Project Code:	W185900	**Project Name:**	Pickering Brook Traffic Impact Assessment
Dept:	Traffic Engineering		
Date:	25 March 2020	**Version No.**	C
Author:	Aaron MacNish		
Reviewer:	Tim Judd		
SUBJECT:	**Transport Review – Pickering Brook Townsite Expansion (Scenario 3)**		
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Introduction

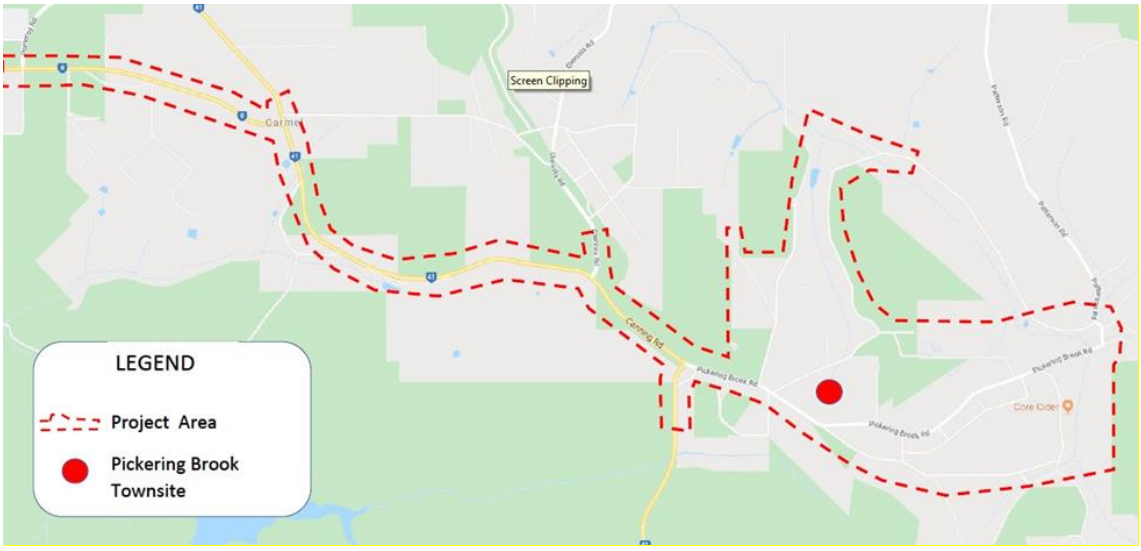
As part of the *Pickering Brook and Surrounds Sustainability and Tourism Strategy* the Department of Planning, Lands and Heritage (DPLH) are investigating the planning and economic development-related opportunities and options to revitalise the Pickering Brook townsite and surrounds. The WAPC's Perth and Peel@3.5million identifies several sites as Planning Investigation Areas, including 80ha of land adjacent to the existing Pickering Brook Townsite. GTA were commissioned by DPLH to undertake a transport impact assessment of the preferred townsite expansion option (Scenario 3) selected by a multi-criteria analysis to understand the likely impact the townsite expansion would have on the existing road network within Pickering Brook.

Broader Study Area

The broad study area consists of the existing Pickering Brook townsite, including Canning Road and Welshpool Road E until the intersection of Carmel Road and Pomeroy Road respectively shown in Figure 1.

Due to the existing demographics of Pickering Brook the majority of residents living in Pickering Brook work externally travelling along Canning Road and Welshpool Road E to access the wider transport network.

Figure 1: Pickering Brook Townsite Expansion – Study Area



Existing Situation

The existing land use for Pickering Brook is predominately agriculture and horticulture with the small townsite and residential dwellings primarily located adjacent to Pickering Brook Road between Davey Road and Merrivale Road. The lots affected by the development of Scenario 3 are mostly rural in nature with existing dwellings supporting the rural properties with a small portion of light industry to the north of Pickering Brook Road.

Traffic Count Information

DPLH obtained traffic counts for the period of 05/12/2019 to 11/12/2019 for 9 intersections within the study area, the location of these counts is shown in Figure 2 below.

Figure 2: Traffic count locations - 2019

A summary of the traffic volumes from the 2019 counts can be seen in Table 1 below.

Table 1: Summary of existing traffic 2019

Road Name + Location	AM Peak (veh/hour)	PM Peak (veh/hour)	Daily
Welshpool Road west of Pomeroy Road	581	523	5975
Welshpool Road west of Canning Road	265	249	2721
Canning Road north Carmel Road	225	216	2335
Canning Road south of Welshpool Road E	388	361	3876
Canning Road west of Glenisla Road	354	336	3621
Glenisla Road north of Canning Road	63	57	578
Canning Road east of Glenisla Road	396	363	3892
Canning Road south of Pickering Brook Road	254	245	2634
Picking Brook Road east of Canning Road	230	182	1934

Existing Crash Data

Crash data shown for the period between 2014 and 2018.

Road Name	Number of Crashes	Crash Severity	Main Crash Type	Comment
Canning Road (Welshpool Road to Pickering Brook Road)	17	1 – Hospital 3 – Medical 13 - PDO	6 – vehicles from one direction (same lane rear end) 4 – head on 3 – thru and right	No crash pattern evident
Welshpool Road / Canning Road intersection	0			No crash data available in MRWA system
Pickering Brook Road (Canning Road to Bracken Road)	14	1 – Fatal 1 – Hospital 1 – Medical	4 – vehicles from one direction (same lane rear end) 3 – off path on curve 3 – thru and right	No crash pattern evident (it is noted the fatal and hospital

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Road Name	Number of Crashes	Crash Severity	Main Crash Type	Comment
		11 - PDO		were both single vehicle off path)
Patterson Road (Bracken Road to Walnut Road)	1	1 – Medical	1 - Thru-left	-
Pomeroy Road (Welshpool Road East to Lawnbrook Road)	17	2 – Hospital 1 – Medical 14 - PDO	9 – Intersection 5 – off path	6 crashes at the intersection with Welshpool Road East

The crash data is typical of rural townsite environment, with no obvious crash patterns present.

Public Transport

GTA sought email advice from PTA who advised that due to low patronage and catchment there are currently no plans to reinstate a bus route to the Pickering Brook Townsite.

Active Travel

Being a predominantly rural townsite formal active transport infrastructure is not present. Currently Pickering Brook Road has a footpath on the southern boundary providing walking and cycling facility between the general store and the townsite.

Road Hierarchy

At the time of this investigation there are no internal road detailed provided within the development area, this technical note will focus on the suitability and capacity of the existing road network within the Pickering Brook townsite to accommodate the additional traffic. Details of the existing road network can be seen in Table 2.

Table 2: Existing Road – Pickering Brook Townsite

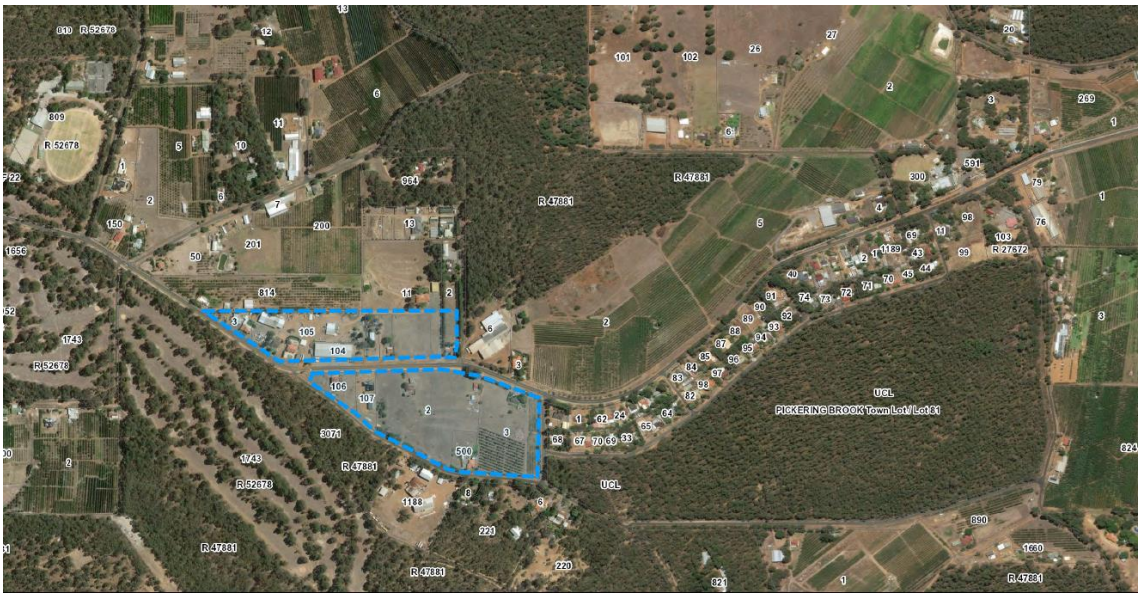
Road Name	Pickering Brook Road	Carinyah Road	Isaacs Road	Davey Road	Canning Road East	Canning Road South	Welshpool Road E
Jurisdiction	City of Kalamunda	City of Kalamunda	City of Kalamunda	City of Kalamunda	City of Kalamunda	City of Kalamunda	City of Kalamunda
Class Type	Local Distributor	Access Road	Access Road	Access Road	Regional Distributor	Regional Distributor	Regional Distributor
Posted Speed	70km/h	50km/h	50km/h	50km/h	70km/h	90km/h	80km/h
Lane Formation	3.5 lanes/ undivided/ single carriageway	2.5m lanes/ undivided/ single carriageway	2.5 lanes/ undivided/ single carriageway	3.0m lanes/ undivided/ single carriageway	3.5m lanes/ undivided/ single carriageway	3.5m lanes/ undivided/ single carriageway	4.0m lanes/ undivided, single carriageway
Carriageway Width	12m	8m	8m	8m	10m	12m	12m
Reserve Width	20.1m	20.1m	20.1	17.9m	20.1m	20.1m	20.1m

Proposed Development

There were originally eight development scenarios proposed by DPLH. A high-level comparison of traffic impact was undertaken of the eight scenarios to rank their impact on the existing road network as an input into a Multi-criteria analysis workshop. The proposed expansion scenarios can be seen in Appendix B.

Following the Multi-criteria analysis workshop held in January 2020 "Scenario 3" was selected as the preferred development scenario. The preferred development scenario map is shown below in Figure 3. Scenario 3 is divided by Pickering Brook Road forming a central "spine" road through the development. Isaacs Road and Davey Roads both run north – south on the eastern boundary of the site with Carinya Road forming the southern boundary.

Figure 3: Development Scenario 3 – Preferred option



Land Use

Scenario 3 comprises 8.9ha of developable land. The land use is almost exclusively residential with an average R5 density, 2000m^2 lots. A potential local centre of 1,500m2 is included within the cell bounded by Pickering Brook Road to the north and Carinya Road to the south. The development scenario assumes a standard 10% land use for Public Open Space.

Traffic Generation

Standard traffic generation rates were taken from the WAPC Transport Assessment Guidelines for residential trips and NSW RMS Guideline to Traffic Generating Developments for the retail component. Rates are shown below in Table 3.

Table 3: Trip generation rates

Land Use	Daily	AM Peak	PM Peak
Residential	9 trips / dwelling	0.8 trips / dwelling	0.8 trips / dwelling
Retail (Local Centre)	121 trips / 100m^2 GLA	2.5 trips / 100m^2 GLA	10 trips / 100m^2 GLA

Traffic growth on existing roads between 2020 and 2031 has been calculated based on the STEM Strategic model development by the Department of Transport and calculated to be 22.7% over the 11-year period.

Two scenarios were tested, 2031 without development of scenario three and 2031 with development of scenario three expecting a dwelling yield of 44 and 1,500m2 NLA of retail store.

The development is expected to generate on average **2,167 weekday vehicle trips**. **73 trips** predicted to be in the **AM Peak** and **185 trips** predicted in the **PM Peak**.

Traffic Distribution

Given the land use proposed is consistent with that which currently exists within the Pickering Brook townsite, GTA maintained the same traffic distribution patterns as calculated from the 2019 traffic counts of the area. The additional vehicle trips from the development were distributed onto the network based on current travel patterns and then added to the background strategic traffic taken from the STEM strategic model.

Due to the scale of the study area the traffic distribution diagrams are included in Appendix C of this technical note.

Prior to Scenario 3 being selected as the preferred scenario via a multicriteria analysis process GTA completed a high-level traffic assessment of seven (7) different development scenarios. To determine the highest likely impact, the largest development was modelled and distributed through the network. The rationale being that if no upgrades were trigged by the large development then developments of a lesser intensity will also not require additional upgrades. Where upgrades were noted as being required these could be checked in isolation for the selected scenario (in this case Scenario 3) to see if the lesser development still trigger the upgrades. As such the volumes in Table 4 represent a "worst case" scenario for development of a much larger 80ha site that included the 8.9ha Scenario 3 site.

Table 4: Traffic Volumes 2031 + Development Traffic

Road Name	2031 No Development	2031 + Scenario 3 Development	2031 + Scenario 6 (worst case) Development
Repatriation Road	190	190	926
Pickering Brook Road (E of Carinya Road)	2828	3050	3606
Pickering Brook Road (Reserve - Carinya)	3101	3829	4592
Pickering Brook Road (Canning - Reserve)	2859	4000	4969
Reserve Road	18	18	18
Weston Road	221	221	957
Canning Road (South of Pickering Brook Rd)	2889	2981	3069
Canning Road (West of Pickering Brook Rd)	4558	5773	7053
Canning Road (Welshpool - Glenisla)	4251	5320	6485
Glenisla Road	675	790	912
Camel Road	1135	1179	1227
Welshpool Road E	2770	3469	4086
Edward Road	37	38	38
Pomeroy Road	3535	4337	4394

Traffic Impact of Development – Road Width Upgrades

Based on this increase in traffic volumes GTA have assessed the likely mid-block road cross-sections required for the existing roads in 2031 with development and determined whether or not any additional upgrades would be required as a result of the development scenario. Proposed cross-sections were decided upon with reference to *Austroads Guide to Road Design Part 3: Table 4.5 – Single carriageway rural road widths* included below for reference in Figure 4.

Figure 4: Rural road widths (m) Table 4.5 AGRD Part 3

Table 4.5: Single carriageway rural road widths (m)

Element	Design AADT				
	1–150	150–500	500–1000	1000–3000	> 3000
Traffic lanes(1)	3.7 (1 x 3.7)	6.2 (2 x 3.1)	6.2–7.0 (2 x 3.1/3.5)	7.0 (2 x 3.5)	7.0 (2 x 3.5)
Total shoulder	2.5	1.5	1.5	2.0	2.5
Minimum shoulder seal (2),(3),(4),(5),(6)	0	0.5	0.5	1.0	1.5
Total carriageway	8.7	9.2	9.2–10.0	11.0	12.0

1 *Traffic lane widths include centrelines but are exclusive of edge-lines.*
2 *Where significant numbers of cyclists use the roadway, consideration should be given to fully sealing the shoulders. Suggest use of a maximum size 10 mm seal within a 20 km radius of towns.*
3 *Wider shoulder seals may be appropriate depending on requirements for maintenance costs, soil and climatic conditions or to accommodate the tracked width requirements for Large Combination Vehicles.*
4 *Short lengths of wider shoulder seal or lay-bys to be provided at suitable locations to provide for discretionary stops.*
5 *Full width shoulder seals may be appropriate adjacent to safety barriers and on the high side of superelevation.*
6 *A minimum 7.0 m seal should be provided on designated heavy vehicle routes (or where the AADT contains more than 15% heavy vehicles).*

Based on the predicated 2031 traffic volumes as presented in Table 4 and the road width requirements of AGRD Part 3 the following road upgrades will be required in 2031. The three roads below will only require upgrading as a result of the development directly adjacent to them in Scenario 3.

Davey Road:

- existing is 3.0m lanes, no sealed shoulder
- upgrade required – widen traffic lanes to 2x3.1m, 0.5m sealed shoulder with 0.25m unsealed backing.

Carinyah Road:

- existing is 2.5m lanes, no sealed shoulder
- upgrade required – widen traffic lanes to 2x3.1m, 0.5m sealed shoulder with 0.25m unsealed backing.

Isaacs Road:

- Existing is 2.5m lanes, no sealed shoulder
- Upgrade Required – widen traffic lanes to 2x3.1m, 0.5m sealed shoulder with 0.25m unsealed backing.

Traffic Impact of Development – Intersection Upgrades

Unsignalised intersections rely on gap selection for the entry of minor road traffic into or across the major road and for right turn movements from the major road. Higher conflicting volumes result in increased delays and as a result of driver frustration higher risk of crashes.

When the volumes at an intersection are less than those shown in Table 5 a detailed analysis to demonstrate that adequate capacity is available is unlikely to be necessary.

Table 5: Warrants for detailed intersection assessments

Major road type	Major road flow (vph)	Minor road flow (vph)
Two-lane	400	250
	500	200
	650	100
Four-lane	1000	100
	1500	50
	2000	25

Due to the relatively low volume of traffic in the Pickering Brook area the majority of intersections fall below the warrants for detailed analysis with the exception of the three intersections mentioned below.

The majority of intersections within the Pickering Brook townsite will function at a Level of Service A in 2031 with the addition of the development traffic, as such will not require any additional modifications.

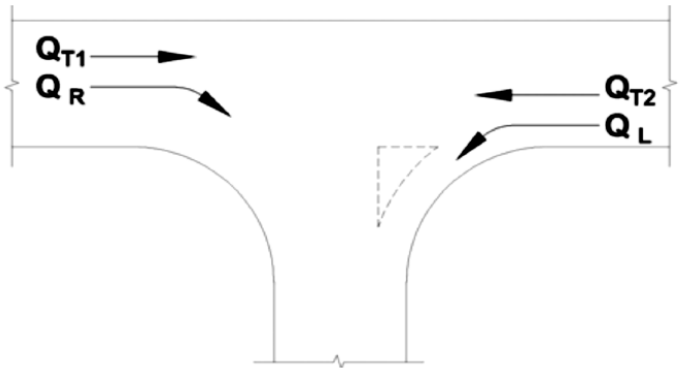
However, three intersections do experience a higher increase in traffic as a result of the 2031 background traffic volumes requiring dedicated turning lanes., These intersections are:

- Canning Road / Pickering Brook Road[1]
- Canning Road / Welshpool Road East
- Welshpool Road East / Pomeroy Road

The turning volumes in 2031 for each of the three intersections have been assessed against the warrants for dedicated turning pockets in *Austroads Guide to Traffic Management Part 6: Intersections, interchanges and crossings.* The turning movement volumes and conflicting movement volumes are calculated using Figure 2.26 of AGTM Part 6 shown below in Figure 5. The overall turning movement volumes and conflicting movements volumes calculated for the intersections within the project boundary are included in Appendix D.

Figure 5: AGTM calculation of turning volumes

Figure 2.26: Calculation of the major road traffic volume Q_M

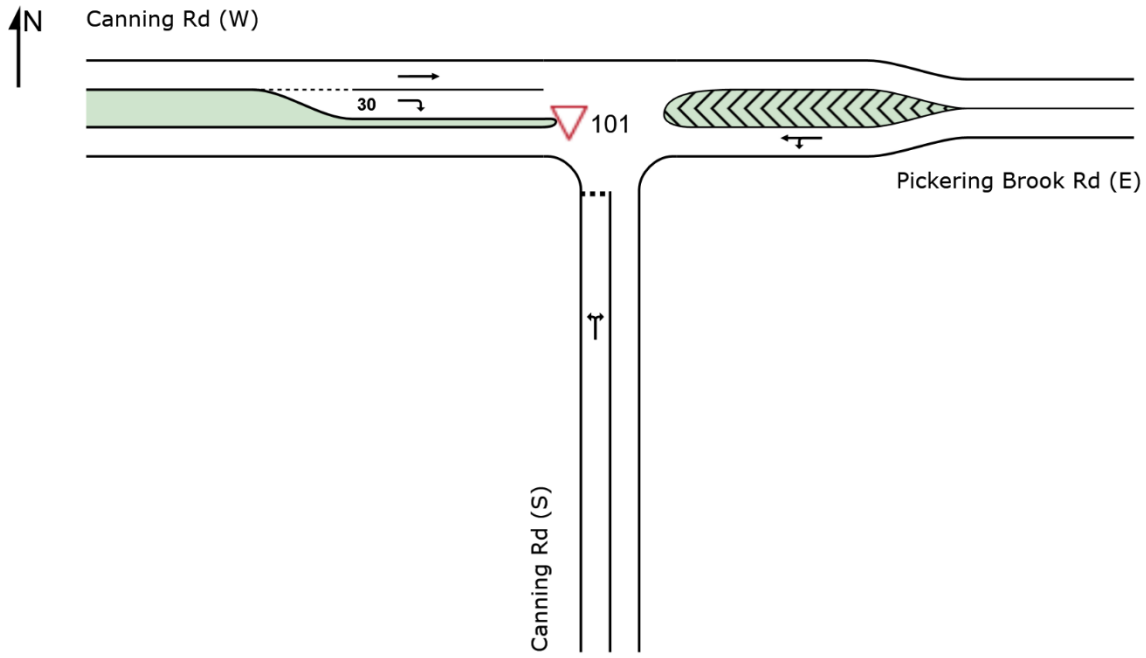


[1] it is noted that this is an approved Black Spot location for upgrade. Initial works at this location have already been undertaken inclusive of localised widening and the implementation of a splitter island/median on the southern approach

Canning Road / Pickering Brook Road

The 2031 turning volumes for the Canning Road / Pickering Brook intersection require a right turn pocket for east bound traffic on Canning Road. The proposed intersection layout is shown in are shown below in Figure 6. The 77 right turning vehicles in the AM peak warrant the use of a channalised right turn lane on Canning Road in 2031. It should be noted that this treatment is required **without** any additional Scenario 3 development traffic, development traffic does not necessitate any additional works at Canning Road / Pickering Brook Road in addition to this.

