

Richmond Subdivision Transportation Brief Update

January 25, 2019

Prepared for:

Mattamy Homes

Prepared by:

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1.0 INTRODUCTION

1.1 STUDY PURPOSE

Stantec Consulting Ltd. was retained by Mattamy Homes to provide an assessment of the transportation needs and impacts related to the future build-out of a residential development known as the "Richmond Subdivision" at 6420 Ottawa Street and 6431 Ottawa Street. These properties are in the south-western portion of the Village of Richmond, within the City of Ottawa.

This transportation brief is an update to the original transportation brief from March 2012 and has been prepared to support a draft plan application. Since the original transportation brief was published, the proposed number of residential units has been reduced in size, the build-out horizon has been extended, and background developments have changed.

1.2 PROPOSED DEVELOPMENT

The proposed development is anticipated to consist of 296 townhome-style dwellings and 802 single family dwellings for a total of 1098 residential units. The final number of residential units is subject to change as the plan is refined but these changes are not expected to be substantial. It is noted that recent changes to the plan of subdivision resulted in minor modifications to the unit counts. The minor discrepancy between the unit count on **Figure 2** below and the analysis contained in this report is acknowledged, however, it does not impact the findings or recommendations of this report. Full built-out is anticipated to occur by 2029.

The development site will be accessed at four locations as follows:

- Perth Street at Meynell Road vis-à-vis the extension of a new North-South Collector (i.e. Meynell Road) through the Richmond Village Development Corporation's development to the north;
- The westerly extension of Royal York Street, from Fortune Street to the subject development;
- Ottawa Street at Meynell Road; and,
- Ottawa Street at a new access to the southern portion of the property (i.e. south of Ottawa Street).

Figure 1 illustrates the location of the proposed development.

Figure 2 depicts the site plan for the proposed development.



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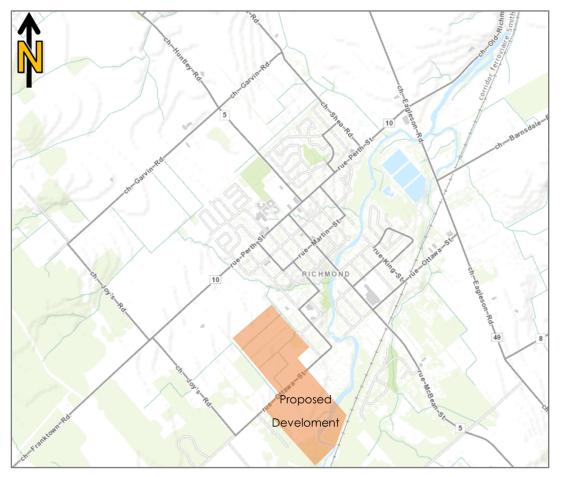
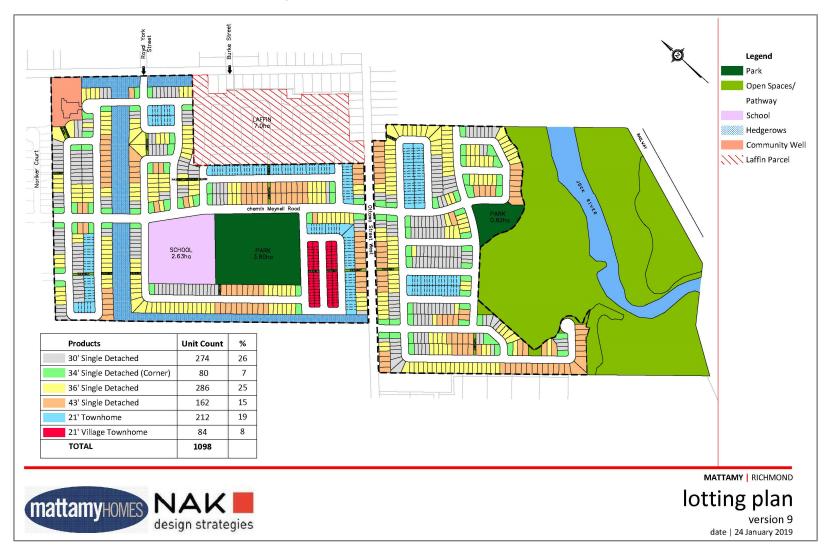


Figure 1 - Location of Proposed Development

Background image source: geoOttawa, accessed January 2018



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1.3 SCOPE OF THE ASSESSMENT

This study is an update to a previous report from 2012 and therefore follows the City of Ottawa's 2006 Traffic Impact Assessment (TIA) Guidelines. The scope of the analysis was confirmed with City staff and is described below.

- Study area intersections include:
 - o Perth Street at Queen Charlotte Street / Rochelle Drive;
 - o Ottawa Street at Queen Charlotte Street;
 - o Perth Street at Meynell Road (new N-S collector); and
 - o Ottawa Street at Meynell Road.
- Study horizons include:
 - o 2018 (existing conditions);
 - o 2029 (site build-out); and
 - o 2034 (site build-out + 5 years).
- Analysis time periods include the weekday AM and PM peak hours.

The methodology used in this TIS is as follows:

- The net increase in site traffic from the proposed development will be estimated.
- Background traffic growth will be explicitly accounted for based on known developments in the study area.
- Future background traffic volumes will be combined with the net increase in site traffic volumes to determine total future traffic volumes.
- A 2% per annum growth rate will be used for the through volumes along Perth Street to account for growth outside of the immediate study area. This rate of growth is consistent with previously approved traffic studies in the area.
- Intersection analyses will be performed to determine the operating characteristics of the study area intersections under each study horizon.
- Mitigation measures will be examined where operational deficiencies are identified.



Existing Transportation Environment January 25, 2019

2.0 EXISTING TRANSPORTATION ENVIRONMENT

2.1 ROADS AND TRAFFIC CONTROL

The roadways under consideration in the study area are described below. The road classifications were referenced from Map 8 of the City of Ottawa's *2013 Transportation Master Plan*.

Perth Street	Approximately 225 m west of Queen Charlotte Street, Perth Street is a two-lane arterial road with a rural cross-section and paved shoulders are provided along both sides of the road. East of Queen Charlotte Street, Perth Street is a four-lane undivided arterial road with an urban cross-section and sidewalks along both sides of the road. The posted speed limit along Perth street transitions from 80 km/h to 50 km/h approximately 300 m west of Queen Charlotte Street.
Queen Charlotte Street	Queen Charlotte Street is a two-lane local road with a semi-urban cross-section (i.e. the west side of the road is urbanized). There are no pedestrian or cycling facilities along Queen Charlotte Street. The intersection with Perth Street is currently stop-controlled along the minor approach (i.e. along Queen Charlotte Street). The default speed limit is 50 km/h.
Rochelle Drive	Rochelle Drive represents the north leg of the intersection of Perth Street / Queen Charlotte Street / Rochelle Drive. Rochelle Drive is a two-lane local road with an urban cross-section. A sidewalk is provided along the eastern side of the road. The intersection with Perth Street is stop-controlled along the minor approach (i.e. along Rochelle Drive). The default speed limit is 50 km/h.
Ottawa Street West	Ottawa Street West is a two-lane collector road with a rural cross-section. There are no pedestrian facilities, cycling facilities, or paved shoulders along Ottawa Street West. The posted speed limit is 50 km/h within the residential area and 70 km/h to the west of the subject development. The intersection with Queen Charlotte Street is currently all-way stop-controlled.

Figure 3 illustrates the existing intersection control and lane configuration for the study area intersections.



Existing Transportation Environment January 25, 2019

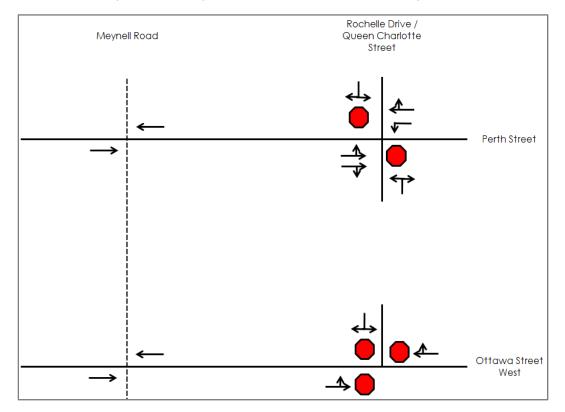


Figure 3 - Existing Intersection Control and Lane Configuration

2.2 TRANSIT

Transit service is provided along Perth Street via OC Transpo bus routes 283 and 301. Route 283 is a peak direction bus route that runs between Munster and Mackenzie King Station. Route 301 is a Monday only bus route that runs between the Village of Richmond and Carlingwood Shopping Centre.

Figure 4 illustrates the existing study area transit routes.



Existing Transportation Environment January 25, 2019

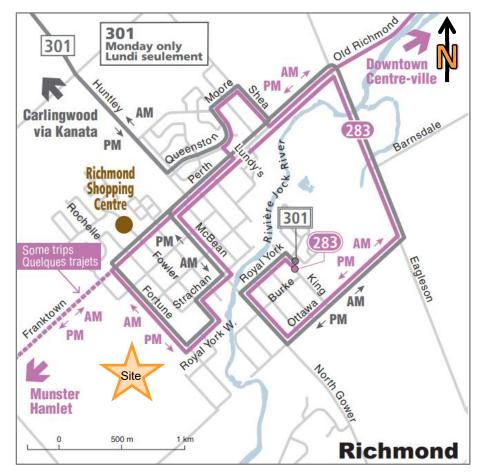


Figure 4 - Existing Transit Service

(Source: OC Transpo System Map, accessed January 2019)

2.3 WALKING AND CYCLING

There are sidewalks along Perth Street, east of Queen Charlotte Street, as well as along Rochelle Street. The *Village* of *Richmond Community Design Plan*, Schedule C, indicates that Perth Street has shared use lanes, indicating that cyclists travel on the road in mixed use traffic. This is consistent with the City of Ottawa's *Cycling Plan* which outlines Perth Street as a suggested cycling route. The City of Ottawa's Ultimate Cycling Network designates Perth Street as a spine route east of Queen Charlotte Street.

2.4 TRAFFIC VOLUMES

Traffic counts at the Perth Street at Queen Charlotte / Rochelle Drive intersection were obtained from the Richmond Oaks Health Centre Transportation Brief (D.J. Halpenny & Associates Ltd., 2016). The intersection counts were collected prior to 2018, and therefore, the count data was adjusted to the reflect the current existing condition. A 2% per annum growth rate was used to increase the through volumes along Perth Street to 2018 volumes which is consistent with previously prepared and approved traffic studies in the area.



Existing Transportation Environment January 25, 2019

Stantec conducted traffic counts at the Ottawa Street at Queen Charlotte Street intersection on December 14, 2017.

Figure 5 and **Figure 6** illustrate the 2018 existing AM and PM peak hour traffic volumes at the study area intersections. **Appendix A** contains the traffic data and is provided for reference.

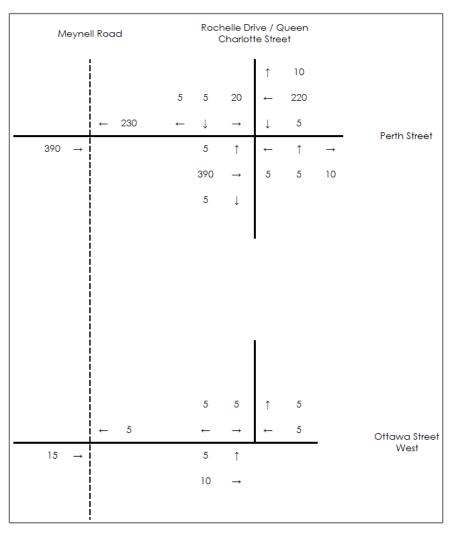


Figure 5 - 2018 Existing Traffic Volumes – AM Peak Hour



Future Transportation Environment January 25, 2019

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Figure 6 - 2018 Existing Traffic Volumes – PM Peak Hour

3.0 FUTURE TRANSPORTATION ENVIRONMENT

3.1 FUTURE NETWORK UPGRADES

3.1.1 Road Network Improvements

Several significant transportation improvements have been noted in the City of Ottawa's 2013 *Transportation Master Plan* and the Village of Richmond's 2010 *Transportation Master Plan* near the proposed site and are outlined in **Table 1** below.



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Table 1 - Scheduled Upgrades

Project	Description	Ottawa TMP Phase	Richmond TMP Phase
New North-South Collector	Will ultimately connect Ottawa Street, Perth Street, and the Richmond Village By-Pass.	N/A	Stage 1 (2011 - 2020)
Perth Street Roundabout	Proposed at the intersection between Perth Street at the New North-South collector.	N/A	Stage 1 (2011 – 2020)
Richmond Village By- Pass	New two-lane road between Huntley Road and Eagleson Road.	Network Concept (i.e. beyond 2031)	Stage 2 (2021 – 2031)
Perth Street	Widen to four lanes between Shea Road and Eagleson Road and between Queen Charlotte Street and the village boundary.	Network Concept (i.e. beyond 2031)	(no timeline provided)

- The New North-South Collector road from the above table is called Meynell Road in the proposed plan of subdivision and this roadway will serve as the primary access to the site.
- The roundabout at the Perth Street at New North-South collector (Meynell Road) intersection is identified within Stage 1 of the Village of Richmond's TMP and is DC eligible. The TMP outlines that once this intersection meets traffic signal warrants, a roundabout should be implemented.
- The Richmond Village By-Pass will not directly impact the subject development and is highlighted for information purposes.
- The widening of Perth Street is not scheduled to occur within the timelines of the subject study; however, adequate right-of-way width will need to be dedicated by adjacent developments to protect for the future widening.

3.1.2 Future Background Developments

There are several developments scheduled to occur in the vicinity of the subject site, as outlined in **Table 2** below. These background developments were explicitly accounted for and added to the roadway network as background traffic volumes.

Table 2 - Background Developments

Development	Location	Size	Assumed Build- Out
Richmond Village Development Corporation Phase 1	Bordered by Perth Street to the north, undeveloped/vacant land to the west and south, and the Jock River Tributary to the east.	214 residential units	2021
Richmond Oaks Health Centre	Northeast quadrant of the Perth Street at Rochelle Drive intersection.	24,000 ft2 GFA retail 31 units of senior residence	2022
Samara Square	Located north of Chestnut Green Private, east of Talos Circle. The site is bordered by outdoor recreational facilities to the east and vacant land to the north.	147 apartment units 124 senior apartments 4,920 ft2 GFA retail	2023



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Richmond Village Development Corporation Phase 2	Bounded by Perth Street to the north, Richmond Village Development Corporation Phase 1 to the east, and vacant land to the south and west	205 residential units	2024
Richmond Village Development Corporation Phase 3	Bounded by Perth Street to the south, existing development to the east, and vacant land to the west and north.	308 residential units	2028
Laffin Lands	Bounded by existing residential to the east, Ottawa Street to the south, and Mattamy's proposed Richmond Village development to the north and west.	In the absence of a development application, the number of residential units was estimated based on the densities in the proposed Mattamy Richmond Village draft plan. This equates to approximately 160 residential units.	In the absence of a development application, the build-out year was assumed to occur sometime between 2029 and 2034

3.2 2029 FUTURE BACKGROUND CONDITIONS

Future background conditions are assessed to differentiate between the transportation improvements that may be required to address background traffic growth and those that may be required to accommodate traffic generated by the subject development. Any improvements identified to address future background conditions are not the responsibility of the developer.

The Richmond Oaks Health Centre, Samara Square, and Richmond Village Development Corporation's Phases 1, 2, and 3 are anticipated to be fully built by the 2029 ultimate horizon. Site traffic for these proposed developments was obtained from the respective transportation impact studies and added to the roadway network as background traffic.

In addition to these background developments, a nominal 2% annual growth rate was applied to the through volumes along Perth Street. This rate of growth is consistent with industry standards and those that were applied in previously prepared / approved studies (i.e. *Richmond Oaks Health Centre Transportation Brief* and *Richmond Village Phase 1 Transportation Impact Study*).

Figure 7 and **Figure 8** illustrate the 2029 future background traffic volumes at the study area intersections during the AM and PM peak hours, respectively.

Appendix B contains the site-generated traffic volumes for the Richmond Oaks Health Centre, Samara Square, and Richmond Village Development Corporation's Phases 1, 2, and 3.



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Figure 7 - 2029 Future Background Traffic Volumes – AM Peak Hour

Future Transportation Environment January 25, 2019

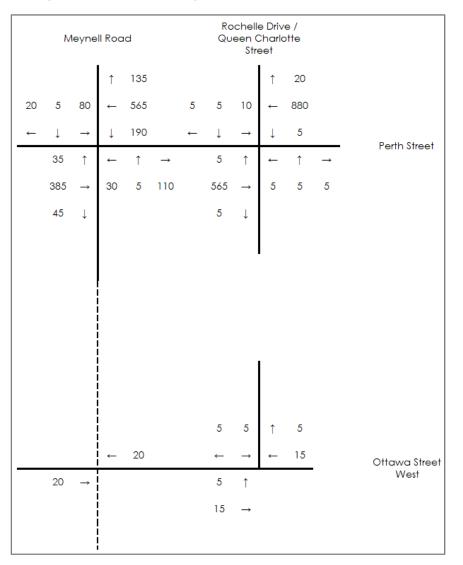


Figure 8 - 2029 Future Background Traffic Volumes – PM Peak Hour

3.3 SITE TRAFFIC GENERATION

3.3.1 Land Use and Trip Generation Rates

The *TRANS Trip Generation Study, 2009*, was used to estimate traffic generated by the subject site. Land use codes 210 – single detached dwellings and 224 – semi-detached dwellings, townhouses, rowhouses were thought to be most representative of the proposed land uses.

 Table 3 lists the trip generation rates obtained from the TRANS Trip Generation Study.



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Table 3 - TRANS Trip Generation Rates

ITE Land Use			Mor	ning Peak H	lour	Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
210 Single detached dwellings	Units	805	29%	71%	0.62	62%	39%	0.92
224 Semi-detached dwellings, townhouses, rowhouses	Units	296	37%	64%	0.62	53%	47%	0.67

3.3.2 Vehicle Site Trips

Table 4 lists the vehicle trips generated by the site. The site was split north and south of Ottawa Street to facilitate trip assignment to the road network.

Table 4	 Vehicle 	Site Trips
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Location	Мс	orning Peak Ho	our	Afternoon Peak Hour			
Location	In	Out	Total	In	Out	Total	
Mattamy North of Ottawa St.	127	274	401	319	221	540	
Mattamy South of Ottawa St.	86	198	284	245	161	406	
Total	213	472	685	564	382	946	

3.3.3 Traffic Distribution and Assignment

The distribution of traffic to / from the study area was determined through examination of the current traffic distribution at the Perth Street at Queen Charlotte Street / Rochelle Drive intersection in combination with engineering judgement. As Ottawa Street bisects the proposed development, two separate distributions were developed: one for the lands north of Ottawa Street and one for the lands south of Ottawa Street.

