1736	1541	0
Flt Permitted				0.995	0.990	
Satd. Flow (perm)	1740	0	0	1736	1541	0
Lane Group Flow (vph)	481	0	0	323	128	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Control Type: Unsignalized			
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	425	8	31	260	23	92
Future Vol, veh/h	425	8	31	260	23	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	472	9	34	289	26	102

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	481	0	834	477
Stage 1	-	-	-	-	477	-
Stage 2	-	-	-	-	357	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1082	-	338	588
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	708	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1082	-	325	588
Mov Cap-2 Maneuver	-	-	-	-	325	-
Stage 1	-	-	-	-	624	-
Stage 2	-	-	-	-	682	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.9	14.5
HCM LOS			B

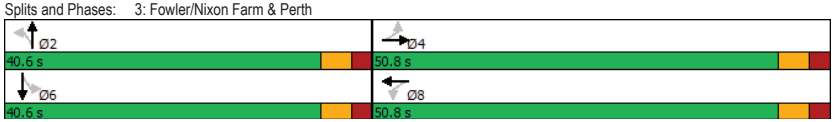
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	506	-	-	1082	-
HCM Lane V/C Ratio	0.253	-	-	0.032	-
HCM Control Delay (s)	14.5	-	-	8.4	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1	-	-	0.1	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	476	1	2	249	42	3	0	15	81	0	32
Future Volume (vph)	23	476	1	2	249	42	3	0	15	81	0	32
Satd. Flow (prot)	0	3309	0	0	3243	0	0	1534	0	1658	1483	0
Flt Permitted		0.930			0.953			0.955		0.744		
Satd. Flow (perm)	0	3084	0	0	3090	0	0	1475	0	1298	1483	0
Satd. Flow (RTOR)					29			33			530	
Lane Group Flow (vph)	0	556	0	0	326	0	0	20	0	90	36	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	50.8	50.8		50.8	50.8		25.6	25.6		25.6	25.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.2			53.2			11.2		11.2	11.2	
Actuated g/C Ratio		0.75			0.75			0.16		0.16	0.16	
v/c Ratio		0.24			0.14			0.08		0.44	0.05	
Control Delay		4.5			3.7			6.6		34.0	0.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		4.5			3.7			6.6		34.0	0.2	
LOS		A			A			A		C	A	
Approach Delay		4.5			3.7			6.6			24.4	
Approach LOS		A			A			A			C	
Queue Length 50th (m)		12.3			5.9			0.0		11.7	0.0	
Queue Length 95th (m)		22.5			12.1			3.8		23.7	0.0	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2302			2314			745		641	1000	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.24			0.14			0.03		0.14	0.04	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.2
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.44

Intersection Signal Delay: 6.7 Intersection LOS: A
Intersection Capacity Utilization 49.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Lanes, Volumes, Timings
1: Queen Charlotte/Rochelle & Perth 05-30-2020

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	393	0	3	581	20	1	0	4	13	1	6
Future Volume (vph)	5	393	0	3	581	20	1	0	4	13	1	6
Satd. Flow (prot)	0	3312	0	1658	1736	0	0	1541	0	0	1618	0
Flt Permitted		0.999		0.950				0.990			0.969	
Satd. Flow (perm)	0	3312	0	1658	1736	0	0	1541	0	0	1618	0
Lane Group Flow (vph)	0	443	0	3	668	0	0	5	0	0	22	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Control Type: Unsignalized	
Intersection Capacity Utilization 43.6%	ICU Level of Service A
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	393	0	3	581	20	1	0	4	13	1	6
Future Vol, veh/h	5	393	0	3	581	20	1	0	4	13	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	437	0	3	646	22	1	0	4	14	1	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	668	0	0	437	0	0	1116	1123	219	894	1112	657
Stage 1	-	-	-	-	-	-	449	449	-	663	663	-
Stage 2	-	-	-	-	-	-	667	674	-	231	449	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	920	-	-	1121	-	-	173	205	786	249	208	464
Stage 1	-	-	-	-	-	-	560	571	-	450	458	-
Stage 2	-	-	-	-	-	-	447	453	-	752	571	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	920	-	-	1121	-	-	168	203	786	246	206	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	168	203	-	246	206	-
Stage 1	-	-	-	-	-	-	555	566	-	446	457	-
Stage 2	-	-	-	-	-	-	438	452	-	741	566	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	13	18.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	453	920	-	-	1121	-	-	283
HCM Lane V/C Ratio	0.012	0.006	-	-	0.003	-	-	0.079
HCM Control Delay (s)	13	8.9	0	-	8.2	-	-	18.8
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.3

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	339	25	101	487	15	59
Future Volume (vph)	339	25	101	487	15	59
Satd. Flow (prot)	1729	0	0	1729	1543	0
Flt Permitted				0.991	0.990	
Satd. Flow (perm)	1729	0	0	1729	1543	0
Lane Group Flow (vph)	405	0	0	653	83	0
Sign Control	Free			Free	Stop	

Intersection Summary		
Control Type: Unsignalized		
Intersection Capacity Utilization	68.1%	ICU Level of Service C
Analysis Period (min)	15	

Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	339	25	101	487	15	59
Future Vol, veh/h	339	25	101	487	15	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	377	28	112	541	17	66

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	405	0	1156	391
Stage 1	-	-	-	-	391	-
Stage 2	-	-	-	-	765	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1154	-	217	658
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	459	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1154	-	187	658
Mov Cap-2 Maneuver	-	-	-	-	187	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	395	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.5	15.2
HCM LOS			C

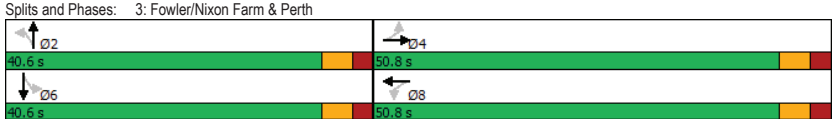
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	436	-	-	1154	-
HCM Lane V/C Ratio	0.189	-	-	0.097	-
HCM Control Delay (s)	15.2	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.7	-	-	0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	378	1	17	645	103	2	2	16	59	0	39
Future Volume (vph)	43	378	1	17	645	103	2	2	16	59	0	39
Satd. Flow (prot)	0	3299	0	0	3246	0	0	1545	0	1658	1483	0
Flt Permitted		0.820			0.941			0.970		0.743		
Satd. Flow (perm)	0	2719	0	0	3058	0	0	1507	0	1297	1483	0
Satd. Flow (RTOR)					27			18			161	
Lane Group Flow (vph)	0	469	0	0	850	0	0	22	0	66	43	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.8	24.8		24.8	24.8		40.6	40.6		40.6	40.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.5			53.5			10.5		10.5	10.5	
Actuated g/C Ratio		0.75			0.75			0.15		0.15	0.15	
v/c Ratio		0.23			0.37			0.09		0.34	0.12	
Control Delay		4.1			4.6			14.2		31.9	0.7	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		4.1			4.6			14.2		31.9	0.7	
LOS		A			A			B		C	A	
Approach Delay		4.1			4.6			14.2			19.6	
Approach LOS		A			A			B			B	
Queue Length 50th (m)		10.2			20.2			0.5		8.7	0.0	
Queue Length 95th (m)		17.6			33.0			6.0		18.6	0.0	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2053			2316			757		644	817	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.23			0.37			0.03		0.10	0.05	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 70.9
Natural Cycle: 70
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.37

Intersection Signal Delay: 5.7	Intersection LOS: A
Intersection Capacity Utilization 59.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Appendix D