Figure 6: Canning Rd / Pickering Brook Rd. Intersection Layout

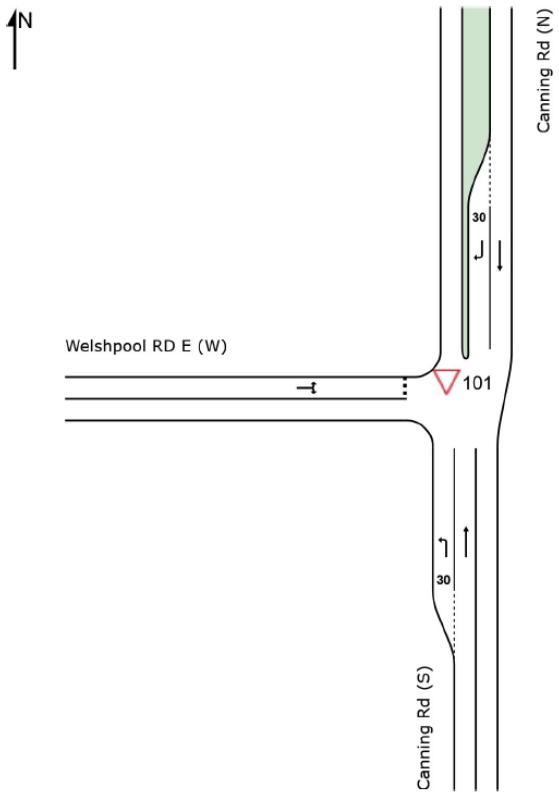


The intersection inclusive of the turning pocket upgrade was assessed for operational performance using SIDRA Intersection 8 software. All lanes achieve a Level of Service A in 2031, the SIDRA modelling report is included in Appendix A.

Canning Road / Welshpool Road E

The turning volumes for the Canning Road / Welshpool Road East intersection require both a left turn slip lane for north bound traffic on Canning Road (western side) and a right turn slip lane for south bound traffic on Canning Road. The proposed intersection layout is shown in Figure 7.

Figure 7: Canning Road / Welshpool Road E Intersection Layout

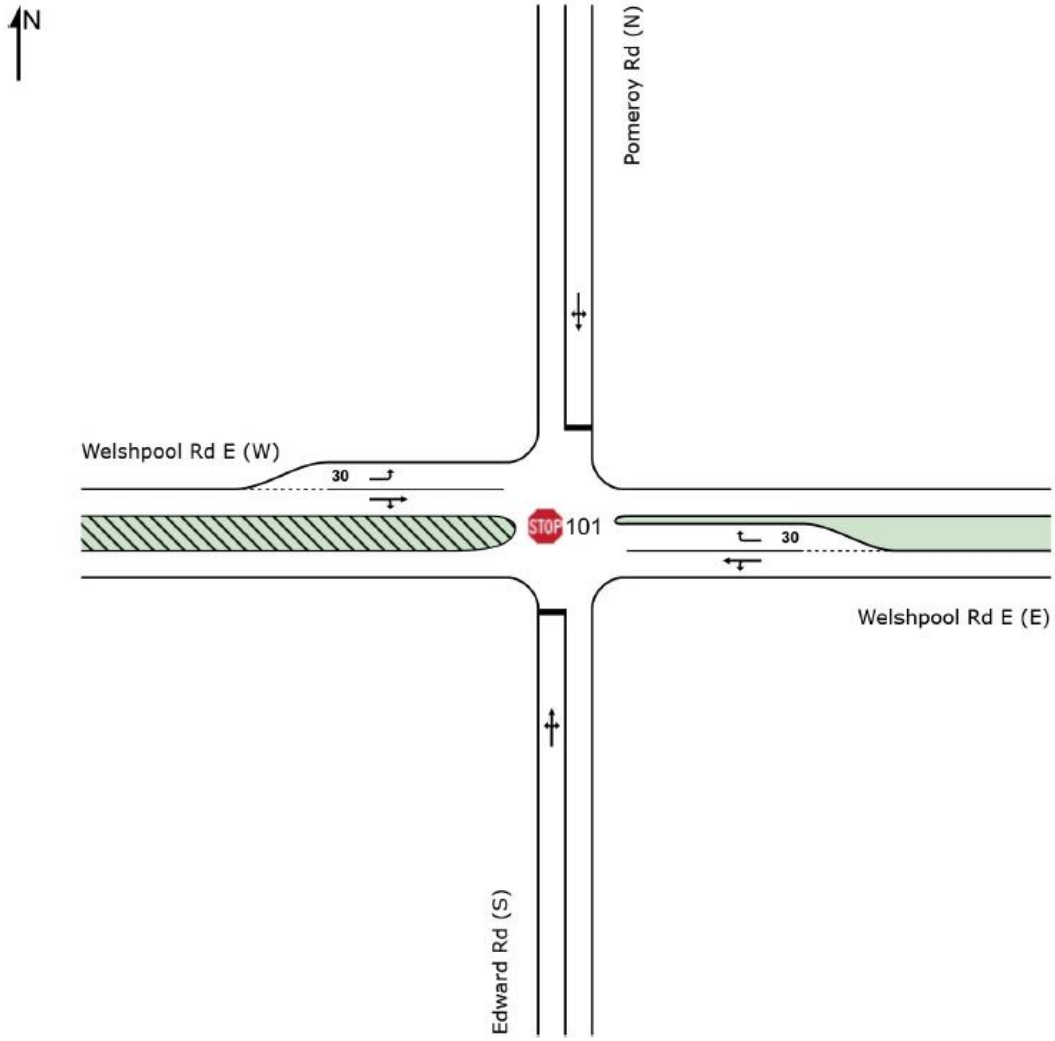


The intersection has been modelled inclusive of its proposed turn pocket treatments in SIDRA Intersection 8. All lanes operate at a Level of Service A in 2031, no further upgrades are required with addition of Scenario 3 development traffic.

Welshpool Road East / Pomeroy Road

The 4 – way stop sign controlled intersection at Welshpool Road East, Pomeroy Road and Edward Street is close to capacity in 2031 primarily due to the high demand for the right turn movement from Pomeroy Road onto Welshpool Road East. This right turn lane operates at a Level of Service E in the AM Peak with an average queue of 10 vehicles and an average delay of 38 seconds. In addition to the existing lane configuration the high turning volumes warrant a channalised right turn movement for vehicles turning right from Welshpool Road East onto Pomeroy Road and a left turn slip lane for vehicles turning left from Welshpool Road East onto Pomeroy Road. The proposed intersection configuration is shown in Figure 8.

Figure 8: Proposed intersection configuration Welshpool Road E / Pomeroy Road 2031



This congestion is a result of the growth determined from the strategic STEM model not as a result of Scenario 3 development traffic. Dependent on what development were to occur it is likely the intersection would need to be looked at in more detail to determine whether or not an alternative intersection treatment is required. Typically, a roundabout would be considered at this location in preference over a signalised intersection.

Comparison of Intersections Performance

The comparison of the performances for the intersection between three different scenarios are shown in Figure 9.

Figure 9: Comparison of Intersections Performance

Overall Intersection Performance	2019 AM			2019 PM			2031 AM (w/o Scenario 3 Dev)			2031 PM (w/o Scenario 3 Dev)			2031 AM (with Scenario 3 Dev)			2031 PM (with Scenario 3 Dev)		
	DOS	LOS	Queue (95%, m)	DOS	LOS	Queue (95%, m)	DOS	LOS	Queue (95%, m)	DOS	LOS	Queue (95%, m)	DOS	LOS	Queue (95%, m)	DOS	LOS	Queue (95%, m)
Canning Road / Pickering Brook Road	14.6%	A	5.3	12.9%	A	5.4	18.2%	A	6.1	11.6%	A	3.8	21.1%	A	6.9	14.0%	A	4.3
Canning Road / Welshpool Road East	15.9%	A	3.7	18.4%	A	5.7	20.6%	A	6	28.1%	A	8.9	29.1%	B	9.6	39.6%	B	16.6
Welshpool Road East / Pomeroy Road	45.4%	B	17.6	41.3%	B	15.2	86.0%	E	72.3	70.4%	D	43.3	95.5%	F	107.7	80.4%	D	56.7

Summary

The traffic generated by the proposed development Scenario 3 will have a negligible impact on the existing traffic network in 2031, the majority of deficiencies in the network at 2031 are due to forecast growth in background traffic and not as a direct result of the proposed development.

The local access roads of Davey Road, Isaacs Road and Carinyah Road should all be upgraded to current standards adjacent to the development site as a matter of due course. The potential intersection upgrade of Pomeroy Road and Welshpool Road East should be monitored as it is heavily dependent on the growth in background traffic. Scenario 3 development traffic in and of itself would not require any upgrades to the intersections current form and function.

APPENDIX A

SIDRA Output Reports

USER REPORT FOR SITE

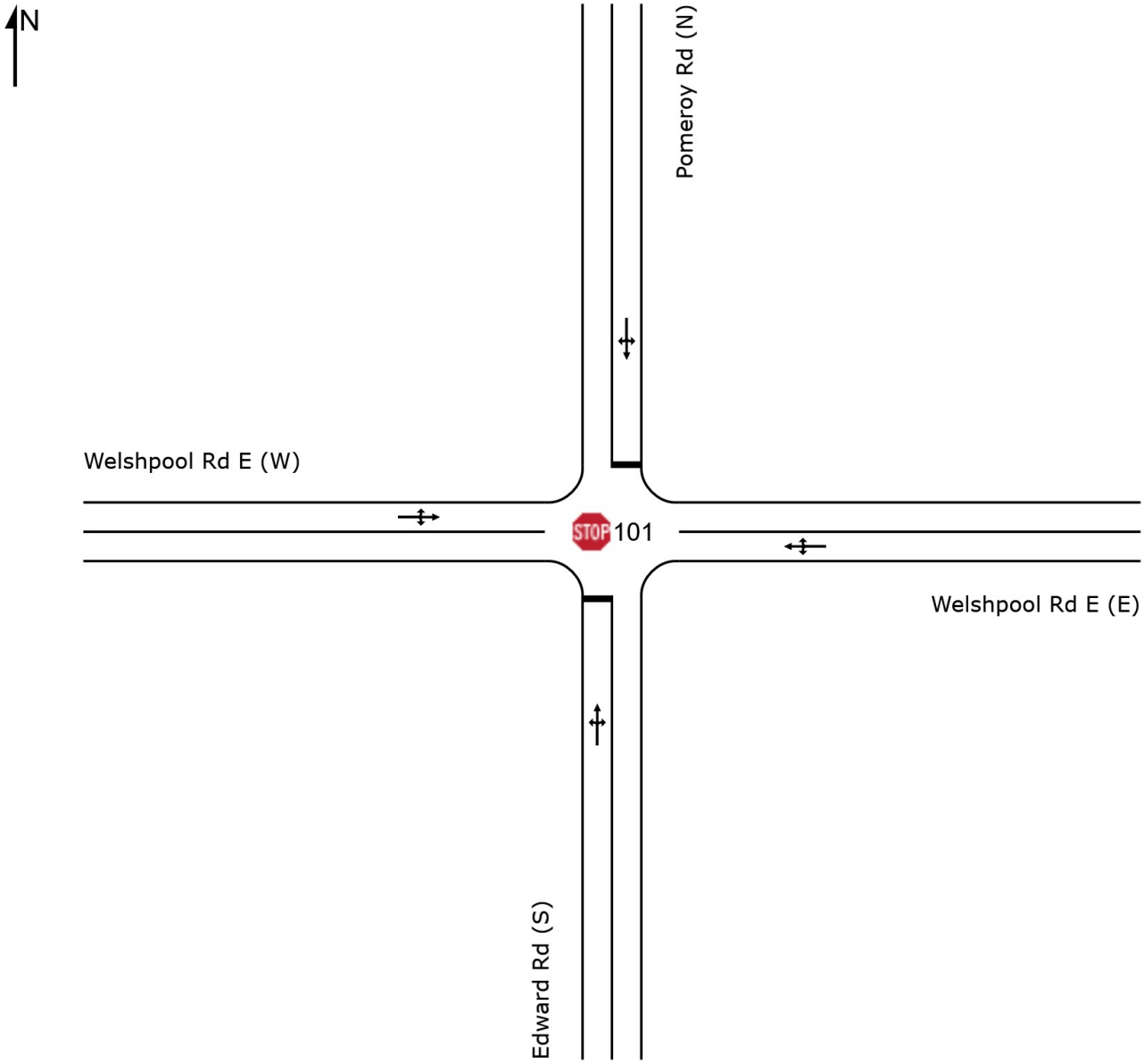
Project: 200206sid-W185990 Pickering Brook - Sidra

Template: GTA Appendix Report (Non Signalised)

Site: 101 [2019 AM - Welsphool Rd/Pomeroy/Edward]

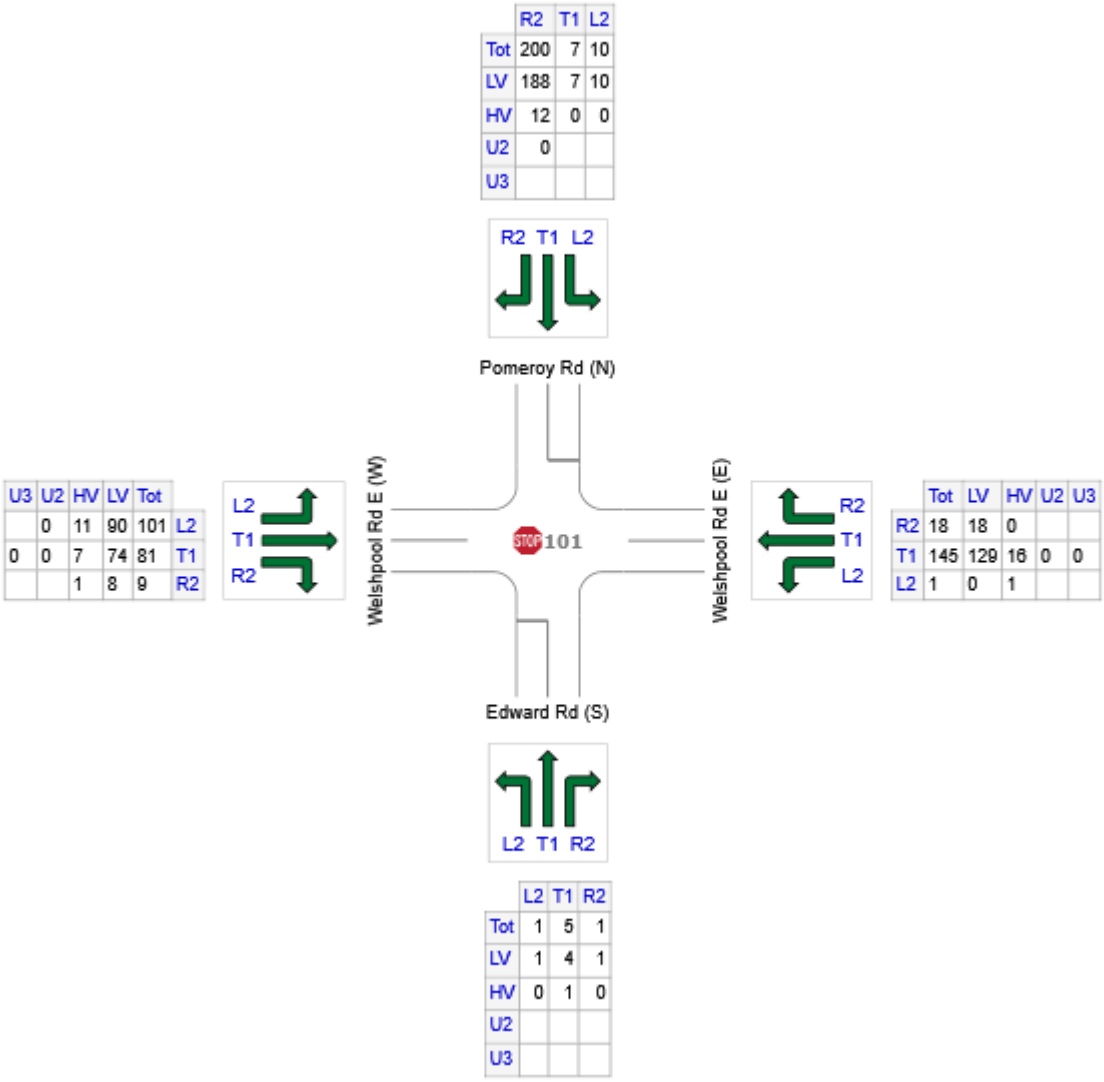
New Site
Site Category: (None)
Stop (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Articulated (C6-10) (U2)	B Double (Class 1
S: Edward Rd (S)	7	6	1	-	-
E: Welshpool Rd E (E)	164	147	17	0	0
N: Pomeroy Rd (N)	217	205	12	0	-
W: Welshpool Rd E (W)	191	172	19	0	0
Total	579	530	49	0	0

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Edward Rd (S)													
Lane 1	7	14.3	466	0.016	100	12.3	LOS B	0.0	0.4	Full	500	0.0	0.0
Approach	7	14.3		0.016		12.3	LOS B	0.0	0.4				
East: Welshpool Rd E (E)													
Lane 1	173	10.4	1740	0.099	100	0.8	LOS A	0.1	1.1	Full	500	0.0	0.0
Approach	173	10.4		0.099		0.8	NA	0.1	1.1				
North: Pomeroy Rd (N)													
Lane 1	228	5.5	503	0.454	100	13.8	LOS B	2.4	17.6	Full	500	0.0	0.0
Approach	228	5.5		0.454		13.8	LOS B	2.4	17.6				
West: Welshpool Rd E (W)													
Lane 1	201	9.9	1719	0.117	100	3.4	LOS A	0.1	0.8	Full	500	0.0	0.0
Approach	201	9.9		0.117		3.4	NA	0.1	0.8				
Intersection	609	8.5		0.454		6.6	NA	2.4	17.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

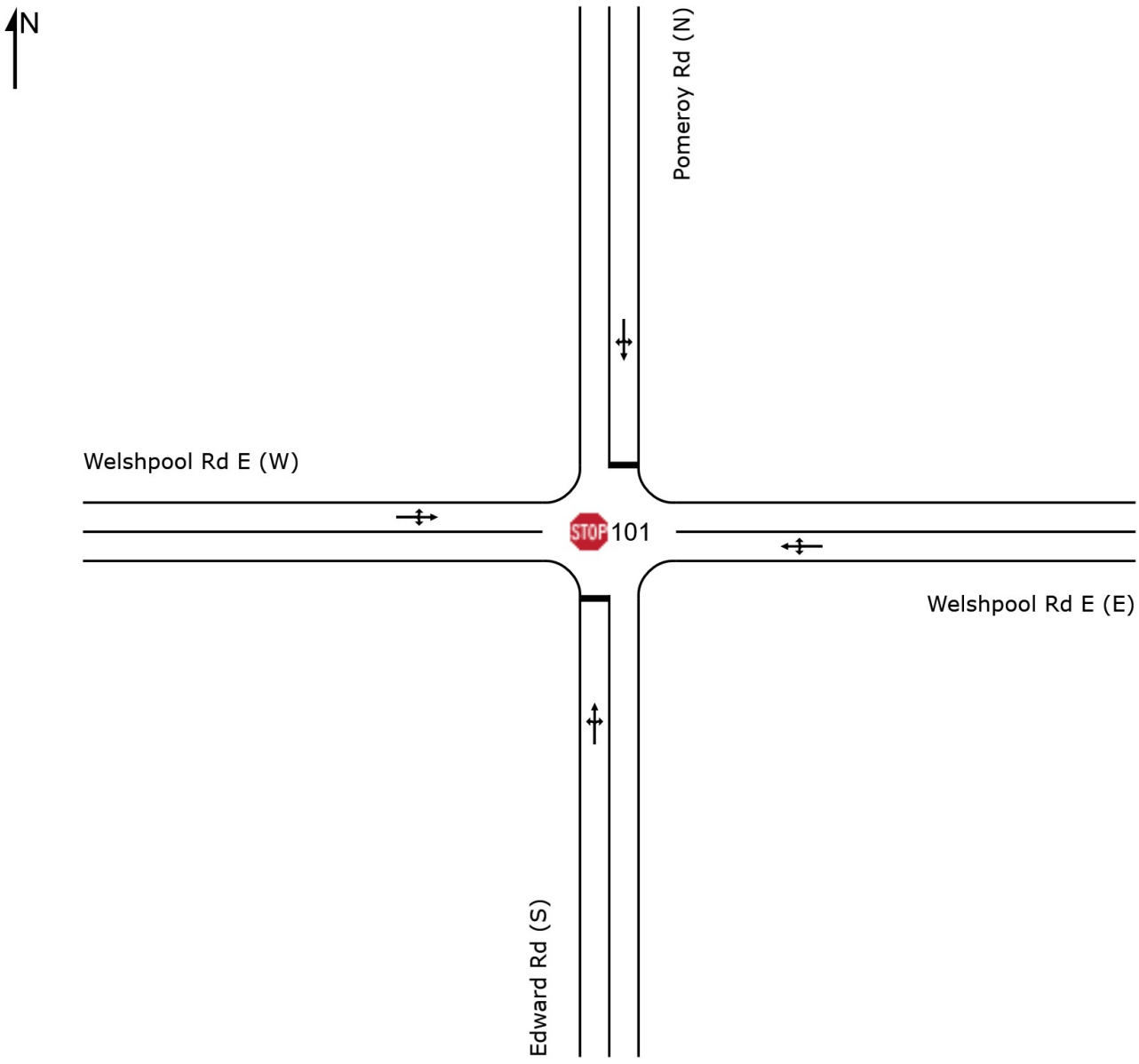
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2019 PM - Welshpool Rd/Pomeroy/Edward]