Table 5 below outlines the assumed trip distribution for the lands north of Ottawa Street.

Table 5 – Traffic Distribution

			Via (to/from)		
	Perth Street	Perth Street	Ottawa Street	Ottawa Street	Royal York Street
	(East)	(West)	(East)	(West)	(East)
Mattamy North of Ottawa St	78%	2%	5%	3%	12%
Mattamy South of Ottawa St	78%	0%	15%	5%	2%

Figure 9 and Figure 10 illustrate the assignment of site traffic volumes to the road network for the AM and PM peak hours respectively. The abbreviated term "Neg." indicates that a negligible number of site trips are expected to utilize the turning movement.



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Figure 9 - Site Traffic – AM Peak Hour



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Figure 10 - Site Traffic – PM Peak Hour

3.4 2029 TOTAL FUTURE CONDITIONS

Total future conditions are examined to determine improvements that may be required as a direct result of the development. It is anticipated that by 2029 the residential development will be fully built and occupied. The 2029 total future traffic volumes were derived by adding site generated trips to future background volumes anticipated for 2029.

Figure 11 and Figure 12 illustrate the 2029 total future traffic volumes at the study area intersections during the AM and PM peak hours, respectively. Section 4.3 contains an assessment of 2029 total future traffic conditions.



Future Transportation Environment January 25, 2019

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Figure 11 - 2029 Total Future Traffic Volumes – AM Peak Hour

Future Transportation Environment January 25, 2019

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Figure 12 - 2029 Total Future Traffic Volumes – PM Peak Hour

Future Transportation Environment January 25, 2019

3.5 2034 ULTIMATE CONDITIONS

Ultimate conditions for the 2034 horizon were examined to determine if other improvements may be required due to additional growth in background traffic volumes 5 years beyond the expected build-out of the subject site.

The Laffin Lands were assumed to be developed by the 2034 ultimate horizon. In the absence of a development application for these lands, the number of residential units was approximated using the same unit densities as the subject development. A trip generation was completed using these residential units and the site trips were added to the roadway network as background traffic. In addition, a nominal 2% annual growth rate was applied to the through volumes along Perth Street. This rate of growth is consistent with industry standards and those that were applied in previously prepared / approved studies (i.e. *Richmond Oaks Health Centre Transportation Brief* and *Richmond Village Phase 1 Transportation Impact Study*).

Figure 13 and **Figure 14** illustrate the 2034 ultimate traffic volumes at the study area intersections during the AM and PM peak hours, respectively. **Section 4.4** contains the assessment of 2034 ultimate traffic conditions.

Appendix B contains the assumed background traffic generated by the Laffin Lands.



Future Transportation Environment January 25, 2019

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Figure 13 - 2034 Ultimate Traffic Volumes – AM Peak Hour

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Figure 14 - 2034 Ultimate Traffic Volumes - PM Peak Hour

Transportation Assessment January 25, 2019

4.0 TRANSPORTATION ASSESSMENT

4.1 2018 EXISTING CONDITIONS

Figure 3 (Section 2.1) illustrates the 2018 existing intersection controls and lane configuration at the study area intersections.

4.1.1 Intersection Operational Analysis

An assessment of the study area intersections was undertaken to determine the operational characteristics of these intersections. Stop-controlled intersection operations were analyzed using the Synchro 10.0[™] software package with the Highway Capacity Manual 2010 edition (HCM 2010) methodology.

Table 6 provides a summary of 2018 existing intersection operations. All study area intersections operate acceptably under 2018 existing conditions, and therefore, no improvements are required to supplement existing conditions.

Appendix C contains detailed intersection performance worksheets.

Intersection	Control	А	pproach / Movement	LOS	V/C	Delay (s)	Queue 95th (veh)
		NB	Left / Through / Right	B (C)	0.05 (0.05)	13.0 (15.7)	0.1 (0.1)
		EB	Left / Through / Right	A (A)	0.00 (0.01)	7.8 (8.4)	0.0 (0.0)
Perth Street at Queen Charlotte	Two-Way Stop		Left	A (A)	0.01 (0.01)	8.2 (7.9)	0.0 (0.0)
Street / Rochelle Drive	Control	WB	Through / Right	A (A)	0.00 (0.00)	0.0 (0.0)	0.0 (0.0)
Diive		SB	Left / Through / Right	B (C)	0.07 (0.06)	13.3 (15.6)	0.2 (0.2)
			Overall Intersection	A (A)	-	1.1 (0.8)	-
		EB	Left / Through / Right	A (A)	0.02 (0.03)	7.1 (7.1)	0.1 (0.1)
Ottawa Street	All-Way Stop	WB	Left / Through / Right	A (A)	0.01 (0.02)	6.7 (6.9)	0.0 (0.1)
West at Queen Charlotte Street	Control	SB	Left / Through / Right	A (A)	0.01 (0.01)	6.8 (6.9)	0.0 (0.0)
			Overall Intersection	A (A)	-	6.9 (7.0)	-
Notes: Table format A	M Peak (PM Peak)						

Table 6 - 2018 Existing Intersection Operations

4.2 2029 FUTURE BACKGROUND CONDITIONS

Future background conditions for the 2029 horizon were assessed to determine transportation improvements that may be required to address growth in traffic exclusive from improvements that may be required to accommodate traffic generated by the proposed development.

The background development assumptions and distributions outlined in **Section 3.1** and **Section 3.2** were applied to existing traffic volumes to predict 2029 future background traffic volumes.



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4.2.1 Intersection Operational Analysis

An assessment of the study area intersections was undertaken to determine the operational characteristics of these intersections. Stop-controlled intersection operations were analyzed using the Synchro 10.0[™] software package with the Highway Capacity Manual 2010 edition (HCM 2010) methodology. Roundabout operations were analyzed using the Sidra 7.0 software package with the SIDRA Standard capacity model and SIDRA Roundabout level of service (LOS) method.

 Table 7 summarizes the operational characteristics of the study area intersections under 2029 future background conditions.

The intersection of Perth Street and Meynell Road was assumed to be a single-lane roundabout by the 2026 horizon as per the Village of Richmond's *Transportation Master Plan* and Richmond Village Development Corporation's *Richmond Village Phase 1 Transportation Impact Study* (Stantec, 2017).

The study area intersections are projected to operate acceptably under 2029 future background conditions.

Appendix C contains detailed intersection performance worksheets.

Intersection	Control	Ар	proach / Movement	LOS	V/C	Delay (s)	Queue 95th (veh)
		NB	Left / Through / Right	C (D)	0.08 (0.10)	20.7 (32.7)	0.3 (0.3)
		EB	Left / Through / Right	A (A)	0.00 (0.01)	8.1 (9.8)	0.0 (0.0)
Perth Street at Queen Charlotte	Two-Way Stop		Left	A (A)	0.01 (0.01)	9.4 (8.6)	0.0 (0.0)
Street / Rochelle Drive	Control	WB	Through / Right	A (A)	0.00 (0.00)	0.0 (0.0)	0.0 (0.0)
Dilve		SB	Left / Through / Right	C (D)	0.11 (0.12)	19.8 (30.5)	0.4 (0.4)
		0	verall Intersection	A (A)	-	0.9 (0.8)	-
		NB	Left / Through / Right	A (A)	0.24 (0.14)	7.5 (6.5)	1.4 (0.7)
		WB	Left / Through / Right	A (A)	0.27 (0.59)	4.3 (4.8)	1.5 (4.5)
Perth Street at Meynell Road	Single-lane Roundabout	SB	Left / Through / Right	A (B)	0.15 (0.13)	9.3 (11.5)	0.7 (0.7)
		EB	Left / Through / Right	A (A)	0.40 (0.39)	4.1 (4.9)	2.3 (2.1)
		0	verall Intersection	A (A)	0.40 (0.59)	5.4 (5.4)	2.3 (4.5)
		EB	Left / Through / Right	A (A)	0.02 (0.02)	7.1 (7.1)	0.1 (0.1)
Ottawa Street at	All-Way Stop	WB	Left / Through / Right	A (A)	0.01 (0.02)	6.7 (6.9)	0.0 (0.1)
Queen Charlotte Street	Control	SB	Left / Through / Right	A (A)	0.01 (0.01)	6.8 (6.9)	0.0 (0.0)
		0	verall Intersection	A (A)	-	6.9 (7.0)	-
Notes: Table format A	M Peak (PM Peak)						

Table 7 - 2029 Future Background Intersection Operations



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4.3 2029 TOTAL FUTURE CONDITIONS

Total future conditions are assessed to determine transportation improvements that may be required to accommodate traffic generated by the proposed development. The site trip generation, distribution, and assignment assumptions outlined in **Section 3.3** were added to the 2029 future background traffic volumes to predict total future traffic volumes.

4.3.1 Intersection Operational Analysis

An assessment of the study area intersections was undertaken to determine the operational characteristics of these intersections. Stop-controlled intersection operations were analyzed using the Synchro 10.0[™] software package with the Highway Capacity Manual 2010 edition (HCM 2010) methodology. Roundabout operations were analyzed using the Sidra 7.0 software package with the SIDRA Standard capacity model and SIDRA Roundabout level of service (LOS) method.

Table 8 summarizes the operational characteristics of the study area intersections under 2029 total future conditions.**Figure 15** illustrates the assumed intersection control and lane geometry.

Perth Street at Queen Charlotte Street / Rochelle Drive: the northbound and southbound approaches of the intersection are anticipated to operate with a poor level of service due to high delay experienced at the minor approaches. Given that these are low-volume approaches that are expected to operate below capacity, further mitigation is not recommended.

Perth Street at Meynell Road: as a single-lane roundabout, the westbound approach is anticipated to operate at a v/c ratio of 0.87 during the PM peak hour and the sum of the entry and conflicting circulatory volumes will exceed 1,000 vehicles per hour for all approaches during either the weekday AM or PM peak hour. The National Cooperative Highway Research Program (NCHRP) *Report 672 – Roundabouts: An Informational Guide, Second Edition*, suggests that a two-lane entry may be required when volumes exceed 1,000 vehicles per hour, and that the operation of the roundabout may become unstable when the v/c exceeds 0.85. Furthermore, the mid-block volumes on Perth Street east of Meynell Road exceed 1,000 vehicles per hour in each direction during the weekday peak hours and therefore widening Perth Street to 2-lanes in each direction should be considered.

Given that the Village of Richmond is expanding west, it is logical to extend the existing four-lane Perth Street crosssection westwards to Meynell Road to support the proposed and future developments, and to facilitate the addition of a northbound right-turn channel and a westbound left-turn lane to the single-lane roundabout. Widening Perth Street to four lanes will require modifications to the Perth Street and Queen Charlotte / Rochelle Drive intersection (i.e. conversion of the westbound left-turn lane to a shared westbound left / through lane).

With the above mitigation measures in place, all remaining study area intersections are forecasted to operate acceptably, however, the Perth Street intersection with Queen Charlotte Street / Rochelle Drive is forecasted to continue to operate with high delays along the minor approaches.

Figure 16 illustrates the recommended intersection controls and lane geometry.

Appendix C contains detailed intersection performance worksheets.



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Intersection	Control	A	pproach / Movement	LOS	V/C	Delay (s)	Queue 95th (veh)
		NB	Left / Through / Right	E (F)	0.17 (0.35)	41.6 (128.2)	0.6 (1.2)
		EB	Left / Through / Right	A (B)	0.01 (0.01)	8.6 (12.1)	0.0 (0.0)
			Left	B (A)	0.01 (0.01)	11.1 (9.7)	0.0 (0.0)
		WB	Through / Right	A (A)	0.00 (0.00)	0.0 (0.0)	0.0 (0.0)
Perth Street at		SB	Left / Through / Right	E (F)	0.20 (0.35)	35.7 (96.7)	0.7 (1.2)
Queen Charlotte	Two-Way Stop		Overall Intersection	A (A)	-	1.2 (1.8)	-
Street / Rochelle	Control		Recommended Upgr	ade: Wide	ning Perth Stre	et to Four Lane	s
Drive		NB	Left / Through / Right	E (F)	0.14 (0.21)	35.0 (67.7)	0.5 (0.7)
		EB	Left / Through / Right	A (B)	0.01 (0.01)	8.6 (12.1)	0.0 (0.0)
		WB	Left / Through / Right	B (A)	0.01 (0.01)	11.1 (9.7)	0.0 (0.0)
		SB	Left / Through / Right	E (F)	0.21 (0.36)	37.3 (103.9)	0.8 (1.3)
		(Overall Intersection	A (A)	-	1.1 (1.5)	-
		NB	Left / Through / Right	B (A)	0.67 (0.46)	10.7 (6.6)	6.8 (3.2)
		WB	Left / Through / Right	A (A)	0.38 (0.87)	5.8 (7.0)	2.5 (15.9)
		SB	Left / Through / Right	B (C)	0.17 (0.26)	10.2 (19.0)	0.8 (1.9)
		EB	Left / Through / Right	A (A)	0.46 (0.58)	5.1 (9.9)	2.7 (5.2)
		(Overall Intersection	A (A)	0.67 (0.87)	7.6 (8.0)	6.8 (15.9)
			Recommended Upgrade	: Impleme	nting NBR and	WBL Turning L	anes.
Perth Street at	Single-lane		Left / Through	B (A)	0.05 (0.03)	10.5 (9.7)	0.3 (0.2)
Meynell Road	Roundabout	NB	Right	A (A)	0.27 (0.20)	3.2 (3.2)	0.0 (0.0)
			Through / Right	A (A)	0.16 (0.44)	9.3 (9.4)	0.8 (2.7)
		WB	Left	A (A)	0.21 (0.42)	3.4 (3.5)	1.0 (2.6)
		SB	Left / Through / Right	A (B)	0.17 (0.14)	9.2 (10.3)	0.5 (0.5)
		EB	Left / Through / Right	A (A)	0.51 (0.59)	5.1 (9.6)	2.6 (4.3)
		(Overall Intersection	A (A)	0.51 (0.59)	5.3 (6.7)	2.6 (4.3)
		EB	Left / Through / Right	A (A)	0.07 (0.06)	7.3 (7.3)	0.2 (0.2)
Ottawa Street	All-Way Stop	WB	Left / Through / Right	A (A)	0.03 (0.08)	7.0 (7.3)	0.1 (0.2)
West at Queen	Control	SB	Left / Through / Right	A (A)	0.01 (0.01)	7.0 (7.0)	0.0 (0.0)
Charlotte Street		(Overall Intersection	A (A)	-	7.2 (7.3)	-
		NB	Left / Through / Right	A (A)	0.14 (0.12)	7.9 (8.1)	0.5 (0.4)
Ottawa Street	Ottawa Street	EB	Left / Through / Right	A (A)	0.12 (0.13)	8.1 (8.5)	0.4 (0.4)
West at Meynell	All-Way Stop	WB	Left / Through / Right	A (A)	0.03 (0.09)	7.6 (8.1)	0.1 (0.3)
Road	Control	SB	Left / Through / Right	A (A)	0.10 (0.25)	7.6 (8.6)	0.3 (1.0)
			Overall Intersection	A (A)	-	7.9 (8.4)	-

Table 8 - 2029 Total Future Intersection Operations

Notes: Table format AM Peak (PM Peak)



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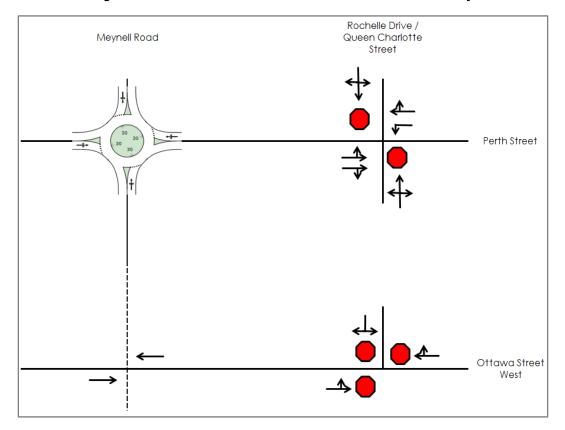
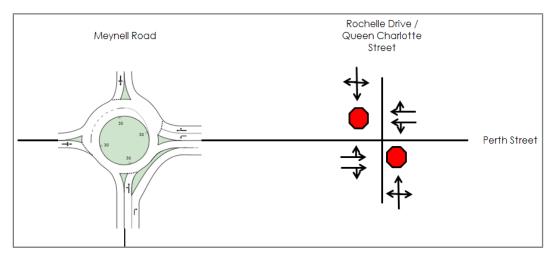


Figure 15 - 2029 Assumed Intersection Control and Lane Geometry

Figure 16 - 2029 Recommended Intersection Control and Lane Geometry Improvements





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4.4 2034 ULTIMATE CONDITIONS

Ultimate conditions for the 2034 horizon were examined to determine if other improvements may be required due to growth in background traffic five years beyond the anticipated build-out horizon of the site.

4.4.1 Intersection Operational Analysis

Table 9 summarizes the operational characteristics of the study area intersections under 2034 ultimate conditions.**Figure 17** illustrates the intersection control and lane requirements for the 2034 total future horizon.

Consistent with the 2029 total future horizon, the northbound and southbound movements at the intersection of Perth Street at Queen Charlotte Street / Rochelle Drive are expected to experience high delays. However, these movements have very low traffic volumes and the movements are operating below capacity, therefore, further mitigation is not recommended. All remaining study area intersections are forecasted to operate acceptably under 2034 conditions.

Appendix C contains detailed intersection operation summaries.