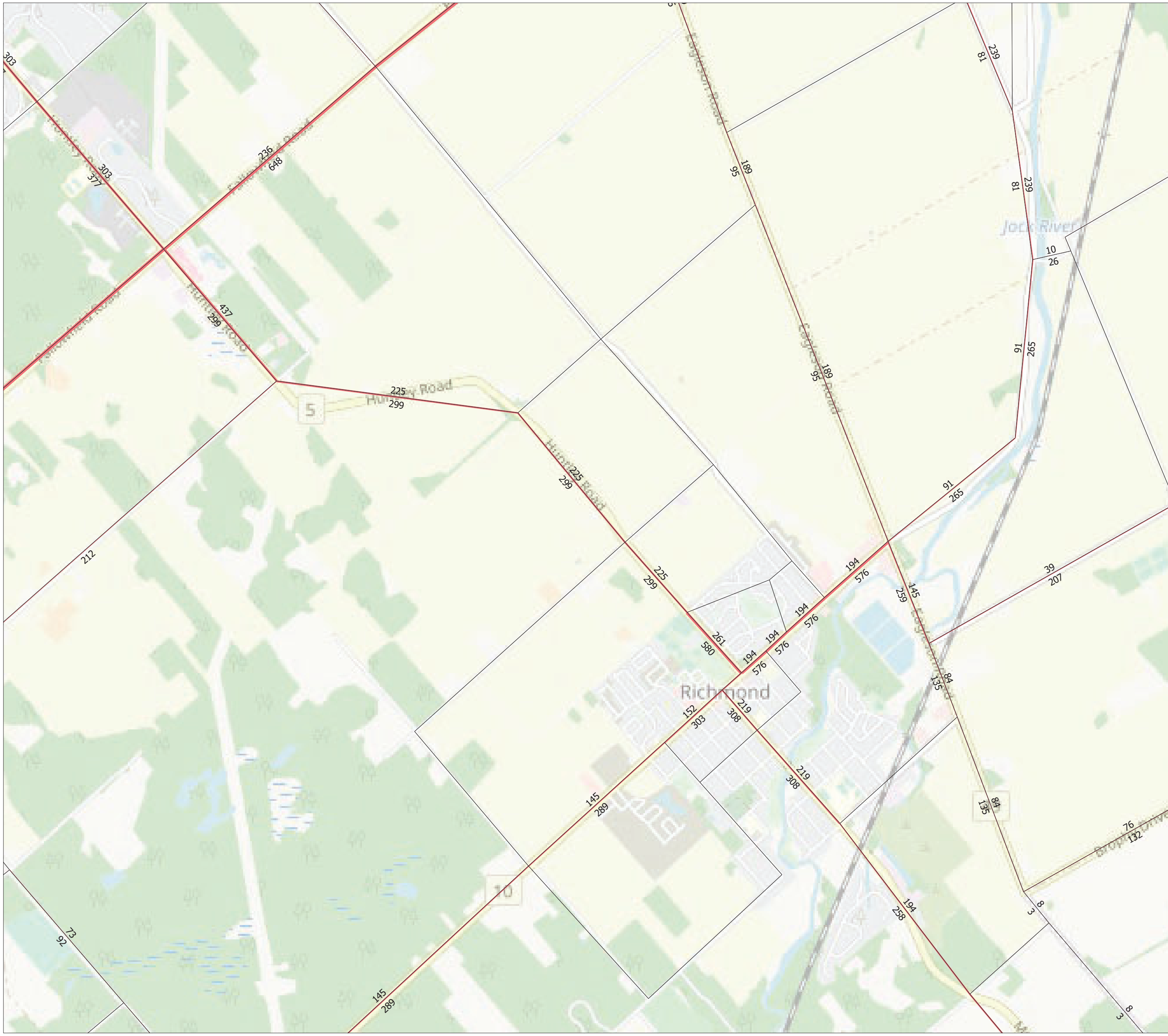
Collision Data

CGH TRANSPORTATION

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition
2018-03-04	2018	11:49	FORTUNE ST @ MARTIN ST (0000443)	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	02 - Angle	01 - Dry
2018-04-06	2018	9:15	FORTUNE ST btwn PERTH ST & HAMILTON ST (__3ZBNC5)	01 - Clear	01 - Daylight	10 - No control		02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-06-30	2015	12:28	FOWLER ST/NIXON FARM DR @ PERTH ST	01 - Clear	01 - Daylight	01 - Traffic signal		02 - Non-fatal injury	07 - SMV other	01 - Dry
2014-09-18	2014	7:59	FRANKTOWN RD btwn JOY'S RD & PERTH ST	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry
2016-09-28	2016	3:00	FRANKTOWN RD btwn JOY'S RD & PERTH ST	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	07 - SMV other	01 - Dry
2017-12-11	2017	8:49	PERTH ST @ QUEEN CHARLOTTE ST/ROCHELLE DR	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	04 - Sideswipe	01 - Dry
2015-02-07	2015	4:38	PERTH ST @ QUEEN CHARLOTTE ST/ROCHELLE DR	01 - Clear	07 - Dark	02 - Stop sign		03 - P.D. only	07 - SMV other	02 - Wet
2017-02-20	2017	1:58	PERTH ST @ QUEEN CHARLOTTE ST/ROCHELLE DR	01 - Clear	07 - Dark	02 - Stop sign		02 - Non-fatal injury	07 - SMV other	06 - Ice
2018-10-09	2018	17:20	PERTH ST @ QUEEN CHARLOTTE ST/ROCHELLE DR (0009772)	01 - Clear	01 - Daylight	02 - Stop sign		03 - P.D. only	05 - Turning movement	01 - Dry
2015-08-23	2015	5:05	PERTH ST btwn FORTUNE ST & TARRYN TER	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	07 - SMV other	01 - Dry
2014-10-13	2014	19:27	PERTH ST btwn FRANKTOWN RD & ROCHELLE DR	02 - Rain	07 - Dark	10 - No control		03 - P.D. only	05 - Turning movement	02 - Wet
2015-03-02	2015	19:05	PERTH ST btwn FRANKTOWN RD & ROCHELLE DR	03 - Snow	07 - Dark	10 - No control		03 - P.D. only	07 - SMV other	06 - Ice
2015-12-20	2015	5:41	PERTH ST btwn FRANKTOWN RD & ROCHELLE DR	03 - Snow	07 - Dark	10 - No control		02 - Non-fatal injury	07 - SMV other	06 - Ice
2017-06-17	2017	4:28	PERTH ST btwn FRANKTOWN RD & ROCHELLE DR	01 - Clear	07 - Dark	10 - No control		03 - P.D. only	07 - SMV other	01 - Dry
2018-03-31	2018	13:31	PERTH ST btwn NIXONFARM DR & LENNOX ST (__3ZA42Z)	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	05 - Turning movement	01 - Dry
2018-04-19	2018	16:01	PERTH ST btwn TARRYN TER & NIXONFARM DR (__3ZA42Y)	01 - Clear	01 - Daylight	10 - No control		03 - P.D. only	03 - Rear end	01 - Dry

Appendix E

TRANS Background Projection Plots



TRANS Regional Model

Version 2.13 - Assigned December 11, 2019

AM Peak Hour Total Traffic Volume

Richmond Area

2011 Model - Base Scenario

No Modifications from Base Version

User Initials: MM
Plot Prepared: April 21, 2020
EMME Scenario: 21311

Legend

AM Peak Hour Total Traffic Volume

2000 4000 6000 8000 10000

N

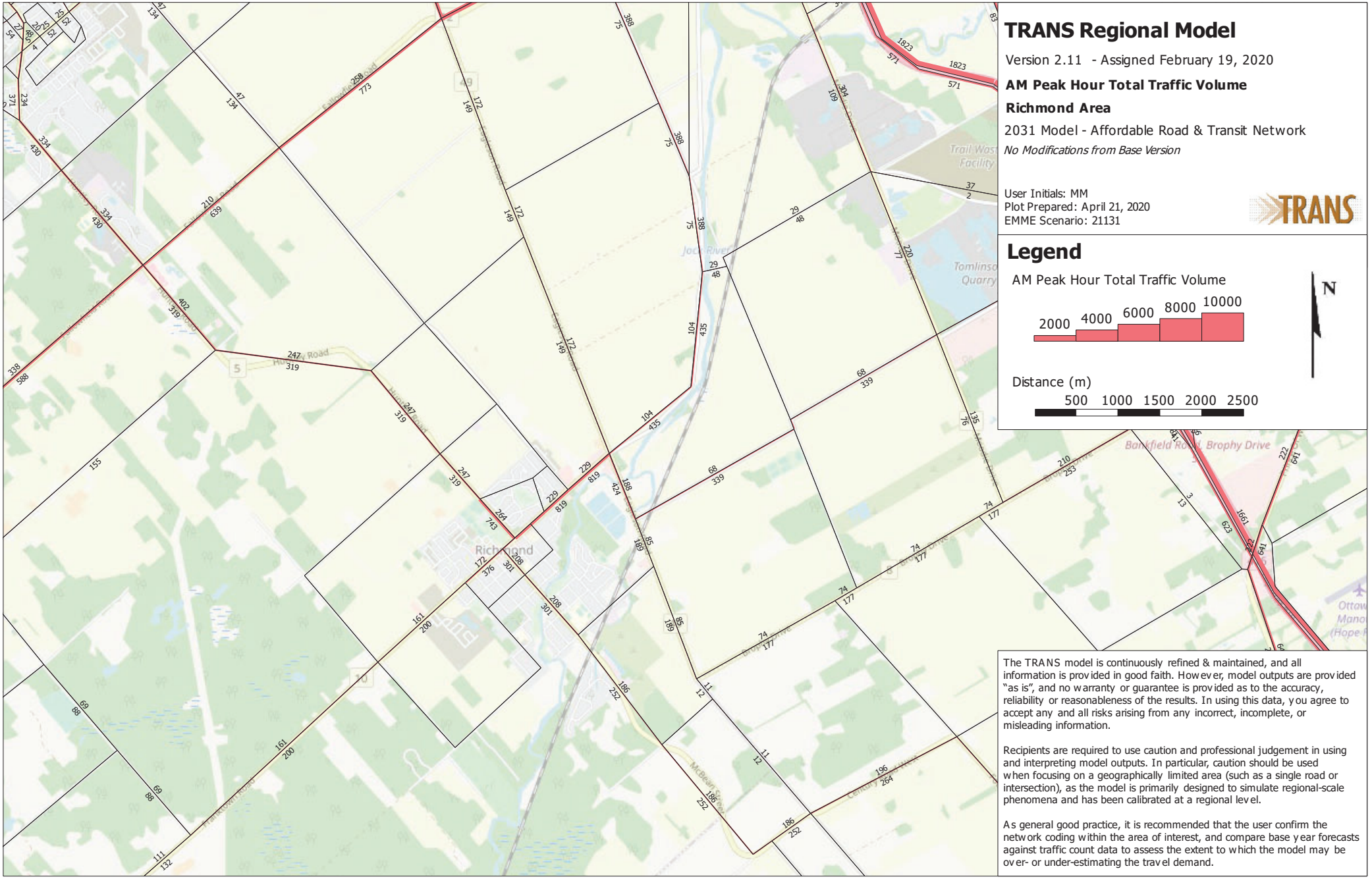
Distance (m)

500 1000 1500 2000

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.