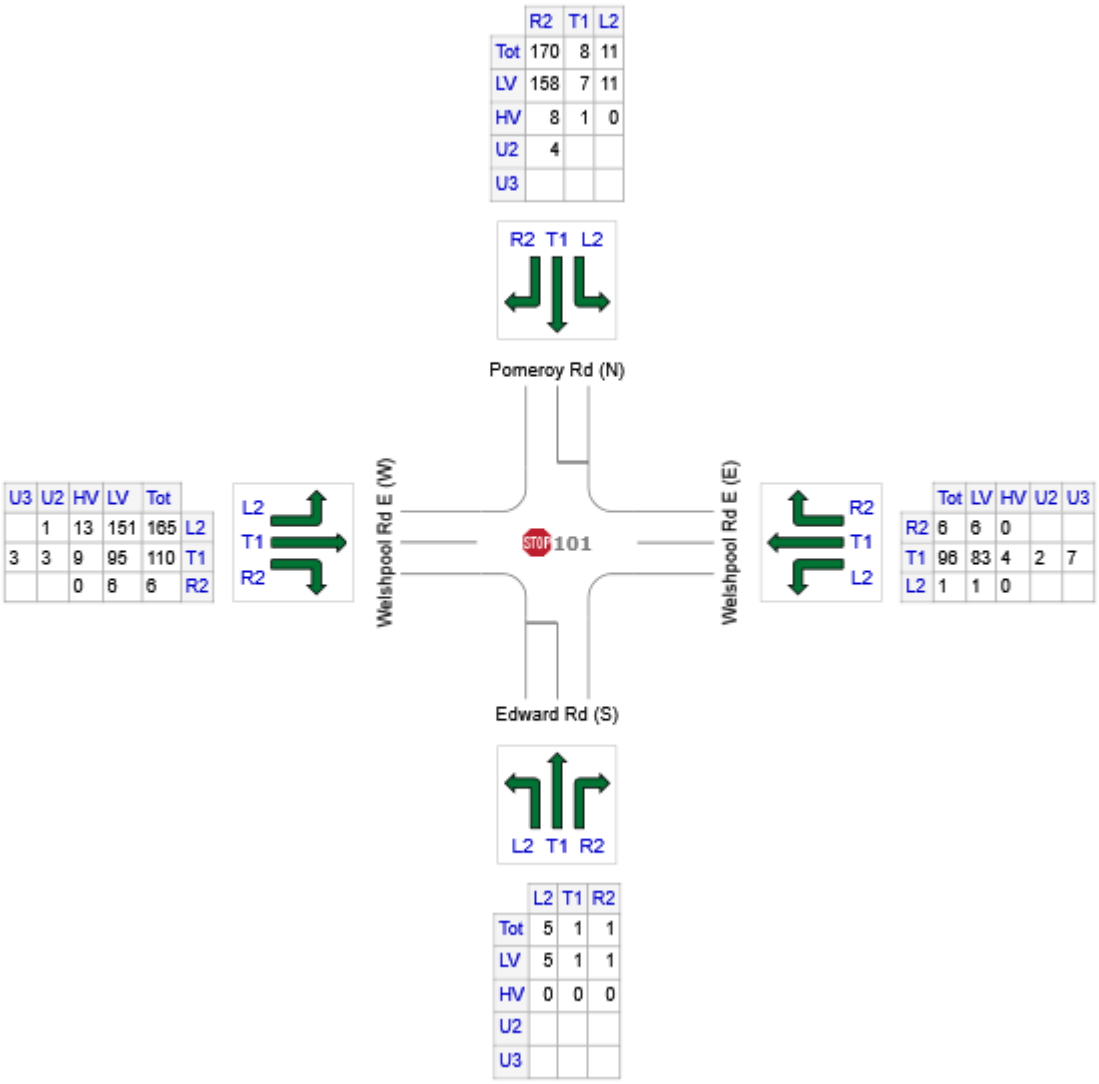
New Site
Site Category: (None)
Stop (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Articulated (C6-9) (U2)	B Double (Class 10
S: Edward Rd (S)	7	7	0	-	-
E: Welshpool Rd E (E)	103	90	4	2	7
N: Pomeroy Rd (N)	189	176	9	4	-
W: Welshpool Rd E (W)	281	252	22	4	3
Total	580	525	35	10	10

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Edward Rd (S)													
Lane 1	7	0.0	876	0.008	100	9.1	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	7	0.0		0.008		9.1	LOS A	0.0	0.2				
East: Welshpool Rd E (E)													
Lane 1	108	12.6	1521	0.071	100	0.5	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	108	12.6		0.071		0.5	NA	0.1	0.5				
North: Pomeroy Rd (N)													
Lane 1	199	6.9	482	0.413	100	13.9	LOS B	2.0	15.2	Full	500	0.0	0.0
Approach	199	6.9		0.413		13.9	LOS B	2.0	15.2				
West: Welshpool Rd E (W)													
Lane 1	296	10.3	1674	0.177	100	3.5	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	296	10.3		0.177		3.5	NA	0.1	0.5				
Intersection	611	9.5		0.413		6.4	NA	2.0	15.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

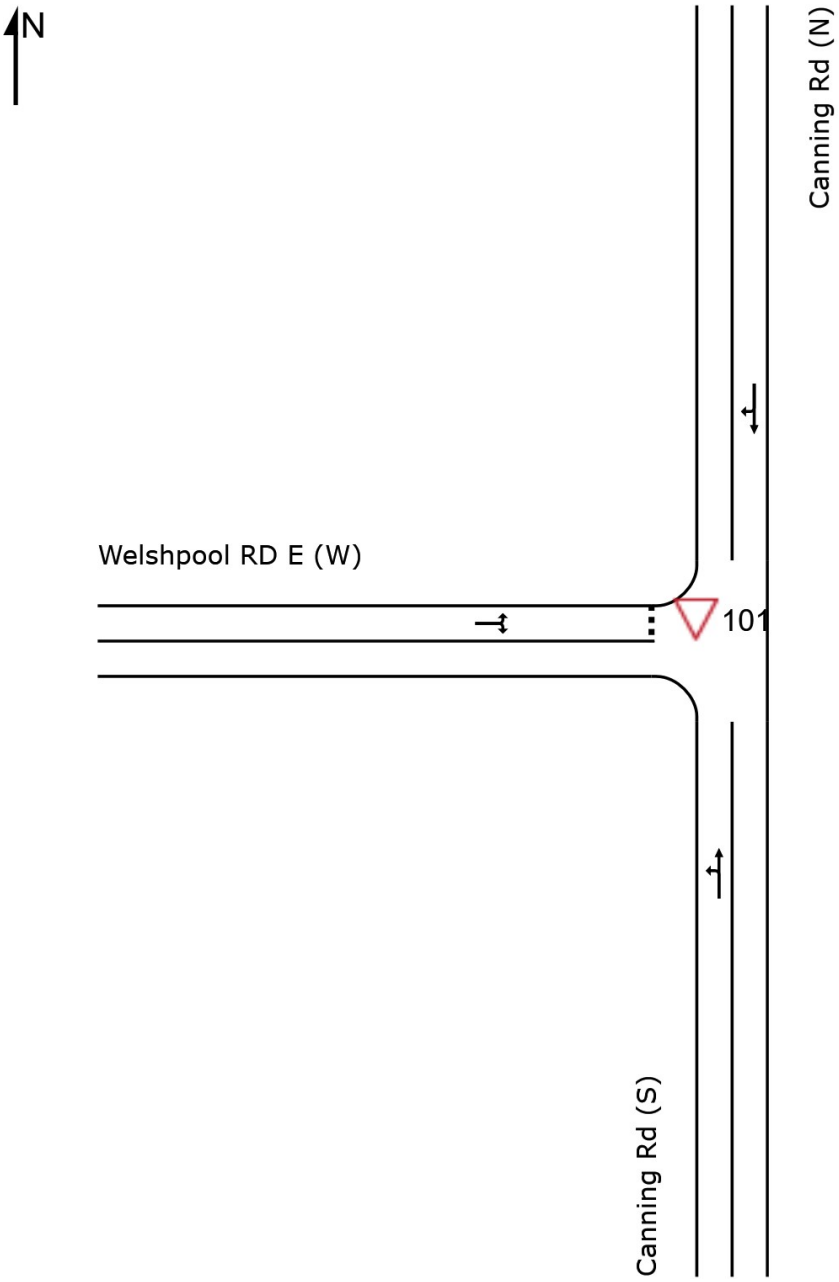
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2019 AM - Canning Rd/Welshpool Rd E]

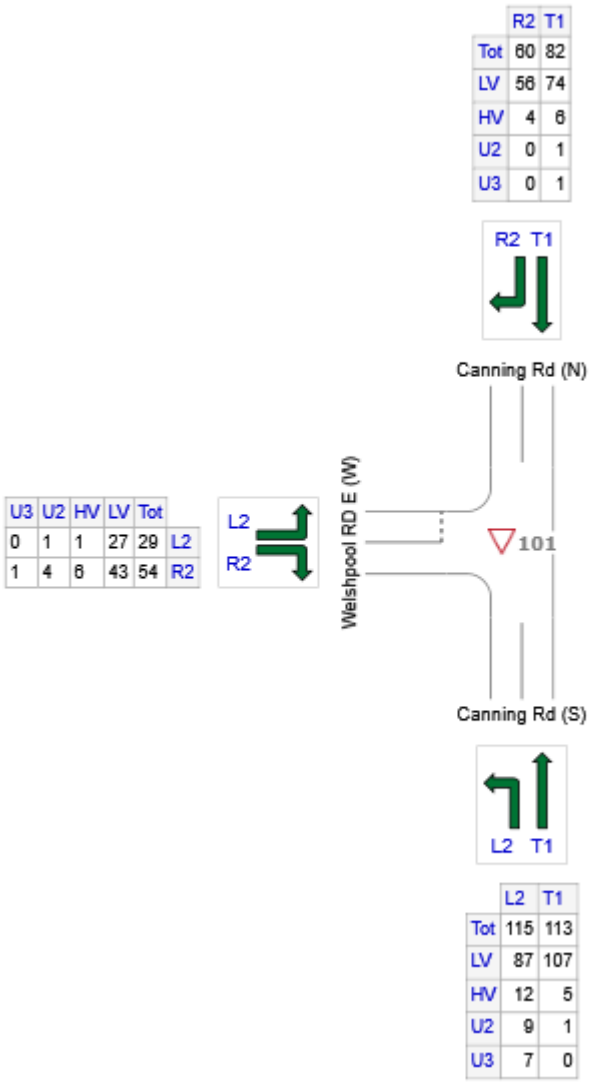
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Articulated (C6-10) (U2)	B Double (Class
S: Canning Rd (S)	228	194	17	10	7
N: Canning Rd (N)	142	130	10	1	1
W: Welshpool RD E (W)	83	70	7	5	1
Total	453	394	34	16	9

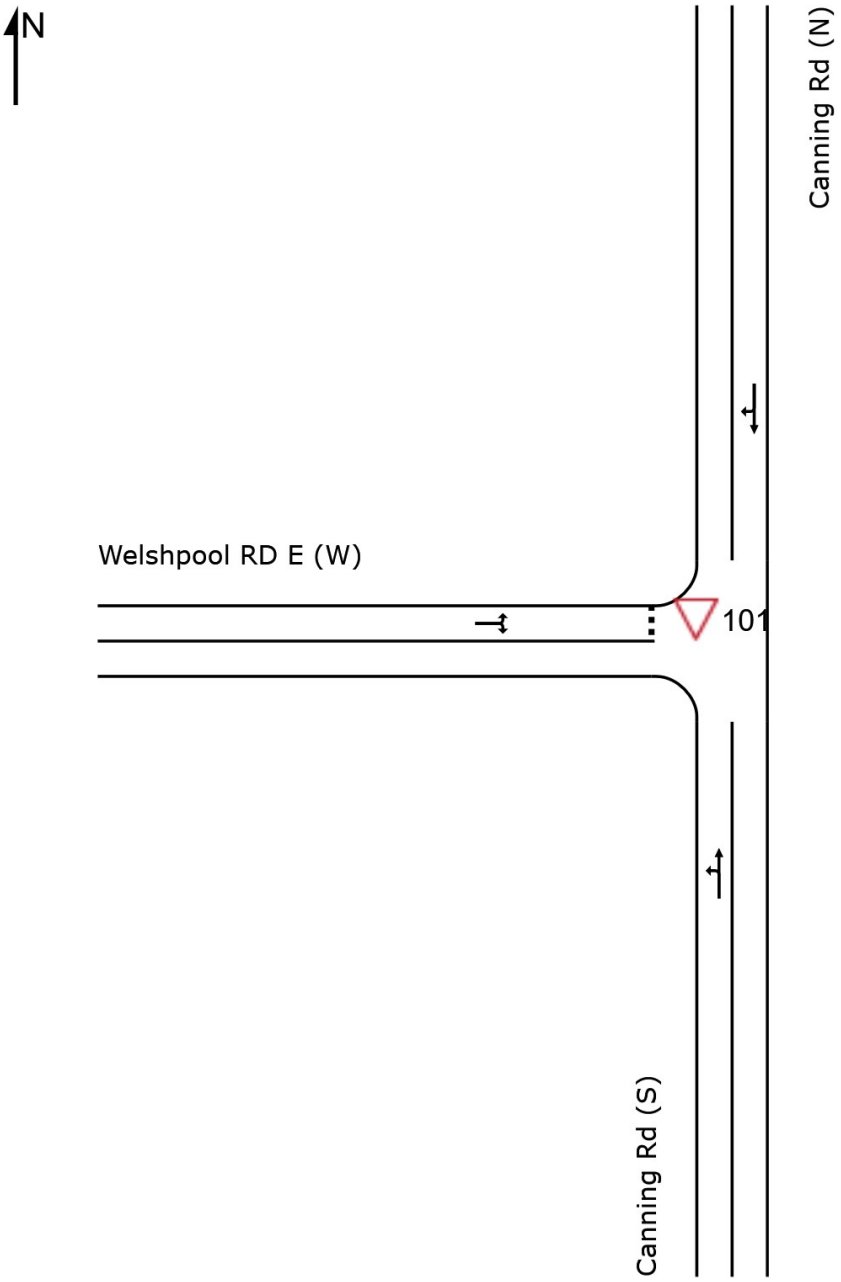
Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	240	14.9	1510	0.159	100	3.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	240	14.9		0.159		3.0	NA	0.0	0.0				
North: Canning Rd (N)													
Lane 1	149	8.5	1549	0.096	100	3.1	LOS A	0.4	3.2	Full	500	0.0	0.0
Approach	149	8.5		0.096		3.1	NA	0.4	3.2				
West: Welshpool RD E (W)													
Lane 1	87	15.7	674	0.130	100	8.0	LOS A	0.4	3.7	Full	500	0.0	0.0
Approach	87	15.7		0.130		8.0	LOS A	0.4	3.7				
Intersection	477	13.0		0.159		4.0	NA	0.4	3.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2019 PM - Canning Rd/Welshpool Rd E]

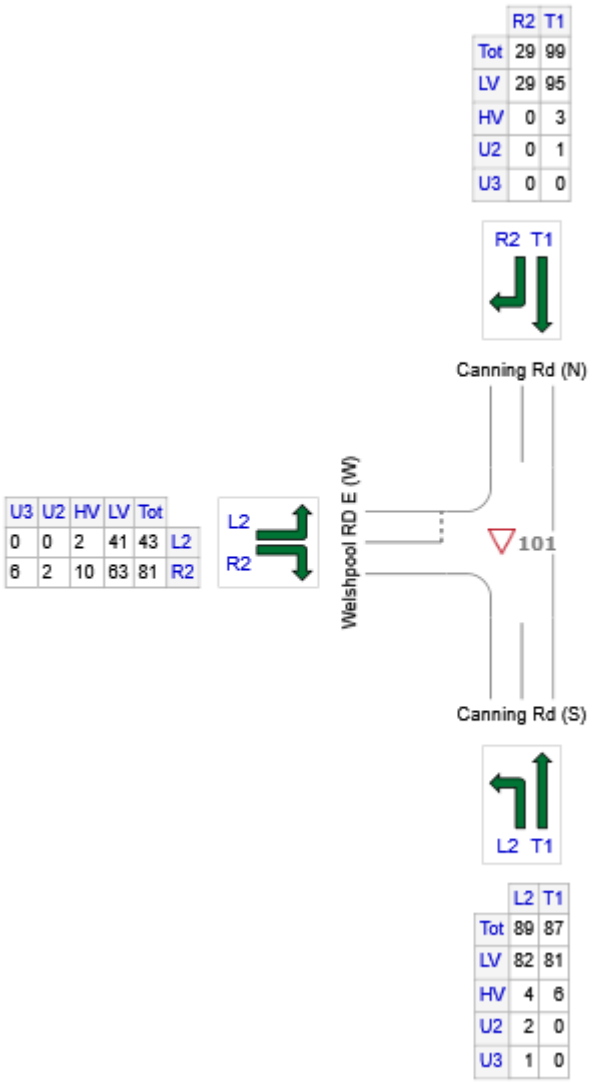
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Articulated (C6-10) (U2)	B Double (Class
S: Canning Rd (S)	176	163	10	2	1
N: Canning Rd (N)	128	124	3	1	0
W: Welshpool RD E (W)	124	104	12	2	6
Total	428	391	25	5	7

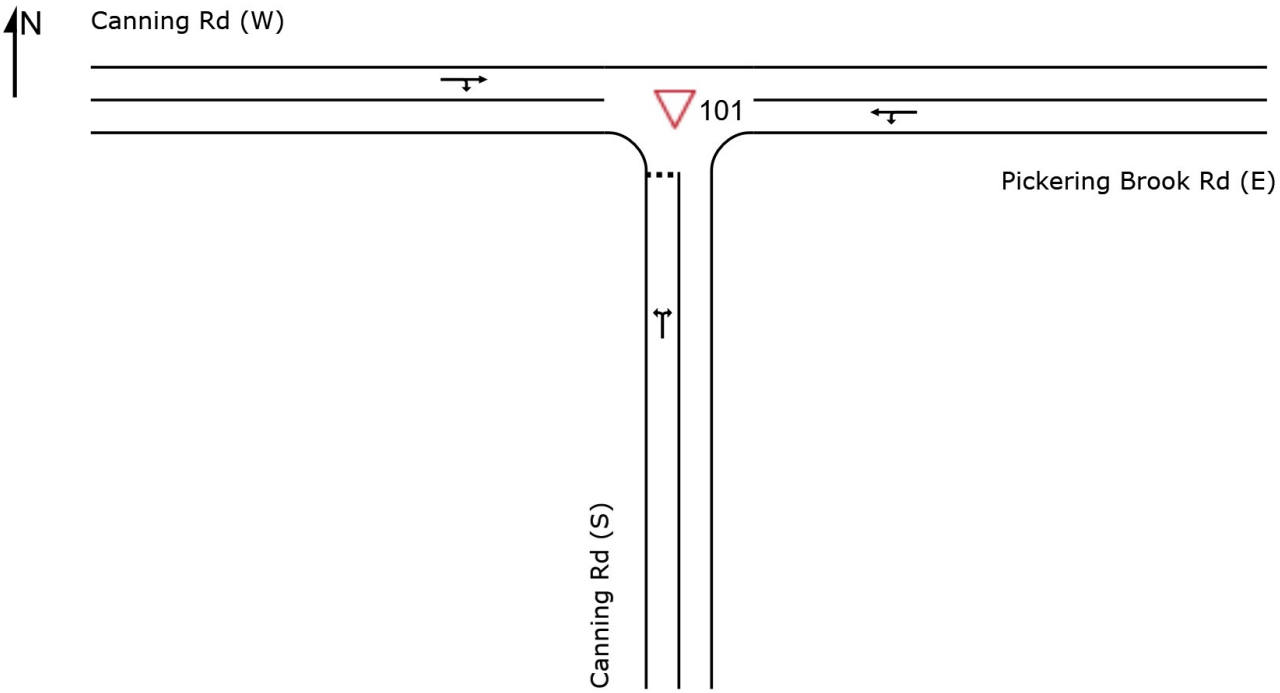
Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	185	7.4	1745	0.106	100	2.9	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	185	7.4		0.106		2.9	NA	0.0	0.0				
North: Canning Rd (N)													
Lane 1	135	3.1	1779	0.076	100	1.5	LOS A	0.2	1.5	Full	500	0.0	0.0
Approach	135	3.1		0.076		1.5	NA	0.2	1.5				
West: Welshpool RD E (W)													
Lane 1	131	16.1	709	0.184	100	7.7	LOS A	0.6	5.7	Full	500	0.0	0.0
Approach	131	16.1		0.184		7.7	LOS A	0.6	5.7				
Intersection	451	8.6		0.184		3.9	NA	0.6	5.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2019 AM - Canning Rd/Pickering Brook Rd]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