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INTERSECTION		APPI	ROACH / MOVEMENT	LOS	V/C	Delay (s)	Queue 95th (veh)
		NB	Left / Through / Right	E (F)	0.16 (0.24)	38.6 (79.2)	0.5 (0.8)
Perth Street at		EB	Left / Through / Right	A (B)	0.01 (0.01)	8.7 (12.5)	0.0 (0.0)
Queen Charlotte	Two-way stop	WB	Left / Through / Right	B (A)	0.01 (0.01)	11.4 (9.9)	0.0 (0.0)
Street / Rochelle	control	SB	Left / Through / Right	E (F)	0.24 (0.56)	41.9 (158.2)	0.9 (2.1)
Drive		0	verall Intersection	A (A)	-	1.2 (2.4)	-
		NB	Left / Through	B (A)	0.05 (0.03)	10.7 (9.8)	0.3 (0.2)
		IND	Right	A (A)	0.28 (0.21)	3.2 (3.2)	0.0 (0.0)
	Single-lane	WB	Through / Right	A (A)	0.17 (0.46)	9.3 (9.4)	0.8 (2.9)
Perth Street at	roundabout with	VVD	Left	A (A)	0.22 (0.45)	3.4 (3.5)	1.1 (2.9)
Meynell Road	II Road WBL and NBR lanes	SB	Left / Through / Right	A (B)	0.17 (0.14)	9.3 (10.5)	0.5 (0.5)
	lanes	EB	Left / Through / Right	A (B)	0.54 (0.63)	5.4 (10.5)	3.1 (5.2)
		0	verall Intersection	A (A)	0.54 (0.63)	5.4 (6.9)	-
		EB	Left / Through / Right	A (A)	0.07 (0.06)	7.3 (7.3)	0.2 (0.2)
Ottawa Street	All-way stop	WB	Left / Through / Right	A (A)	0.03 (0.08)	7.0 (7.3)	0.1 (0.2)
West at Queen	control	SB	Left / Through / Right	A (A)	0.01 (0.01)	7.0 (7.0)	0.0 (0.0)
Charlotte Street		0	verall Intersection	A (A)	-	7.2 (7.3)	-
		NB	Left / Through / Right	A (A)	0.14 (0.12)	7.9 (8.1)	0.5 (0.4)
Ottawa Street		EB	Left / Through / Right	A (A)	0.13 (0.13)	8.2 (8.5)	0.4 (0.4)
West at Meynell	All-way stop	WB	Left / Through / Right	A (A)	0.03 (0.09)	7.6 (8.1)	0.1 (0.3)
Road	control	SB	Left / Through / Right	A (A)	0.10 (0.25)	7.6 (8.6)	0.3 (1.0)
		0	verall Intersection	A (A)	-	7.9 (8.4)	-

Table 9 - 2034 Ultimate Intersection Operations

Notes: Table format AM Peak (PM Peak)



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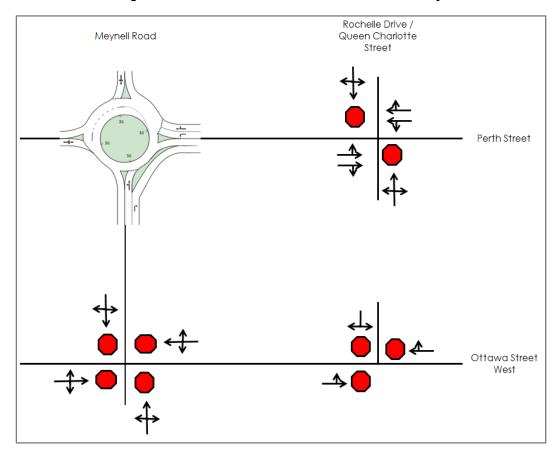


Figure 17 - 2034 Intersection Control and Lane Geometry

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5.0 DRAFT PLAN REVIEW

The objective of the draft plan review is to create an efficient, integrated, and well-designed transportation network that accommodates all modes of travel.

Figure 18 illustrates the proposed transit route through the subject development, including potential transit stop locations. As per Richmond Village Development Corporation's *Richmond Village Phase 1 Transportation Impact Study* (Stantec 2017), there is a proposed northbound transit stop located along Meynell Road just north of the subject Mattamy development. To complement this, a southbound transit stop is proposed on the west side of Meynell Road, at the northernmost limits of the subject development. Two transit stops are proposed (i.e. one northbound and one southbound) along Meynell Road at the school location. Two more transit stops are proposed (i.e. one northbound and one southbound) along Meynell Road just north of Ottawa Street. With the proposed transit stop locations, 95% of the residents will be within a 400m radius of the transit stops.

Figure 19 illustrates the proposed sidewalks, pathway connections, pedestrian crossovers, and locations for curb radii reductions. Sidewalks are recommended on both sides of Meynell Road and Ottawa Street and on one side of several local roads to facilitate walking trips to transit stops, the school, and parks. Two pedestrian crossovers are proposed: one crossing Ottawa Street and one crossing Meynell Street at the park. The curb radii at all intersections along Meynell Road are proposed to be reduced to act as a form of proactive traffic calming and to reduce the crossing distances for pedestrians. The exception to this is at the Meynell Road at Ottawa Street intersection where the curb radii will be dictated by the required turning movements of transit vehicles. The required curb radii will be determined at registration as part of the detailed design of the road.

Figure 20 illustrates the proposed cross-section for Meynell Road which is consistent with the cross-section of Meynell Road through the Richmond Village Development Corporation's development to the north. The 22m cross-section will feature an 8.5m asphalt surface and sidewalks will be provided along both sides. It should be noted that the cross-section of Meynell Road across the frontage of the park and school may differ from what is illustrated in **Figure 20** below. In front of the school and park, parking lay-bys may potentially be included to facilitate parking for both the park and the school. A similar treatment has been implemented along Kilbirnie Drive in Barrhaven South, where Kilbirnie Drive has a ROW width of 22m which includes sidewalks along both sides and parking lay-bys along one side. The detailed cross-section of Meynell Road will be further refined in subsequent TIAs as the development proceeds through to registration.



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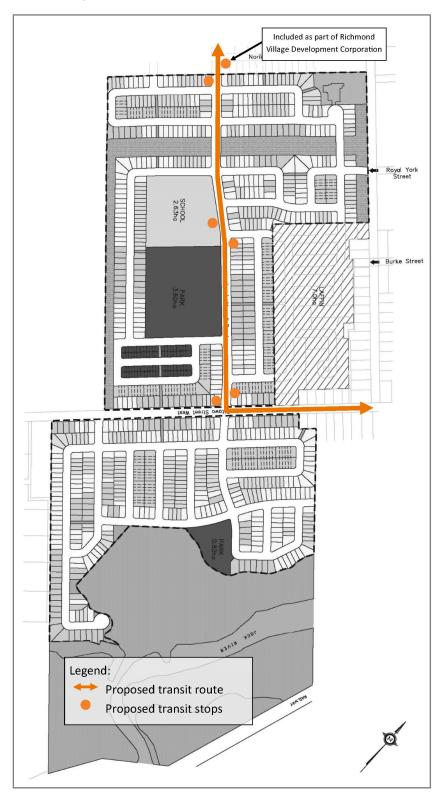
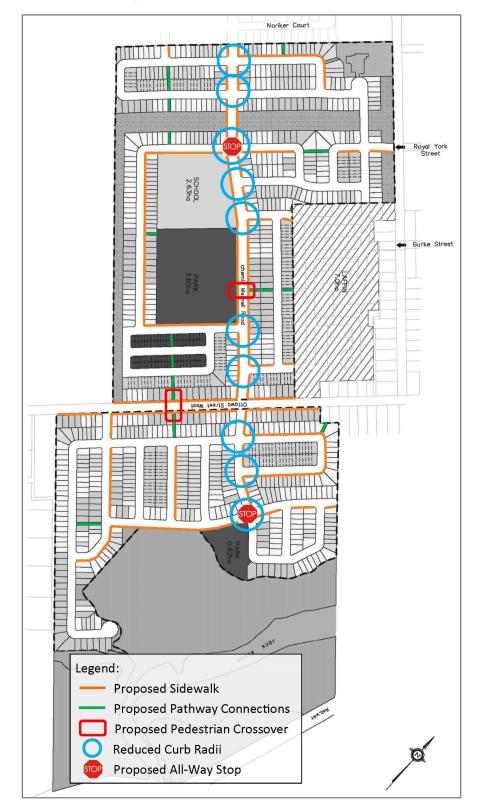


Figure 18 - Proposed Transit Route and Transit Stops

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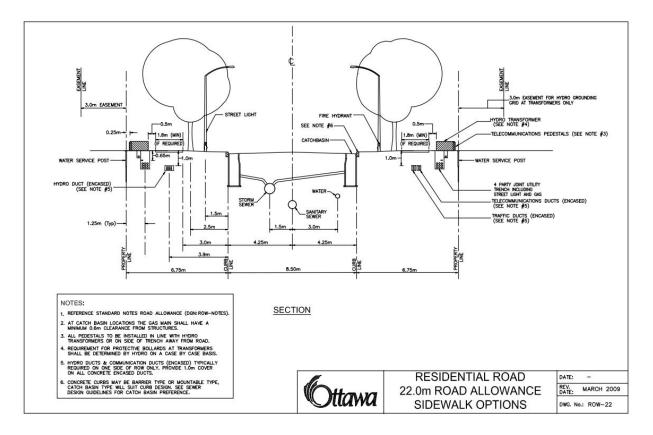


Figure 20 - Proposed Meynell Road Cross-Section - without Parking

Transportation Demand Management January 25, 2019

6.0 TRANSPORTATION DEMAND MANAGEMENT

The City of Ottawa Transportation Demand Management (TDM) supportive design & infrastructure measures checklist was used to identify TDM measures that could be applied to the subject site. The checklist is outlined below.

	TDM-s	supportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	1.	WALKING & CYCLING: ROUTES	
	1.1	Building location & access points	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☐ Not applicable
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	Not applicable
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	Not applicable
	1.2	Facilities for walking & cycling	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	Not applicable
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official <i>Plan policy 4.3.12</i>)	□ Not applicable

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	TDM-s	supportive design & infrastructure measures: Residential developments		Check if completed & descriptions, explanations r plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see Official Plan policy 4.3.10)		Sidewalks will be provided and crosswalks marked at intersections.
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see Official Plan policy 4.3.10)		Gradual grade transition and depressed curbs to be provided at street corners.
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on- road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see Official Plan policy 4.3.11)		Pathways identified on plan.
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops		Walking routes, sidewalks, and pathways identified on plan.
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible		Walking routes will be on streets, sidewalks, or pathways. Lighting will be provided on pathways and may be provided for streets/sidewalks as per City standards.
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility		
	1.3	Amenities for walking & cycling	-	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails		Walking and cycling routes will be on streets, sidewalks or pathways. Lighting will be provided on pathways and may be provided for streets/sidewalks as per City standards.
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)		Not applicable



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	TDM-s	supportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	2.	WALKING & CYCLING: END-OF-TRIP FACILITIES	
	2.1	Bicycle parking	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see Official Plan policy 4.3.6)	Not applicable
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well- used areas (see Zoning By-law Section 111)	Not applicable
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored <i>(see Zoning By-law Section 111)</i>	Not applicable
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	Not applicable
	2.2	Secure bicycle parking	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see Zoning By-law Section 111)	Not applicable
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi- family residential developments	Not applicable
	2.3	Bicycle repair station	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	Not applicable
	3.	TRANSIT	
	3.1	Customer amenities	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ Not applicable
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	Not applicable
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	Not applicable



Transportation Demand Management January 25, 2019

	TDM-s	upportive design & infrastructure measures: Residential developments	Check if completed & add descriptions, explanations or plan/drawing references
	4.	RIDESHARING	
	4.1	Pick-up & drop-off facilities	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	Not applicable
	5.	CARSHARING & BIKESHARING	
	5.1	Carshare parking spaces	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses <i>(see Zoning By-law Section 94)</i>	Not applicable
	5.2	Bikeshare station location	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	Not applicable
	6.	PARKING	
	6.1	Number of parking spaces	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	Not applicable
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	Not applicable
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly <i>(see Zoning By-law</i> <i>Section 104)</i>	Not applicable
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking <i>(see Zoning By-law Section 111)</i>	☐ Not applicable
	6.2	Separate long-term & short-term parking areas	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐ Not applicable

Summary and Conclusions January 25, 2019

7.0 SUMMARY AND CONCLUSIONS

Proposed Development

- Mattamy's proposed residential subdivision in the Village of Richmond (City of Ottawa) is located roughly 600
 m south of Perth Street and west of Queen Charlotte Street and extends south of Ottawa Street towards the
 Jock River. The site is bound by Richmond Village Development Corporation's plan of subdivision to the north,
 existing residential homes to the east, the Jock River to the south, and vacant agricultural lands to the west.
 The proposed development is anticipated to consist of 296 townhome-style dwellings and 805 single family
 dwellings for a total of 1101 residential units.
- The development is anticipated to generate 685 and 946 vehicle trips during the AM and PM peak hours, respectively.

2018 Existing Conditions

• The study area intersections assessed as part of this study currently operate acceptably under 2018 existing conditions.

2029 Future Background Conditions

- By 2029 the intersection of Perth Street and Meynell Road was assumed to be constructed as a single-lane roundabout consistent with the Village of Richmond's *Transportation Master Plan* and Richmond Village Development Corporation's *Richmond Village Phase 1 Transportation Impact Study* (Stantec, 2017)
- The study area intersections are forecasted to operate acceptably under 2029 future background conditions.

2029 Total Future Conditions

- At the intersection of Perth Street at Queen Charlotte Street / Rochelle Drive, the northbound and southbound
 movements are expected to experience poor levels of service due to high delays. However, those movements
 are expected to operate below capacity as they have very low traffic volumes, and therefore, further mitigation
 is not recommended.
- Without additional mitigation, the single-lane roundabout assumed at the intersection of Perth Street and Meynell Road is forecasted to operate above capacity.
- The mid-block volumes on Perth Street east of the Meynell Road are forecasted to exceed the typical arterial lane capacity of 1,000 vehicles per hour during the AM and PM peak hours.
- It is recommended that Perth Street be widened to four lanes between Queen Charlotte Street / Rochelle
 Drive and Meynell Road. In conjunction with this, the Perth Street / Meynell Road roundabout should be
 widened to accommodate two entry lanes on the westbound approach and two departure lanes proceeding
 eastbound from the roundabout. The roundabout would function with a dedicated westbound left-turn lane and
 northbound right-turn lane with the remaining movements operating in a shared lane configuration.



Summary and Conclusions January 25, 2019

• With the above improvements in place all remaining study area intersections are forecasted to operate acceptably under 2029 total future conditions, however, the Perth Street intersection with Queen Charlotte Street / Rochelle Drive is forecasted to continue to operate with high delays along the minor approaches.

2034 Ultimate Conditions

- Similar to the 2029 total future horizon, the northbound and southbound movements at the intersection of Perth Street at Queen Charlotte Street / Rochelle Drive are forecasted to experience poor level of service due to high delays. Given that these movements will have very low volumes and are projected to operate below capacity, further mitigation is not recommended.
- All remaining study area intersections are forecasted to operate acceptably under 2034 ultimate conditions.

Draft Plan Review

- A transit route is proposed through the subject development along Meynell Road and Ottawa Street. Transit
 stops are proposed to be located along Meynell Road at the northernmost edge of the subject development,
 at the proposed school, and just north of Ottawa Street. With these transit stops in place, 95% of the subject
 development will be located within a 400m radius of the transit stops.
- The draft plan includes sidewalks along both sides of Meynell Road and Ottawa Street and along one side of
 several local roads. Two pedestrian crossovers are proposed: one crossing Ottawa Street and one crossing
 Meynell Street at the park. The curb radii at all intersections along Meynell Road are proposed to be reduced
 to act as a form of traffic calming and to reduce the crossing distances for pedestrians. The exception to this
 is at the Meynell Road at Ottawa Street intersection where the curb radii will be dictated by the required turning
 movements of transit vehicles.
- The cross-section of Meynell Road through Mattamy's plan of subdivision is consistent with the cross-section
 of Meynell Road through Richmond Village Development Corporation's development to the north. The crosssection for Meynell Road features wide travel lanes which will facilitate cyclists and motor vehicles operating
 in a shared lane. It should be noted that the cross-section of Meynell Road in front of the school and park may
 differ to accommodate parking via parking lay-bys. The detailed cross-section of Meynell Road will be further
 refined in subsequent TIAs as the development proceeds through to registration.

Transportation Demand Management

With the proposed development being residential in nature, opportunities for Transportation Demand Management (TDM) measures / initiatives are limited. TMD measures / initiatives for the proposed development include:

- Sidewalks along both sides of the proposed north-south collector (Meynell Road), both sides of Ottawa Street, and along several local streets within the plan of subdivision.
- Marked crosswalks at intersections and depressed curbs at street corners.
- Safe (i.e. illuminated), direct, and attractive walking routes to transit stops located along Meynell Road.



Summary and Conclusions January 25, 2019

- Curb radii reductions at specified intersections to act as a preventative form of traffic calming as well as to reduce the pedestrian crossing distances.
- Two pedestrian crossovers are proposed within the subject development: one along Meynell Road and one along Ottawa Street.

Based on the transportation evaluation and improvements recommended in this study, Mattamy's proposed Richmond subdivision residential development should be permitted to proceed.

STANTEC CONSULTING LTD.