TRANS Regional Model

Version 2.11 - Assigned February 19, 2020

AM Peak Hour Total Traffic Volume

Richmond Area

2031 Model - Affordable Road & Transit Network

No Modifications from Base Version

User Initials: MM
Plot Prepared: April 21, 2020
EMME Scenario: 21131

TRANS

Legend

AM Peak Hour Total Traffic Volume

2000 4000 6000 8000 10000

N

Distance (m)

500 1000 1500 2000 2500

Appendix F

Synchro Intersection Worksheets – 2025 Future Background Conditions

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	621	0	3	840	20	1	0	4	13	1	6
Future Vol, veh/h	5	621	0	3	840	20	1	0	4	13	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	621	0	3	840	20	1	0	4	13	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	860	0	0	621	0	0	1491	1497	311	1177	1487	850
Stage 1	-	-	-	-	-	-	631	631	-	856	856	-
Stage 2	-	-	-	-	-	-	860	866	-	321	631	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	779	-	-	958	-	-	93	122	686	157	124	359
Stage 1	-	-	-	-	-	-	436	473	-	352	373	-
Stage 2	-	-	-	-	-	-	350	369	-	666	473	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	779	-	-	958	-	-	90	120	686	154	122	359
Mov Cap-2 Maneuver	-	-	-	-	-	-	90	120	-	154	122	-
Stage 1	-	-	-	-	-	-	432	468	-	348	372	-
Stage 2	-	-	-	-	-	-	342	368	-	655	468	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	17.4	27.1
HCM LOS			C	D

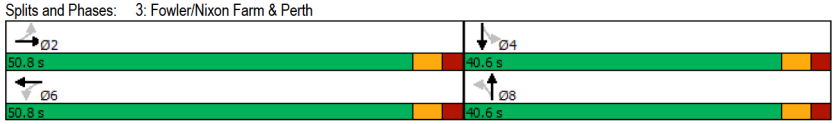
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	295	779	-	-	958	-	-	183
HCM Lane V/C Ratio	0.017	0.006	-	-	0.003	-	-	0.109
HCM Control Delay (s)	17.4	9.7	0	-	8.8	-	-	27.1
HCM Lane LOS	C	A	A	-	A	-	-	D
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	606	1	17	918	103	2	2	16	59	0	39
Future Volume (vph)	43	606	1	17	918	103	2	2	16	59	0	39
Satd. Flow (prot)	0	3306	0	0	3263	0	0	1549	0	1658	1483	0
Flt Permitted		0.838			0.941			0.967		0.744		
Satd. Flow (perm)	0	2779	0	0	3073	0	0	1505	0	1298	1483	0
Satd. Flow (RTOR)					18			16			92	
Lane Group Flow (vph)	0	650	0	0	1038	0	0	20	0	59	39	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.8	24.8		24.8	24.8		40.6	40.6		40.6	40.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		54.1			54.1			10.4		10.4	10.4	
Actuated g/C Ratio		0.76			0.76			0.15		0.15	0.15	
v/c Ratio		0.31			0.44			0.09		0.31	0.13	
Control Delay		4.4			5.1			14.9		31.6	1.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		4.4			5.1			14.9		31.6	1.5	
LOS		A			A			B		C	A	
Approach Delay		4.4			5.1			14.9			19.6	
Approach LOS		A			A			B			B	
Queue Length 50th (m)		14.3			25.9			0.5		7.5	0.0	
Queue Length 95th (m)		23.0			40.1			5.6		16.0	1.2	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2108			2336			751		641	778	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.31			0.44			0.03		0.09	0.05	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.3
Natural Cycle: 75
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.44

Intersection Signal Delay: 5.8 Intersection LOS: A
Intersection Capacity Utilization 71.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Intersection												
Int Delay, s/veh	0.6											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	808	0	10	425	5	0	1	10	20	1	4
Future Vol, veh/h	1	808	0	10	425	5	0	1	10	20	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	808	0	10	425	5	0	1	10	20	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	430	0	0	808	0	0	1260	1260	404	855	1258	428
Stage 1	-	-	-	-	-	-	810	810	-	448	448	-
Stage 2	-	-	-	-	-	-	450	450	-	407	810	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1128	-	-	815	-	-	137	170	597	265	170	626
Stage 1	-	-	-	-	-	-	341	392	-	589	572	-
Stage 2	-	-	-	-	-	-	588	571	-	593	392	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1128	-	-	815	-	-	134	168	597	257	168	626
Mov Cap-2 Maneuver	-	-	-	-	-	-	134	168	-	257	168	-
Stage 1	-	-	-	-	-	-	340	391	-	588	565	-
Stage 2	-	-	-	-	-	-	576	564	-	580	391	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	12.6	19.3
HCM LOS			B	C

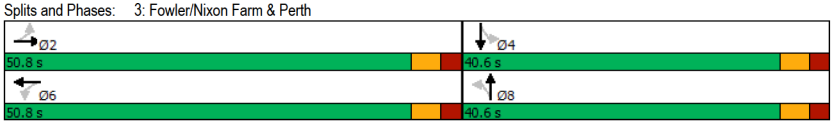
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	485	1128	-	-	815	-	-	277
HCM Lane V/C Ratio	0.023	0.001	-	-	0.012	-	-	0.09
HCM Control Delay (s)	12.6	8.2	0	-	9.5	-	-	19.3
HCM Lane LOS	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	766	1	2	387	42	3	0	15	81	0	32
Future Volume (vph)	23	766	1	2	387	42	3	0	15	81	0	32
Satd. Flow (prot)	0	3312	0	0	3266	0	0	1536	0	1658	1483	0
Flt Permitted		0.937			0.953			0.949		0.746		
Satd. Flow (perm)	0	3107	0	0	3112	0	0	1469	0	1302	1483	0
Satd. Flow (RTOR)					18			33			395	
Lane Group Flow (vph)	0	790	0	0	431	0	0	18	0	81	32	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	50.8	50.8		50.8	50.8		25.6	25.6		25.6	25.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.6			53.6			10.9		10.9	10.9	
Actuated g/C Ratio		0.75			0.75			0.15		0.15	0.15	
v/c Ratio		0.34			0.18			0.07		0.41	0.06	
Control Delay		4.8			3.9			5.7		33.4	0.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		4.8			3.9			5.7		33.4	0.2	
LOS		A			A			A		C	A	
Approach Delay		4.8			3.9			5.7			24.0	
Approach LOS		A			A			A			C	
Queue Length 50th (m)		17.8			8.0			0.0		10.2	0.0	
Queue Length 95th (m)		30.7			15.0			3.0		20.2	0.0	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2333			2342			741		642	931	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.34			0.18			0.02		0.13	0.03	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.3
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.41

Intersection Signal Delay: 6.1 — Intersection LOS: A
Intersection Capacity Utilization 60.8% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



MOVEMENT SUMMARY

Site: 101 [Perth-Meynell AM FB2025]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	47	1.0	0.381	12.8	LOS B	2.6	18.5	0.77	0.81	0.77	53.1
2	T1	1	1.0	0.381	8.2	LOS A	2.6	18.5	0.77	0.81	0.77	53.1
3	R2	266	1.0	0.381	7.9	LOS A	2.6	18.5	0.77	0.81	0.77	51.9
Approach		315	1.0	0.381	8.7	LOS A	2.6	18.5	0.77	0.81	0.77	52.1
East: Perth												
4	L2	143	1.0	0.315	9.1	LOS A	2.3	16.0	0.26	0.49	0.26	54.6
5	T1	274	2.0	0.315	4.5	LOS A	2.3	16.0	0.26	0.49	0.26	54.6
6	R2	35	1.0	0.315	4.2	LOS A	2.3	16.0	0.26	0.49	0.26	53.4
Approach		452	1.6	0.315	5.9	LOS A	2.3	16.0	0.26	0.49	0.26	54.5
North: Meynell												
7	L2	78	1.0	0.137	11.2	LOS B	0.8	5.3	0.57	0.69	0.57	52.8
8	T1	1	1.0	0.137	6.5	LOS A	0.8	5.3	0.57	0.69	0.57	52.8
9	R2	52	1.0	0.137	6.3	LOS A	0.8	5.3	0.57	0.69	0.57	51.6
Approach		131	1.0	0.137	9.2	LOS A	0.8	5.3	0.57	0.69	0.57	52.3
West: Perth												
10	L2	15	1.0	0.453	10.2	LOS B	3.2	22.9	0.52	0.56	0.52	54.3
11	T1	507	2.0	0.453	5.6	LOS A	3.2	22.9	0.52	0.56	0.52	54.3
12	R2	18	1.0	0.453	5.4	LOS A	3.2	22.9	0.52	0.56	0.52	53.0
Approach		540	1.9	0.453	5.8	LOS A	3.2	22.9	0.52	0.56	0.52	54.2
All Vehicles		1437	1.5	0.453	6.8	LOS A	3.2	22.9	0.50	0.60	0.50	53.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Perth-Meynell PM FB2025]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	31	1.0	0.243	11.7	LOS B	1.5	10.7	0.66	0.71	0.66	54.1
2	T1	1	1.0	0.243	6.9	LOS A	1.5	10.7	0.66	0.71	0.66	54.2
3	R2	187	1.0	0.243	6.8	LOS A	1.5	10.7	0.66	0.71	0.66	52.8
Approach		219	1.0	0.243	7.5	LOS A	1.5	10.7	0.66	0.71	0.66	53.0
East: Perth												
4	L2	256	1.0	0.588	9.2	LOS A	5.8	41.5	0.33	0.48	0.33	54.5
5	T1	581	2.0	0.588	4.5	LOS A	5.8	41.5	0.33	0.48	0.33	54.6
6	R2	56	1.0	0.588	4.2	LOS A	5.8	41.5	0.33	0.48	0.33	53.3
Approach		893	1.7	0.588	5.8	LOS A	5.8	41.5	0.33	0.48	0.33	54.5
North: Meynell												
7	L2	115	1.0	0.275	15.2	LOS B	1.8	13.0	0.83	0.88	0.83	49.8
8	T1	1	1.0	0.275	10.7	LOS B	1.8	13.0	0.83	0.88	0.83	49.9
9	R2	65	1.0	0.275	10.3	LOS B	1.8	13.0	0.83	0.88	0.83	48.8
Approach		181	1.0	0.275	13.4	LOS B	1.8	13.0	0.83	0.88	0.83	49.4
West: Perth												
10	L2	25	1.0	0.418	11.2	LOS B	2.8	20.0	0.63	0.67	0.63	53.7
11	T1	357	2.0	0.418	6.7	LOS A	2.8	20.0	0.63	0.67	0.63	53.7
12	R2	51	1.0	0.418	6.5	LOS A	2.8	20.0	0.63	0.67	0.63	52.5
Approach		433	1.8	0.418	6.9	LOS A	2.8	20.0	0.63	0.67	0.63	53.6
All Vehicles		1725	1.5	0.588	7.1	LOS A	5.8	41.5	0.50	0.60	0.50	53.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix G