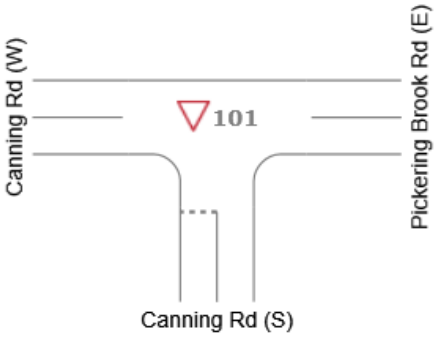
Site Layout



Input Volumes

Volume Display Method: Separate

U3	U2	HV	LV	Tot	
0	1	5	89	95	T1
2	3	11	47	63	R2



	Tot	LV	HV	U2	U3
T1	112	96	10	6	0
L2	23	21	1	1	0

	L2	R2
Tot	116	27
LV	98	23
HV	8	2
U2	3	2
U3	7	0

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Articulated (C6-10) (U2)	B Double (Class
S: Canning Rd (S)	143	121	10	5	7
E: Pickering Brook Rd (E)	135	117	11	7	0
W: Canning Rd (W)	158	136	16	4	2
Total	436	374	37	16	9

Lane Use and Performance

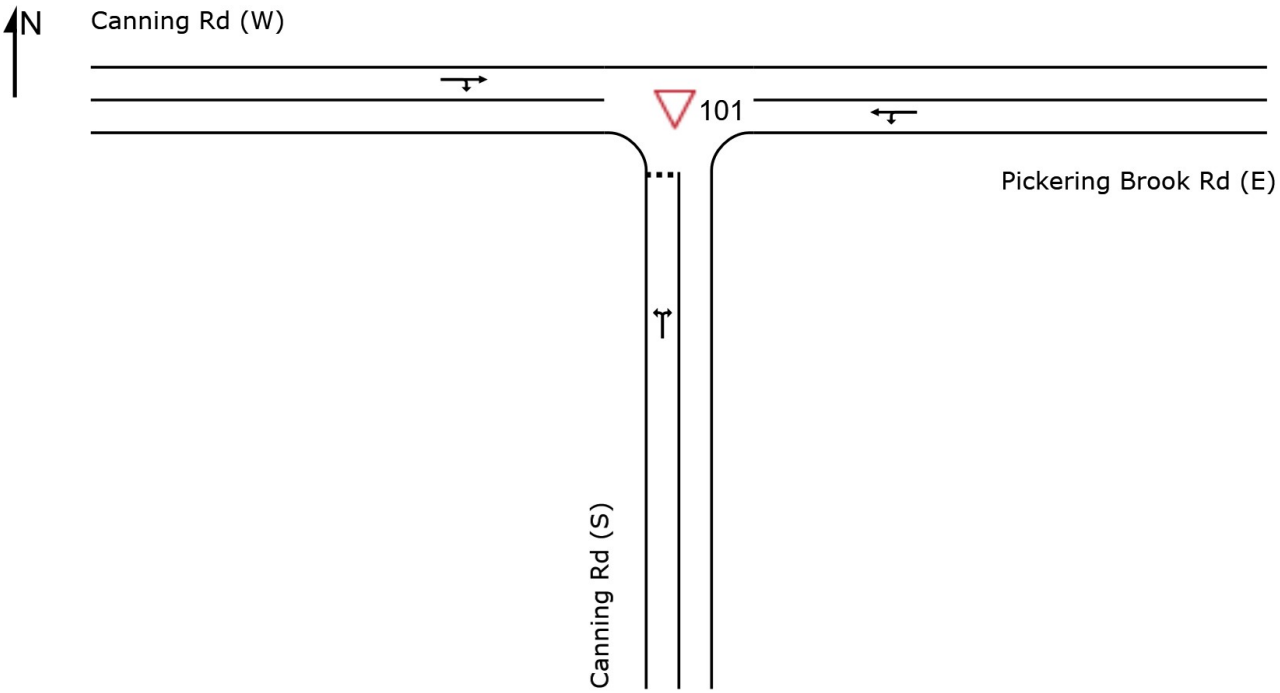
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	151	15.4	1029	0.146	100	6.8	LOS A	0.6	5.3	Full	500	0.0	0.0
Approach	151	15.4		0.146		6.8	LOS A	0.6	5.3				
East: Pickering Brook Rd (E)													
Lane 1	142	13.3	1647	0.086	100	1.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	142	13.3		0.086		1.0	NA	0.0	0.0				
West: Canning Rd (W)													
Lane 1	166	13.9	1465	0.114	100	2.9	LOS A	0.5	4.1	Full	500	0.0	0.0
Approach	166	13.9		0.114		2.9	NA	0.5	4.1				
Intersection	459	14.2		0.146		3.6	NA	0.6	5.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2019 PM - Canning Rd/Pickering Brook Rd]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

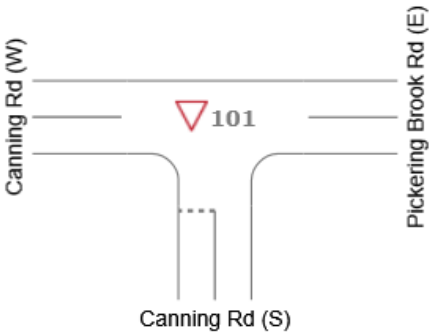
Site Layout



Input Volumes

Volume Display Method: Separate

U3	U2	HV	LV	Tot	
0	0	5	57	62	T1
7	2	7	106	122	R2



	Tot	LV	HV	U2	U3
T1	72	71	1	0	0
L2	8	8	0	0	0

	L2	R2
Tot	102	10
LV	92	8
HV	7	1
U2	2	1
U3	1	0

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)	Articulated (C6-10) (U2)	B Double (Class
S: Canning Rd (S)	112	100	8	3	1
E: Pickering Brook Rd (E)	80	79	1	0	0
W: Canning Rd (W)	184	163	12	2	7
Total	376	342	21	5	8

Lane Use and Performance

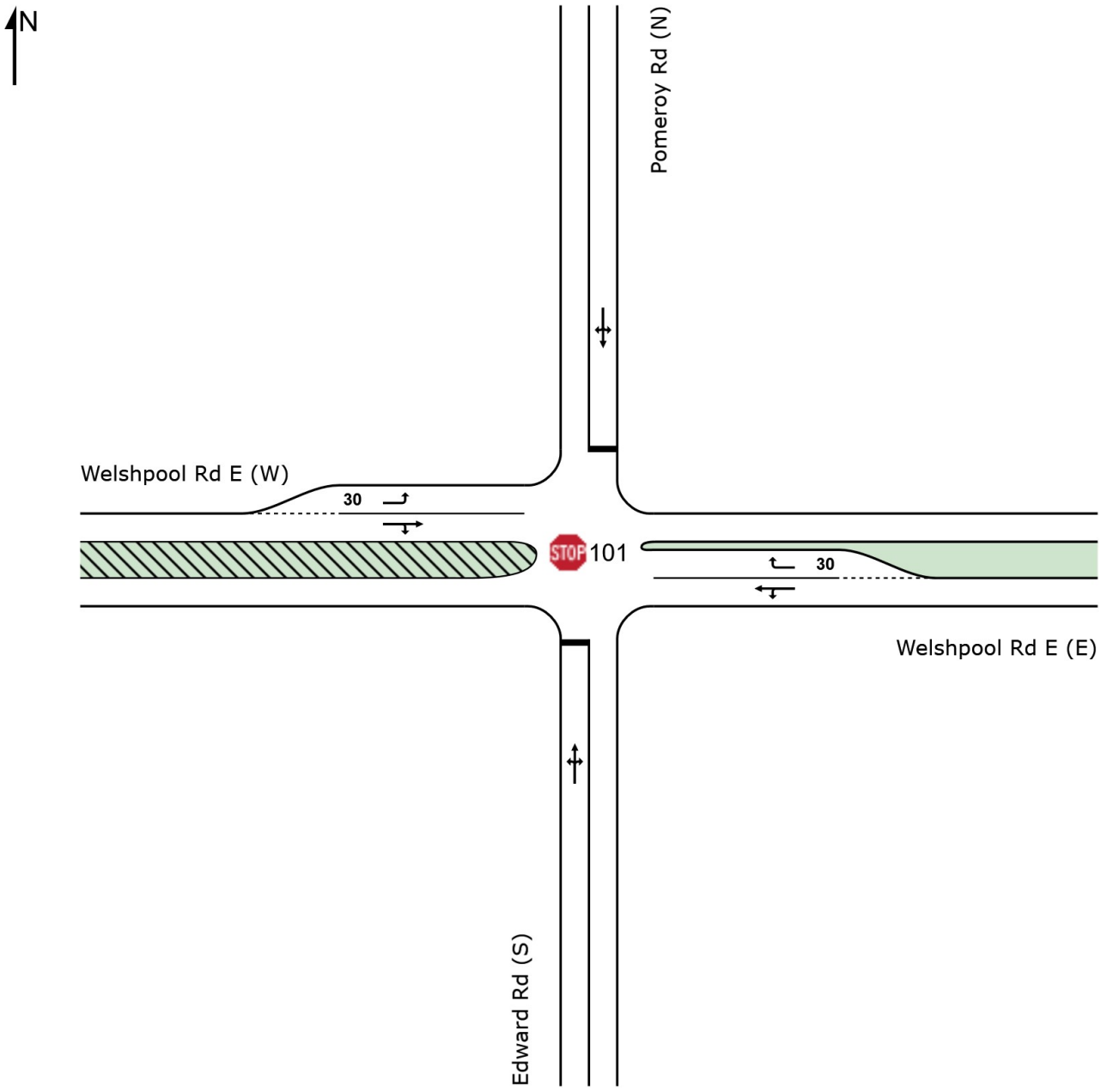
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	118	10.7	1263	0.093	100	6.2	LOS A	0.4	3.0	Full	500	0.0	0.0
Approach	118	10.7		0.093		6.2	LOS A	0.4	3.0				
East: Pickering Brook Rd (E)													
Lane 1	84	1.3	1936	0.043	100	0.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	84	1.3		0.043		0.6	NA	0.0	0.0				
West: Canning Rd (W)													
Lane 1	194	11.4	1500	0.129	100	4.1	LOS A	0.6	5.4	Full	500	0.0	0.0
Approach	194	11.4		0.129		4.1	NA	0.6	5.4				
Intersection	396	9.0		0.129		4.0	NA	0.6	5.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 AM W/O SITE - Welsphool Rd/Pomeroy/Edward]

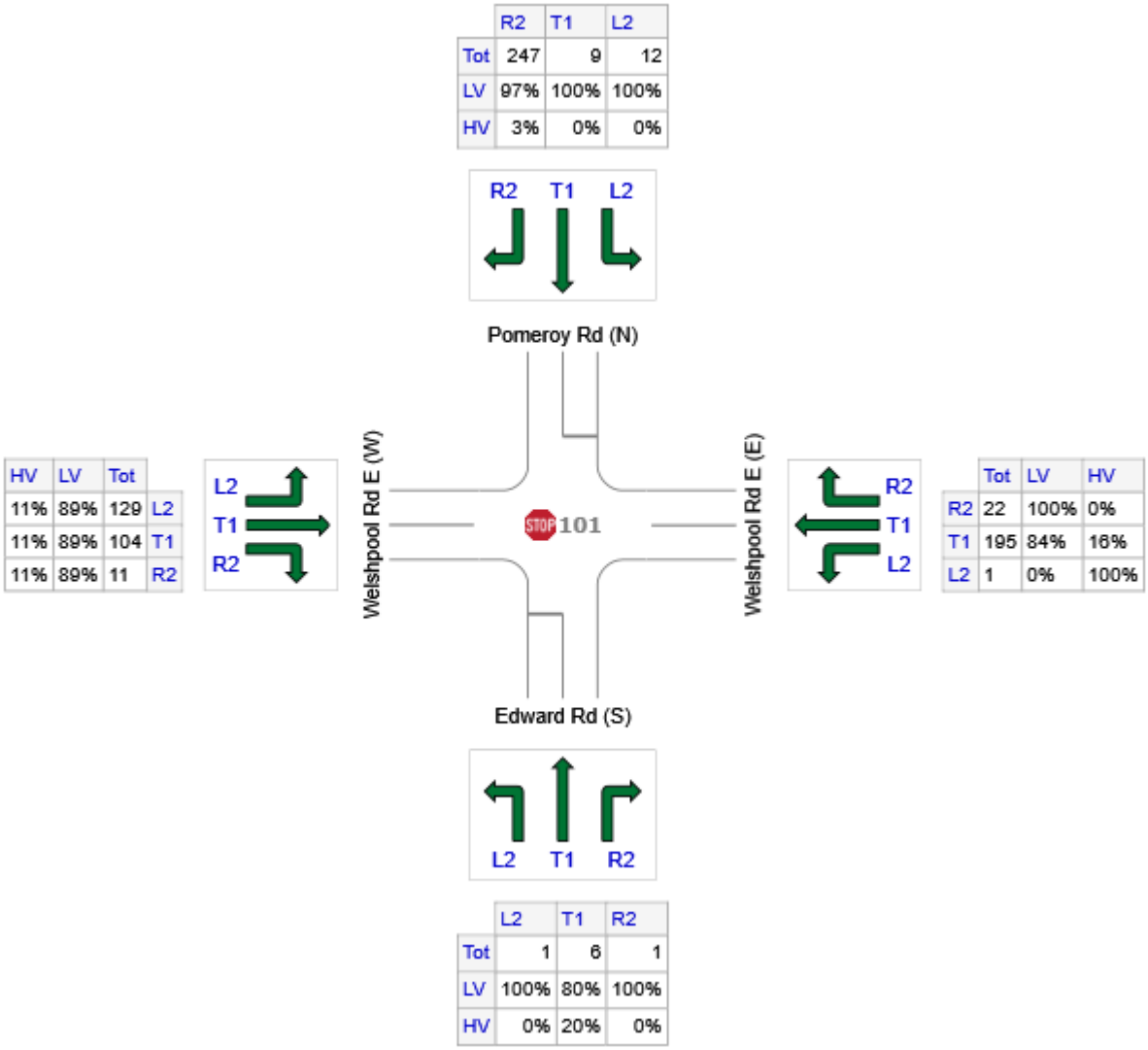
New Site
Site Category: (None)
Stop (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Edward Rd (S)	8	7	1
E: Welshpool Rd E (E)	218	186	32
N: Pomeroy Rd (N)	268	261	7
W: Welshpool Rd E (W)	244	217	27
Total	738	670	68

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Edward Rd (S)													
Lane 1	8	15.0	277	0.030	100	18.1	LOS C	0.1	0.8	Full	500	0.0	0.0
Approach	8	15.0		0.030		18.1	LOS C	0.1	0.8				
East: Welshpool Rd E (E)													
Lane 1	206	16.4	1678	0.123	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	23	0.0	1121	0.021	100	6.4	LOS A	0.1	0.6	Short	30	0.0	NA
Approach	229	14.8		0.123		0.7	NA	0.1	0.6				
North: Pomeroy Rd (N)													
Lane 1	282	2.8	328	0.860	100	38.0	LOS E	10.0	72.3	Full	500	0.0	0.0
Approach	282	2.8		0.860		38.0	LOS E	10.0	72.3				
West: Welshpool Rd E (W)													
Lane 1	136	11.0	1678	0.081	100	5.7	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	121	11.0	1719	0.070	100	0.7	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	257	11.0		0.081		3.3	NA	0.1	0.7				
Intersection	777	9.2		0.860		15.3	NA	10.0	72.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

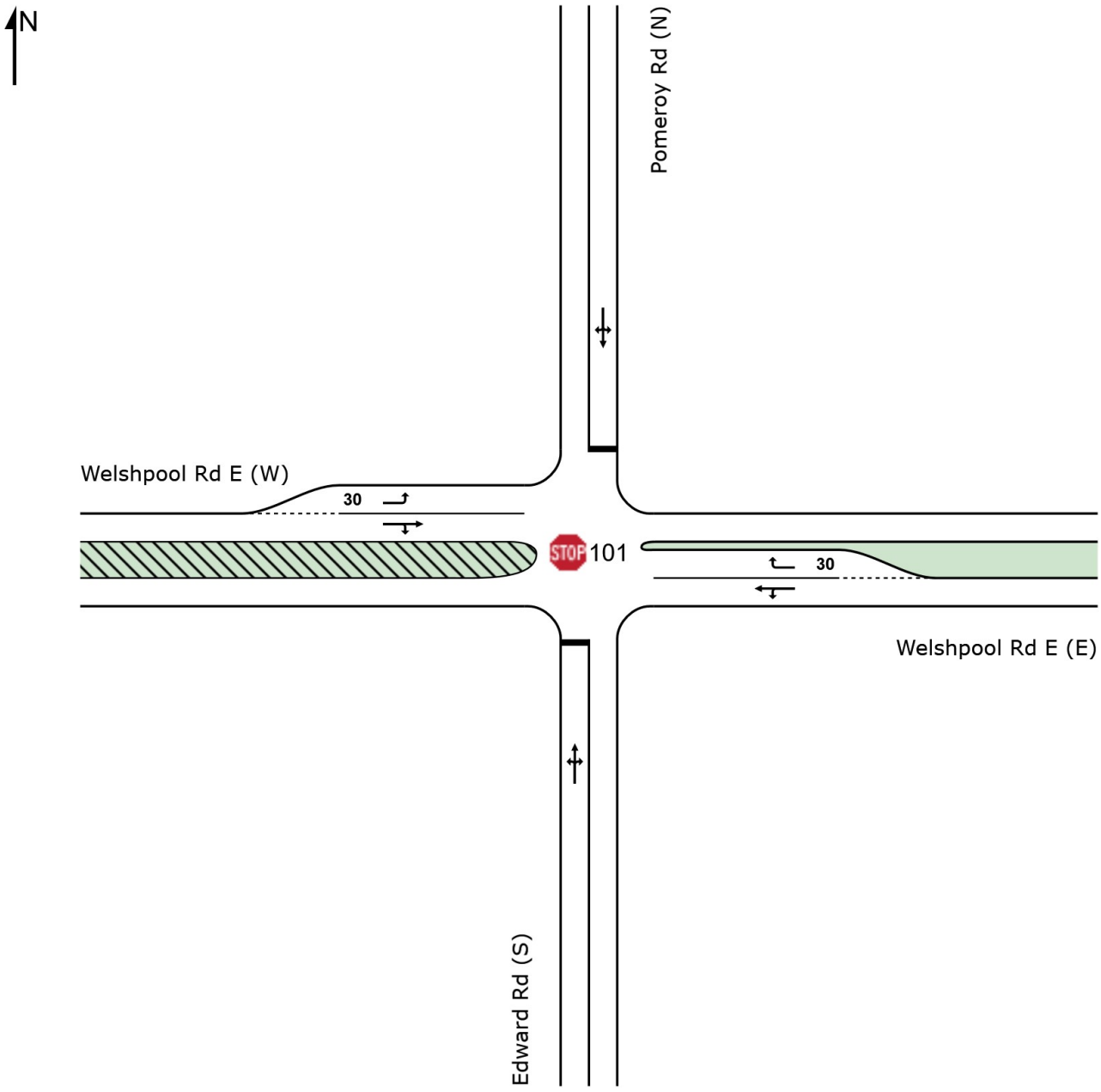
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 PM W/O SITE - Welshpool Rd/Pomeroy/Edward]

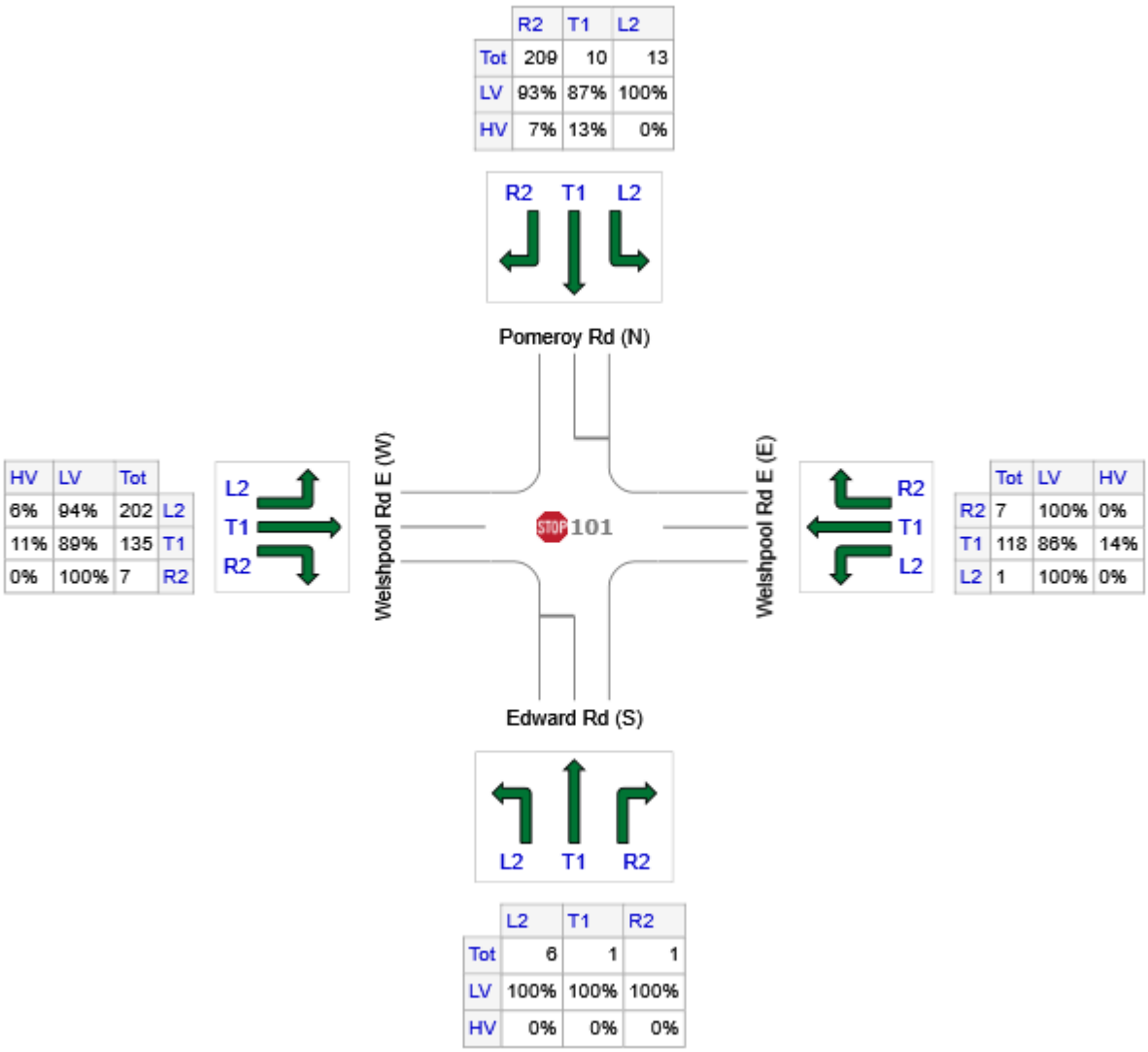
New Site
Site Category: (None)
Stop (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Edward Rd (S)	8	8	0
E: Welshpool Rd E (E)	126	109	17
N: Pomeroy Rd (N)	232	216	16
W: Welshpool Rd E (W)	344	317	27
Total	710	651	59