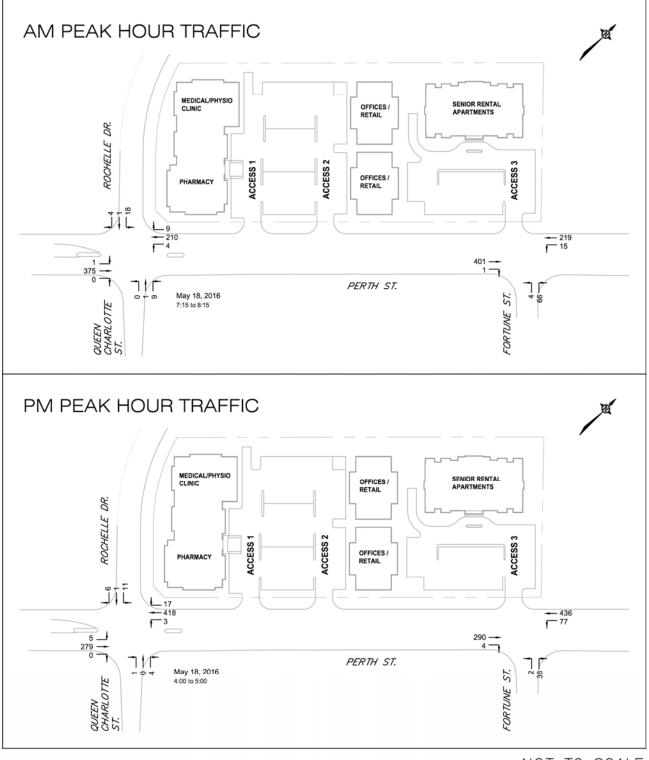
(Original signed and stamped)

Robert Vastag, RPP Project Manager, Senior Transportation Planner Lauren O'Grady, P. Eng. Transportation Engineer



Appendix A TRAFFIC DATA January 25, 2019

Appendix A TRAFFIC DATA



NOT TO SCALE

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Appendix B BACKGROUND DEVELOPMENTS January 25, 2019

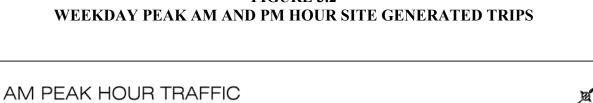
Appendix B BACKGROUND DEVELOPMENTS

Richmond Village Development Corporation Phases 1, 2, 3 Site Generated Traffic Volumes - Weekday AM Peak Hour

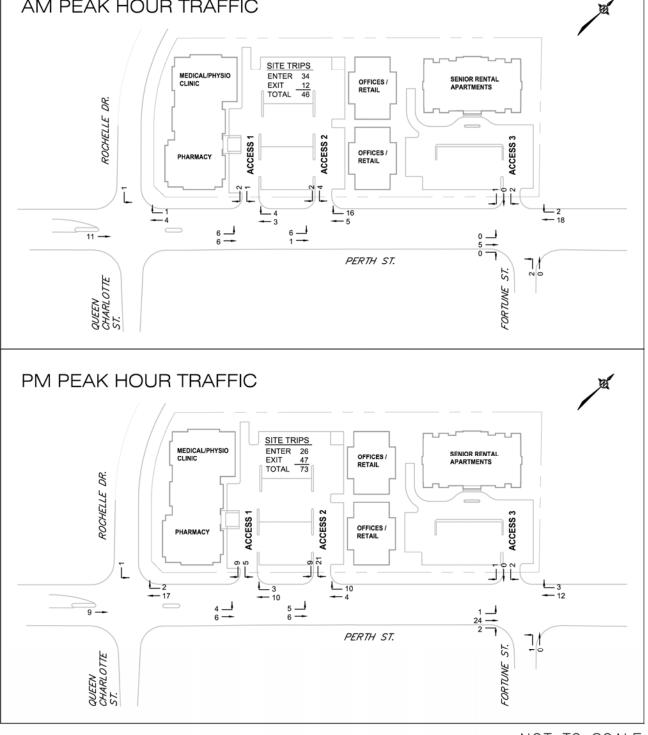
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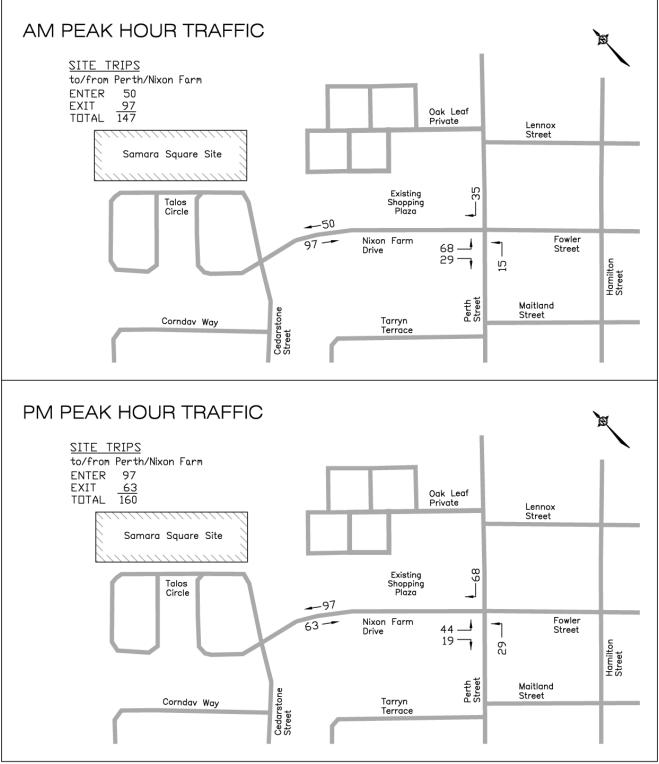
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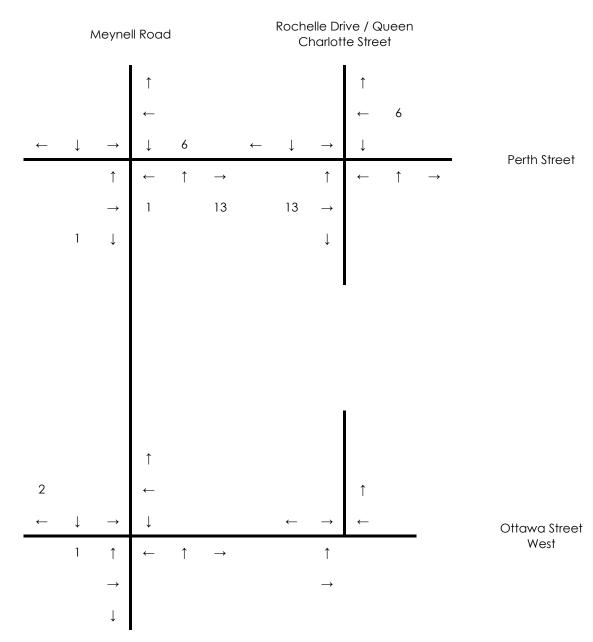




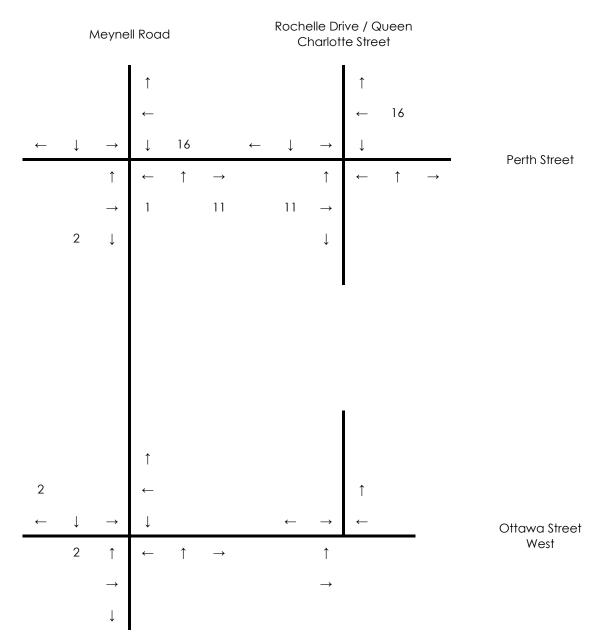
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Laffin Lands Site Generated Traffic Volumes - AM Peak Hour



Laffin Lands Site Generated Traffic Volumes - PM Peak Hour

Appendix C INTERSECTION PERFORMANCE WORKSHEETS January 25, 2019

Appendix C INTERSECTION PERFORMANCE WORKSHEETS

Mattamy Richmond Village 2018 Existing AM

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		đ‡>		3	ĥ			4			4	
Traffic Vol, veh/h	5	390	5	5	220	10	5	5	10	20	5	5
Future Vol. veh/h	5	390	5	5	220	10	5	5	10	20	5	5
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			-	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
Mymt Flow	6	433	6	6	244	11	6	6	11	22	6	6
	0		0	0	244	- 11	0	0		22	0	0
Major/Minor M	Major1		1	Major2		1	Minor1		1	Minor2		
Conflicting Flow All	255	0	0	439	0	0	716	715	220	494	713	250
Stage 1	-	-	-	-	-	-	448	448	-	262	262	-
Stage 2	-		-		-	-	268	267	-	232	451	
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	1309	-	-	1119	-	-	331	355	785	472	356	788
Stage 1		-		-			561	572	-	742	691	-
Stage 2		-		-			737	687	-	751	570	-
Platoon blocked. %												
Mov Cap-1 Maneuver	1309			1119	-	-	322	351	785	456	352	788
Mov Cap-2 Maneuver	-						322	351		456	352	
Stage 1	-				-	-	558	569	-	738	688	
Stage 2							722	684		729	567	
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			13			13.3		
HCM LOS							В			В		
			501	COT	FBR	14/DI	MOT	MOD	001-4			
Minor Lane/Major Mvm	ι I	NBLn1	EBL 1309	EBT	EBK	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)		470		-	-	1119	-	-	466			
HCM Lane V/C Ratio		0.047	0.004	-		0.005	-	-	0.072			
HCM Control Delay (s)		13	7.8	0		8.2	-	-	13.3			
HCM Lane LOS		B	A	A		A	-	-	B			
HCM 95th %tile Q(veh)		0.1	0	-	-	0	-	-	0.2			

2: Ottawa St. W. & Queen Charlotte St	H	CM 201	0 A	WS	С			
	2:	Ottawa	St.	W.	&	Queen	Charlotte	St.

HCM 2010 AWSC

Mattamy Richmond Village 2018 Existing AM

Mattamy Richmond Village

Intersection						
Intersection Delay, s/veh	6.9					
Intersection LOS	A					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		ર્સ	¢Î,		Y	
Traffic Vol, veh/h	5	10	5	5	5	5
Future Vol, veh/h	5	10	5	5	5	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	11	6	6	6	6
Number of Lanes	0	1	1	0	1	0
Approach	EB		WB		SB	
Opposing Approach	WB		FB			
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	7.1		6.7		6.8	
HCM LOS	A		A		A	
Lane		EBLn1	WBLn1	SBLn1		
Vol Left, %		33%	0%	50%		
Vol Thru, %		67%	50%	0%		
Vol Right, %		0%	50%	50%		
Sign Control		Stop	Stop	Stop		
Traffic Vol by Lane		15	10	10		
LT Vol		5	0	5		
Through Vol		10	5	0		
RT Vol		0	5	5		
Lane Flow Rate		17	11	11		
Geometry Grp		1	1	1		
Degree of Util (X)		0.019	0.011	0.012		
Departure Headway (Hd)		4.029	3.666	3.783		
Convergence, Y/N		Yes	Yes	Yes		
Сар		893	980	950		
Service Time		2.034	1.673	1.792		
HCM Lane V/C Ratio		0.019	0.011	0.012		
HCM Control Delay		7.1	6.7	6.8		
HCM Lane LOS		Α	A	Α		
HCM 95th-tile Q		0.1	0	0		

HCM 2010 TW: 1: Queen Charl		St./Ro	chell	e Dr.	& Pe	erth S	t.				IVIa	attarny	y Richmond Village 2018 Existing PN
Intersection													
Int Delay, s/veh	0.8												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		دا له		7	4			\$			\$		
Troffic Vol voh/h	5	200	5	5	425	20	5	5	5	10	5	5	

wovernent	EDL	EDI	EDK	WDL	VVDI	NOK	INDL	INDI	NDK	ODL	ର ଅ ।	JDC	
Lane Configurations		415		1	¢Î			4			4		
Traffic Vol, veh/h	5	290	5	5	435	20	5	5	5	10	5	5	
Future Vol, veh/h	5	290	5	5	435	20	5	5	5	10	5	5	
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		-	-	0					-		-	-	
Veh in Median Storage	e.# -	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	
Mymt Flow	6	322	6	6	483	22	6	6	6	11	6	6	
		_				_		_			_	_	
	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	505	0	0	328	0	0	849	854	164	682	846	494	
Stage 1			-		-		337	337	-	506	506		
Stage 2	-	-		-	-	-	512	517	-	176	340	-	
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	-	-		4.019	3.319		4.019		
Pot Cap-1 Maneuver	1058	-	-	1230	-	-	267	295	852	350	298	574	
Stage 1	-	-	-	-	-	-	652	640	-	548	539	-	
Stage 2	-	-	-	-	-	-	544	533	-	809	639	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1058	-	-	1230	-	-	258	291	852	340	294	574	
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	291	-	340	294	-	
Stage 1	-	-	-	-	-	-	647	636	-	544	536	-	
Stage 2	-	-		-	-	-	531	530	-	791	635		
Approach	FB			WB			NB			SB			
HCM Control Delay, s	0.1			0.1			15.7			15.6			
HCM LOS	0.1			0.1			15.7 C			15.0 C			
LOO							U			U			
Minor Lane/Major Mvn	nt 🔤	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)		354	1058	-	-	1230	-	-	363				
HCM Lane V/C Ratio		0.047	0.005	-		0.005			0.061				
HCM Control Delay (s))	15.7	8.4	0	-	7.9	-	-	15.6				
HCM Lane LOS		С	A	A		A			С				
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.2				

2: Ottawa St. W. & 0	Jueen	Unari	ulle SL				2018 Existing
ntersection							
Intersection Delay, s/veh	7						
Intersection LOS	A						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		¢,	ţ,		Y		
Traffic Vol, veh/h	5	15	15	5	5	5	
Future Vol. veh/h	5	15	15	5	5	5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles, %	2	2	2	2	2	2	
Mymt Flow	6	17	17	6	6	6	
Number of Lanes	0	1	1	Ű	1	0	
Approach	EB		WB		SB		
Opposing Approach	WB		EB				
Opposing Lanes	1		1		0		
Conflicting Approach Left	SB				WB		
Conflicting Lanes Left	1		0		1		
Conflicting Approach Right			SB		EB		
Conflicting Lanes Right	0		1		1		
HCM Control Delay	7.1		6.9		6.9		
HCM LOS	A		А		Α		
Lane			WBLn1	SBLn1			
Vol Left, %		25%	0%	50%			
Vol Thru, %		75%	75%	0%			
Vol Right, %		0%	25%	50%			
Sign Control		Stop	Stop	Stop			
Traffic Vol by Lane		20	20	10			
LT Vol		5	0	5			
Through Vol		15	15	0			
RT Vol		0 22	5	5			
Lane Flow Rate		22	22	11			
Geometry Grp			1				
Degree of Util (X)		0.025	0.024 3.82	0.012			
Departure Headway (Hd)		4.02 Yes	3.82 Yes	3.812 Yes			
Convergence, Y/N Cap		Yes 894	940	940			
Service Time		2.028	1.829	1.829			
HCM Lane V/C Ratio		0.025	0.023	0.012			
HCM Control Delay		7.1	6.9	6.9			
HCM Lane LOS		A 0.1	A	A 0			
HCM 95th-tile Q		U.1	0.1	U			

HCM 2010 TWSC 1: Queen Charlotte St./Rochelle Dr. & Perth St.

Mattamy Richmond Village 2029 Background AM

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		-4î∌		٦	î>			- 4 >				
Traffic Vol, veh/h	5	800	5	5	385	10	5	5	10	20	5	5
Future Vol, veh/h	5	800	5	5	385	10	5	5	10	20	5	5
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	-	-	-	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	800	5	5	385	10	5	5	10	20	5	5
Major/Minor I	Major1	_		Major2	_		Minor1	_		Minor2	_	_
Conflicting Flow All	395	0	0	805	0	0	1218	1218	403	813	1215	390
Stage 1	-			-			813	813	-	400	400	-
Stage 2							405	405		413	815	
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					3.319		4.019	3.319
Pot Cap-1 Maneuver	1162			817			147	180	598	283	181	658
Stage 1	-			-			339	391	-	625	601	-
Stage 2							622	598		588	390	-
Platoon blocked, %							JLL	500		500	500	
Mov Cap-1 Maneuver	1162			817			141	177	598	269	178	658
Mov Cap-2 Maneuver				-			141	177		269	178	
Stage 1	-			-			336	388	-	620	597	
Stage 2				-			608	594		566	387	-
olago 2							000	004		000	001	
Approach	FB			WB			NB			SB		
HCM Control Delay, s	0.1	_	_	0.1	_	_	20.7	_	_	19.8	_	_
HCM LOS	0.1			0.1			20.1 C			13.0 C		
							U			U		
Minor Lane/Major Mvm	d I	NBLn1	EBL	EBT	EBR	WBL	WBT	WRP	SBLn1			_
Capacity (veh/h)		249	1162	-	LDIX -	817	-	-	273			_
HCM Lane V/C Ratio		0.08	0.004	-		0.006			0.11			
HCM Control Delay (s)		20.7	0.004	0		9.4			19.8			
HCM Control Delay (s) HCM Lane LOS		20.7 C	0.1 A	A		9.4 A	-	-	19.0 C			
HCM 95th %tile Q(veh)		0.3	A 0	A		A 0		-	0.4			
I OW SOUL WILL O (VEU		0.3	0			0		-	0.4			

HCM 2	2010 A	WS	С		
2: Otta	wa St	. W.	& Que	een Char	lotte St.

Mattamy Richmond Village 2029 Background AM

Intersection						
Intersection Delay, s/veh	6.9					
Intersection LOS	A					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	4Î		Y	
Traffic Vol. veh/h	5	10	5	5	5	5
Future Vol. veh/h	5	10	5	5	5	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	5	10	5	5	5	5
Number of Lanes	0	1	1	0	1	0
	-					
Approach	EB		WB		SB	
Opposing Approach	WB		EB			
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	7.1		6.7		6.8	
HCM LOS	A		A		A	
Lane		EBLn1	WBLn1	SBLn1		
Vol Left, %		33%	0%	50%		
Vol Thru, %		67%	50%	0%		
Vol Right, %		0%	50%	50%		
Sign Control		Stop	Stop	Stop		
Traffic Vol by Lane		15	10	10		
LT Vol		5	0	5		
Through Vol		10	5	0		
RT Vol		0	5	5		
I ane Flow Rate		15	10	10		
Geometry Grp		1	1	1		
Degree of Util (X)		0.017	0.01	0.01		
Departure Headway (Hd)		4.026	3.663	3,777		
Convergence, Y/N		Yes	Yes	Yes		
Cap		894	982	951		
Service Time		2.029	1.668	1.787		
HCM Lane V/C Ratio		0.017	0.01	0.011		
HCM Control Delay		7.1	6.7	6.8		
HCM Lane LOS		7.1 A	0.7 A	0.0 A		
HCM Lane LOS HCM 95th-tile Q		0.1	A 0	A 0		
ILON SOLU-LINE C		U.1	0	U		

HCM 2010 TWSC	Western Development Lands
1: Queen Charlotte St./Rochelle Dr. & Perth St.	2029 Background PM

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		41>		3	4			4			4	
Traffic Vol. veh/h	5	565	5	5	880	20	5	5	5	10	5	5
Future Vol. veh/h	5	565	5	5	880	20	5	5	5	10	5	5
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			-	0		-			-			-
Veh in Median Storage	e.# -	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	565	5	5	880	20	5	5	5	10	5	5
Maior/Minor	Maior1			Major2			Minor1		1	Minor2		
Conflicting Flow All	900	0	0	570	0	0	1483	1488	285	1195	1480	890
Stage 1			-	-		-	578	578		900	900	-
Stage 2							905	910		295	580	
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	753		-	1000		-	95	124	713	152	125	341
Stage 1				-		-	469	500	-	332	356	-
Stage 2			-	-		-	330	353	-	690	499	-
Platoon blocked, %												
Mov Cap-1 Maneuver	753	-	-	1000	-	-	90	122	713	145	123	341
Mov Cap-2 Maneuver	-				-	-	90	122	-	145	123	-
Stage 1	-	-	-	-	-	-	464	495	-	329	354	-
Stage 2	-	-	-	-	-	-	319	351	-	671	494	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			32.7			30.5		
HCM LOS							D			D		
Minor Lane/Major Mvn	nt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)		145	753			1000		-	161			
HCM Lane V/C Ratio			0.007			0.005			0.124			
HCM Control Delay (s)	1	32.7	9.8	0		8.6			30.5			
HCM Lane LOS	/	J2.7	3.0 A	A		0.0 A			00.0 D			
HCM 95th %tile Q(veh	0	0.3	0			0			0.4			
Nom Sour Mile Q(Veri	7	0.5	0			0			0.4			