Synchro Intersection Worksheets – 2030 Future Background Conditions

CGH TRANSPORTATION

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1090	0	10	534	5	0	1	10	20	1	4
Future Vol, veh/h	1	1090	0	10	534	5	0	1	10	20	1	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	1090	0	10	534	5	0	1	10	20	1	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	539	0	0	1090	0	0	1651	1651	545	1105	1649	537
Stage 1	-	-	-	-	-	-	1092	1092	-	557	557	-
Stage 2	-	-	-	-	-	-	559	559	-	548	1092	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1027	-	-	638	-	-	71	98	483	176	98	543
Stage 1	-	-	-	-	-	-	230	290	-	514	511	-
Stage 2	-	-	-	-	-	-	513	510	-	489	290	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1027	-	-	638	-	-	69	96	483	169	96	543
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	96	-	169	96	-
Stage 1	-	-	-	-	-	-	230	289	-	513	503	-
Stage 2	-	-	-	-	-	-	500	502	-	476	289	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	15.5	27.6
HCM LOS			C	D

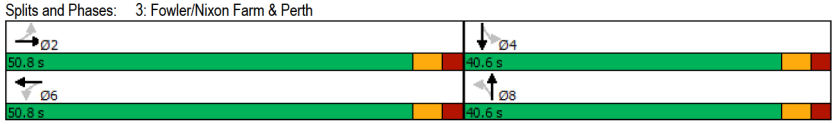
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	353	1027	-	-	638	-	-	184
HCM Lane V/C Ratio	0.031	0.001	-	-	0.016	-	-	0.136
HCM Control Delay (s)	15.5	8.5	0	-	10.7	-	-	27.6
HCM Lane LOS	C	A	A	-	B	-	-	D
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1047	1	2	496	42	3	0	15	81	0	32
Future Volume (vph)	23	1047	1	2	496	42	3	0	15	81	0	32
Satd. Flow (prot)	0	3312	0	0	3276	0	0	1536	0	1658	1483	0
Flt Permitted		0.938			0.953			0.949		0.746		
Satd. Flow (perm)	0	3110	0	0	3122	0	0	1469	0	1302	1483	0
Satd. Flow (RTOR)					13			33			295	
Lane Group Flow (vph)	0	1071	0	0	540	0	0	18	0	81	32	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	50.8	50.8		50.8	50.8		25.6	25.6		25.6	25.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.6			53.6			10.9		10.9	10.9	
Actuated g/C Ratio		0.75			0.75			0.15		0.15	0.15	
v/c Ratio		0.46			0.23			0.07		0.41	0.07	
Control Delay		5.7			4.1			5.7		33.4	0.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		5.7			4.1			5.7		33.4	0.3	
LOS		A			A			A		C	A	
Approach Delay		5.7			4.1			5.7			24.1	
Approach LOS		A			A			A			C	
Queue Length 50th (m)		27.6			10.7			0.0		10.2	0.0	
Queue Length 95th (m)		46.6			19.2			3.0		20.2	0.0	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2336			2348			741		642	881	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.46			0.23			0.02		0.13	0.04	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.3
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.46

Intersection Signal Delay: 6.4 | Intersection LOS: A
Intersection Capacity Utilization 68.8% | ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↱			↕			↕	
Traffic Vol, veh/h	5	813	0	3	1166	20	1	0	4	13	1	6
Future Vol, veh/h	5	813	0	3	1166	20	1	0	4	13	1	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	813	0	3	1166	20	1	0	4	13	1	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1186	0	0	813	0	0	2009	2015	407	1599	2005	1176
Stage 1	-	-	-	-	-	-	823	823	-	1182	1182	-
Stage 2	-	-	-	-	-	-	1186	1192	-	417	823	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	587	-	-	812	-	-	39	58	594	78	59	232
Stage 1	-	-	-	-	-	-	335	387	-	231	262	-
Stage 2	-	-	-	-	-	-	229	260	-	585	387	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	587	-	-	812	-	-	37	57	594	76	58	232
Mov Cap-2 Maneuver	-	-	-	-	-	-	37	57	-	76	58	-
Stage 1	-	-	-	-	-	-	330	381	-	227	261	-
Stage 2	-	-	-	-	-	-	221	259	-	572	381	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	30.2	54
HCM LOS			D	F

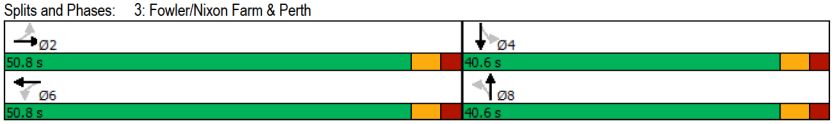
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	148	587	-	-	812	-	-	93
HCM Lane V/C Ratio	0.034	0.009	-	-	0.004	-	-	0.215
HCM Control Delay (s)	30.2	11.2	0.1	-	9.4	-	-	54
HCM Lane LOS	D	B	A	-	A	-	-	F
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	798	1	17	1253	103	2	2	16	59	0	39
Future Volume (vph)	43	798	1	17	1253	103	2	2	16	59	0	39
Satd. Flow (prot)	0	3306	0	0	3276	0	0	1549	0	1658	1483	0
Flt Permitted		0.821			0.941			0.967		0.744		
Satd. Flow (perm)	0	2722	0	0	3086	0	0	1505	0	1298	1483	0
Satd. Flow (RTOR)					13			16			35	
Lane Group Flow (vph)	0	842	0	0	1373	0	0	20	0	59	39	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.8	24.8		24.8	24.8		40.6	40.6		40.6	40.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		54.1			54.1			10.4		10.4	10.4	
Actuated g/C Ratio		0.76			0.76			0.15		0.15	0.15	
v/c Ratio		0.41			0.59			0.09		0.31	0.16	
Control Delay		5.1			6.6			14.9		31.6	12.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		5.1			6.6			14.9		31.6	12.2	
LOS		A			A			B		C	B	
Approach Delay		5.1			6.6			14.9			23.8	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		20.6			41.3			0.5		7.5	0.5	
Queue Length 95th (m)		32.8			63.7			5.6		16.0	7.5	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2065			2344			751		641	750	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.41			0.59			0.03		0.09	0.05	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.3
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.59

Intersection Signal Delay: 6.9 — Intersection LOS: A
Intersection Capacity Utilization 76.7% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



MOVEMENT SUMMARY

Site: 101 [Perth-Meynell AM FB2030]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	51	1.0	0.720	20.6	LOS C	9.1	64.1	0.99	1.16	1.46	47.8
2	T1	1	1.0	0.720	16.0	LOS B	9.1	64.1	0.99	1.16	1.46	47.9
3	R2	480	1.0	0.720	15.8	LOS B	9.1	64.1	0.99	1.16	1.46	46.9
Approach		532	1.0	0.720	16.2	LOS B	9.1	64.1	0.99	1.16	1.46	46.9
East: Perth												
4	L2	239	1.0	0.397	9.1	LOS A	3.2	22.9	0.32	0.52	0.32	54.1
5	T1	274	2.0	0.397	4.5	LOS A	3.2	22.9	0.32	0.52	0.32	54.1
6	R2	54	1.0	0.397	4.3	LOS A	3.2	22.9	0.32	0.52	0.32	52.9
Approach		566	1.5	0.397	6.5	LOS A	3.2	22.9	0.32	0.52	0.32	54.0
North: Meynell												
7	L2	124	1.0	0.215	12.0	LOS B	1.3	9.1	0.66	0.76	0.66	51.9
8	T1	1	1.0	0.215	7.4	LOS A	1.3	9.1	0.66	0.76	0.66	52.0
9	R2	63	1.0	0.215	7.2	LOS A	1.3	9.1	0.66	0.76	0.66	50.8
Approach		188	1.0	0.215	10.4	LOS B	1.3	9.1	0.66	0.76	0.66	51.5
West: Perth												
10	L2	19	1.0	0.560	12.0	LOS B	4.6	33.0	0.70	0.72	0.75	53.4
11	T1	544	2.0	0.560	7.4	LOS A	4.6	33.0	0.70	0.72	0.75	53.4
12	R2	21	1.0	0.560	7.2	LOS A	4.6	33.0	0.70	0.72	0.75	52.2
Approach		584	1.9	0.560	7.6	LOS A	4.6	33.0	0.70	0.72	0.75	53.4
All Vehicles		1871	1.4	0.720	10.0	LOS A	9.1	64.1	0.66	0.79	0.81	51.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Perth-Meynell PM FB2030]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	34	1.0	0.468	12.9	LOS B	3.6	25.7	0.80	0.83	0.84	53.3
2	T1	1	1.0	0.468	8.2	LOS A	3.6	25.7	0.80	0.83	0.84	53.3
3	R2	359	1.0	0.468	8.0	LOS A	3.6	25.7	0.80	0.83	0.84	52.1
Approach		394	1.0	0.468	8.4	LOS A	3.6	25.7	0.80	0.83	0.84	52.2
East: Perth												
4	L2	509	1.0	0.829	9.8	LOS A	15.4	109.3	0.66	0.50	0.66	52.9
5	T1	623	2.0	0.829	5.2	LOS A	15.4	109.3	0.66	0.50	0.66	52.9
6	R2	104	1.0	0.829	5.0	LOS A	15.4	109.3	0.66	0.50	0.66	51.7
Approach		1237	1.5	0.829	7.1	LOS A	15.4	109.3	0.66	0.50	0.66	52.8
North: Meynell												
7	L2	145	1.0	0.578	31.5	LOS C	5.7	40.5	1.00	1.16	1.42	40.9
8	T1	1	1.0	0.578	26.8	LOS C	5.7	40.5	1.00	1.16	1.42	40.9
9	R2	73	1.0	0.578	26.6	LOS C	5.7	40.5	1.00	1.16	1.42	40.2
Approach		219	1.0	0.578	29.8	LOS C	5.7	40.5	1.00	1.16	1.42	40.7
West: Perth												
10	L2	37	1.0	0.587	16.3	LOS B	5.7	40.2	0.90	0.99	1.12	50.7
11	T1	357	2.0	0.587	11.7	LOS B	5.7	40.2	0.90	0.99	1.12	50.7
12	R2	57	1.0	0.587	11.4	LOS B	5.7	40.2	0.90	0.99	1.12	49.6
Approach		451	1.8	0.587	12.1	LOS B	5.7	40.2	0.90	0.99	1.12	50.6
All Vehicles		2300	1.4	0.829	10.5	LOS B	15.4	109.3	0.76	0.71	0.85	50.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix H