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Edward Rd (S)													
Lane 1	8	0.0	691	0.012	100	10.1	LOS B	0.0	0.3	Full	500	0.0	0.0
Approach	8	0.0		0.012		10.1	LOS B	0.0	0.3				
East: Welshpool Rd E (E)													
Lane 1	125	13.9	1718	0.073	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	7	0.0	996	0.007	100	6.9	LOS A	0.0	0.2	Short	30	0.0	NA
Approach	133	13.1		0.073		0.4	NA	0.0	0.2				
North: Pomeroy Rd (N)													
Lane 1	244	6.9	347	0.704	100	26.0	LOS D	5.7	43.3	Full	500	0.0	0.0
Approach	244	6.9		0.704		26.0	LOS D	5.7	43.3				
West: Welshpool Rd E (W)													
Lane 1	213	6.0	1763	0.121	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	149	10.5	1770	0.084	100	0.3	LOS A	0.0	0.4	Full	500	0.0	0.0
Approach	362	7.8		0.121		3.4	NA	0.0	0.4				
Intersection	747	8.4		0.704		10.4	NA	5.7	43.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

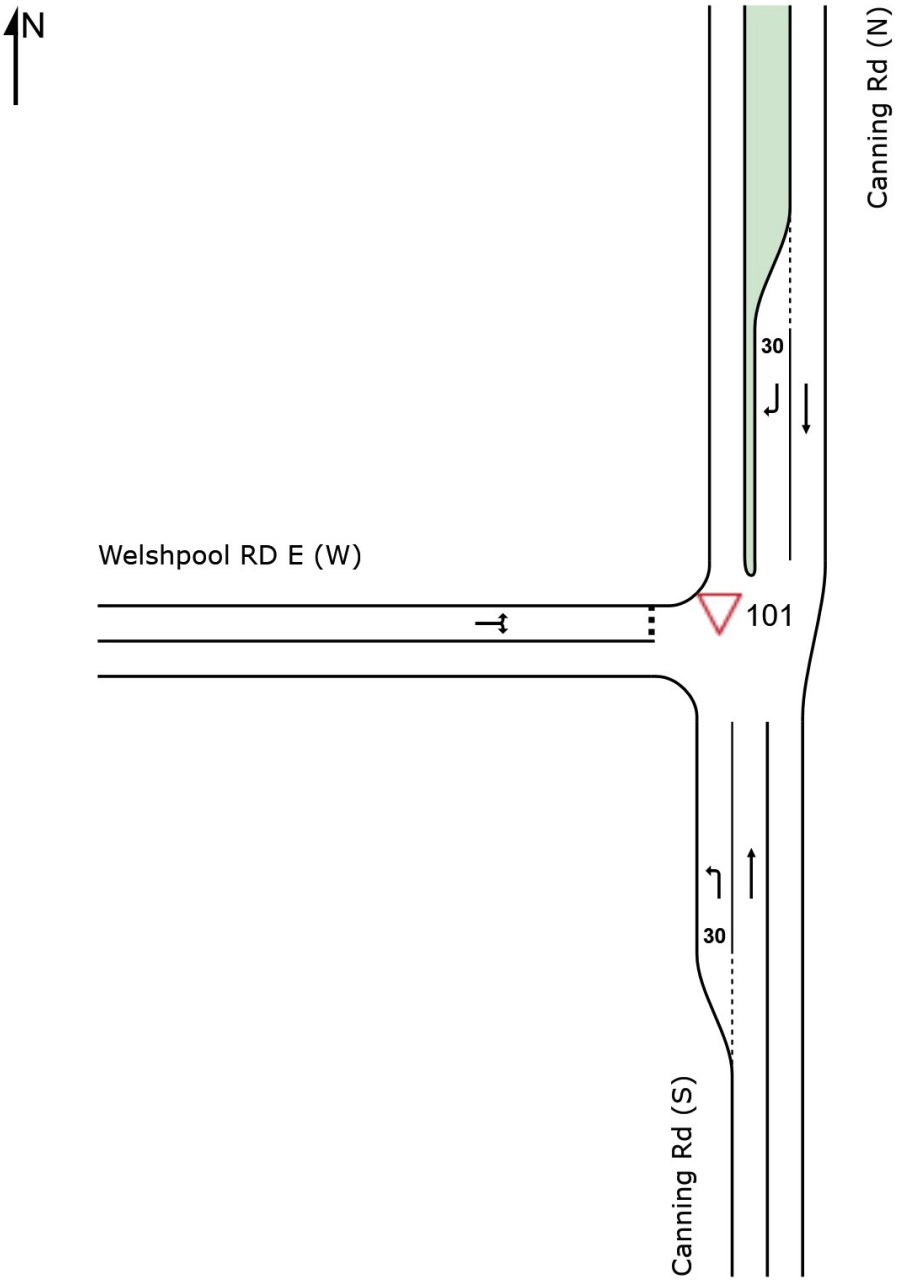
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 AM W/O SITE - Canning Rd/Welshpool Rd E]

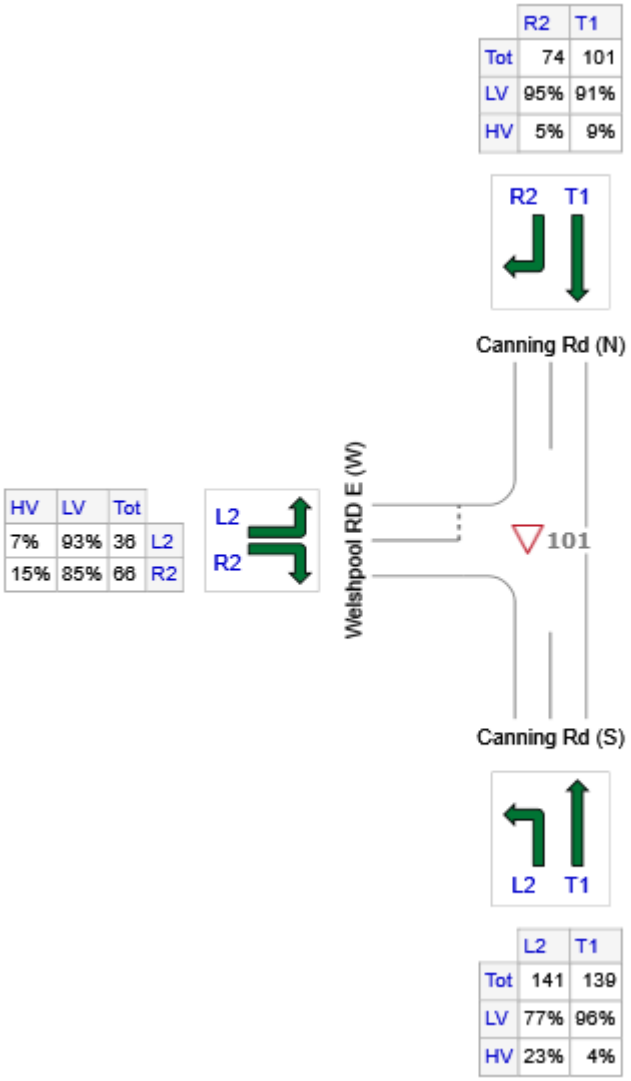
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	280	242	38
N: Canning Rd (N)	175	162	13
W: Welshpool RD E (W)	102	90	12
Total	557	494	63

Lane Use and Performance

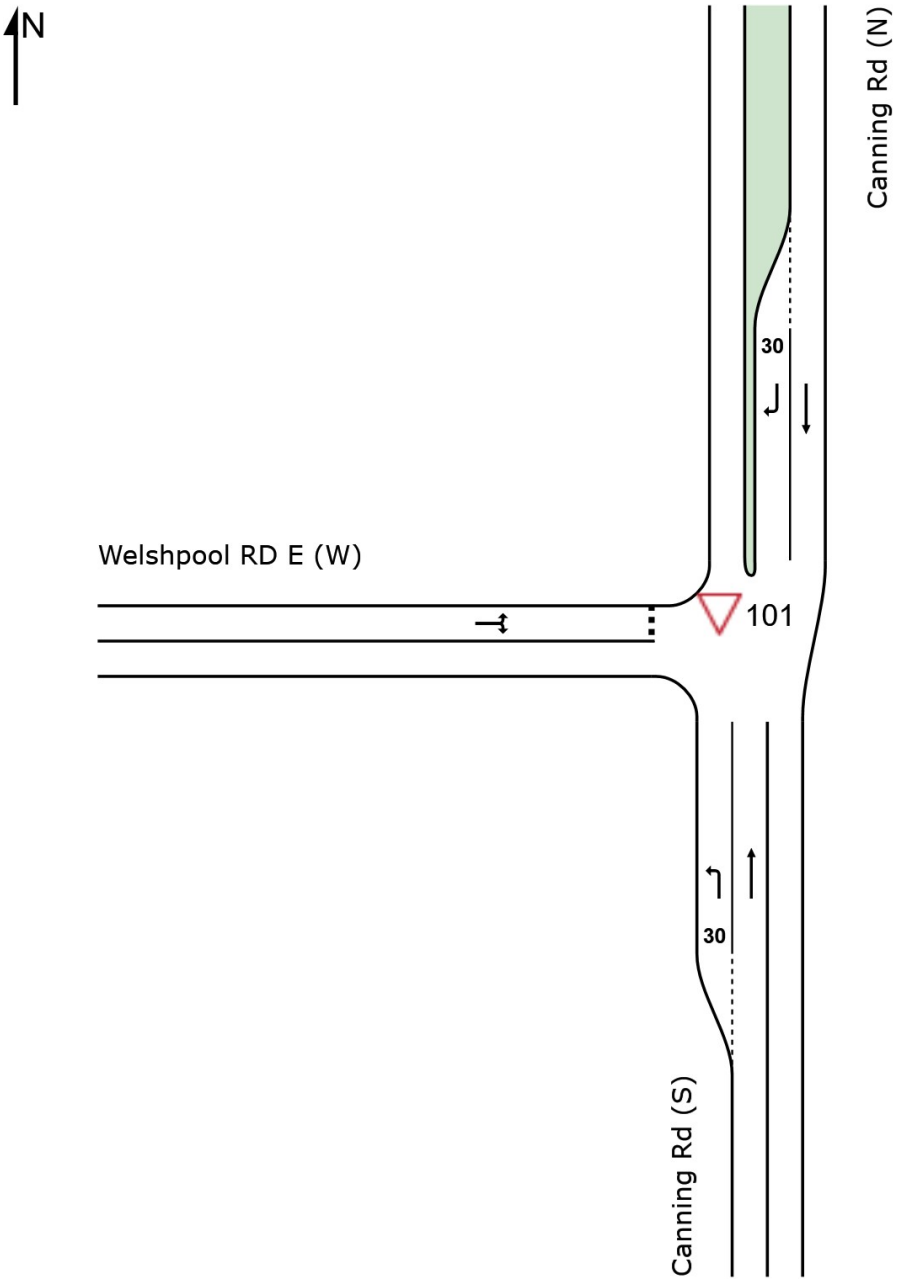
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	148	23.0	1504	0.099	100	5.9	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	146	4.0	1895	0.077	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	295	13.6		0.099		3.0	NA	0.0	0.0				
North: Canning Rd (N)													
Lane 1	106	9.0	1790	0.059	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	78	5.0	1024	0.076	100	6.9	LOS A	0.3	2.2	Short	30	0.0	NA
Approach	184	7.3		0.076		2.9	NA	0.3	2.2				
West: Welshpool RD E (W)													
Lane 1	107	12.2	520	0.206	100	10.0	LOS A	0.8	6.0	Full	500	0.0	0.0
Approach	107	12.2		0.206		10.0	LOS A	0.8	6.0				
Intersection	586	11.3		0.206		4.2	NA	0.8	6.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 PM W/O SITE - Canning Rd/Welshpool Rd E]

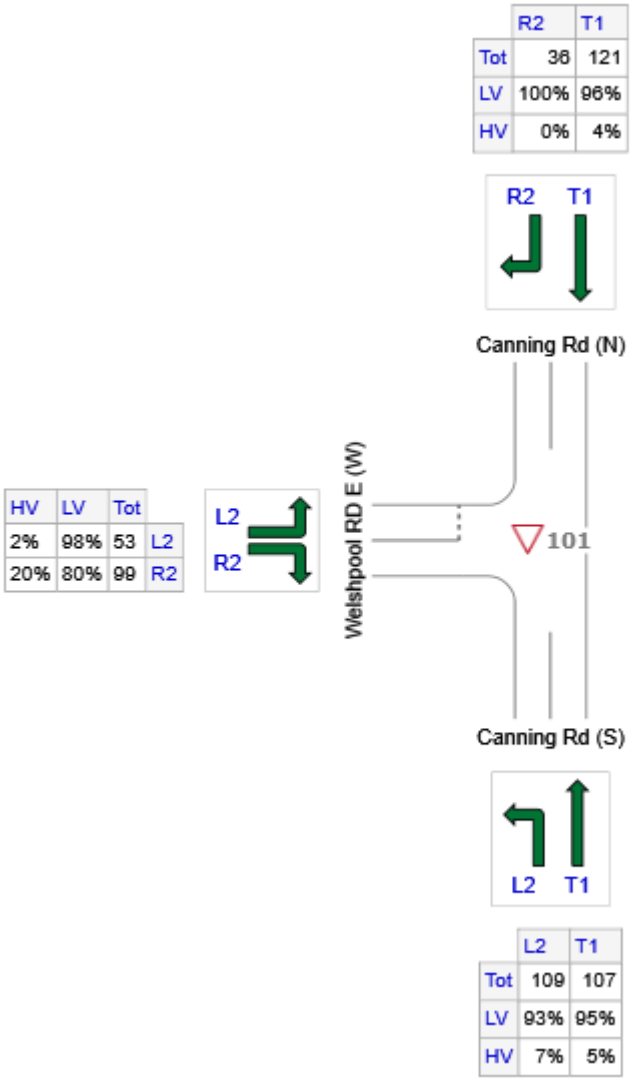
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	216	203	13
N: Canning Rd (N)	157	152	5
W: Welshpool RD E (W)	152	131	21
Total	525	486	39

Lane Use and Performance

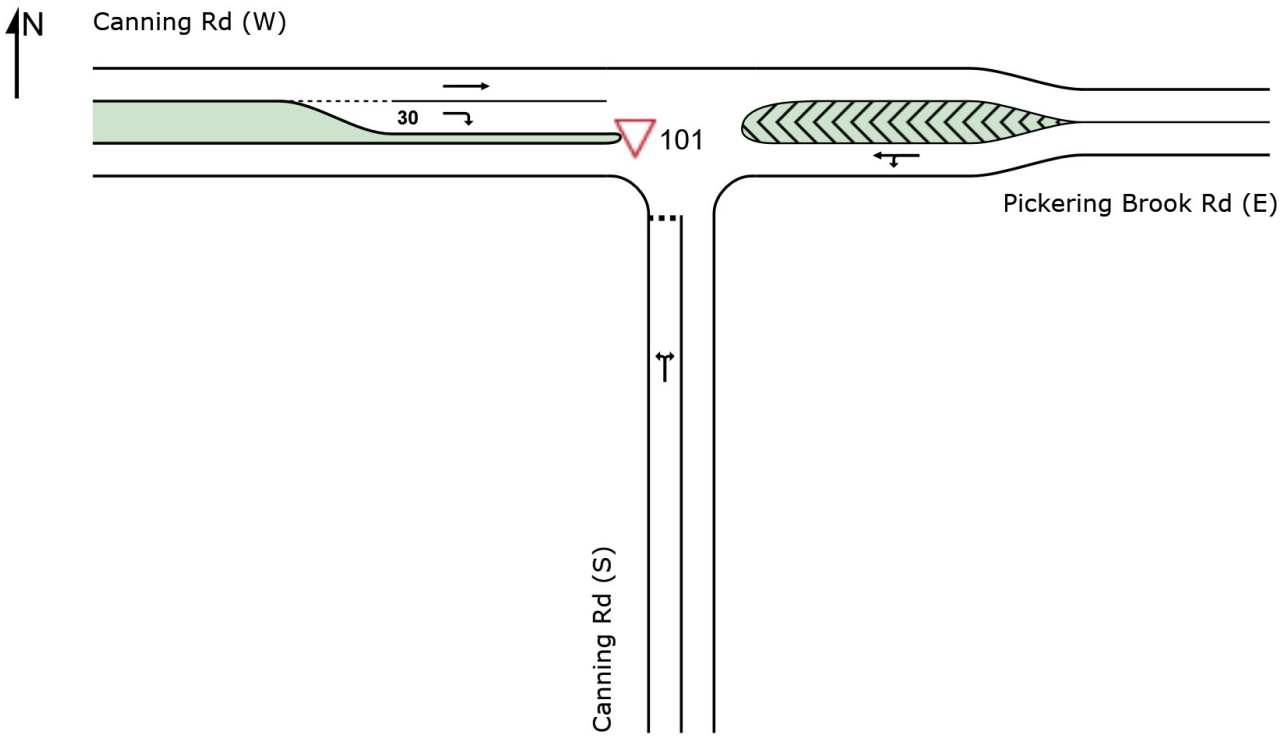
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	115	7.0	1745	0.066	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	113	5.0	1876	0.060	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	227	6.0		0.066		2.8	NA	0.0	0.0				
North: Canning Rd (N)													
Lane 1	127	4.0	1879	0.068	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	38	0.0	1151	0.033	100	6.4	LOS A	0.1	0.9	Short	30	0.0	NA
Approach	165	3.1		0.068		1.5	NA	0.1	0.9				
West: Welshpool RD E (W)													
Lane 1	160	13.7	570	0.281	100	9.4	LOS A	1.1	8.9	Full	500	0.0	0.0
Approach	160	13.7		0.281		9.4	LOS A	1.1	8.9				
Intersection	553	7.4		0.281		4.3	NA	1.1	8.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 AM W/O SITE - Canning Rd/Pickering Brook Rd]

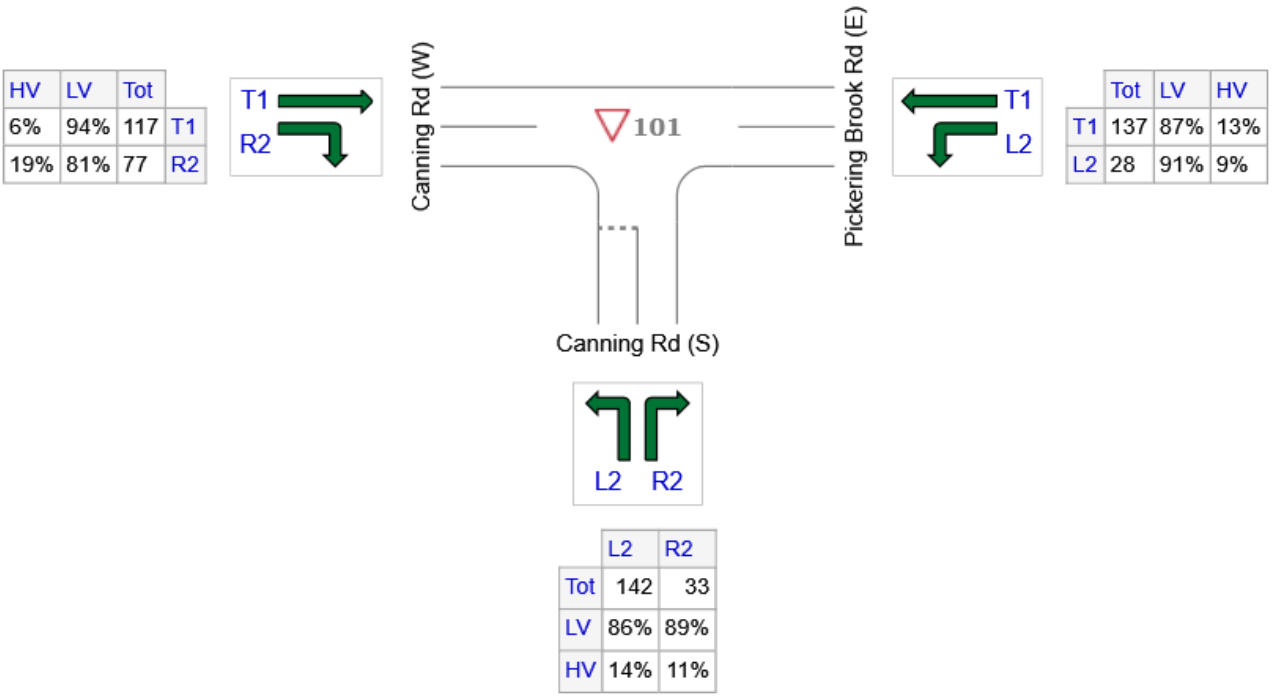
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	175	151	24
E: Pickering Brook Rd (E)	165	145	20
W: Canning Rd (W)	194	172	22
Total	534	469	65