HCM 2010 AWSC 2: Ottawa St. W. & 0	Queen	Western Development Lan 2029 Background					
Intersection							
Intersection Delay, s/veh	7						
Intersection LOS	A						
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		र्भ	ĥ		Y		
Traffic Vol, veh/h	5	15	15	5	5	5	
Future Vol, veh/h	5	15	15	5	5	5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Heavy Vehicles, %	2	2	2	2	2	2	
Mvmt Flow	5	15	15	5	5	5	
Number of Lanes	0	1	1	0	1	0	
Approach	EB		WB		SB		
Opposing Approach	WB		EB		•		
Opposing Lanes	1		1		0		
Conflicting Approach Left	SB				WB		
Conflicting Lanes Left	1		0		1		
Conflicting Approach Right			SB		EB		
Conflicting Lanes Right	0		1		1		
HCM Control Delay	7.1		6.9		6.9		
HCM LOS	A		A		A		
Lane		EBLn1	WBLn1	SBLn1			
Vol Left. %		25%	0%	50%			
Vol Ebru, %		75%	75%	0%			
Vol Right, %		0%	25%	50%			
Sign Control		Stop	Stop	Stop			
Traffic Vol by Lane		20	20	10			
LT Vol		5	0	5			
Through Vol		15	15	0			
RT Vol		0	5	5			
Lane Flow Rate		20	20	10			
Geometry Grp		1	1	1			
Degree of Util (X)		0.022	0.021	0.011			
Departure Headway (Hd)		4.017	3.817	3.804			
Convergence, Y/N		Yes	Yes	Yes			
Сар		895	942	943			
Service Time		2.023	1.824	1.818			
HCM Lane V/C Ratio		0.022	0.021	0.011			
HCM Control Delay		7.1	6.9	6.9			
HCM Lane LOS		A	A	A			
HCM 95th-tile Q		0.1	0.1	0			

LANE SUMMARY

Ø Site: 101 [2029 FB AM]

Perth Street and Meynell Road Roundabout

Lane Use a			ICE									~	
	Demand F			Deg.		Average		95% Back of					Prob.
	veh/h	%	veh/h	v/c	%	Sec			m		m	%	%
South: Meyr													
Lane 1 ^d	225	2.0	924	0.243	100	7.5	LOS A	1.4	9.7	Full	500	0.0	0.0
Approach	225	2.0		0.243		7.5	LOS A	1.4	9.7				
East: Perth	Street												
Lane 1 ^d	395	2.0	1469	0.269	100	4.3	LOS A	1.5	10.4	Full	500	0.0	0.0
Approach	395	2.0		0.269		4.3	LOS A	1.5	10.4				
North: Meyn	ell Road												
Lane 1 ^d	165	2.0	1107	0.149	100	9.3	LOS A	0.7	4.9	Full	500	0.0	0.0
Approach	165	2.0		0.149		9.3	LOS A	0.7	4.9				
West: Perth	Street												
Lane 1 ^d	520	2.0	1291	0.403	100	4.1	LOS A	2.3	16.5	Full	500	0.0	0.0
Approach	520	2.0		0.403		4.1	LOS A	2.3	16.5				
Intersection	1305	2.0		0.403		5.4	LOS A	2.3	16.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Site Level of SerVice (LCS) Method: SubJRA Roundabout LCS), site LCS wention is specified in the Parameter Setungs dial Roundabout LCS whites are based on average delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay delay for all lanes (v/c not used as specified in HCM 2010). Roundabout Capacity Model: ISUPAS Standard. SiDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity: SIGNAS Standard (Arcellik M3D). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

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MOVEMENT SUMMARY

V Site: 101 [2029 FB AM]

Perth Street and Meynell Road Roundabout

Mov	OD	Demand		Deg.		Level of	95% Back		Prop.	Effective	
0 11		veh/h	%	v/c	sec		veh	m		per veh	km/
	Meynell F				10.0						
1	L2	45	2.0	0.243	12.0	LOS B	1.4	9.7	0.63	0.73	54.
2	T1	5	2.0	0.243	6.1	LOS A	1.4	9.7	0.63	0.73	54.
3	R2	175	2.0	0.243	6.4	LOS A	1.4	9.7	0.63	0.73	53.
Appro	ach	225	2.0	0.243	7.5	LOS A	1.4	9.7	0.63	0.73	53.
East: F	Perth Stree	et									
4	L2	60	2.0	0.269	9.3	LOS A	1.5	10.4	0.20	0.41	57.
5	T1	295	2.0	0.269	3.3	LOS A	1.5	10.4	0.20	0.41	56.
6	R2	40	2.0	0.269	3.7	LOS A	1.5	10.4	0.20	0.41	55
Appro	ach	395	2.0	0.269	4.3	LOS A	1.5	10.4	0.20	0.41	56
North:	Meynell R	load									
7	L2	130	2.0	0.149	10.5	LOS B	0.7	4.9	0.44	0.67	53
8	T1	5	2.0	0.149	4.6	LOS A	0.7	4.9	0.44	0.67	53
9	R2	30	2.0	0.149	4.9	LOS A	0.7	4.9	0.44	0.67	51.
Appro	ach	165	2.0	0.149	9.3	LOS A	0.7	4.9	0.44	0.67	53
West:	Perth Stre	et									
10	L2	10	2.0	0.403	9.9	LOS A	2.3	16.5	0.39	0.44	56
11	T1	495	2.0	0.403	4.0	LOS A	2.3	16.5	0.39	0.44	56
12	R2	15	2.0	0.403	4.3	LOS A	2.3	16.5	0.39	0.44	54
Appro	ach	520	2.0	0.403	4.1	LOS A	2.3	16.5	0.39	0.44	56
All Vel	hielee	1305	2.0	0.403	5.4	LOSA	2.3	16.5	0.38	0.51	55

Site Level of Service (LOS) Method: Delay & vic (HCM 2010). 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 and vic ratio (degree of saturation) per movement. LOS F will result Vic> 1 irrespective of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (vic not used as specified in HCM 2010). Roundabout Capacity Mode: SiDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SiDRA Standard (Acguit MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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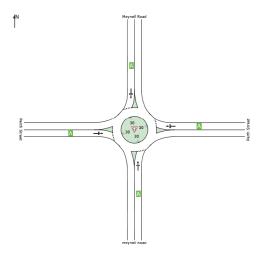
LANE LEVEL OF SERVICE

Lane Level of Service

V Site: 101 [2029 FB AM] Perth Street and Meynell Road Roundabout

All Movement Classes

South East North West Intersection LOS A A A A



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay or all lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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LANE SUMMARY

Site: 101 [2029 FB PM]

Perth Street and	Meynell Road
Roundabout	

1	emand F	lows		Dea.	Lane	Average	Level of	95% Back of	Queue	Lane	Lane	Cap.	Prob.
				Satn		Delay							
South: Meyne	ell Road												
Lane 1 ^d	145	2.0	1011	0.143	100	6.5	LOS A	0.7	5.1	Full	500	0.0	0.0
Approach	145	2.0		0.143		6.5	LOS A	0.7	5.1				
East: Perth S	treet												
Lane 1 ^d	890	2.0	1515	0.587	100	4.8	LOS A	4.5	32.2	Full	500	0.0	0.0
Approach	890	2.0		0.587		4.8	LOS A	4.5	32.2				
North: Meyne	II Road												
Lane 1 ^d	105	2.0	824	0.127	100	11.5	LOS B	0.7	5.0	Full	500	0.0	0.0
Approach	105	2.0		0.127		11.5	LOS B	0.7	5.0				
West: Perth S	Street												
Lane 1 ^d	465	2.0	1209	0.385	100	4.9	LOS A	2.1	15.0	Full	500	0.0	0.0
Approach	465	2.0		0.385		4.9	LOS A	2.1	15.0				
Intersection	1605	2.0		0.587		5.4	LOSA	4.5	32.2				

Sile Level of Service (LOS) Method: Delay & vic (HCM 2010). Sile LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS Values are based on average delay and vic ratio (degree of saturation) per lane. LOS F will result if vic > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all lanes (vic not used as specified in HCM 2010). Roundabout Capacity Model: SIDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptane Capacity. SIDRA Standard. Gap-Acceptane Capacity. SIDRA Standard (Acquire MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

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MOVEMENT SUMMARY

Ø Site: 101 [2029 FB PM]

Perth Street and Meynell Road Roundabout

Move	ement Pe	formance -	Vehicle	s							
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back Vehicles		Prop. Queued	Effective Stop Rate	Average Speed
South	: Mevnell F		70	v/c	Sec	_	veh	m	_	per veh	km/ř
1	L2	30	2.0	0.143	11.0	LOS B	0.7	5.1	0.53	0.64	55.5
2	T1	5	2.0	0.143	5.1	LOSA	0.7	5.1	0.53	0.64	55.2
3	R2	110	2.0	0.143	5.4	LOSA	0.7	5.1	0.53	0.64	53.
Appro		145	2.0	0.143	6.5	LOS A	0.7	5.1	0.53	0.64	54.0
East:	Perth Stree	ət									
4	L2	190	2.0	0.587	9.5	LOS A	4.5	32.2	0.29	0.45	56.
5	T1	565	2.0	0.587	3.5	LOS A	4.5	32.2	0.29	0.45	56.
6	R2	135	2.0	0.587	3.8	LOS A	4.5	32.2	0.29	0.45	54.
Appro	ach	890	2.0	0.587	4.8	LOS A	4.5	32.2	0.29	0.45	55.
North:	Meynell F	load									
7	L2	80	2.0	0.127	12.8	LOS B	0.7	5.0	0.67	0.77	52.
8	T1	5	2.0	0.127	6.9	LOS A	0.7	5.0	0.67	0.77	51.
9	R2	20	2.0	0.127	7.2	LOS A	0.7	5.0	0.67	0.77	50.
Appro	ach	105	2.0	0.127	11.5	LOS B	0.7	5.0	0.67	0.77	51.
West:	Perth Stre	et									
10	L2	35	2.0	0.385	10.3	LOS B	2.1	15.0	0.45	0.50	56.
11	T1	385	2.0	0.385	4.4	LOS A	2.1	15.0	0.45	0.50	55.
12	R2	45	2.0	0.385	4.7	LOS A	2.1	15.0	0.45	0.50	54.3
Appro	ach	465	2.0	0.385	4.9	LOS A	2.1	15.0	0.45	0.50	55.
All Ve	hicles	1605	2.0	0.587	5.4	LOS A	4.5	32.2	0.38	0.50	55.

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDPA Roundabout LOS. Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result v/o > 1 imsgechieve of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010). Roundabout Capacity Mode: SIDPA Standard. SIDPA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptane Capachy. SIDPA Standard (Acquilt MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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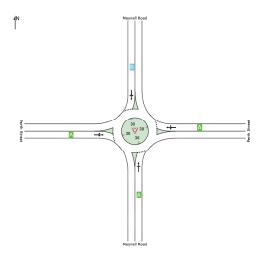
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2029 FB PM] Perth Street and Meynell Road Roundabout

All Movement Classes





Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for al lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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Mattamy Richmond Village 2029 Total AM

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		41»		۲	¢,			4			4	
Traffic Vol. veh/h	5	1165	5	5	550	10	5	5	10	20	5	5
Future Vol. veh/h	5	1165	5	5	550	10	5	5	10	20	5	5
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				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
Mymt Flow	5	1165	5	5	550	10	5	5	10	20	5	5
Major/Minor I	Major1		1	Major2		1	Minor1			Minor2		
Conflicting Flow All	560	0	0	1170	0	0	1748	1748	585	1160	1745	555
Stage 1		-		-		-	1178	1178		565	565	-
Stage 2						-	570	570		595	1180	
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	1009		-	595	-	-	61	86	455	161	86	530
Stage 1	-			-	-	-	203	264	-	509	507	
Stage 2	-		-		-	-	506	504	-	459	263	
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1009	-	-	595	-	-	57	84	455	148	84	530
Mov Cap-2 Maneuver	-				-		57	84	-	148	84	
Stage 1	-	-	-	-	-	-	200	260	-	502	503	-
Stage 2	-		-		-	-	492	500	-	434	259	
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			41.6			35.7		
HCM LOS							E			E		
Minor Lane/Major Mvm	nt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	_	_	_
Capacity (veh/h)		118	1009	-	-	595		-	147			-
HCM Lane V/C Ratio		0.169	0.005			0.008			0.204			
HCM Control Delay (s)		41.6	8.6	0.1		11.1			35.7			
HCM Lane LOS		E	A	A		B			E			
HCM 95th %tile Q(veh))	0.6	0	-		0			0.7			
	,											

Intersection						
Intersection Delay, s/veh	7.2					
Intersection LOS	А					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		ર્સ	¢Î,		¥	
Traffic Vol, veh/h	5	55	20	5	5	5
Future Vol. veh/h	5	55	20	5	5	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	55	20	5	5	5
Number of Lanes	0	1	1	0	1	0
Approach	EB		WB		SB	
Opposing Approach	WB		FB		00	
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	7.3		7		7	
HCM LOS	A		Á		A	
			~			
Lane		EBI n1	WBLn1	SBLn1		
Vol Left, %		8%	0%	50%		
Vol Thru, %		92%	80%	0%		
Vol Right, %		92%	20%	50%		
Sign Control		Stop	Stop	Stop		
Traffic Vol by Lane		5top 60	25	5top 10		
LT Vol		5	23	5		
Through Vol		55	20	0		
RT Vol		0	20	5		
Lane Flow Rate		60	25	10		
Geometry Grp		1	1	1		
Degree of Util (X)		0.066	0.027	0.011		
Departure Headway (Hd)		3.987	3.876	3.879		
Convergence, Y/N		Yes	Yes	Yes		
Cap		902	926	920		
Service Time		1.995	1.891	1.914		
HCM Lane V/C Ratio		0.067	0.027	0.011		
HCM Control Delay		7.3	7	7		
HCM Lane LOS		A	A	A		
HCM 95th-tile Q		0.2	0.1	0		
		0.2	0.1	•		

3: Meynell Rd. &	Ollav	va	JL. VV											29 Total A
Intersection														
Intersection Delay, s/veh	7.9													
Intersection LOS	А													
Movement	EBL E	BT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		4			\$			\$			4			
Traffic Vol, veh/h	65	25	5	10	5	5	5	95	15	15	40	35		
Future Vol, veh/h	65	25	5	10	5	5	5	95	15	15	40	35		
Peak Hour Factor	1.00 1	00.1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2		
Mvmt Flow	65	25	5	10	5	5	5	95	15	15	40	35		
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0		
Approach	EB			WB			NB			SB				
Opposing Approach	WB			EB			SB			NB				
Opposing Lanes	1			1			1			1				
Conflicting Approach Lef	t SB			NB			EB			WB				
Conflicting Lanes Left	1			1			1			1				
Conflicting Approach Rig	hNB			SB			WB			EB				
Conflicting Lanes Right	1			1			1			1				
HCM Control Delay	8.1			7.6			7.9			7.6				
HCM LOS	А			A			Α			Α				
	ND		-DI - 41		001-4									
Lane	NB	4%	EBLn1V 68%	50%	17%									
Vol Left, %				25%	44%									
Vol Thru, %		33%												
Vol Right, %		3%	5%	25%	39%									
Sign Control		Stop 115	Stop 95	Stop 20	Stop 90									
Traffic Vol by Lane LT Vol		5	95	20	90									
Through Vol		95	25	5	40									
RT Vol		95	20	5	35									
l ane Flow Rate		115	95	20	90									
Geometry Grp		1	95	20	90									
Degree of Util (X)	0		0.119											
Departure Headway (Hd)		237		4.441										
Convergence, Y/N		Yes	Yes	Yes	Yes									
Cap		851	798	809	872									
Service Time		237		2.454										
HCM Lane V/C Ratio			0.119											
HCM Control Delay	0.	7.9	8.1	7.6	7.6									
HCM Lane LOS		7.5 A	0.1 A	7.0 A	7.0 A									
HCM 95th-tile Q		0.5	0.4	0.1	0.3									

HCM 2010 TWSC	Mattamy Richmond Village
1: Queen Charlotte St./Rochelle Dr. & Perth St.	2029 Total PM

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		đ þ		۱. ۲	1			4			4	
Traffic Vol. veh/h	5	865	5	5	1320	20	5	5	5	10	5	5
Future Vol. veh/h	5	865	5	5	1320	20	5	5	5	10	5	5
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			-	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
Mymt Flow	5	865	5	5	1320	20	5	5	5	10	5	5
WWITCHIOW	5	000	0	5	1020	20	0	5	5	10	0	5
Major/Minor	Major1			Major2		1	Minor1			Minor2		
Conflicting Flow All	1340	0	0	870	0	0	2223	2228	435	1785	2220	1330
Stage 1		-	-	-	-	-	878	878		1340	1340	-
Stage 2							1345	1350		445	880	
Critical Hdwy	4.13			4.13			7.33	6.53	6.93	7.33	6.53	6.23
Critical Hdwy Stg 1	4.13			4.15			6.53	5.53	0.30	6.13	5.53	0.20
Critical Hdwy Stg 2							6.13	5.53		6.53	5.53	
Follow-up Hdwy	2.219			2.219				4.019	3 3 10	3.519		3.319
Pot Cap-1 Maneuver	512			773	-	-	27	43	570	57	43	188
Stage 1	012			115			310	365		187	220	-
Stage 2							186	218		563	364	
Platoon blocked. %							100	210		303	304	
Mov Cap-1 Maneuver	512			773			23	42	570	50	42	188
Mov Cap-1 Maneuver	312			113			23	42	510	50	42	100
Stage 1							304	358		183	219	
Stage 2							176	217		540	357	
Staye 2							170	217		540	357	
Approach	FB			WB			NB			SB		
HCM Control Delay, s	0.2		_	0			128.2			96.7	_	_
HCM LOS	0.2			Ŭ			F			F		
TIOM EOO												
Minor Lane/Major Mvn	nt I	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)		43	512	-		773			58			
HCM Lane V/C Ratio		0.349	0.01			0.006			0.345			
HCM Control Delay (s)		128.2	12.1	0.1		9.7			96.7			
HCM Lane LOS		F	B	A	-	3.7 A	-		50.7 F			
HCM 95th %tile Q(veh)	1.2	0	-		0			1.2			
nom oour mile a(ven	/	1.4	0			0			1.2			

HCM 2010 AWSC 2: Ottawa St. W. & Queen Charlotte St.