MMLOS Analysis

CGH TRANSPORTATION

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation	**Project**	2019-64 - 6295, 6363, 6409
Scenario	Existing and Future		Perth, 6305 Ottawa
Comments		**Date**	21-Dec-20

INTERSECTIONS		**Perth & Nixon Farm/Fowler**			
	Crossing Side	**NORTH**	**SOUTH**	**EAST**	**WEST**
Pedestrian	Lanes	3	0 - 2	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel
	Corner Radius	5-10m	5-10m	5-10m	5-10m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	**71**	**86**	**54**	**54**
	Ped. Exposure to Traffic LoS	**C**	**B**	**D**	**D**
	Cycle Length	50	50	40	40
	Effective Walk Time	19	19	20	20
	Average Pedestrian Delay	**10**	**10**	**5**	**5**
	Pedestrian Delay LoS	**B**	**B**	**A**	**A**
	Level of Service	**C**	**B**	**D**	**D**
		D			
	Approach From	**NORTH**	**SOUTH**	**EAST**	**WEST**
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	≤ 50 m	≤ 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	**D**	**D**	**D**	**D**
	Separated or Mixed Traffic	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h
	Left Turning Cyclist	**B**	**B**	**C**	**C**
	Level of Service	**D**	**D**	**D**	**D**
		D			
Transit	Average Signal Delay			≤ 10 sec	≤ 10 sec
	Level of Service	**-**	**-**	**B**	**B**
		B			
Truck	Effective Corner Radius			< 10 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection			1	1
	Level of Service	**-**	**-**	**F**	**F**
		F			
Auto	Volume to Capacity Ratio	0.61 - 0.70			
	Level of Service	**B**			

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation	**Project**	2019-64 - 6295, 6363, 6409
Scenario	Existing and Future		Perth, 6305 Ottawa
Comments		**Date**	21-Dec-20

SEGMENTS		Street A	Meynell	Oldenburg	Ex. Perth	Mira	Cedarstone	Burke	Ex. Ottawa	Fut. Ottawa	Int. Perth N	Int. Perth S	Fut. Perth
			1	2	3	4	5	6	7	9	11	12	13
Pedestrian	Sidewalk Width Boulevard Width	E	1.8 m 0.5 - 2 m	1.8 m < 0.5 m	no sidewalk n/a	no sidewalk n/a	1.5 m < 0.5 m	no sidewalk n/a	no sidewalk n/a	≥ 2 m < 0.5	≥ 2 m > 2 m	no sidewalk n/a	≥ 2 m > 2 m
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	> 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000	> 3000	> 3000	> 3000	> 3000
	Operating Speed On-Street Parking		> 30 to 50 km/h yes	> 30 to 50 km/h yes	> 60 km/h no	> 30 to 50 km/h yes	> 30 to 50 km/h yes	≤ 30 km/h yes	> 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no	> 50 to 60 km/h no
	Exposure to Traffic PLoS		**C**	**C**	**F**	**F**	**E**	**C**	**F**	**E**	**C**	**F**	**C**
	Effective Sidewalk Width		2.0 m	1.5 m			1.5 m			2.0 m	2.0 m		2.0 m
	Pedestrian Volume		250 ped/hr	250 ped/hr			250 ped/hr			250 ped/hr	250 ped/hr		250 ped/hr
	Crowding PLoS		**B**	**B**	**-**	**-**	**B**	**-**	**-**	**B**	**B**	**-**	**B**
	Level of Service		**C**	**C**	**-**	**-**	**E**	**-**	**-**	**E**	**C**	**-**	**C**
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Physically Separated	Curbside Bike Lane	Physically Separated
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)	2-3 lanes total	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)	≤ 2 (no centreline)		≤ 1 each direction	
	Operating Speed		≤ 40 km/h	≤ 40 km/h	≥ 60 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≥ 60 km/h	≥ 50 to 60 km/h		>50 to 70 km/h	
	# of Lanes & Operating Speed LoS		**A**	**A**	**F**	**A**	**A**	**A**	**F**	**D**	**-**	**C**	**-**
	Bike Lane (+ Parking Lane) Width											≥1.5 to <1.8 m	
	Bike Lane Width LoS		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**B**	**-**
	Bike Lane Blockages											Rare	
	Blockage LoS		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**A**	**-**
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge	< 1.8 m refuge		< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes	≤ 3 lanes		≤ 3 lanes	
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h	>40 to 50 km/h	≤ 40 km/h	≤ 40 km/h	≤ 40 km/h	≥ 65 km/h	>50 to 60 km/h		>40 to 50 km/h	
	Unsignalized Crossing - Lowest LoS		**A**	**A**	**A**	**A**	**A**	**A**	**D**	**B**	**A**	**A**	**A**
	Level of Service		**A**	**A**	**F**	**A**	**A**	**A**	**F**	**D**	**A**	**C**	**A**
Transit	Facility Type	D	Mixed Traffic		Mixed Traffic					Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8		Vt/Vp ≥ 0.8					Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8
	Level of Service		**D**	**-**	**D**	**-**	**-**	**-**	**-**	**D**	**D**	**D**	**D**
Truck	Truck Lane Width	C			≤ 3.5 m						≤ 3.5 m	≤ 3.5 m	≤ 3.5 m
	Travel Lanes per Direction				1						1	1	1
	Level of Service		**-**	**-**	**C**	**-**	**-**	**-**	**-**	**-**	**C**	**C**	**C**
Auto	**Level of Service**	**Not Applicable**											

Appendix I

Synchro Intersection Worksheets – 2025 Future Total Conditions

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	987	0	10	516	14	0	1	10	20	1	12
Future Vol, veh/h	4	987	0	10	516	14	0	1	10	20	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	987	0	10	516	14	0	1	10	20	1	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	530	0	0	987	0	0	1545	1545	494	1045	1538	523
Stage 1	-	-	-	-	-	-	995	995	-	543	543	-
Stage 2	-	-	-	-	-	-	550	550	-	502	995	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	1035	-	-	698	-	-	85	114	522	194	115	553
Stage 1	-	-	-	-	-	-	263	322	-	523	519	-
Stage 2	-	-	-	-	-	-	518	515	-	521	322	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1035	-	-	698	-	-	81	111	522	186	112	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	111	-	186	112	-
Stage 1	-	-	-	-	-	-	261	319	-	518	512	-
Stage 2	-	-	-	-	-	-	499	508	-	505	319	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.5	22.5
HCM LOS			B	C

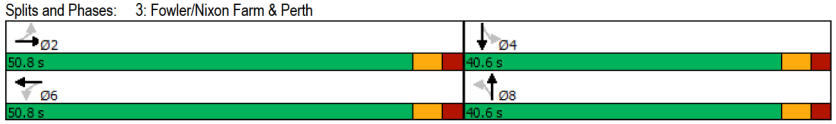
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	391	1035	-	-	698	-	-	239
HCM Lane V/C Ratio	0.028	0.004	-	-	0.014	-	-	0.138
HCM Control Delay (s)	14.5	8.5	0	-	10.2	-	-	22.5
HCM Lane LOS	B	A	A	-	B	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	999	1	2	517	42	3	0	15	104	0	32
Future Volume (vph)	23	999	1	2	517	42	3	0	15	104	0	32
Satd. Flow (prot)	0	3312	0	0	3279	0	0	1536	0	1658	1483	0
Flt Permitted		0.937			0.953			0.953		0.746		
Satd. Flow (perm)	0	3107	0	0	3125	0	0	1475	0	1302	1483	0
Satd. Flow (RTOR)					13			33			278	
Lane Group Flow (vph)	0	1023	0	0	561	0	0	18	0	104	32	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	50.8	50.8		50.8	50.8		25.6	25.6		25.6	25.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.0			53.0			11.8		11.8	11.8	
Actuated g/C Ratio		0.74			0.74			0.16		0.16	0.16	
v/c Ratio		0.44			0.24			0.07		0.49	0.07	
Control Delay		6.0			4.6			5.5		35.0	0.3	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		6.0			4.6			5.5		35.0	0.3	
LOS		A			A			A		C	A	
Approach Delay		6.0			4.6			5.5			26.8	
Approach LOS		A			A			A			C	
Queue Length 50th (m)		27.1			11.7			0.0		12.6	0.0	
Queue Length 95th (m)		47.8			22.0			2.9		25.0	0.0	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2301			2318			741		639	870	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.44			0.24			0.02		0.16	0.04	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.6
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.49