Lane Use and Performance

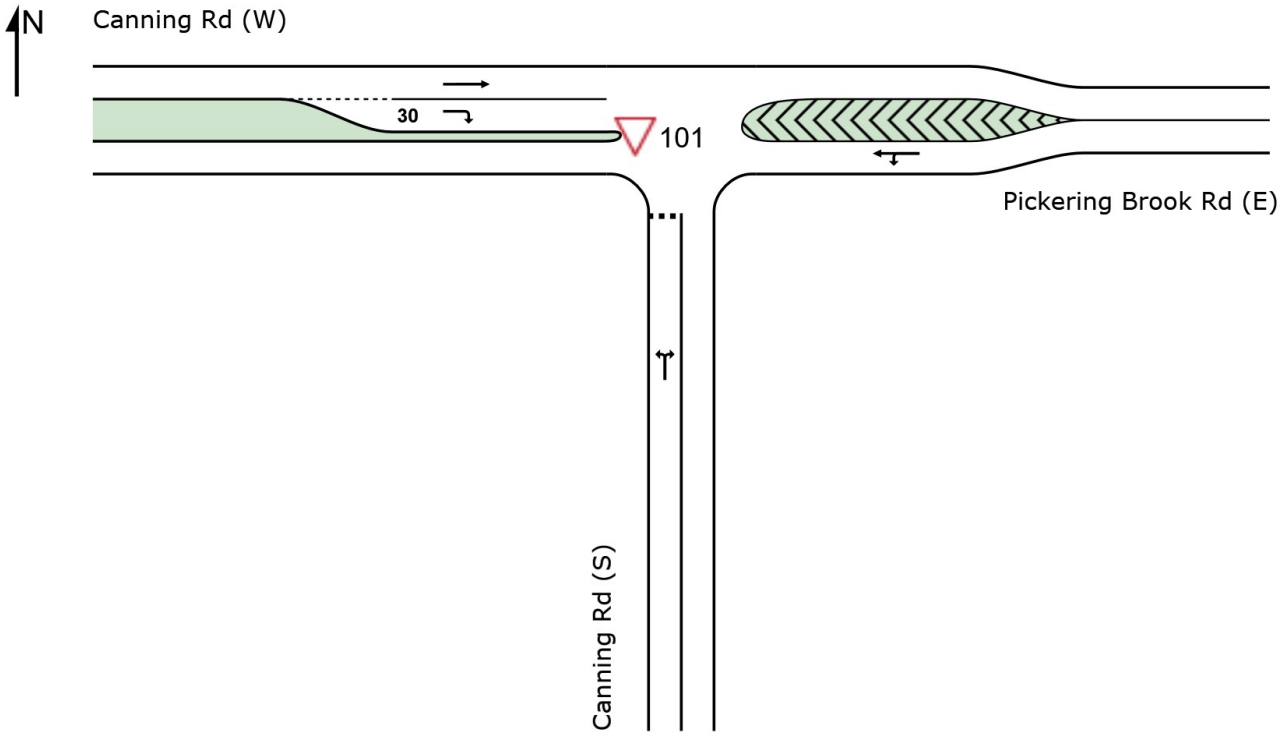
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	184	13.4	1012	0.182	100	7.1	LOS A	0.8	6.1	Full	500	0.0	0.0
Approach	184	13.4		0.182		7.1	LOS A	0.8	6.1				
East: Pickering Brook Rd (E)													
Lane 1	174	12.3	1738	0.100	100	1.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	174	12.3		0.100		1.0	NA	0.0	0.0				
West: Canning Rd (W)													
Lane 1	123	6.0	1849	0.067	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	81	19.0	1372	0.059	100	6.4	LOS A	0.3	2.3	Short	30	0.0	NA
Approach	204	11.2		0.067		2.5	NA	0.3	2.3				
Intersection	562	12.3		0.182		3.5	NA	0.8	6.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 PM W/O SITE - Canning Rd/Pickering Brook Rd]

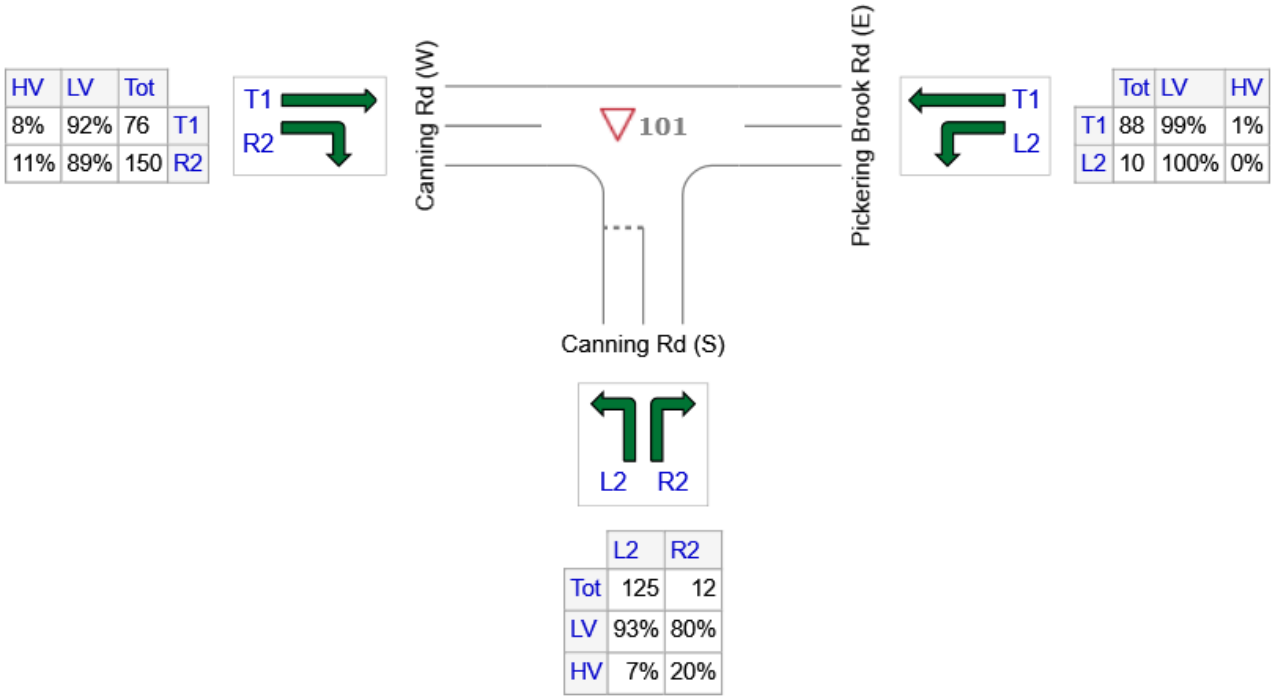
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	137	126	11
E: Pickering Brook Rd (E)	98	97	1
W: Canning Rd (W)	226	203	23
Total	461	426	35

Lane Use and Performance

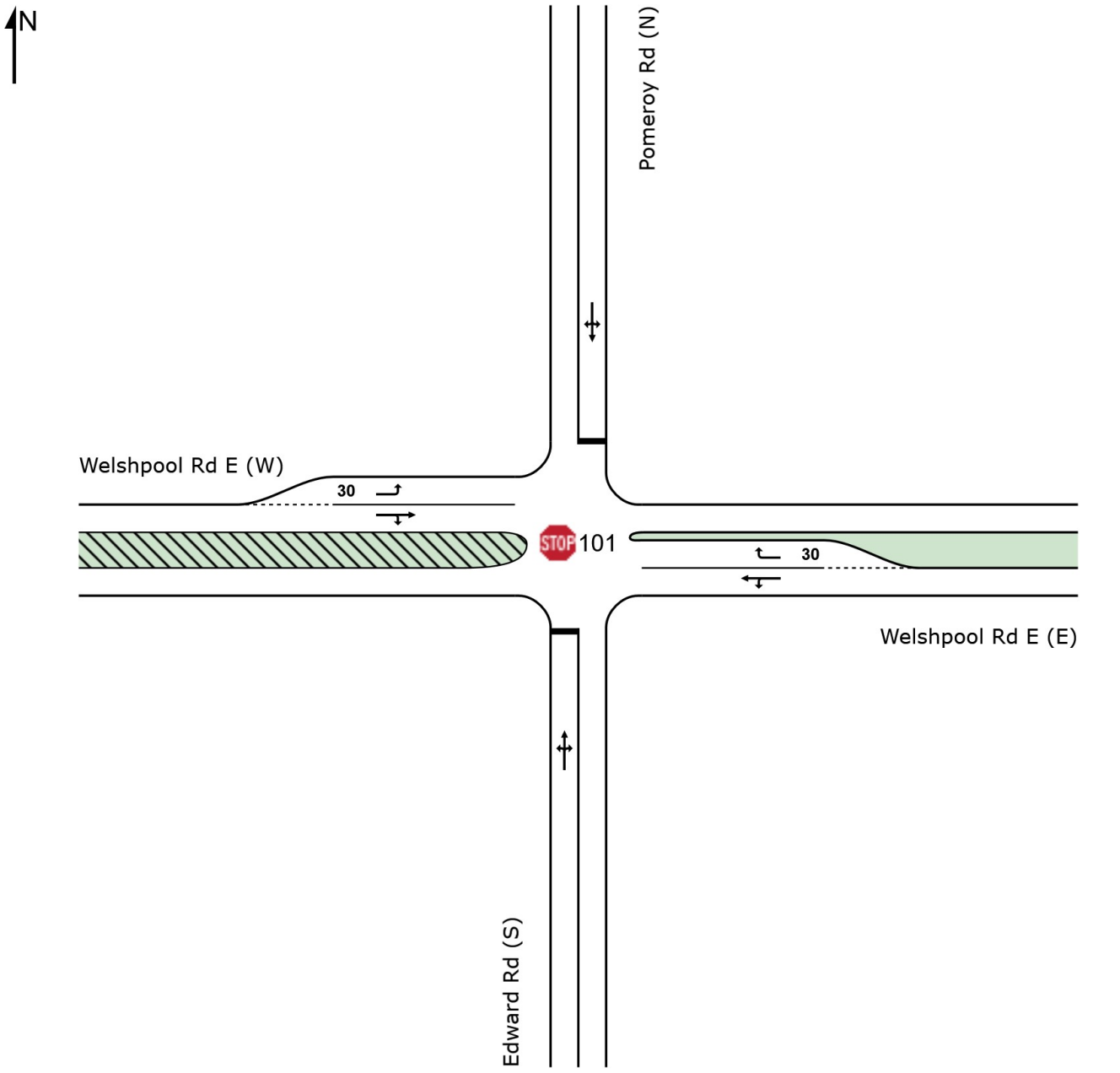
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	144	8.1	1246	0.116	100	6.3	LOS A	0.5	3.6	Full	500	0.0	0.0
Approach	144	8.1		0.116		6.3	LOS A	0.5	3.6				
East: Pickering Brook Rd (E)													
Lane 1	103	0.9	1943	0.053	100	0.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	103	0.9		0.053		0.6	NA	0.0	0.0				
West: Canning Rd (W)													
Lane 1	80	8.0	1809	0.044	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	158	11.0	1552	0.102	100	6.0	LOS A	0.5	3.8	Short	30	0.0	NA
Approach	238	10.0		0.102		4.0	NA	0.5	3.8				
Intersection	485	7.5		0.116		3.9	NA	0.5	3.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 AM W/ SITE - Welsphool Rd/Pomeroy/Edward]

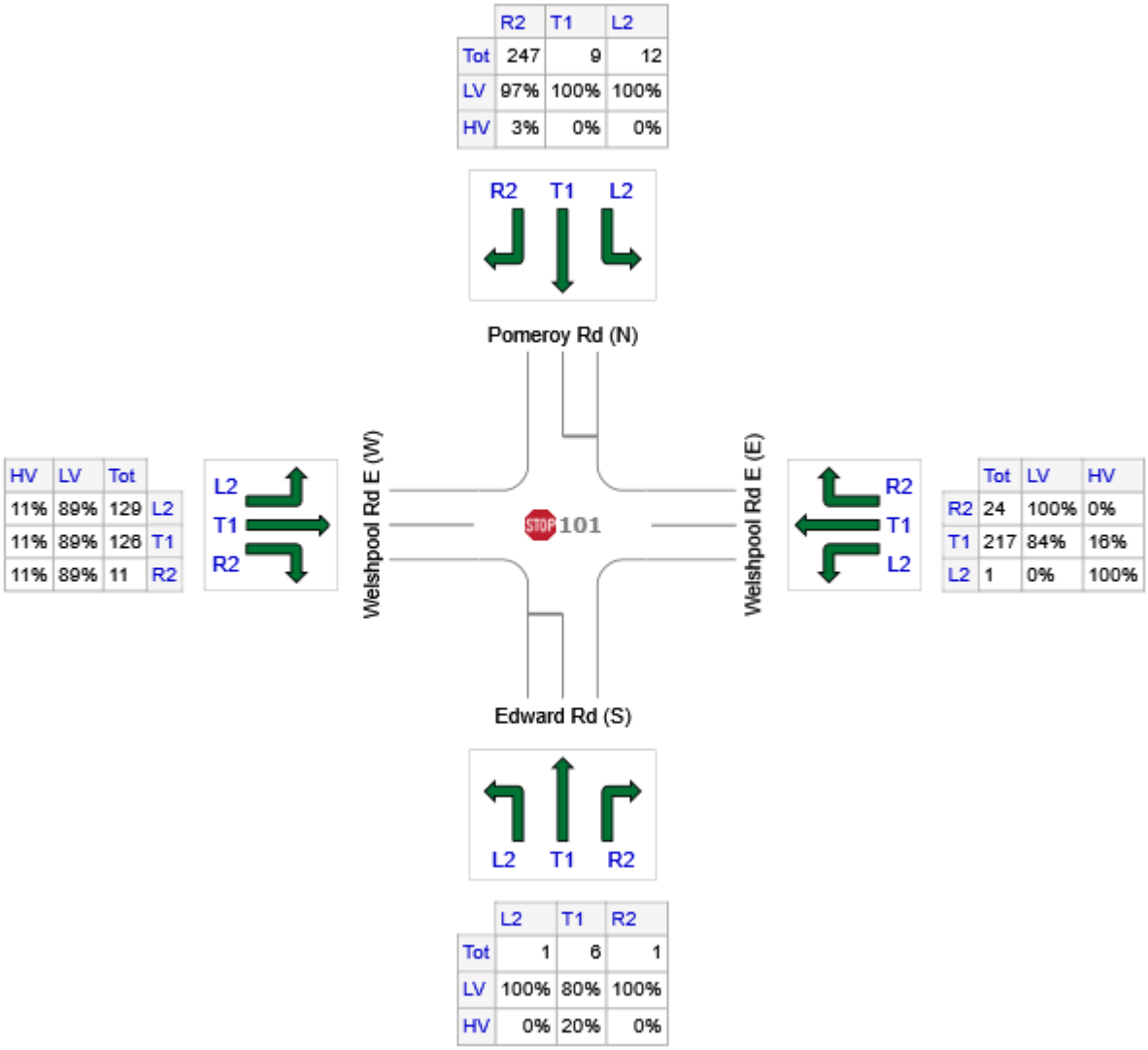
New Site
Site Category: (None)
Stop (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Edward Rd (S)	8	7	1
E: Welshpool Rd E (E)	242	206	36
N: Pomeroy Rd (N)	268	261	7
W: Welshpool Rd E (W)	266	237	29
Total	784	710	74

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Edward Rd (S)													
Lane 1	8	15.0	247	0.034	100	19.8	LOS C	0.1	0.9	Full	500	0.0	0.0
Approach	8	15.0		0.034		19.8	LOS C	0.1	0.9				
East: Welshpool Rd E (E)													
Lane 1	229	16.4	1677	0.137	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	25	0.0	1094	0.023	100	6.6	LOS A	0.1	0.6	Short	30	0.0	NA
Approach	255	14.8		0.137		0.7	NA	0.1	0.6				
North: Pomeroy Rd (N)													
Lane 1	282	2.8	295	0.955	100	61.2	LOS F	14.9	107.7	Full	500	0.0	0.0
Approach	282	2.8		0.955		61.2	LOS F	14.9	107.7				
West: Welshpool Rd E (W)													
Lane 1	136	11.0	1678	0.081	100	5.7	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	144	11.0	1723	0.084	100	0.6	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	280	11.0		0.084		3.1	NA	0.1	0.7				
Intersection	825	9.4		0.955		22.4	NA	14.9	107.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

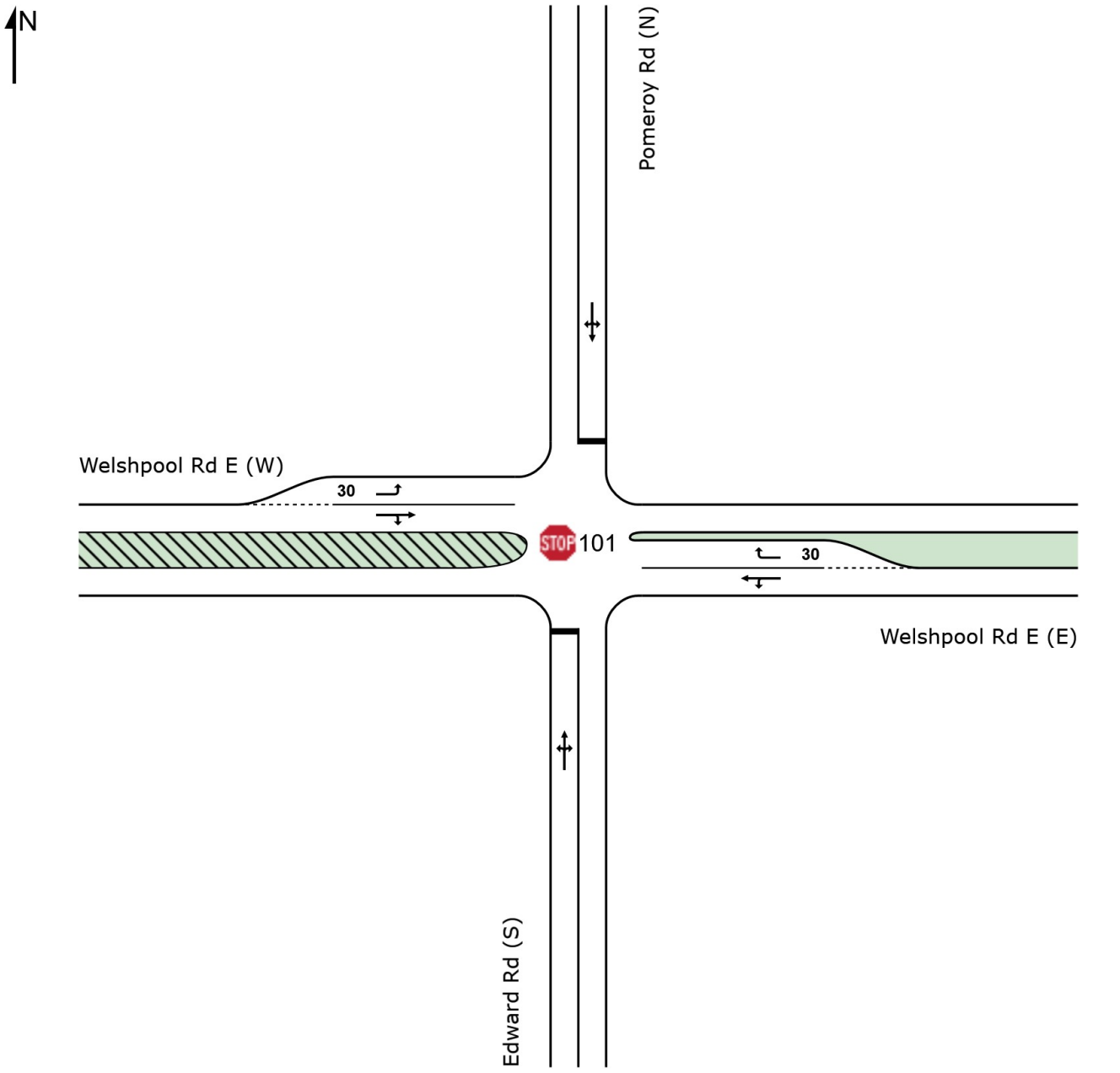
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 PM W/ SITE - Welshpool Rd/Pomeroy/Edward]