Mattamy Richmond Village 2029 Total PM

Intersection						
Intersection Delay, s/veh	7.3					
Intersection LOS	A					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	LDL	<u>୍</u> ୟ	12	TIDIN	M	ODIN
Traffic Vol. veh/h	5	50	65	5	5	5
Future Vol, veh/h	5	50	65	5	5	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	5	50	65	5	5	5
Number of Lanes	0	30	1	0	1	0
	-	1		U		U
Approach	EB		WB		SB	
Opposing Approach	WB		EB			
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	7.3		7.3		7	
HCM LOS	A		A		А	
Lane		FBI n1	WBLn1	SBLn1	_	_
Vol Left. %		9%	0%	50%		
Vol Thru, %		91%	93%	0%		
Vol Right, %		0%	7%	50%		
Sian Control		Stop	Stop	Stop		
Traffic Vol by Lane		5top 55	5top 70	5top 10		
LT Vol		5	/0	5		
Through Vol		50	65	5		
RT Vol		0	5	5		
Lane Flow Rate		55	5 70	5 10		
Geometry Grp		55 1	1	10		
		0.061	0.077	0.011		
Degree of Util (X)		4.022	3.95	3.948		
Departure Headway (Hd)				3.948 Yes		
Convergence, Y/N		Yes 892	Yes 909			
Cap				900		
Service Time HCM Lane V/C Ratio		2.038	1.964	2		
		0.062	0.077	0.011		
		7.0	7.0			
HCM Control Delay		7.3	7.3	7		
HCM Lane V/C Ratio HCM Control Delay HCM Lane LOS HCM 95th-tile Q		7.3 A 0.2	7.3 A 0.2	7 A 0		

HCM 2010 AWSC 3: Meynell Rd. & Ottawa St. W.

Mattamy Richmond Village 2029 Total PM

Intersection Intersection Delay, s/veh	0.4													
Intersection Delay, s/ver	A A													
Intersection LOS	A													
Movement	EBL EB		WBL		WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations				4			4			4				
Traffic Vol, veh/h	60 3			30	15	5	75	15	10	120	85			
Future Vol, veh/h	60 3				15	5	75	15	10	120	85			
Peak Hour Factor	1.00 1.0				1.00		1.00	1.00	1.00	1.00	1.00			
Heavy Vehicles, %		2 2			2	2	2	2	2	2	2			
Mvmt Flow	60 3				15	5	75	15	10	120	85			
Number of Lanes	0	1 0	0	1	0	0	1	0	0	1	0			
Approach	EB		WB			NB			SB					
Opposing Approach	WB		EB			SB			NB					
Opposing Lanes	1		1			1			1					
Conflicting Approach Le	ft SB		NB			EB			WB					
Conflicting Lanes Left	1		1			1			1					
Conflicting Approach Rig	βhΝB		SB			WB			EB					
			1			1			1					
	1													
	8.5		8.1			8.1			8.6					
HCM Control Delay HCM LOS	8.5 A		8.1 A											
HCM Control Delay HCM LOS Lane	8.5 A NBLn	1 EBLn1	8.1 A WBLn1	SBLn1		8.1			8.6					
HCM Control Delay HCM LOS Lane Vol Left, %	8.5 A NBLn 5	63%	8.1 A WBLn1 31%	SBLn1 5%	_	8.1	_	_	8.6	_	_			
HCM Control Delay HCM LOS Lane Vol Left, % Vol Thru, %	8.5 A NBLn 5 ⁶ 79 ⁶	63% 32%	8.1 A WBLn1 31% 46%	SBLn1 5% 56%		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Left, % Vol Thru, % Vol Right, %	8.5 A NBLn 5 ⁶ 79 ⁶ 16 ⁶	63% 32% 5%	8.1 A WBLn1 31% 46% 23%	SBLn1 5% 56% 40%		8.1	_		8.6	_			_	
HCM Control Delay HCM LOS Vol Left, % Vol Teft, % Vol Right, % Sign Control	8.5 A NBLn 5° 79° 16° Sto	63% 32% 5% Stop	8.1 A WBLn1 31% 46% 23% Stop	SBLn1 5% 56% 40% Stop		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane	8.5 A NBLn 5° 79° 16° Sto 9	63% 32% 5% Stop 5 95	8.1 A 31% 46% 23% Stop 65	SBLn1 5% 56% 40% Stop 215		8.1			8.6	_				
HCM Control Delay HCM LOS Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol	8.5 A NBLn 5° 79° 16° Sto 9	63% 32% 5% 580 595 500	8.1 A WBLn1 31% 46% 23% Stop 65 20	SBLn1 5% 56% 40% Stop 215 10		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol Through Vol	8.5 A NBLn 5 ⁶ 79 ⁶ 16 ⁶ Sta 9	63% 32% 5% 580 595 500 500 530	8.1 A WBLn1 31% 46% 23% Stop 65 20 30	SBLn1 5% 56% 40% Stop 215 10 120		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol Through Vol RT Vol	8.5 A NBLn 5 ⁶ 79 ⁶ 16 ⁶ Sto 9	63% 32% 5% 550 595 560 530 555 5	8.1 A 31% 46% 23% Stop 65 20 30 15	SBLn1 5% 56% 40% Stop 215 10 120 85		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane ET Vol Through Vol RT Vol Lane Flow Rate	8.5 A NBLn 5' 79' 16' Sto 9 7 7 1 1 9	63% 32% 5% 550 595 560 530 555	8.1 A 31% 46% 23% Stop 65 20 30 15 65	SBLn1 5% 56% 40% Stop 215 10 120 85 215		8.1			8.6					
HCM Control Delay HCM LOS Lane Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol Through Vol RT Vol Lane Flow Rate Geometry Grp Degree of Ubi (X)	8.5 A NBLn 5 ⁵ 79 ⁴ 16 ⁴ Sto 9 7 1 9 0.11	63% 32% 5% 5% 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	8.1 A 31% 46% 23% Stop 65 20 30 15 65 20 30 15 65 1 0.084	SBLn1 5% 56% 40% Stop 215 10 120 85 215 1 0.251		8.1			8.6					
HCM Control Delay HCM LOS Lane Vol Left, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol Through Vol RT Vol Lane Flow Rate Geometry Grp Degree of Ubi (X)	8.5 A NBLn 5 ⁵ 79 ⁴ 16 ⁴ Sto 9 7 1 9 0.11	63% 32% 5% 5595 595 560 530 530 5555 595 1	8.1 A 31% 46% 23% Stop 65 20 30 15 65 20 30 15 65 1 0.084	SBLn1 5% 56% 40% Stop 215 10 120 85 215 1 0.251		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Thru, % Vol Thru, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol Through Vol RT Vol Lane Flow Rate Geometry Grp Degreed / Uh (X) Departure Headway (N	8.5 A NBLn 5 ⁴ 79 ⁴ 16 ⁶ Sta 9 7 1 9 7 1 9 0.11) 4.46 Υτε	6 63% 6 32% 6 5% 5 95 5 95 5 60 5 30 5 5 5 95 1 1 3 0.126 6 4.789 s Yes	8.1 A 31% 46% 23% Stop 65 20 30 15 65 20 30 15 65 1 0.084 4.657 Yes	SBLn1 5% 56% 40% Stop 215 10 215 10 85 215 1 0.251 4.201 Yes		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Right, % Vol Right, % Sign Control Traffic Vol by Lane LT Vol Traffic Vol by Lane LT Vol Traffic Vol by Lane LT Vol Traffic Vol by Lane LT Vol Traffic Vol by Lane Lane Flow Rate Geometry Gro Degree of Ulil (X) Degree of Ulil (X) Degreture Hedway (Hd Convergence, YN Cap	8.5 A NBLn 55 794 164 Stot 9 9 7 1 9 9 0.11 9 9 0.11) 0.446 Yee 80	6 63% 6 32% 6 5% 5 955 5 955 5 955 5 955 1 1 3 0.126 6 4.789 s Yes 4 749	8.1 A 31% 46% 23% Stop 65 20 300 15 65 20 300 15 65 1 0.084 4.657 Yes 769	SBLn1 5% 56% 40% Stop 215 10 120 85 215 1 0.251 4.201 Yes 856		8.1			8.6					
HCM Control Delay HCM LOS Vol Eft, % Vol Thru, % Vol Thru, % Sign Control Traffic Vol by Lane I Trolog Vol Traffic Vol by Lane I Through Vol Through Vol Through Vol Geometry Gro Degree of Util (X) Departure Headway (Hd Convergence, VN Cap Service Time	8.5 A NBLn 5' 79' 16' Sto 9 7 7 1 9 0.11) 4.46 Ye 80 2.48	6 63% 6 32% 6 5% 5 95 5 95 5 60 5 30 5 95 1 1 8 0.126 6 4.789 5 Yes 4 749 3 2.818	8.1 A 31% 46% 23% Stop 65 20 30 15 65 20 30 15 65 1 0.084 4.657 Yes 769 2.688	SBLn1 5% 56% 40% Stop 215 10 2215 10.251 4.201 Yes 856 2.22		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Raft, % Vol Raft, % Sign Control Traffic Vol by Lane LT Vol Through Vol RT Vol Eare Flow Rate Geometry Gro Degree of UB (X) Degrater Meal Convergence, YN Goap Service Time HCM Lane V(C Ratio	8.5 A NBLn 5' 79' 16' Sto 9 7 7 1 9 0.11 9 0.11) 4.46 Ye 80 0.2.48 0.11	6 63% 6 32% 6 5% 5 955 5 60 5 30 5 5 5 95 1 1 3 0.126 6 4.789 8 Yes 4 749 8 2.818 8 0.127	8.1 A 31% 46% 23% Stop 65 20 30 15 65 20 30 15 65 1 4.6% 769 2.688 0.085	SBLn1 5% 56% 40% Stop 215 10 120 85 215 1 0.251 4.201 Yes 856 2.22 0.251		8.1			8.6					
Conflicting Lanes Right HCM Control Delay HCM Lots Vol Left, % Vol Left, % Vol Right, % Sign Control Traffic Vol by Lane ET Vol Through Vol RT Vol RT Vol Lane Flow Rate Geometry Gip Degree of Uhl (X) Degree of Uhl (X) Degree of Uhl (X) Degree of Uhl (X) Degree of Uhl (X) Convergence, YN Cap Service Time HCM Lane VIC Ratio	8.5 A NBLn 55799 164 Sto 9 0.11 9 0.11) 4.46 Yee 80 2.48 0.11 8	6 63% 6 32% 6 5% 5 955 5 955 5 955 5 95 1 1 3 0.126 6 4.789 8 Yes 4 749 3 2.818 3 0.127 1 8.5	8.1 A 31% 46% 23% Stop 65 20 30 15 65 65 1 0.084 4.657 Yes 769 2.688 0.085 8.1	SBLn1 5% 56% 40% Stop 215 10 225 1 0.251 4.201 Yes 856 2.22 2.22 8.56 2.251 8.6		8.1			8.6					
HCM Control Delay HCM LOS Vol Left, % Vol Raft, % Vol Raft, % Sign Control Traffic Vol by Lane LT Vol Through Vol RT Vol Eare Flow Rate Geometry Gro Degree of UB (X) Degrater Meal Convergence, YN Goap Service Time HCM Lane V(C Ratio	8.5 A NBLn 55799 164 Sto 9 0.11 9 0.11) 4.46 Yee 80 2.48 0.11 8	6 63% 6 32% 6 5% 5 955 5 955 5 955 5 955 1 1 8 0.126 6 4.789 8 Yes 4 749 8 2.818 8 0.127 1 8.5 A A A	8.1 A 31% 46% 23% Stop 65 20 300 30 30 30 30 30 30 30 5 5 5 5 5 5 5	SBLn1 5% 56% 40% 215 10 120 85 1 0.251 4.201 Yes 856 2.221 0.251 856 2.221 8.66 A		8.1			8.6					

LANE SUMMARY

Ø Site: 101 [2029 TF AM]

Perth Street and Meynell Road Roundabout

Lane Use a			nce										-
	Demand F			Deg.		Average		95% Back of					Prob.
	Total veh/h			Satn v/c									
South: Meyn		%	veh/h	V/C	70	sec	_		m	_	m	%	%
Lane 1 ^d	600	2.0	901	0.666	100	10.7	LOS B	6.8	48.2	Full	500	0.0	0.0
Approach	600	2.0		0.666		10.7	LOS B	6.8	48.2				
East: Perth \$	Street												
Lane 1 ^d	560	2.0	1477	0.379	100	5.8	LOS A	2.5	17.9	Full	500	0.0	0.0
Approach	560	2.0		0.379		5.8	LOS A	2.5	17.9				
North: Meyn	ell Road												
Lane 1 ^d	165	2.0	987	0.167	100	10.2	LOS B	0.8	6.0	Full	500	0.0	0.0
Approach	165	2.0		0.167		10.2	LOS B	0.8	6.0				
West: Perth	Street												
Lane 1 ^d	525	2.0	1140	0.461	100	5.1	LOS A	2.7	19.6	Full	500	0.0	0.0
Approach	525	2.0		0.461		5.1	LOS A	2.7	19.6				
Intersection	1850	2.0		0.666		7.6	LOS A	6.8	48.2				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Site Level of SerVice (LCS) Method: SubJRA Roundabout LCS), site LCS wention is specified in the Parameter Setungs dial Roundabout LCS whites are based on average delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay and v/c ratio (degree of saturation) per lane. LCS F will result if v/c > 1 insepschied of lane delay delay for all lanes (v/c not used as specified in HCM 2010). Roundabout Capacity Model: ISUPAS Standard. SiDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity: SIGNAS Standard (Arcellik M3D). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

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MOVEMENT SUMMARY

V Site: 101 [2029 TF AM]

Perth Street and Meynell Road Roundabout

	OD			Deg.		Level of	95% Back		Prop.	Effective	
		veh/h	%	v/c	sec		veh	m		per veh	km
	: Meynell F										
1	L2	50	2.0	0.666	15.8	LOS B	6.8	48.2	0.86	0.99	52
2	T1	5	2.0	0.666	9.9	LOS A	6.8	48.2	0.86	0.99	52
3	R2	545	2.0	0.666	10.2	LOS B	6.8	48.2	0.86	0.99	50
Appro	ach	600	2.0	0.666	10.7	LOS B	6.8	48.2	0.86	0.99	50
East: I	Perth Stree	ət									
4	L2	225	2.0	0.379	9.3	LOS A	2.5	17.9	0.25	0.49	55
5	T1	295	2.0	0.379	3.4	LOS A	2.5	17.9	0.25	0.49	55
6	R2	40	2.0	0.379	3.7	LOS A	2.5	17.9	0.25	0.49	53
Appro	ach	560	2.0	0.379	5.8	LOS A	2.5	17.9	0.25	0.49	55
North:	Meynell R	load									
7	L2	130	2.0	0.167	11.4	LOS B	0.8	6.0	0.55	0.73	52
8	T1	5	2.0	0.167	5.5	LOS A	0.8	6.0	0.55	0.73	52
9	R2	30	2.0	0.167	5.8	LOS A	0.8	6.0	0.55	0.73	51
Appro	ach	165	2.0	0.167	10.2	LOS B	0.8	6.0	0.55	0.73	52
West:	Perth Stre	et									
10	L2	10	2.0	0.461	10.9	LOS B	2.7	19.6	0.54	0.54	55
11	T1	495	2.0	0.461	5.0	LOS A	2.7	19.6	0.54	0.54	55
12	R2	20	2.0	0.461	5.3	LOS A	2.7	19.6	0.54	0.54	53
Appro	ach	525	2.0	0.461	5.1	LOS A	2.7	19.6	0.54	0.54	55
All Ve	hiclos	1850	2.0	0.666	7.6	LOSA	6.8	48.2	0.56	0.69	53

Site Level of Service (LOS) Method: Delay & vic (HCM 2010). 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 and vic ratio (degree of saturation) per movement. LOS F will result Vic> 1 irrespective of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (vic not used as specified in HCM 2010). Roundabout Capacity Mode: SiDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SiDRA Standard (Acguit MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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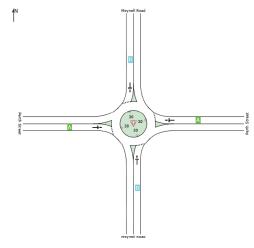
LANE LEVEL OF SERVICE

Lane Level of Service

V Site: 101 [2029 TF AM] Perth Street and Meynell Road Roundabout

All Movement Classes

South East North West Intersection LOS B A B A



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay or all lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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LANE SUMMARY

Site: 101 [2029 TF PM]

Perth Street and	Meynell Road
Roundabout	

	Demand F							95% Back of					
											Length		
South: Meyr	ell Road												
Lane 1 ^d	445	2.0	960	0.464	100	6.6	LOS A	3.2	23.0	Full	500	0.0	0.0
Approach	445	2.0		0.464		6.6	LOS A	3.2	23.0				
East: Perth	Street												
Lane 1 ^d	1325	2.0	1528	0.867	100	7.0	LOS A	15.9	113.0	Full	500	0.0	0.0
Approach	1325	2.0		0.867		7.0	LOS A	15.9	113.0				
North: Meyn	ell Road												
Lane 1 ^d	105	2.0	407	0.258	100	19.0	LOS B	1.9	13.6	Full	500	0.0	0.0
Approach	105	2.0		0.258		19.0	LOS B	1.9	13.6				
West: Perth	Street												
Lane 1 ^d	475	2.0	817	0.582	100	9.9	LOS A	5.2	37.1	Full	500	0.0	0.0
Approach	475	2.0		0.582		9.9	LOS A	5.2	37.1				
Intersection	2350	2.0		0.867		8.0	LOSA	15.9	113.0				

Sile Level of Service (LOS) Method: Delay & vic (HCM 2010). Sile LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS Values are based on average delay and vic ratio (degree of saturation) per lane. LOS F will result if vic > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all lanes (vic not used as specified in HCM 2010). Roundabout Capacity Model: SIDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptane Capacity. SIDRA Standard. Gap-Acceptane Capacity. SIDRA Standard (Acquire MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

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MOVEMENT SUMMARY

𝕂 Site: 101 [2029 TF PM]

Perth Street and Meynell Road Roundabout

Move	ment Per	formance -	Vehicle	s							
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	: Mevnell F		70	V/C	sec	_	ven	m	_	per ven	Km/n
1	L2	35	2.0	0 464	11.7	LOS B	3.2	23.0	0.71	0.76	55.3
2	T1	5	2.0	0 464	5.8	LOSA	3.2	23.0	0.71	0.76	55.
3	R2	405	2.0	0.464	6.1	LOSA	3.2	23.0	0.71	0.76	53.5
Appro		445	2.0	0.464	6.6	LOS A	3.2	23.0	0.71	0.76	53.7
East:	Perth Stree	et									
4	L2	625	2.0	0.867	10.1	LOS B	15.9	113.0	0.63	0.50	54.
5	T1	565	2.0	0.867	4.1	LOS A	15.9	113.0	0.63	0.50	53.
6	R2	135	2.0	0.867	4.4	LOS A	15.9	113.0	0.63	0.50	52.3
Appro	ach	1325	2.0	0.867	7.0	LOS A	15.9	113.0	0.63	0.50	53.
North:	Meynell R	load									
7	L2	80	2.0	0.258	20.3	LOS C	1.9	13.6	0.98	0.95	47.
8	T1	5	2.0	0.258	14.4	LOS B	1.9	13.6	0.98	0.95	47.0
9	R2	20	2.0	0.258	14.7	LOS B	1.9	13.6	0.98	0.95	45.9
Appro	ach	105	2.0	0.258	19.0	LOS B	1.9	13.6	0.98	0.95	46.9
West:	Perth Stre	et									
10	L2	35	2.0	0.582	15.3	LOS B	5.2	37.1	0.86	0.96	53.
11	T1	385	2.0	0.582	9.4	LOS A	5.2	37.1	0.86	0.96	52.9
12	R2	55	2.0	0.582	9.7	LOS A	5.2	37.1	0.86	0.96	51.4
Appro	ach	475	2.0	0.582	9.9	LOS A	5.2	37.1	0.86	0.96	52.
All Ve	hicles	2350	2.0	0.867	8.0	LOS A	15.9	113.0	0.71	0.66	53.