Intersection Signal Delay: 7.2 | Intersection LOS: A
Intersection Capacity Utilization 68.8% | ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	521	356	18	53	53
Future Vol, veh/h	27	521	356	18	53	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	521	356	18	53	53

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	374	0	-	0	940	365
Stage 1	-	-	-	-	365	-
Stage 2	-	-	-	-	575	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1184	-	-	-	293	680
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	563	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1184	-	-	-	284	680
Mov Cap-2 Maneuver	-	-	-	-	284	-
Stage 1	-	-	-	-	680	-
Stage 2	-	-	-	-	563	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	17.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1184	-	-	-	401
HCM Lane V/C Ratio	0.023	-	-	-	0.264
HCM Control Delay (s)	8.1	0	-	-	17.2
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1

MOVEMENT SUMMARY

Site: 101 [Perth-Meynell AM FT2025]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	54	1.0	0.520	16.8	LOS B	4.6	32.5	0.92	1.00	1.10	50.2
2	T1	1	1.0	0.520	12.2	LOS B	4.6	32.5	0.92	1.00	1.10	50.2
3	R2	299	1.0	0.520	11.9	LOS B	4.6	32.5	0.92	1.00	1.10	49.1
Approach		354	1.0	0.520	12.7	LOS B	4.6	32.5	0.92	1.00	1.10	49.3
East: Perth												
4	L2	160	1.0	0.396	9.2	LOS A	3.1	22.1	0.33	0.50	0.33	54.5
5	T1	293	2.0	0.396	4.6	LOS A	3.1	22.1	0.33	0.50	0.33	54.5
6	R2	103	1.0	0.396	4.4	LOS A	3.1	22.1	0.33	0.50	0.33	53.3
Approach		556	1.5	0.396	5.9	LOS A	3.1	22.1	0.33	0.50	0.33	54.3
North: Meynell												
7	L2	202	1.0	0.301	11.8	LOS B	1.9	13.2	0.66	0.77	0.66	51.8
8	T1	1	1.0	0.301	7.2	LOS A	1.9	13.2	0.66	0.77	0.66	51.9
9	R2	73	1.0	0.301	7.0	LOS A	1.9	13.2	0.66	0.77	0.66	50.7
Approach		276	1.0	0.301	10.6	LOS B	1.9	13.2	0.66	0.77	0.66	51.5
West: Perth												
10	L2	25	1.0	0.571	12.1	LOS B	5.0	35.3	0.73	0.74	0.78	53.2
11	T1	542	2.0	0.571	7.5	LOS A	5.0	35.3	0.73	0.74	0.78	53.3
12	R2	21	1.0	0.571	7.3	LOS A	5.0	35.3	0.73	0.74	0.78	52.1
Approach		588	1.9	0.571	7.7	LOS A	5.0	35.3	0.73	0.74	0.78	53.2
All Vehicles		1774	1.5	0.571	8.6	LOS A	5.0	35.3	0.63	0.72	0.68	52.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	753	0	3	1010	44	1	0	4	13	1	11
Future Vol, veh/h	13	753	0	3	1010	44	1	0	4	13	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	753	0	3	1010	44	1	0	4	13	1	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1054	0	0	753	0	0	1823	1839	377	1441	1817	1032
Stage 1	-	-	-	-	-	-	779	779	-	1038	1038	-
Stage 2	-	-	-	-	-	-	1044	1060	-	403	779	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	658	-	-	855	-	-	54	75	621	101	77	282
Stage 1	-	-	-	-	-	-	356	405	-	278	307	-
Stage 2	-	-	-	-	-	-	276	300	-	596	405	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	658	-	-	855	-	-	50	72	621	97	74	282
Mov Cap-2 Maneuver	-	-	-	-	-	-	50	72	-	97	74	-
Stage 1	-	-	-	-	-	-	344	391	-	269	306	-
Stage 2	-	-	-	-	-	-	263	299	-	572	391	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	24.6	37.9
HCM LOS			C	E

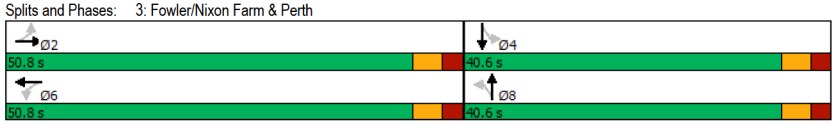
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	189	658	-	-	855	-	-	134
HCM Lane V/C Ratio	0.026	0.02	-	-	0.004	-	-	0.187
HCM Control Delay (s)	24.6	10.6	0.2	-	9.2	-	-	37.9
HCM Lane LOS	C	B	A	-	A	-	-	E
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	779	1	17	1163	103	2	2	16	74	0	39
Future Volume (vph)	43	779	1	17	1163	103	2	2	16	74	0	39
Satd. Flow (prot)	0	3306	0	0	3273	0	0	1549	0	1658	1483	0
Flt Permitted		0.829			0.941			0.968		0.744		
Satd. Flow (perm)	0	2749	0	0	3083	0	0	1507	0	1298	1483	0
Satd. Flow (RTOR)					14			16			46	
Lane Group Flow (vph)	0	823	0	0	1283	0	0	20	0	74	39	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.8	24.8		24.8	24.8		40.6	40.6		40.6	40.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.5			53.5			10.7		10.7	10.7	
Actuated g/C Ratio		0.75			0.75			0.15		0.15	0.15	
v/c Ratio		0.40			0.55			0.08		0.38	0.15	
Control Delay		5.2			6.5			14.4		32.7	8.7	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		5.2			6.5			14.4		32.7	8.7	
LOS		A			A			B		C	A	
Approach Delay		5.2			6.5			14.4			24.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		19.8			36.5			0.5		9.2	0.0	
Queue Length 95th (m)		33.7			60.2			5.4		18.9	6.1	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2069			2324			754		643	757	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.40			0.55			0.03		0.12	0.05	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.1
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.55

Intersection Signal Delay: 7.0 | Intersection LOS: A
Intersection Capacity Utilization 77.1% | ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	430	649	33	39	39
Future Vol, veh/h	50	430	649	33	39	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	430	649	33	39	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	682	0	-	0	1196	666
Stage 1	-	-	-	-	666	-
Stage 2	-	-	-	-	530	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	911	-	-	-	206	459
Stage 1	-	-	-	-	511	-
Stage 2	-	-	-	-	590	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	911	-	-	-	191	459
Mov Cap-2 Maneuver	-	-	-	-	191	-
Stage 1	-	-	-	-	474	-
Stage 2	-	-	-	-	590	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	23.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	911	-	-	-	270
HCM Lane V/C Ratio	0.055	-	-	-	0.289
HCM Control Delay (s)	9.2	0	-	-	23.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.2

MOVEMENT SUMMARY

Site: 101 [Perth-Meynell PM FT2025]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	36	1.0	0.318	12.9	LOS B	2.1	15.2	0.77	0.80	0.77	53.1
2	T1	1	1.0	0.318	8.2	LOS A	2.1	15.2	0.77	0.80	0.77	53.1
3	R2	212	1.0	0.318	8.0	LOS A	2.1	15.2	0.77	0.80	0.77	51.8
Approach		248	1.0	0.318	8.8	LOS A	2.1	15.2	0.77	0.80	0.77	52.0
East: Perth												
4	L2	286	1.0	0.733	9.7	LOS A	9.7	68.5	0.53	0.50	0.53	53.9
5	T1	606	2.0	0.733	5.0	LOS A	9.7	68.5	0.53	0.50	0.53	53.9
6	R2	184	1.0	0.733	4.7	LOS A	9.7	68.5	0.53	0.50	0.53	52.7
Approach		1077	1.6	0.733	6.2	LOS A	9.7	68.5	0.53	0.50	0.53	53.7
North: Meynell												
7	L2	206	1.0	0.507	19.6	LOS B	4.5	31.8	0.96	1.07	1.18	46.8
8	T1	1	1.0	0.507	15.1	LOS B	4.5	31.8	0.96	1.07	1.18	46.9
9	R2	81	1.0	0.507	14.8	LOS B	4.5	31.8	0.96	1.07	1.18	45.9
Approach		288	1.0	0.507	18.3	LOS B	4.5	31.8	0.96	1.07	1.18	46.6
West: Perth												
10	L2	45	1.0	0.532	13.2	LOS B	4.5	31.6	0.78	0.82	0.86	52.8
11	T1	388	2.0	0.532	8.7	LOS A	4.5	31.6	0.78	0.82	0.86	52.8
12	R2	57	1.0	0.532	8.4	LOS A	4.5	31.6	0.78	0.82	0.86	51.6
Approach		491	1.8	0.532	9.0	LOS A	4.5	31.6	0.78	0.82	0.86	52.7
All Vehicles		2104	1.5	0.733	8.8	LOS A	9.7	68.5	0.68	0.69	0.73	52.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix J