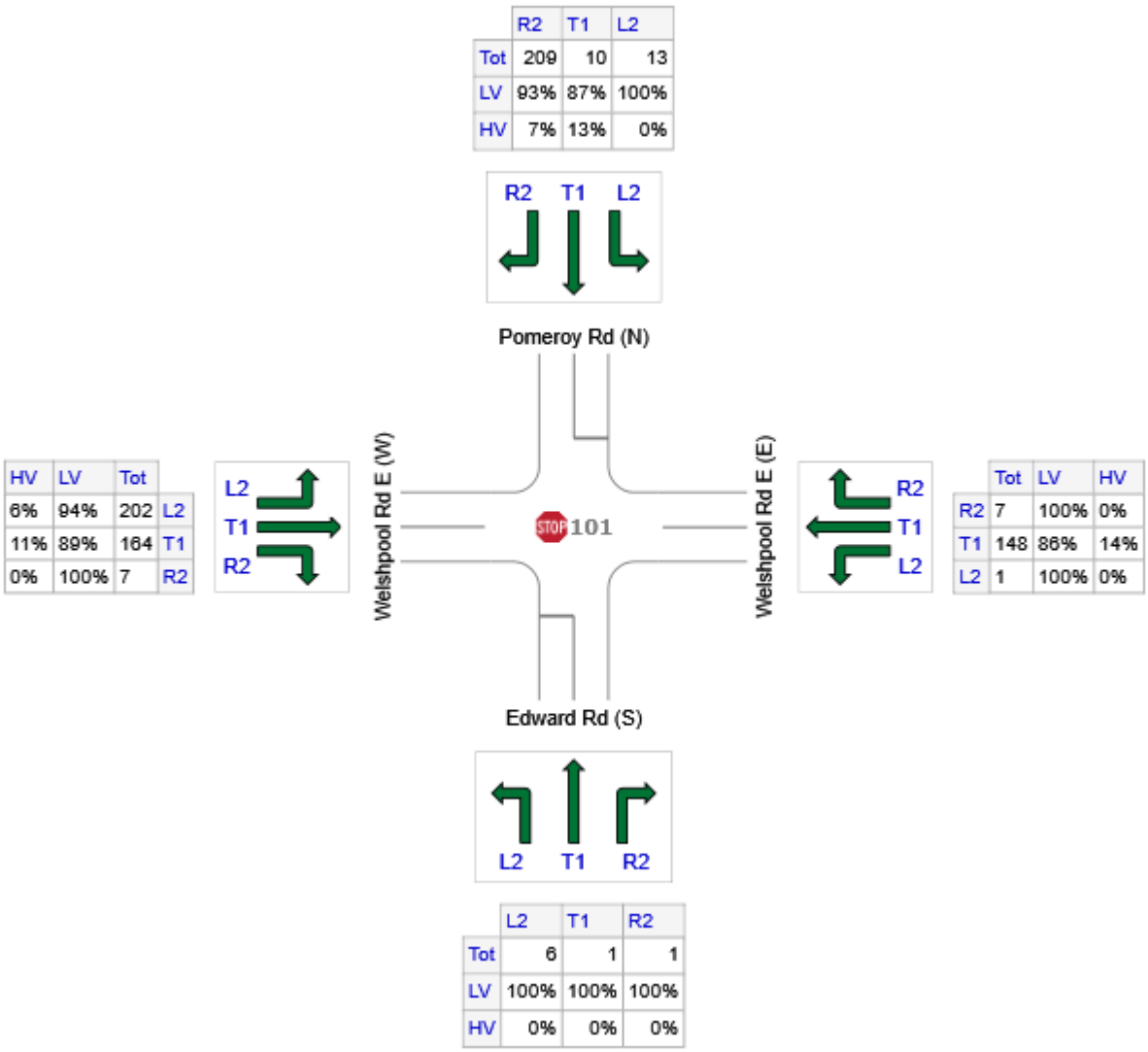
New Site
Site Category: (None)
Stop (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Edward Rd (S)	8	8	0
E: Welshpool Rd E (E)	156	135	21
N: Pomeroy Rd (N)	232	216	16
W: Welshpool Rd E (W)	373	343	30
Total	769	702	67

Lane Use and Performance

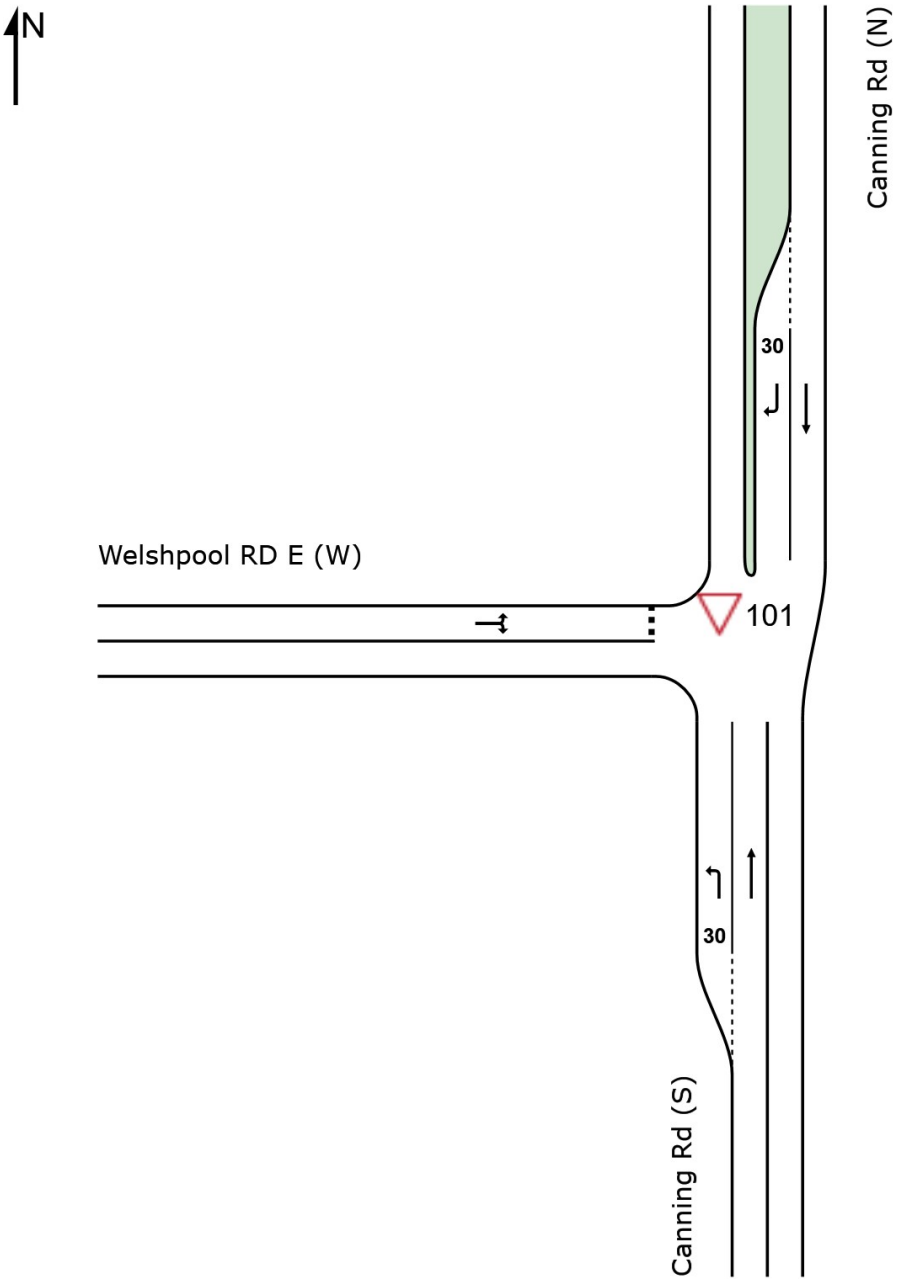
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Edward Rd (S)													
Lane 1	8	0.0	636	0.013	100	10.6	LOS B	0.0	0.3	Full	500	0.0	0.0
Approach	8	0.0		0.013		10.6	LOS B	0.0	0.3				
East: Welshpool Rd E (E)													
Lane 1	157	13.9	1719	0.091	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	7	0.0	963	0.008	100	7.1	LOS A	0.0	0.2	Short	30	0.0	NA
Approach	164	13.3		0.091		0.4	NA	0.0	0.2				
North: Pomeroy Rd (N)													
Lane 1	244	6.9	304	0.804	100	34.9	LOS D	7.5	56.7	Full	500	0.0	0.0
Approach	244	6.9		0.804		34.9	LOS D	7.5	56.7				
West: Welshpool Rd E (W)													
Lane 1	213	6.0	1763	0.121	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	180	10.5	1768	0.102	100	0.3	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	393	8.1		0.121		3.2	NA	0.1	0.4				
Intersection	809	8.7		0.804		12.3	NA	7.5	56.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 AM W/ SITE - Canning Rd/Welshpool Rd E]

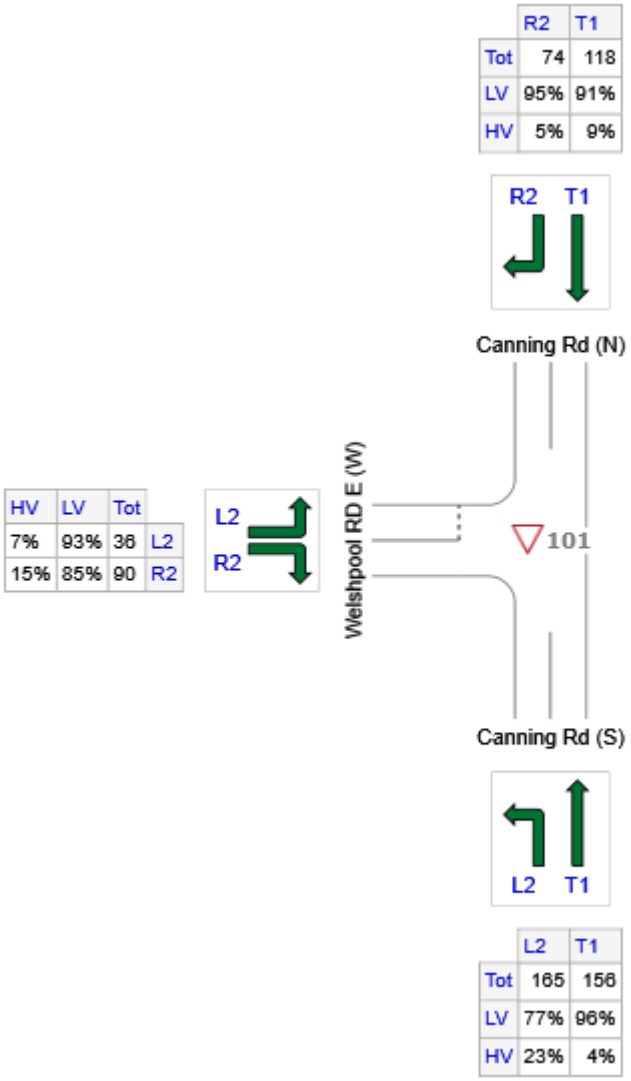
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	321	277	44
N: Canning Rd (N)	192	178	14
W: Welshpool RD E (W)	126	110	16
Total	639	564	75

Lane Use and Performance

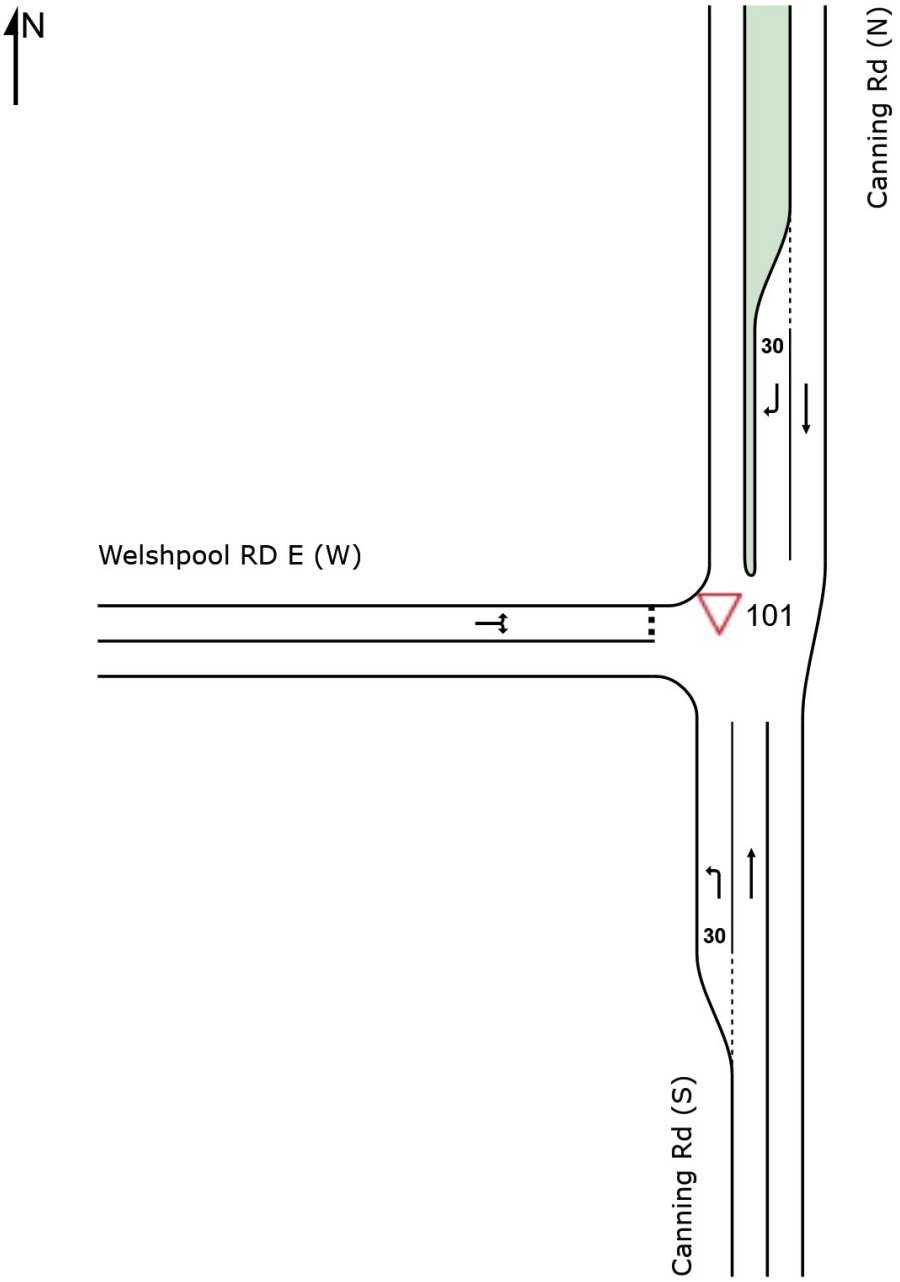
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	174	23.0	1504	0.115	100	5.9	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	164	4.0	1895	0.087	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	338	13.8		0.115		3.0	NA	0.0	0.0				
North: Canning Rd (N)													
Lane 1	124	9.0	1798	0.069	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	78	5.0	973	0.080	100	7.2	LOS A	0.3	2.3	Short	30	0.0	NA
Approach	202	7.5		0.080		2.8	NA	0.3	2.3				
West: Welshpool RD E (W)													
Lane 1	133	12.7	455	0.291	100	11.9	LOS B	1.2	9.6	Full	500	0.0	0.0
Approach	133	12.7		0.291		11.9	LOS B	1.2	9.6				
Intersection	673	11.7		0.291		4.7	NA	1.2	9.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 PM W/ SITE - Canning Rd/Welshpool Rd E]

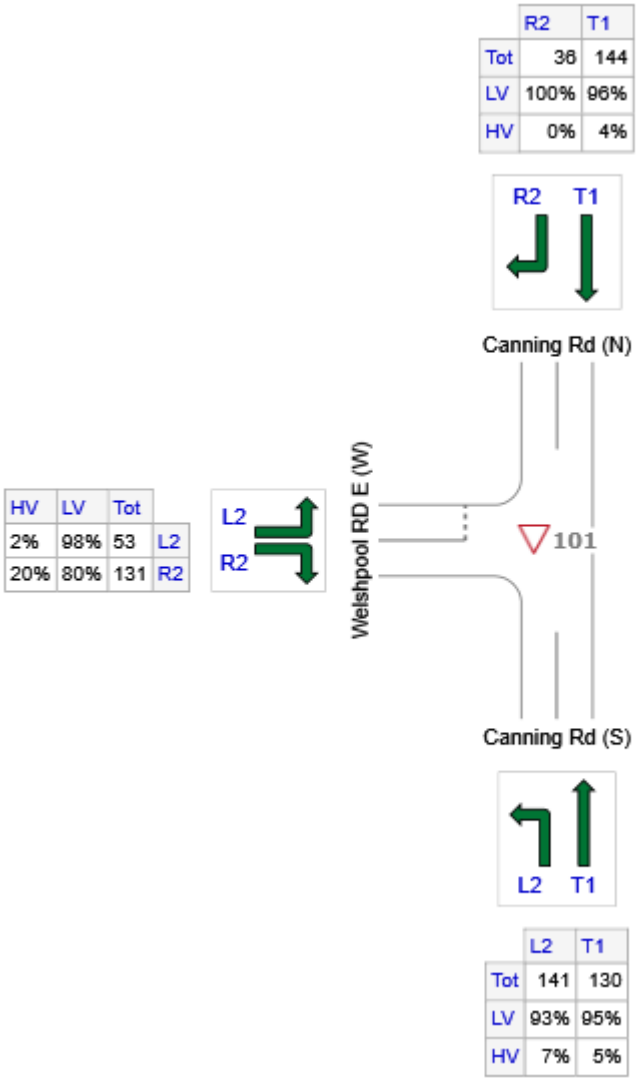
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	271	255	16
N: Canning Rd (N)	180	174	6
W: Welshpool RD E (W)	184	157	27
Total	635	586	49

Lane Use and Performance

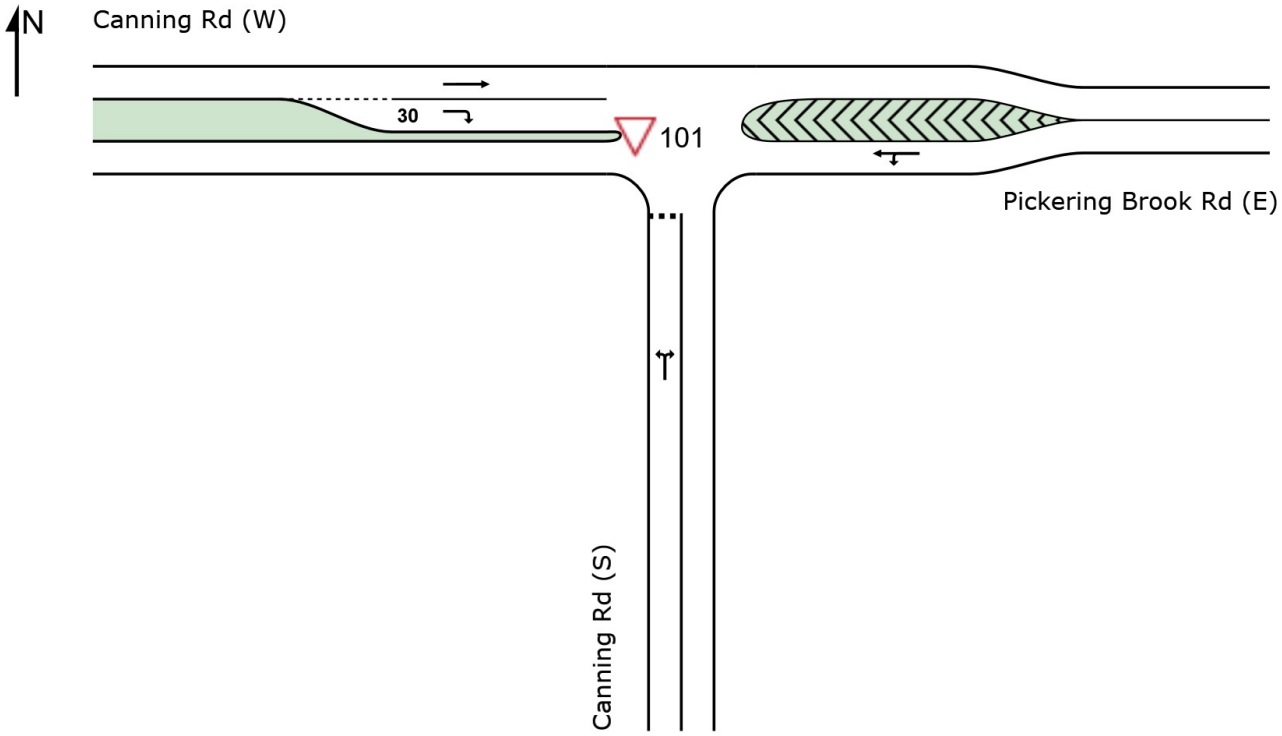
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	148	7.0	1745	0.085	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Lane 2	137	5.0	1876	0.073	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	285	6.0		0.085		2.9	NA	0.0	0.0				
North: Canning Rd (N)													
Lane 1	152	4.0	1877	0.081	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	38	0.0	1082	0.035	100	6.6	LOS A	0.1	1.0	Short	30	0.0	NA
Approach	189	3.2		0.081		1.3	NA	0.1	1.0				
West: Welshpool RD E (W)													
Lane 1	194	14.8	490	0.396	100	12.2	LOS B	2.0	16.6	Full	500	0.0	0.0
Approach	194	14.8		0.396		12.2	LOS B	2.0	16.6				
Intersection	668	7.8		0.396		5.2	NA	2.0	16.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 AM W/ SITE - Canning Rd/Pickering Brook Rd]