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDPA Roundabout LOS. Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement. LOS F will result v/o > 1 imsgechieve of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010). Roundabout Capacity Mode: SIDPA Standard. SIDPA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptane Capachy. SIDPA Standard (Acquilt MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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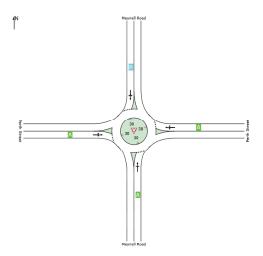
LANE LEVEL OF SERVICE

Lane Level of Service

Site: 101 [2029 TF PM] Perth Street and Meynell Road Roundabout

All Movement Classes





Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for al lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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Mattamy Richmond Village 2029 Total AM (Mitigated)

Intersection												
Int Delay, s/veh	1.1											
<i>P</i> .	501	EDT	500	M/DI	WDT	MDD	NDI	NBT	NDD	001	ODT	000
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL		NBR	SBL	SBT	SBR
Lane Configurations		41>	-	-	41»	40	-	4>	40	00	4>	
Traffic Vol, veh/h	5	1165	5	5	550	10	5	5	10	20	5	5
Future Vol, veh/h	5	1165	5	5	550 0	10	5	5	10	20	5	5
Conflicting Peds, #/hr		0										
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized			None			None	-		None		-	None
Storage Length	-	-	-		-		-	-	-	-	-	-
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	1165	5	5	550	10	5	5	10	20	5	5
Major/Minor M	Major1		1	Major2			Minor1		1	Minor2		
Conflicting Flow All	560	0	0	1170	0	0	1466	1748	585	1160	1745	280
Stage 1	-	-	-	-	-	-	1178	1178	-	565	565	- 200
Stage 2							288	570		595	1180	
Critical Hdwy	4.14			4.14			7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1							6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2							6.54	5.54		6.54	5.54	
Follow-up Hdwy	2.22			2.22			3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1007			593			89	85	454	151	85	717
Stage 1	-						203	263		477	506	
Stage 2							695	504		458	262	-
Platoon blocked. %							500	501		.00	202	
Mov Cap-1 Maneuver	1007			593			83	83	454	138	83	717
Mov Cap-2 Maneuver	-						83	83	-	138	83	
Stage 1						-	200	259		470	500	
Stage 2							675	498		433	258	
Approach	FB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			35	_		37.3	_	
HCM LOS	0.1			0.2			30 F			37.3 E		
IIGINI LUG							E			E		
Minor Lane/Major Mvm	ıt I	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)		140	1007	-	-	593	-	-	141			
HCM Lane V/C Ratio		0.143	0.005	-	-	0.008	-	-	0.213			
HCM Control Delay (s)		35	8.6	0.1	-	11.1	0.1	-	37.3			
HCM Lane LOS		E	A	A	-	В	A	-	E			
HCM 95th %tile Q(veh))	0.5	0	-	-	0	-	-	0.8			

HCM 2010 TWSC 1: Queen Charlotte St./Rochelle Dr. & Perth St.

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		đ þ			đţ\$			\$			4	
Traffic Vol, veh/h	5	865	5	5	1320	20	5	5	5	10	5	5
Future Vol, veh/h	5	865	5	5	1320	20	5	5	5	10	5	5
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	-	-	-	-	-		-			-	-	-
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	865	5	5	1320	20	5	5	5	10	5	5
Major/Minor	Major1		,	Major2			/linor1		1	Minor2		
Conflicting Flow All	1340	0	0	870	0	0	1551	2228	435	1785	2220	670
Stage 1	1040	-	-	0/0	0	0	878	878	400	1340	1340	- 010
Stage 2							673	1350		445	880	
Critical Hdwv	4.14			4.14			7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	4.14			4.14			6.54	5.54	0.34	6.54	5.54	0.34
Critical Hdwy Stg 2							6.54	5.54		6.54	5.54	
Follow-up Hdwy	2.22			2.22			3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	510			770			77	42	569	51	43	399
Stage 1	010			110			309	364		161	220	
Stage 2							411	217		562	363	
Platoon blocked, %							411	217		302	303	
Mov Cap-1 Maneuver	510			770			67	40	569	44	41	399
Mov Cap-1 Maneuver				110			67	40		44	41	- 355
Stage 1							303	357		158	214	
Stage 2							386	211		539	356	
010902							000	211		000	500	
	50			14/15						0.0		
Approach	EB		_	WB		_	NB	_	_	SB		
HCM Control Delay, s	0.2			0.1			67.7			103.9		
HCM LOS							F			F		
Minor Lane/Major Mvm	t 1	VBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)		72	510	-	-	770	-	-	55			
HCM Lane V/C Ratio		0.208	0.01	-	-	0.006	-	-	0.364			
HCM Control Delay (s)		67.7	12.1	0.1	-	9.7	0.1	-	103.9			
HCM Lane LOS		F	В	Α	-	Α	A	-	F			
HCM 95th %tile Q(veh)		0.7	0	-	-	0	-	-	1.3			

LANE SUMMARY

∀ Site: 101 [2029 TF w/ WBL & NBR AM] Perth Street and Meynell Road Roundabout

Lane Use	and Perf	orma	nce										
	Demand F		•	Deg.	Lane	Average	Level of	95% Back of		Lane	Lane	Cap.	Prob.
	Total					Delay							
South: Mev	veh/h	%	veh/h	v/c	%	Sec	_		m	_	m	%	%
Lane 1 ^d	55	2.0	1132	0.049	100	10.5	LOS B	0.3	1.9	Full	500	0.0	0.0
Lane 2	545	2.0	1987	0.274	100	3.2	LOSA	0.0	0.0	Full	500	0.0	0.0
Approach	600	2.0	1001	0.274	100	3.9	LOSA	0.3	1.9	T GII	000	0.0	0.0
East: Perth	Street												
Lane 1	225	2.0	1369	0.164	100	9.3	LOS A	0.8	5.5	Full	500	0.0	0.0
Lane 2 ^d	335	2.0	1637	0.205	100	3.4	LOS A	1.0	7.4	Full	500	0.0	0.0
Approach	560	2.0		0.205		5.7	LOS A	1.0	7.4				
North: Meyr	nell Road												
Lane 1 ^d	165	2.0	978	0.169	100	9.2	LOS A	0.5	3.7	Full	500	0.0	0.0
Approach	165	2.0		0.169		9.2	LOS A	0.5	3.7				
West: Perth	n Street												
Lane 1 ^d	525	2.0	1038	0.506	100	5.1	LOS A	2.6	18.8	Full	500	0.0	0.0
Approach	525	2.0		0.506		5.1	LOS A	2.6	18.8				
Intersection	1850	2.0		0.506		5.3	LOS A	2.6	18.8				

Sile Level of Service (LOS) Method: Delay & vic (HCM 2010). Sile LOS Method is specified in the Parameter Settings dialog (Sile tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS Values are based on average delay and vic ratio (degree of saturation) per lane. LOS F will result if vic > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all lanes (vic not used as specified in HCM 2010). Roundabout Capacity Model: ISUPA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptane Capacity: SIDRA Standard. Gap-Acceptane Capacity. SIDRA Standard (Acguille MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ant lane on roundabout approach

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MOVEMENT SUMMARY

₩ Site: 101 [2029 TF w/ WBL & NBR AM] Perth Street and Meynell Road Roundabout

Mov	OD	Demand		Deg.		Level of	95% Back			Effective	Averag
Couth	Meynell F	veh/h	%	v/c	sec		veh	m		per veh	km
1	L2	50	2.0	0.049	11.1	LOS B	0.3	1.9	0.58	0.67	52
2	T1	5	2.0	0.049	5.1	LOS A	0.3	1.9	0.58	0.67	52
3	R2	545	2.0	0.274	3.2	LOSA	0.0	0.0	0.00	0.43	56
Appro		600	2.0	0.274	3.2	LOSA	0.0	1.9	0.00	0.45	56
	Perth Stree										
4	L2	225	2.0	0.164	9.3	LOS A	0.8	5.5	0.19	0.61	53
5	T1	295	2.0	0.205	3.3	LOS A	1.0	7.4	0.18	0.36	57
6	R2	40	2.0	0.205	3.9	LOS A	1.0	7.4	0.18	0.36	55
Appro	ach	560	2.0	0.205	5.7	LOS A	1.0	7.4	0.18	0.46	55
North:	Meynell R	load									
7	L2	130	2.0	0.169	10.4	LOS B	0.5	3.7	0.39	0.72	53
8	T1	5	2.0	0.169	4.5	LOS A	0.5	3.7	0.39	0.72	53
9	R2	30	2.0	0.169	4.8	LOS A	0.5	3.7	0.39	0.72	51
Appro	ach	165	2.0	0.169	9.2	LOS A	0.5	3.7	0.39	0.72	53
West:	Perth Stre	et									
10	L2	10	2.0	0.506	11.0	LOS B	2.6	18.8	0.49	0.56	56
11	T1	495	2.0	0.506	5.0	LOS A	2.6	18.8	0.49	0.56	55
12	R2	20	2.0	0.506	5.3	LOS A	2.6	18.8	0.49	0.56	54
Appro	ach	525	2.0	0.506	5.1	LOS A	2.6	18.8	0.49	0.56	55
All Vel	nicles	1850	2.0	0.506	5.3	LOSA	2.6	18.8	0.25	0.51	55

Site Level of Service (LOS) Method: Delay & vic (HCM 2010). 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 and vic ratio (degree of saturation) per movement. LOS F will result Vic> 1 irrespective of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (vic not used as specified in HCM 2010). Roundabout Capacity Mode: SiDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SiDRA Standard (Acguit MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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LANE LEVEL OF SERVICE

Lane Level of Service

V Site: 101 [2029 TF w/ WBL & NBR AM] Perth Street and Meynell Road Roundabout

South East North West Intersection

All Movement Classes

LOS A A A A 1^N -1-A <u>_</u> Ø A 30 $\mathbb{V}_{\mathbb{P}}$

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS aveas are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay or al lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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LANE SUMMARY

Site: 101 [2029 TF w/ WBL & NBR PM] Perth Street and Meynell Road Roundabout

	Demand	Flows		Deg.	Lane	Average	Level of	95% Back of	Oueue	Lane	Lane	Cap.	Pro
	Total	HV		Satn	Util.	Delay	Service	Veh	Dist	Config	Length	Adi.	Blo
South: Mey	nell Road												
Lane 1 ^d	40	2.0	1200	0.033	100	9.7	LOSA	0.2	1.3	Full	500	0.0	
Lane 2	405	2.0	1987	0.204	100	3.2	LOS A	0.0	0.0	Full	500	0.0	
Approach	445	2.0		0.204		3.8	LOS A	0.2	1.3				
East: Perth	Street												
Lane 1	625	2.0	1420	0.440	100	9.4	LOS A	2.7	19.3	Full	500	0.0	
Lane 2 ^d	700	2.0	1657	0.423	100	3.5	LOS A	2.6	18.4	Full	500	0.0	
Approach	1325	2.0		0.440		6.3	LOS A	2.7	19.3				
North: Meyr	nell Road												
Lane 1 ^d	105	2.0	770	0.136	100	10.3	LOS B	0.5	3.3	Full	500	0.0	
Approach	105	2.0		0.136		10.3	LOS B	0.5	3.3				
West: Perth	Street												
Lane 1 ^d	475	2.0	811	0.586	100	9.6	LOS A	4.3	30.8	Full	500	0.0	
Approach	475	2.0		0.586		9.6	LOS A	4.3	30.8				

Site Level of Service (LOS) Method: Delay & Vic (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS Values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/o > 1 insepective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010). Roundabout Capacity Model: SiDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. MC (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

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MOVEMENT SUMMARY

Site: 101 [2029 TF w/ WBL & NBR PM] Perth Street and Meynell Road Roundabout

Move	ment Per	formance -	Vehicle	es							
Mov	OD	Demand		Deg.	Average	Level of	95% Back		Prop.	Effective	Average
		Total veh/h		Satn v/c	Delay sec		Vehicles veh			Stop Rate per veh	Speed km/t
South	: Meynell F	Road									
1	L2	35	2.0	0.033	10.4	LOS B	0.2	1.3	0.52	0.63	52.7
2	T1	5	2.0	0.033	4.5	LOS A	0.2	1.3	0.52	0.63	52.5
3	R2	405	2.0	0.204	3.2	LOS A	0.0	0.0	0.00	0.43	56.7
Appro		445	2.0	0.204	3.8	LOS A	0.2	1.3	0.05	0.44	56.
East: I	Perth Stree	ət									
4	L2	625	2.0	0.440	9.4	LOS A	2.7	19.3	0.25	0.61	53.
5	T1	565	2.0	0.423	3.4	LOS A	2.6	18.4	0.23	0.38	57.3
6	R2	135	2.0	0.423	4.0	LOS A	2.6	18.4	0.23	0.38	55.
Appro	ach	1325	2.0	0.440	6.3	LOS A	2.7	19.3	0.24	0.49	54.
North:	Meynell R	load									
7	L2	80	2.0	0.136	11.7	LOS B	0.5	3.3	0.55	0.82	52.
8	T1	5	2.0	0.136	5.8	LOS A	0.5	3.3	0.55	0.82	52.
9	R2	20	2.0	0.136	6.1	LOS A	0.5	3.3	0.55	0.82	51.
Appro	ach	105	2.0	0.136	10.3	LOS B	0.5	3.3	0.55	0.82	52.
West:	Perth Stre	et									
10	L2	35	2.0	0.586	15.0	LOS B	4.3	30.8	0.74	0.92	53.
11	T1	385	2.0	0.586	9.1	LOS A	4.3	30.8	0.74	0.92	53.
12	R2	55	2.0	0.586	9.4	LOS A	4.3	30.8	0.74	0.92	51.
Appro	ach	475	2.0	0.586	9.6	LOS A	4.3	30.8	0.74	0.92	53.
All Vel	hicles	2350	2.0	0.586	6.7	LOS A	4.3	30.8	0.32	0.58	54.

Site Level of Service (LOS) Method: Delay & vic (HCM 2010). 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 and vic ratio (degree of saturation) per movement. LOS F will result Vic> 1 insepscher of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (vic not used as specified in HCM 2010). Roundabout Capacity Model: SIDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SIDRA Standard. HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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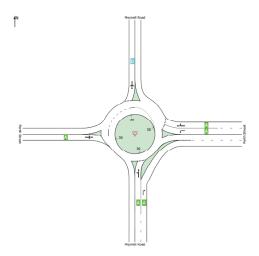
LANE LEVEL OF SERVICE

Lane Level of Service

Ø Site: 101 [2029 TF w/ WBL & NBR PM] Perth Street and Meynell Road Roundabout

All Movement Classes





Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for al lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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Mattamy Richmond Village 2034 Ultimate AM

Internetion												
Intersection Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4Þ			۹ţ»			\$			\$	
Traffic Vol, veh/h	5	1215	5	5	580	10	5	5	10	20	5	5
Future Vol, veh/h	5	1215	5	5	580	10	5	5	10	20	5	5
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	-	-	-	-		-	-		-	-	-	-
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
Mymt Flow	5	1215	5	5	580	10	5	5	10	20	5	5
Major/Minor M	ajor1		1	/lajor2		1	Minor1			Minor2		
Conflicting Flow All	590	0	0	1220	0	0	1531	1828	610	1215	1825	295
Stage 1	- 390	-	0	1220	0	0	1228	1228		595	595	233
		-	-		- 1		303	600		620	1230	
Stage 2 Critical Hdwy	4.14			4.14		-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	4.14			4.14	- 1		6.54	5.54	0.94	6.54	5.54	0.94
Critical Hdwy Stg 2						-	6.54	5.54	-	6.54	5.54	-
	2.22			2.22	- 1		3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	982			567		-	3.52	4.02	437	137	4.02	701
	902	-	-	307		-	189	249	437	458	491	701
Stage 1 Stage 2						-	681			400	248	-
	-		-				001	488	-	44Z	240	-
Platoon blocked, %	982			507		-	74	74	437	124	74	701
Mov Cap-1 Maneuver				567		-	74 74	74 74			74 74	701
Mov Cap-2 Maneuver	-	-	-	-		-			-	124 451	485	
Stage 1							186	245		451	485 244	
Stage 2	-			-	-	-	660	482	-	416	244	
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.2			38.6			41.9		
HCM LOS							E			E		
							-					
Minor Lane/Major Mvmt	,	VBI n1	EBL	FBT	FBR	WBL	WBT	WBR	CDI e1			
	- 1				EBK			WBR				
Capacity (veh/h)		127	982	-	-	567	-	-	127			
HCM Lane V/C Ratio		0.157	0.005	-		0.009	-	-	0.236			
HCM Control Delay (s)		38.6	8.7	0.1		11.4	0.1		41.9			
HCM Lane LOS		E	A	A	-	В	A	-	E			
HCM 95th %tile Q(veh)		0.5	0			0			0.9			