Synchro Intersection Worksheets – 2030 Future Total Conditions

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	1269	0	10	625	14	0	1	10	20	1	12
Future Vol, veh/h	4	1269	0	10	625	14	0	1	10	20	1	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	1269	0	10	625	14	0	1	10	20	1	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	1269	0	0	1936	1936	635	1295	1929	632
Stage 1	-	-	-	-	-	-	1277	1277	-	652	652	-
Stage 2	-	-	-	-	-	-	659	659	-	643	1277	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	943	-	-	545	-	-	44	65	422	129	66	479
Stage 1	-	-	-	-	-	-	177	236	-	456	463	-
Stage 2	-	-	-	-	-	-	452	460	-	429	236	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	943	-	-	545	-	-	41	63	422	121	64	479
Mov Cap-2 Maneuver	-	-	-	-	-	-	41	63	-	121	64	-
Stage 1	-	-	-	-	-	-	175	233	-	450	455	-
Stage 2	-	-	-	-	-	-	432	452	-	411	233	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	18.5	33.3
HCM LOS			C	D

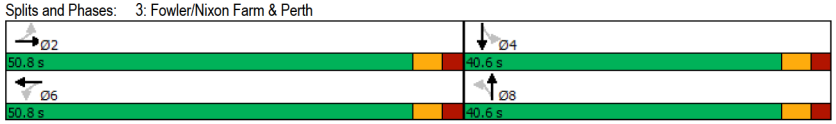
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	278	943	-	-	545	-	-	160
HCM Lane V/C Ratio	0.04	0.004	-	-	0.018	-	-	0.206
HCM Control Delay (s)	18.5	8.8	0.1	-	11.7	-	-	33.3
HCM Lane LOS	C	A	A	-	B	-	-	D
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.7

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1280	1	2	626	42	3	0	15	104	0	32
Future Volume (vph)	23	1280	1	2	626	42	3	0	15	104	0	32
Satd. Flow (prot)	0	3312	0	0	3286	0	0	1536	0	1658	1483	0
Flt Permitted		0.937			0.952			0.953		0.746		
Satd. Flow (perm)	0	3107	0	0	3128	0	0	1475	0	1302	1483	0
Satd. Flow (RTOR)					10			33			207	
Lane Group Flow (vph)	0	1304	0	0	670	0	0	18	0	104	32	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	50.8	50.8		50.8	50.8		25.6	25.6		25.6	25.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.0			53.0			11.8		11.8	11.8	
Actuated g/C Ratio		0.74			0.74			0.16		0.16	0.16	
v/c Ratio		0.57			0.29			0.07		0.49	0.08	
Control Delay		7.4			4.9			5.5		35.0	0.4	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		7.4			4.9			5.5		35.0	0.4	
LOS		A			A			A		C	A	
Approach Delay		7.4			4.9			5.5			26.8	
Approach LOS		A			A			A			C	
Queue Length 50th (m)		39.9			14.8			0.0		12.6	0.0	
Queue Length 95th (m)		70.5			27.2			2.9		25.0	0.0	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2301			2319			741		639	833	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.57			0.29			0.02		0.16	0.04	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.6
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.57

Intersection Signal Delay: 7.8 | Intersection LOS: A
Intersection Capacity Utilization 76.9% | ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	563	377	18	53	53
Future Vol, veh/h	27	563	377	18	53	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	563	377	18	53	53

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	395	0	-	0	1003	386
Stage 1	-	-	-	-	386	-
Stage 2	-	-	-	-	617	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1164	-	-	-	268	662
Stage 1	-	-	-	-	687	-
Stage 2	-	-	-	-	538	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1164	-	-	-	259	662
Mov Cap-2 Maneuver	-	-	-	-	259	-
Stage 1	-	-	-	-	664	-
Stage 2	-	-	-	-	538	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	18.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1164	-	-	-	372
HCM Lane V/C Ratio	0.023	-	-	-	0.285
HCM Control Delay (s)	8.2	0	-	-	18.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

MOVEMENT SUMMARY

Site: 101 [Perth-Meynell AM FT2030]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	57	1.0	0.963	61.8	LOS E	27.0	190.9	1.00	1.90	3.33	31.1
2	T1	1	1.0	0.963	57.2	LOS E	27.0	190.9	1.00	1.90	3.33	31.1
3	R2	513	1.0	0.963	56.9	LOS E	27.0	190.9	1.00	1.90	3.33	30.7
Approach		571	1.0	0.963	57.4	LOS E	27.0	190.9	1.00	1.90	3.33	30.7
East: Perth												
4	L2	256	1.0	0.478	9.3	LOS A	4.2	29.8	0.38	0.52	0.38	54.0
5	T1	293	2.0	0.478	4.7	LOS A	4.2	29.8	0.38	0.52	0.38	54.0
6	R2	122	1.0	0.478	4.5	LOS A	4.2	29.8	0.38	0.52	0.38	52.8
Approach		671	1.4	0.478	6.4	LOS A	4.2	29.8	0.38	0.52	0.38	53.8
North: Meynell												
7	L2	248	1.0	0.399	12.9	LOS B	2.7	19.1	0.76	0.83	0.76	51.0
8	T1	1	1.0	0.399	8.3	LOS A	2.7	19.1	0.76	0.83	0.76	51.1
9	R2	84	1.0	0.399	8.0	LOS A	2.7	19.1	0.76	0.83	0.76	50.0
Approach		334	1.0	0.399	11.7	LOS B	2.7	19.1	0.76	0.83	0.76	50.8
West: Perth												
10	L2	29	1.0	0.699	16.4	LOS B	8.3	59.1	0.89	0.99	1.19	50.7
11	T1	579	2.0	0.699	11.9	LOS B	8.3	59.1	0.89	0.99	1.19	50.7
12	R2	24	1.0	0.699	11.6	LOS B	8.3	59.1	0.89	0.99	1.19	49.6
Approach		633	1.9	0.699	12.1	LOS B	8.3	59.1	0.89	0.99	1.19	50.7
All Vehicles		2207	1.4	0.963	22.0	LOS C	27.0	190.9	0.75	1.06	1.43	44.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	945	0	3	1336	44	1	0	4	13	1	11
Future Vol, veh/h	13	945	0	3	1336	44	1	0	4	13	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	945	0	3	1336	44	1	0	4	13	1	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1380	0	0	945	0	0	2341	2357	473	1863	2335	1358
Stage 1	-	-	-	-	-	-	971	971	-	1364	1364	-
Stage 2	-	-	-	-	-	-	1370	1386	-	499	971	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	495	-	-	724	-	-	22	35	538	50	36	181
Stage 1	-	-	-	-	-	-	272	330	-	182	215	-
Stage 2	-	-	-	-	-	-	180	209	-	523	330	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	495	-	-	724	-	-	19	33	538	47	34	181
Mov Cap-2 Maneuver	-	-	-	-	-	-	19	33	-	47	34	-
Stage 1	-	-	-	-	-	-	257	312	-	172	214	-
Stage 2	-	-	-	-	-	-	168	208	-	491	312	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	51.1	86
HCM LOS			F	F

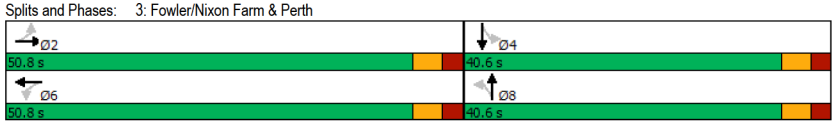
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	83	495	-	-	724	-	-	68
HCM Lane V/C Ratio	0.06	0.026	-	-	0.004	-	-	0.368
HCM Control Delay (s)	51.1	12.5	0.3	-	10	-	-	86
HCM Lane LOS	F	B	A	-	A	-	-	F
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	1.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	971	1	17	1498	103	2	2	16	74	0	39
Future Volume (vph)	43	971	1	17	1498	103	2	2	16	74	0	39
Satd. Flow (prot)	0	3309	0	0	3279	0	0	1549	0	1658	1483	0
Flt Permitted		0.810			0.940			0.968		0.744		
Satd. Flow (perm)	0	2686	0	0	3086	0	0	1507	0	1298	1483	0
Satd. Flow (RTOR)					11			16			33	
Lane Group Flow (vph)	0	1015	0	0	1618	0	0	20	0	74	39	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.8	24.8		24.8	24.8		40.6	40.6		40.6	40.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.5			53.5			10.7		10.7	10.7	
Actuated g/C Ratio		0.75			0.75			0.15		0.15	0.15	
v/c Ratio		0.50			0.70			0.08		0.38	0.16	
Control Delay		6.2			8.7			14.4		32.7	12.6	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		6.2			8.7			14.4		32.7	12.6	
LOS		A			A			B		C	B	
Approach Delay		6.2			8.7			14.4			25.8	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		27.5			57.1			0.5		9.2	0.7	
Queue Length 95th (m)		46.8			95.7			5.4		18.9	7.6	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2022			2326			754		643	751	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.50			0.70			0.03		0.12	0.05	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.1
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.70

Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 82.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Fowler/Nixon Farm & Perth



Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	447	738	33	39	39
Future Vol, veh/h	50	447	738	33	39	39
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	50	447	738	33	39	39

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	771	0	-	0	1302	755
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	547	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	844	-	-	-	177	409
Stage 1	-	-	-	-	464	-
Stage 2	-	-	-	-	580	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	844	-	-	-	163	409
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	580	-

Approach	EB	WB	SB
HCM Control Delay, s	1	0	28
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	844	-	-	-	233
HCM Lane V/C Ratio	0.059	-	-	-	0.335
HCM Control Delay (s)	9.5	0	-	-	28
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.2	-	-	-	1.4