HCN	1 2010) AI	NS	С			
2: 0	ttawa	St.	W.	&	Queen	Charlotte	St

Intersection						
Intersection Delay, s/veh	7.2					
Intersection LOS	A					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		ર્સ	¢Î,		Y	
Traffic Vol, veh/h	5	55	20	5	5	5
Future Vol, veh/h	5	55	20	5	5	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	55	20	5	5	5
Number of Lanes	0	1	1	0	1	0
Approach	EB		WB		SB	
Opposing Approach	WB		FB		00	
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	30		0		VVB 1	
Conflicting Approach Right	- 1		SB		EB	
Conflicting Lanes Right	0		30		1	
HCM Control Delay	7.3		7		7	
HCM LOS	7.5 A		Á		Á	
	~		~		н	
		EDI f	MDL - 1	001-0	_	
Lane			WBLn1	SBLn1		
Vol Left, %		8%	0%	50%		
Vol Thru, %		92%	80%	0%		
Vol Right, %		0%	20%	50%		
Sign Control		Stop	Stop	Stop		
Traffic Vol by Lane		60	25	10		
LT Vol		5	0	5		
Through Vol		55	20	0		
RT Vol		0	5	5		
Lane Flow Rate		60	25	10		
Geometry Grp		1	1	1		
Degree of Util (X)		0.066	0.027	0.011		
Departure Headway (Hd)		3.987	3.876	3.879		
Convergence, Y/N		Yes	Yes	Yes		
Cap		902	926	920		
Service Time		1.995	1.891	1.914		
HCM Lane V/C Ratio		0.067	0.027	0.011		
HCM Control Delay		7.3	7	7		
HCM Lane LOS		A	A	A		
HCM 95th-tile Q		0.2	0.1	0		

HCM 2010 TWSC 1: Queen Charlotte St./Rochelle Dr. & Perth St.	Mattamy Richmond Village 2034 Ultimate PM
1. Queen chanolle ol./Rochene Dr. & Fertinol.	2001 Olandio I M

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		đ þ			414			4			4	
Traffic Vol. veh/h	5	905	5	5	1380	20	5	5	5	15	5	5
Future Vol, veh/h	5	905	5	5	1380	20	5	5	5	15	5	5
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			-			-			-			-
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	905	5	5	1380	20	5	5	5	15	5	5
Major/Minor N	lajor1		1	Major2		1	Minor1		1	Minor2		
Conflicting Flow All	1400	0	0	910	0	0	1621	2328	455	1865	2320	700
Stage 1	-	-	-	-	-	-	918	918	-	1400	1400	-
Stage 2	-			-			703	1410		465	920	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1							6.54	5.54		6.54	5.54	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	484	-	-	744	-	-	68	37	552	45	37	382
Stage 1	-	-	-	-	-	-	292	349	-	148	205	-
Stage 2	-	-	-	-	-	-	394	203	-	547	348	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	484	-	-	744	-	-	57	35	552	38	35	382
Mov Cap-2 Maneuver	-	-	-	-	-	-	57	35	-	38	35	-
Stage 1	-	-	-	-	-	-	286	342	-	145	199	-
Stage 2	-	-	-	-	-	-	367	197	-	523	341	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2	_		0.2	_		79.2			158.2	_	
HCM LOS							F			F		
Minor Lane/Major Mvm	1 1	VBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	_		_
Capacity (veh/h)		63	484	-	-	744	-	-	45			
HCM Lane V/C Ratio		0.238	0.01	-	-	0.007	-	-	0.556			
HCM Control Delay (s)		79.2	12.5	0.1	-	9.9	0.2	-	158.2			
HCM Lane LOS		F	В	A	-	A	A	-	F			
HCM 95th %tile Q(veh)		0.8	0			0			2.1			

HCM 2010 AWS	-		1A/								Ma	attam	y Richmond Vil 2034 Ultima	
3: Meynell Rd. &	Olla	awa	51. 99										2034 Uluma	ile Al
Intersection														
Intersection Delay, s/vel	n 7.9													
Intersection LOS	Α													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		4			4			4			4			
Traffic Vol, veh/h	70	25	5	10	5	5	5	95	20	15	40	35		
Future Vol, veh/h	70	25	5	10	5	5	5	95	20	15	40	35		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2		
Mvmt Flow	70	25	5	10	5	5	5	95	20	15	40	35		
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0		
Approach	EB			WB			NB			SB				
Opposing Approach	WB			EB			SB			NB				
Opposing Lanes	1			1			1			1				
Conflicting Approach Le	ft SB			NB			EB			WB				
Conflicting Lanes Left	1			1			1			1				
Conflicting Approach Rig	ghNB			SB			WB			EB				
Conflicting Lanes Right	1			1			1			1				
HCM Control Delay	8.2			7.6			7.9			7.6				
HCM LOS	Α			A			Α			Α				
Lane	N	IBLn1	EBLn1V	VBLn1	SBLn1									
Vol Left, %		4%	70%	50%	17%									
/ol Thru, %		79%	25%	25%	44%									
/ol Right, %		17%	5%	25%	39%									
Sign Control		Stop	Stop	Stop	Stop									
Traffic Vol by Lane		120	100	20	90									
_T Vol		5	70	10	15									
Through Vol		95	25	5	40									
RT Vol		20	5	5	35									
Lane Flow Rate		120	100	20	90									
Geometry Grp		1	1	1	1									
Degree of Util (X)			0.126											
Departure Headway (Ho	I)	4.23	4.524	4.458	4.143									

Lane Flow Rate	120	100	20	90
Geometry Grp	1	1	1	1
Degree of Util (X)	0.141	0.126	0.025	0.104
Departure Headway (Hd)	4.23	4.524	4.458	4.143
Convergence, Y/N	Yes	Yes	Yes	Yes
Сар	853	795	805	868
Service Time	2.23	2.539	2.474	2.154
HCM Lane V/C Ratio	0.141	0.126	0.025	0.104
HCM Control Delay	7.9	8.2	7.6	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.1	0.3

HCM 2010 AWSC 2: Ottawa St. W. & Queen Charlotte St.

Mattamy Richmond Village 2034 Ultimate PM

Intersection						
Intersection Delay, s/veh	7.3					
Intersection LOS	A					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		લ	4Î		Y	
Traffic Vol, veh/h	5	50	65	5	5	5
Future Vol, veh/h	5	50	65	5	5	5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	50	65	5	5	5
Number of Lanes	0	1	1	0	1	0
Approach	EB	_	WB		SB	
Opposing Approach	WB		EB			
Opposing Lanes	1		1		0	
Conflicting Approach Left	SB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right			SB		EB	
Conflicting Lanes Right	0		1		1	
HCM Control Delay	7.3		7.3		7	
HCM LOS	A		A		А	
Lane		EBLn1	WBLn1	SBLn1		
Vol Left, %		9%	0%	50%		
Vol Thru, %		91%	93%	0%		
Vol Right, %		0%	7%	50%		
Sign Control		Stop	Stop	Stop		
Traffic Vol by Lane		55	70	10		
LT Vol		5	0	5		
Through Vol		50	65	0		
RT Vol		0	5	5		
Lane Flow Rate		55	70	10		
Geometry Grp		1	1	1		
Degree of Util (X)		0.061	0.077	0.011		
Departure Headway (Hd)		4.022	3.95	3.948		
Convergence, Y/N		Yes	Yes	Yes		
Сар		892	909	900		
Service Time		2.038	1.964	2		
HCM Lane V/C Ratio		0.062	0.077	0.011		
		7.0	7.3	7		
HCM Control Delay		7.3	1.5			
HCM Control Delay HCM Lane LOS		A	A	A		

H	ICM 2010	AWS	SC		
3	: Meynell	Rd. 8	& Ottawa	St.	W.

Mattamy Richmond Village 2034 Ultimate PM

Intersection Intersection Delay, s/veh 8.4 Intersection LOS A

Intersection LOS	A												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		4			4			4			4		
Traffic Vol, veh/h	60	30	5	20	30	15	5	75	15	10	120	85	
Future Vol, veh/h	60	30	5	20	30	15	5	75	15	10	120	85	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	60	30	5	20	30	15	5	75	15	10	120	85	
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0	
Approach	EB			WB			NB			SB			
Opposing Approach	WB			EB			SB			NB			
Opposing Lanes	1			1			1			1			
Conflicting Approach Let	ft SB			NB			EB			WB			
Conflicting Lanes Left	1			1			1			1			
Conflicting Approach Rig	ghNB			SB			WB			EB			
Conflicting Lanes Right	1			1			1			1			
HCM Control Delay	8.5			8.1			8.1			8.6			
HCM LOS	Α			A			A			A			
Lane Vol Left. %	ſ	VBLn1 5%	EBLn1V 63%	31%	SBLn1 5%								
			63% 32%										
Vol Thru, %		79%		46%	56%								
Vol Right, %		16%	5%	23%	40%								
Sign Control		Stop	Stop	Stop	Stop								
Traffic Vol by Lane		95	95	65	215								
LT Vol		5	60	20	10								
Through Vol		75	30 5	30	120								
RT Vol		15 95	5 95	15 65	85 215								
Lane Flow Rate		95	95	65 1	215								
Geometry Grp				0.084									
Degree of Util (X)			4.789										
Departure Headway (Hd	9	4.4bb Yes	4.789 Yes	4.657 Yes	4.201 Yes								
Convergence, Y/N		Yes 804	Yes 749	769	Yes 856								
Cap Service Time			2.818		2.22								
HCM Lane V/C Ratio				2.000									
		8.1	8.5	0.065	0.251								
HCM Control Delay HCM Lane LOS		0.1 A	6.5 A	0.1 A	0.0 A								
HCM 25th-tile Q		0.4	0.4	0.3	A 1								
HUM SOM-TILE (J		0.4	0.4	0.3	1								

LANE SUMMARY

V Site: 101 [2034 TF w/ WBL & NBR AM] Perth Street and Meynell Road Roundabout

Lane Use	and Perf	orma	nce										
	Demand F		~	Deg.	Lane	Average	Level of	95% Back of		Lane	Lane	Cap.	Prob.
						Delay							
South: Mey	veh/h	%	veh/h	v/c	%	Sec	_		m	_	m	%	%
Lane 1 ^d	55	2.0	1092	0.050	100	10.7	LOS B	0.3	21	Full	500	0.0	0.0
Lane 2	555	2.0	1987	0.279	100	3.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	610	2.0		0.279		3.9	LOS A	0.3	2.1				
East: Perth	Street												
Lane 1	230	2.0	1360	0.169	100	9.3	LOS A	0.8	5.8	Full	500	0.0	0.0
Lane 2 ^d	360	2.0	1639	0.220	100	3.4	LOS A	1.1	8.2	Full	500	0.0	0.0
Approach	590	2.0		0.220		5.7	LOS A	1.1	8.2				
North: Meyr	nell Road												
Lane 1 ^d	165	2.0	967	0.171	100	9.3	LOS A	0.5	3.8	Full	500	0.0	0.0
Approach	165	2.0		0.171		9.3	LOS A	0.5	3.8				
West: Perth	Street												
Lane 1 ^d	565	2.0	1039	0.544	100	5.4	LOS A	3.1	22.1	Full	500	0.0	0.0
Approach	565	2.0		0.544		5.4	LOS A	3.1	22.1				
Intersection	1930	2.0		0.544		5.4	LOS A	3.1	22.1				

Sile Level of Service (LOS) Method: Delay & vic (HCM 2010). Sile LOS Method is specified in the Parameter Settings dialog (Sile tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS Values are based on average delay and vic ratio (degree of saturation) per lane. LOS F will result if vic > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all lanes (vic not used as specified in HCM 2010). Roundabout Capacity Model: ISUPA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptane Capacity: SIDRA Standard. Gap-Acceptane Capacity. SIDRA Standard (Acguille MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dom ant lane on roundabout approach

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MOVEMENT SUMMARY

₩ Site: 101 [2034 TF w/ WBL & NBR AM] Perth Street and Meynell Road Roundabout

Mov	OD	Demand		Deg.		Level of	95% Back			Effective	Averag
Couth	Meynell F	veh/h	%	v/c	sec		veh	m		per veh	km
1	L2	50	2.0	0.050	11.3	LOS B	0.3	2.1	0.61	0.68	52
2	T1	5	2.0	0.050	5.3	LOS A	0.3	2.1	0.61	0.68	52
3	R2	555	2.0	0.279	3.2	LOSA	0.0	0.0	0.00	0.43	56
Appro		610	2.0	0.279	3.2	LOSA	0.0	2.1	0.00	0.45	56
	Perth Stree										
4	L2	230	2.0	0.169	9.3	LOS A	0.8	5.8	0.19	0.61	53
5	T1	320	2.0	0.220	3.3	LOS A	1.1	8.2	0.18	0.36	57
6	R2	40	2.0	0.220	3.9	LOS A	1.1	8.2	0.18	0.36	55
Appro	ach	590	2.0	0.220	5.7	LOS A	1.1	8.2	0.19	0.46	55
North:	Meynell R	load									
7	L2	130	2.0	0.171	10.5	LOS B	0.5	3.8	0.40	0.73	53
8	T1	5	2.0	0.171	4.5	LOS A	0.5	3.8	0.40	0.73	53
9	R2	30	2.0	0.171	4.9	LOS A	0.5	3.8	0.40	0.73	51
Appro	ach	165	2.0	0.171	9.3	LOS A	0.5	3.8	0.40	0.73	53
West:	Perth Stre	et									
10	L2	10	2.0	0.544	11.2	LOS B	3.1	22.1	0.52	0.60	55
11	T1	535	2.0	0.544	5.3	LOS A	3.1	22.1	0.52	0.60	55
12	R2	20	2.0	0.544	5.6	LOS A	3.1	22.1	0.52	0.60	54
Appro	ach	565	2.0	0.544	5.4	LOS A	3.1	22.1	0.52	0.60	55
All Vel	viclee	1930	2.0	0.544	5.4	LOSA	3.1	22.1	0.26	0.52	55

Site Level of Service (LOS) Method: Delay & vic (HCM 2010). 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 and vic ratio (degree of saturation) per movement. LOS F will result Vic> 1 irrespective of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (vic not used as specified in HCM 2010). Roundabout Capacity Mode: SiDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SiDRA Standard (Acguit MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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attamy richmond village HA.sip7

LANE LEVEL OF SERVICE

Lane Level of Service

V Site: 101 [2034 TF w/ WBL & NBR AM] Perth Street and Meynell Road Roundabout

South East North West Intersection

All Movement Classes

LOS A A A A 1^N -1-A <u>_</u> Ø A 30 $\mathbb{V}_{\mathbb{P}}$

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay or all lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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LANE SUMMARY

Site: 101 [2034 TF w/ WBL & NBR PM]

Perth Street and Meynell Road	
Roundabout	

						Average		95% Back o					Prob.
South: Meyne	ell Road												
Lane 1 ^d	40	2.0	1165	0.034	100	9.8	LOS A	0.2	1.4	Full	500	0.0	0.0
Lane 2	420	2.0	1987	0.211	100	3.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	460	2.0		0.211		3.8	LOS A	0.2	1.4				
East: Perth S	treet												
Lane 1	645	2.0	1416	0.455	100	9.4	LOS A	2.9	20.5	Full	500	0.0	0.0
Lane 2 ^d	745	2.0	1659	0.449	100	3.5	LOS A	2.9	20.4	Full	500	0.0	0.0
Approach	1390	2.0		0.455		6.3	LOS A	2.9	20.5				
North: Meyne	II Road												
Lane 1 ^d	105	2.0	751	0.140	100	10.5	LOS B	0.5	3.4	Full	500	0.0	0.0
Approach	105	2.0		0.140		10.5	LOS B	0.5	3.4				
West: Perth S	Street												
Lane 1 ^d	505	2.0	797	0.633	100	10.5	LOS B	5.2	36.7	Full	500	0.0	0.0
Approach	505	2.0		0.633		10.5	LOS B	5.2	36.7				
Intersection	2460	2.0		0.633		6.9	LOS A	5.2	36.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS Values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/o > 1 insepective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010). Roundabout Capacity Mode: SiDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SiDRA Standard (Acguid MSD). HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

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MOVEMENT SUMMARY

Site: 101 [2034 TF w/ WBL & NBR PM] Perth Street and Meynell Road Roundabout

Move	ement Per	formance -	Vehicle	s							
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/t
South	: Meynell F										
1	L2	35	2.0	0.034	10.5	LOS B	0.2	1.4	0.55	0.64	52.6
2	T1	5	2.0	0.034	4.6	LOS A	0.2	1.4	0.55	0.64	52.4
3	R2	420	2.0	0.211	3.2	LOS A	0.0	0.0	0.00	0.43	56.
Appro		460	2.0	0.211	3.8	LOS A	0.2	1.4	0.05	0.44	56.3
East:	Perth Stree										
4	L2	645	2.0	0.455	9.4	LOS A	2.9	20.5	0.26	0.60	53.
5	T1	610	2.0	0.449	3.4	LOS A	2.9	20.4	0.24	0.38	57.
6	R2	135	2.0	0.449	4.0	LOS A	2.9	20.4	0.24	0.38	55.
Appro	ach	1390	2.0	0.455	6.3	LOS A	2.9	20.5	0.25	0.48	54.
North:	Meynell R	oad									
7	L2	80	2.0	0.140	11.8	LOS B	0.5	3.4	0.56	0.83	52.
8	T1	5	2.0	0.140	5.9	LOS A	0.5	3.4	0.56	0.83	52.
9	R2	20	2.0	0.140	6.2	LOS A	0.5	3.4	0.56	0.83	51.
Appro	ach	105	2.0	0.140	10.5	LOS B	0.5	3.4	0.56	0.83	52.4
West:	Perth Stre	et									
10	L2	35	2.0	0.633	16.0	LOS B	5.2	36.7	0.78	0.97	52.
11	T1	415	2.0	0.633	10.1	LOS B	5.2	36.7	0.78	0.97	52.
12	R2	55	2.0	0.633	10.4	LOS B	5.2	36.7	0.78	0.97	51.
Appro	ach	505	2.0	0.633	10.5	LOS B	5.2	36.7	0.78	0.97	52.
All Ve	hicles	2460	2.0	0.633	6.9	LOS A	5.2	36.7	0.33	0.59	54.

Site Level of Service (LOS) Method: Delay & vic (HCM 2010). 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 and vic ratio (degree of saturation) per movement. LOS F will result Vic> 1 insepscher of movement delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for all movements (vic not used as specified in HCM 2010). Roundabout Capacity Model: SIDRA Standard. SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay. Gap-Acceptance Capacity. SIDRA Standard. Gap-Acceptance Capacity. SIDRA Standard. HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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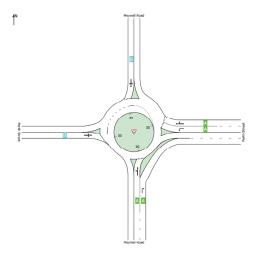
LANE LEVEL OF SERVICE

Lane Level of Service

Ø Site: 101 [2034 TF w/ WBL & NBR PM] Perth Street and Meynell Road Roundabout

All Movement Classes





Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: SIDRA Roundabout LOS. Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane. LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection). Intersection and Approach LOS values are based on average delay for al lanes (v/c not used as specified in HCM 2010). SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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