MOVEMENT SUMMARY

Site: 101 [Perth-Meynell PM FT2030]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	39	1.0	0.567	15.6	LOS B	5.3	37.4	0.90	0.97	1.08	51.2
2	T1	1	1.0	0.567	11.0	LOS B	5.3	37.4	0.90	0.97	1.08	51.2
3	R2	383	1.0	0.567	10.8	LOS B	5.3	37.4	0.90	0.97	1.08	50.1
Approach		423	1.0	0.567	11.2	LOS B	5.3	37.4	0.90	0.97	1.08	50.2
East: Perth												
4	L2	540	1.0	0.987	15.6	LOS B	46.7	330.9	1.00	0.59	1.10	50.3
5	T1	648	2.0	0.987	11.0	LOS B	46.7	330.9	1.00	0.59	1.10	50.3
6	R2	233	1.0	0.987	10.8	LOS B	46.7	330.9	1.00	0.59	1.10	49.2
Approach		1421	1.5	0.987	12.7	LOS B	46.7	330.9	1.00	0.59	1.10	50.1
North: Meynell												
7	L2	237	1.0	1.227	281.4	LOS F	54.8	386.6	1.00	2.85	6.03	10.9
8	T1	1	1.0	1.227	276.8	LOS F	54.8	386.6	1.00	2.85	6.03	10.9
9	R2	88	1.0	1.227	276.6	LOS F	54.8	386.6	1.00	2.85	6.03	10.8
Approach		326	1.0	1.227	280.1	LOS F	54.8	386.6	1.00	2.85	6.03	10.9
West: Perth												
10	L2	57	1.0	0.771	24.3	LOS C	10.6	75.3	1.00	1.25	1.62	45.6
11	T1	388	2.0	0.771	19.7	LOS B	10.6	75.3	1.00	1.25	1.62	45.7
12	R2	63	1.0	0.771	19.4	LOS B	10.6	75.3	1.00	1.25	1.62	44.8
Approach		508	1.8	0.771	20.2	LOS C	10.6	75.3	1.00	1.25	1.62	45.5
All Vehicles		2679	1.4	1.227	46.5	LOS D	54.8	386.6	0.98	1.05	1.79	34.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix K

TDM Checklist

CGH TRANSPORTATION

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	☐
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☐
		2.2 Bicycle skills training	
BETTER		2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	☐

		TDM measures: *Residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☐
BETTER		3.1.2 Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2 Transit fare incentives	
BASIC	★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☑ Provide as an option for new home owners.
BETTER		3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3 Enhanced public transit service	
BETTER	★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☑
		3.4 Private transit service	
BETTER		3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
		4. CARSHARING & BIKESHARING	
		4.1 Bikeshare stations & memberships	
BETTER		4.1.1 Contract with provider to install on-site bikeshare station *(multi-family)*	☐
BETTER		4.1.2 Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2 Carshare vehicles & memberships	
BETTER		4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER		4.2.2 Provide residents with carshare memberships, either free or subsidized	☐
		5. PARKING	
		5.1 Priced parking	
BASIC	★	5.1.1 Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2 Unbundle parking cost from monthly rent *(multi-family)*	☐

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☑

Appendix L

Signal Warrants – Justification 7

CGH TRANSPORTATION

Perth St @ Rochelle Dr/Queen Charlotte St
2025 BG

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	857	95%	11%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	19	11%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	839	93%	12%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	9	12%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including applicable amplification factors
4. T-intersection factor corrected, applies only to 1B
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

Perth St @ Rochelle Dr/Queen Charlotte St
2030 FT - w/SBL

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1084	120%	11%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	19	11%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	1066	118%	12%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	9	12%		

Notes
1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including applicable amplification factors
4. T-intersection factor corrected, applies only to 1B
5. Correction to 2B, as per MTO and City of Ottawa, for '2 or More Lanes' has been applied

Appendix M

Synchro/Sidra Intersection Worksheets – 2030 Future Total Conditions PM Diverted Volumes

CGH TRANSPORTATION

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	945	0	3	1213	44	1	0	4	1	1	11
Future Vol, veh/h	13	945	0	3	1213	44	1	0	4	1	1	11
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	350	-	-	0	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	945	0	3	1213	44	1	0	4	1	1	11

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1257	0	0	945	0	0	2218	2234	473	1740	2212	1235
Stage 1	-	-	-	-	-	-	971	971	-	1241	1241	-
Stage 2	-	-	-	-	-	-	1247	1263	-	499	971	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.53	5.53	-
Follow-up Hdwy	2.219	-	-	2.219	-	-	3.519	4.019	3.319	3.519	4.019	3.319
Pot Cap-1 Maneuver	551	-	-	724	-	-	27	42	538	62	44	214
Stage 1	-	-	-	-	-	-	272	330	-	213	246	-
Stage 2	-	-	-	-	-	-	212	240	-	523	330	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	551	-	-	724	-	-	24	40	538	59	42	214
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	40	-	59	42	-
Stage 1	-	-	-	-	-	-	258	314	-	202	245	-
Stage 2	-	-	-	-	-	-	199	239	-	493	314	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	42.1	33.1
HCM LOS			E	D

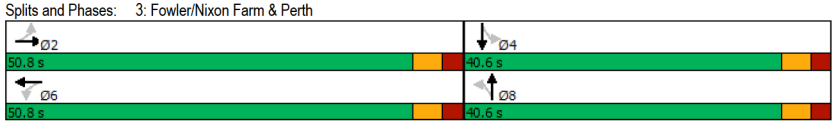
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	102	551	-	-	724	-	-	141
HCM Lane V/C Ratio	0.049	0.024	-	-	0.004	-	-	0.092
HCM Control Delay (s)	42.1	11.7	0.3	-	10	-	-	33.1
HCM Lane LOS	E	B	A	-	A	-	-	D
HCM 95th %tile Q(veh)	0.2	0.1	-	-	0	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	959	1	17	1498	103	2	2	16	86	0	39
Future Volume (vph)	43	959	1	17	1498	103	2	2	16	86	0	39
Satd. Flow (prot)	0	3309	0	0	3279	0	0	1549	0	1658	1483	0
Flt Permitted		0.809			0.940			0.969		0.744		
Satd. Flow (perm)	0	2682	0	0	3086	0	0	1508	0	1298	1483	0
Satd. Flow (RTOR)					11			16			33	
Lane Group Flow (vph)	0	1003	0	0	1618	0	0	20	0	86	39	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.8	24.8		24.8	24.8		40.6	40.6		40.6	40.6	
Total Split (s)	50.8	50.8		50.8	50.8		40.6	40.6		40.6	40.6	
Total Split (%)	55.6%	55.6%		55.6%	55.6%		44.4%	44.4%		44.4%	44.4%	
Yellow Time (s)	3.3	3.3		3.3	3.3		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.3	2.3		2.3	2.3	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.8			5.8			5.6		5.6	5.6	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		53.2			53.2			11.1		11.1	11.1	
Actuated g/C Ratio		0.75			0.75			0.16		0.16	0.16	
v/c Ratio		0.50			0.70			0.08		0.43	0.15	
Control Delay		6.4			9.2			14.2		33.6	12.2	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		6.4			9.2			14.2		33.6	12.2	
LOS		A			A			B		C	B	
Approach Delay		6.4			9.2			14.2			26.9	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		27.1			57.1			0.5		10.5	0.7	
Queue Length 95th (m)		48.5			101.1			5.4		21.4	7.6	
Internal Link Dist (m)		414.4			185.4			258.4			148.6	
Turn Bay Length (m)										15.0		
Base Capacity (vph)		2005			2310			754		642	750	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.50			0.70			0.03		0.13	0.05	

Intersection Summary
Cycle Length: 91.4
Actuated Cycle Length: 71.1
Natural Cycle: 90
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.70

Intersection Signal Delay: 9.0 | Intersection LOS: A
Intersection Capacity Utilization 82.6% | ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Fowler/Nixon Farm & Perth



MOVEMENT SUMMARY

Site: 101 [Perth-Meynell PM FT2030 - 75 veh reduction]

Fox Run Phase 2
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Meynell												
1	L2	39	1.0	0.580	16.6	LOS B	5.6	39.5	0.92	1.01	1.14	50.5
2	T1	1	1.0	0.580	11.9	LOS B	5.6	39.5	0.92	1.01	1.14	50.5
3	R2	383	1.0	0.580	11.7	LOS B	5.6	39.5	0.92	1.01	1.14	49.4
Approach		423	1.0	0.580	12.2	LOS B	5.6	39.5	0.92	1.01	1.14	49.5
East: Perth												
4	L2	408	1.0	0.900	10.6	LOS B	20.9	147.9	0.95	0.54	0.95	52.2
5	T1	648	2.0	0.900	6.0	LOS A	20.9	147.9	0.95	0.54	0.95	52.2
6	R2	233	1.0	0.900	5.8	LOS A	20.9	147.9	0.95	0.54	0.95	51.1
Approach		1289	1.5	0.900	7.4	LOS A	20.9	147.9	0.95	0.54	0.95	52.0
North: Meynell												
7	L2	237	1.0	0.919	73.6	LOS F	17.2	121.1	1.00	1.62	2.65	28.0
8	T1	1	1.0	0.919	69.0	LOS E	17.2	121.1	1.00	1.62	2.65	28.0
9	R2	88	1.0	0.919	68.7	LOS E	17.2	121.1	1.00	1.62	2.65	27.6
Approach		326	1.0	0.919	72.3	LOS F	17.2	121.1	1.00	1.62	2.65	27.9
West: Perth												
10	L2	57	1.0	0.670	18.1	LOS B	7.5	53.5	0.95	1.07	1.28	49.4
11	T1	388	2.0	0.670	13.5	LOS B	7.5	53.5	0.95	1.07	1.28	49.4
12	R2	63	1.0	0.670	13.2	LOS B	7.5	53.5	0.95	1.07	1.28	48.4
Approach		508	1.8	0.670	14.0	LOS B	7.5	53.5	0.95	1.07	1.28	49.3
All Vehicles		2547	1.4	0.919	17.8	LOS B	20.9	147.9	0.95	0.86	1.26	46.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.