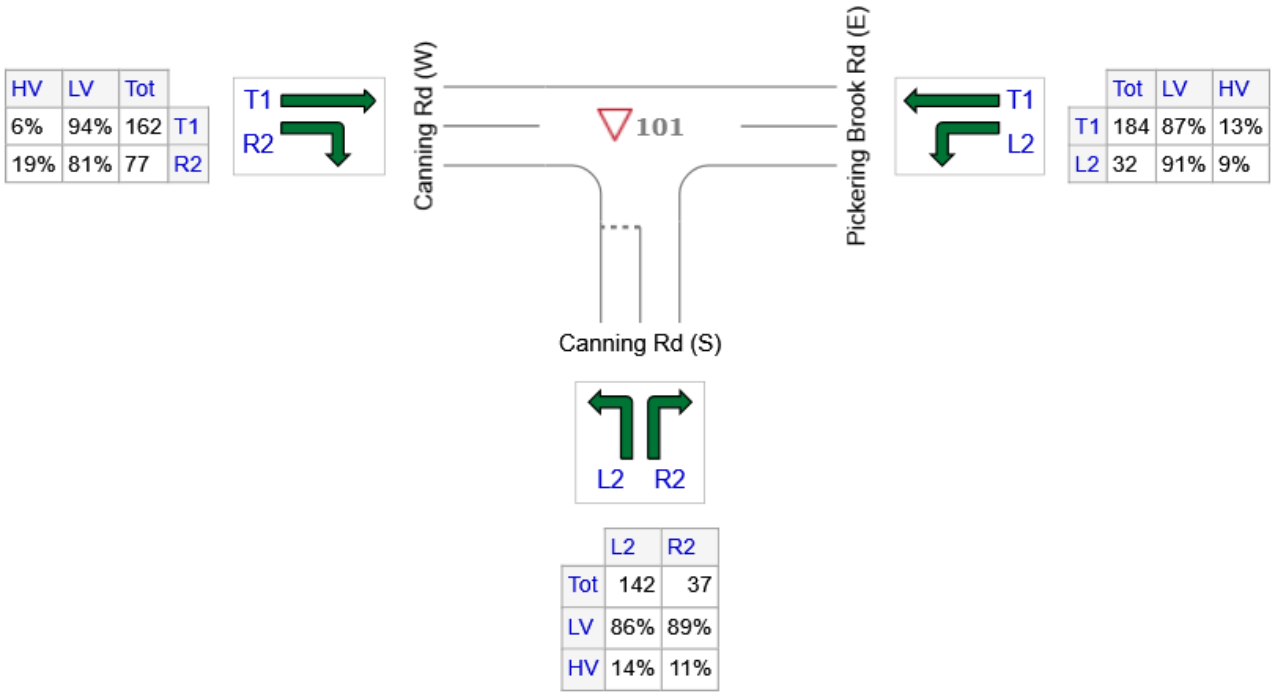
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	179	155	24
E: Pickering Brook Rd (E)	216	189	27
W: Canning Rd (W)	239	215	24
Total	634	559	75

Lane Use and Performance

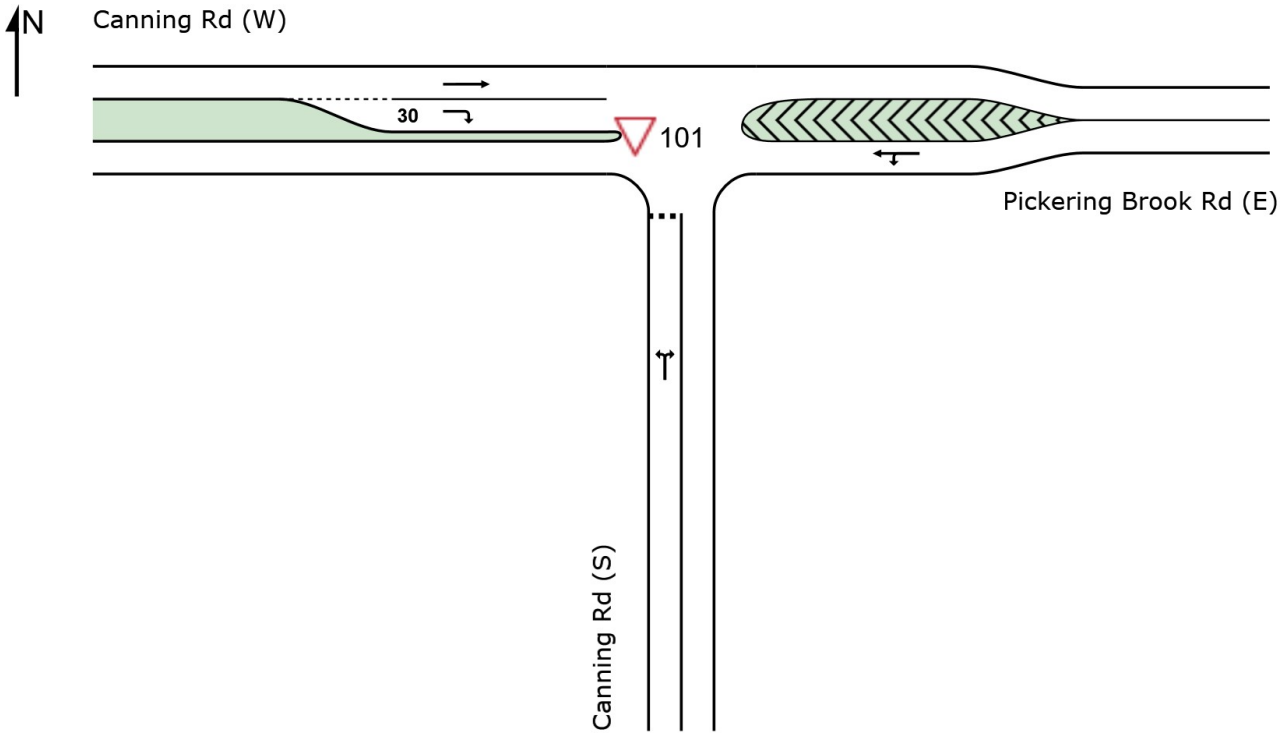
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	188	13.4	894	0.211	100	7.7	LOS A	0.9	6.9	Full	500	0.0	0.0
Approach	188	13.4		0.211		7.7	LOS A	0.9	6.9				
East: Pickering Brook Rd (E)													
Lane 1	227	12.4	1739	0.131	100	0.9	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	227	12.4		0.131		0.9	NA	0.0	0.0				
West: Canning Rd (W)													
Lane 1	171	6.0	1848	0.092	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	81	19.0	1290	0.063	100	6.7	LOS A	0.3	2.4	Short	30	0.0	NA
Approach	252	10.2		0.092		2.2	NA	0.3	2.4				
Intersection	667	11.8		0.211		3.3	NA	0.9	6.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Site: 101 [2031 PM W/ SITE - Canning Rd/Pickering Brook Rd]

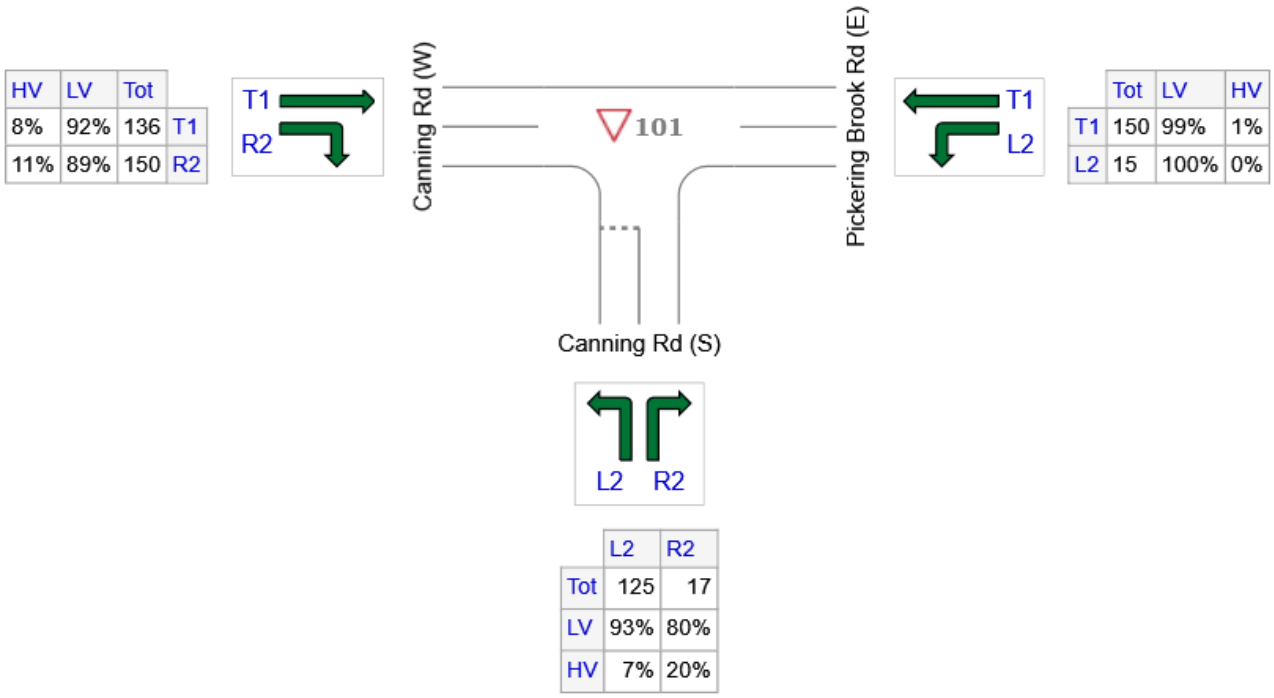
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Canning Rd (S)	142	130	12
E: Pickering Brook Rd (E)	165	164	2
W: Canning Rd (W)	286	259	27
Total	593	552	41

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Canning Rd (S)													
Lane 1	149	8.6	1065	0.140	100	6.9	LOS A	0.6	4.3	Full	500	0.0	0.0
Approach	149	8.6		0.140		6.9	LOS A	0.6	4.3				
East: Pickering Brook Rd (E)													
Lane 1	174	0.9	1944	0.089	100	0.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	174	0.9		0.089		0.5	NA	0.0	0.0				
West: Canning Rd (W)													
Lane 1	143	8.0	1813	0.079	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	158	11.0	1448	0.109	100	6.2	LOS A	0.5	4.0	Short	30	0.0	NA
Approach	301	9.6		0.109		3.3	NA	0.5	4.0				
Intersection	624	6.9		0.140		3.4	NA	0.6	4.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX B

Expansion Scenarios

EXPANSION SCENARIOS

1. Scenario 1

Dwelling Yield : 131

Retail: Nil

Daily Trip Generation : 1179 vehicle per day

Peak Hour : 105 vehicle per hour

Impact : HIGH

2. Scenario 2a

Dwelling Yield : 27

Retail : Nil

Daily Trip Generation : 245 vehicle per day

Peak Hour : 22 vehicle per hour

Impact : LOW

3. Scenario 2b

Dwelling Yield : 26

Retail : 1,500m²

Daily Trip Generation : 1,697 vehicle per day

Peak Hour : 141 vehicle per hour

Impact : HIGH

SCENARIOS CONT.

4. Scenario 3

Dwelling Yield : 44

Retail : Nil

Daily Trip Generation : 400 vehicles per day

Peak Hour : 36 vehicles per hour

Impact : LOW

5. Scenario 4

Dwelling Yield : 79

Retail : Nil

Daily Trip Generation : 711 vehicles per day

Peak Hour : 63 vehicles per hour

Impact : MEDIUM

6. Scenario 5

Dwelling Yield : 98

Retail : Nil

Daily Trip Generation : 888 vehicles per day

Peak Hour : 79 vehicles per hour

Impact : MEDIUM

SCENARIOS CONT.

7. Scenario 6

Dwelling Yield : 262

Retail : Nil

Daily Trip Generation : 2358 vehicles per day

Peak Hour : 210 vehicles per hour

Impact : HIGH

8. Scenario 6b

Dwelling Yield : 261

Retail : 1,500m^2

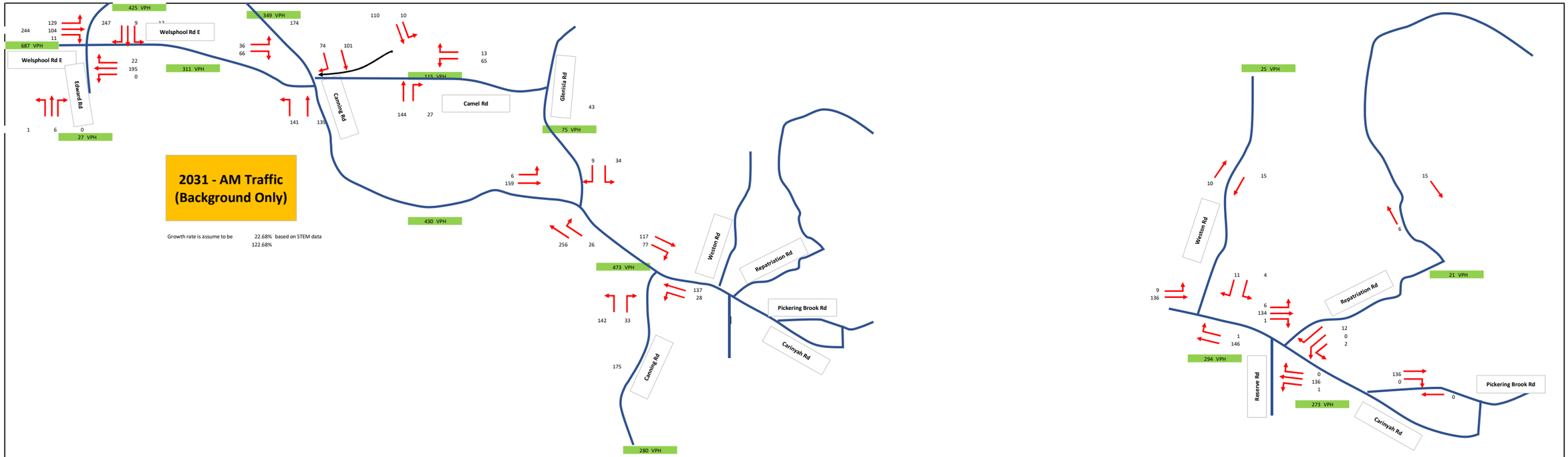
Daily Trip Generation : 3,810 vehicles per day

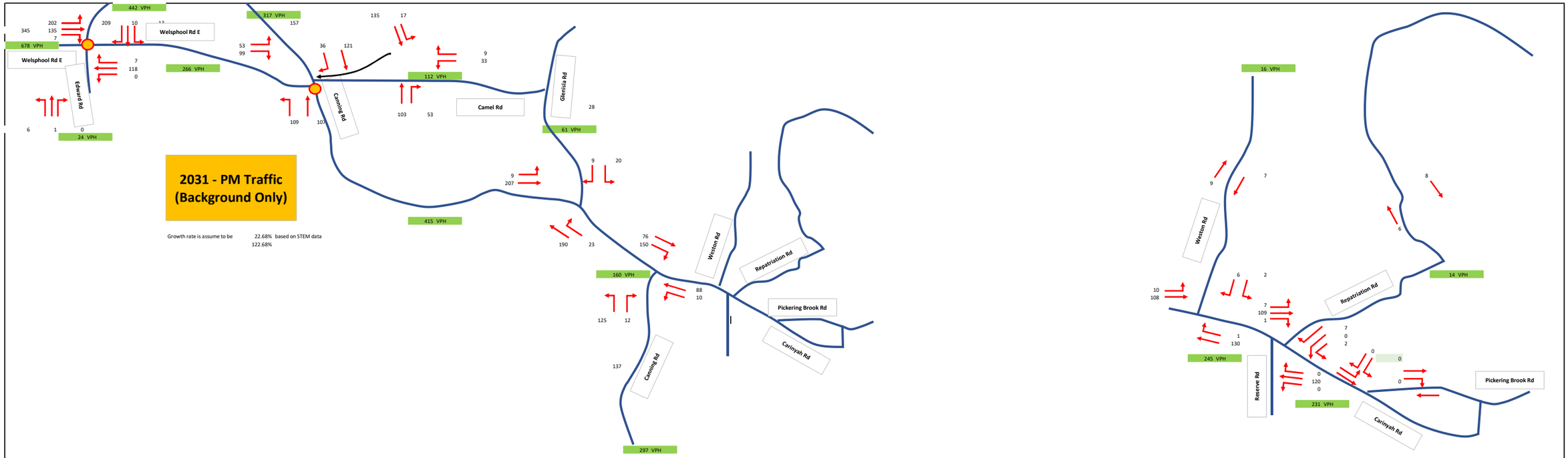
Peak Hour : 329 vehicles per hour

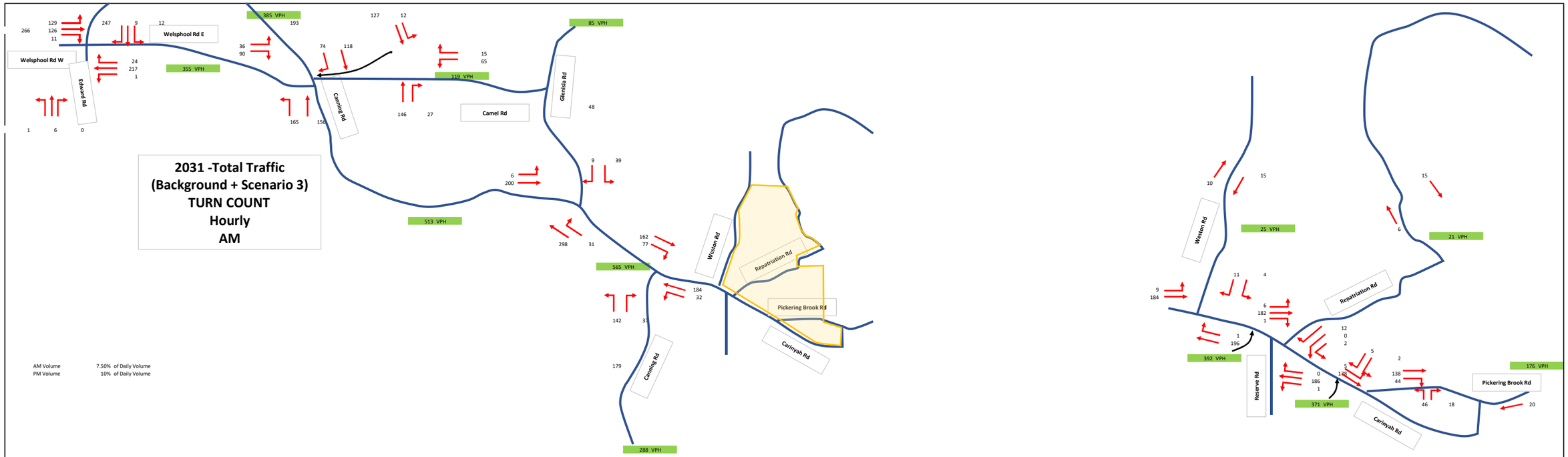
Impact : HIGH

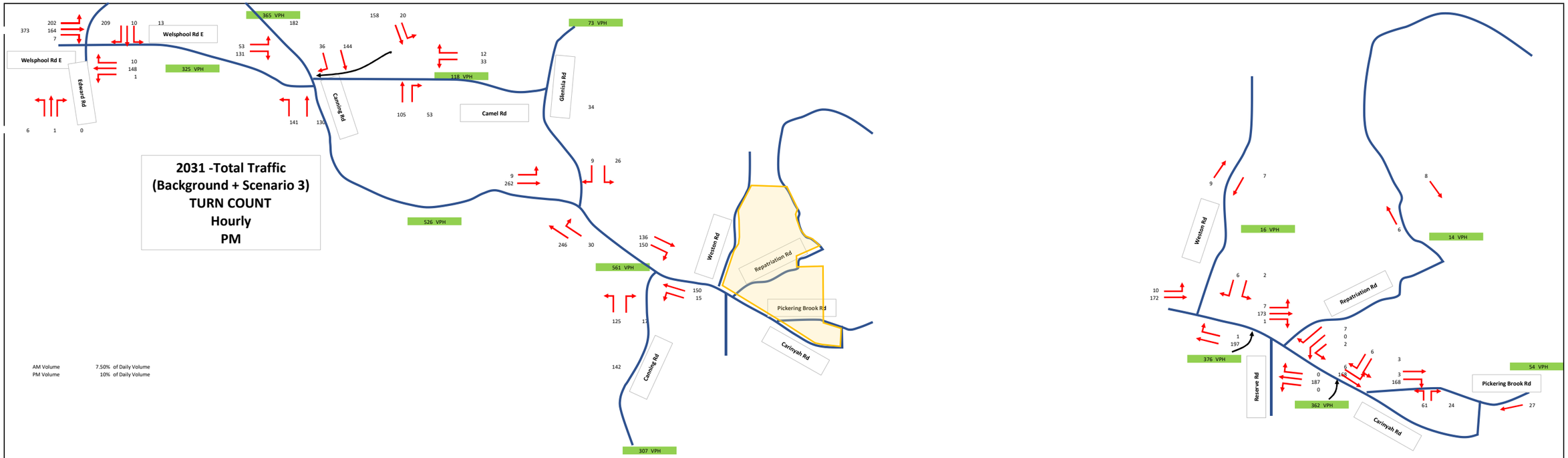
APPENDIX C

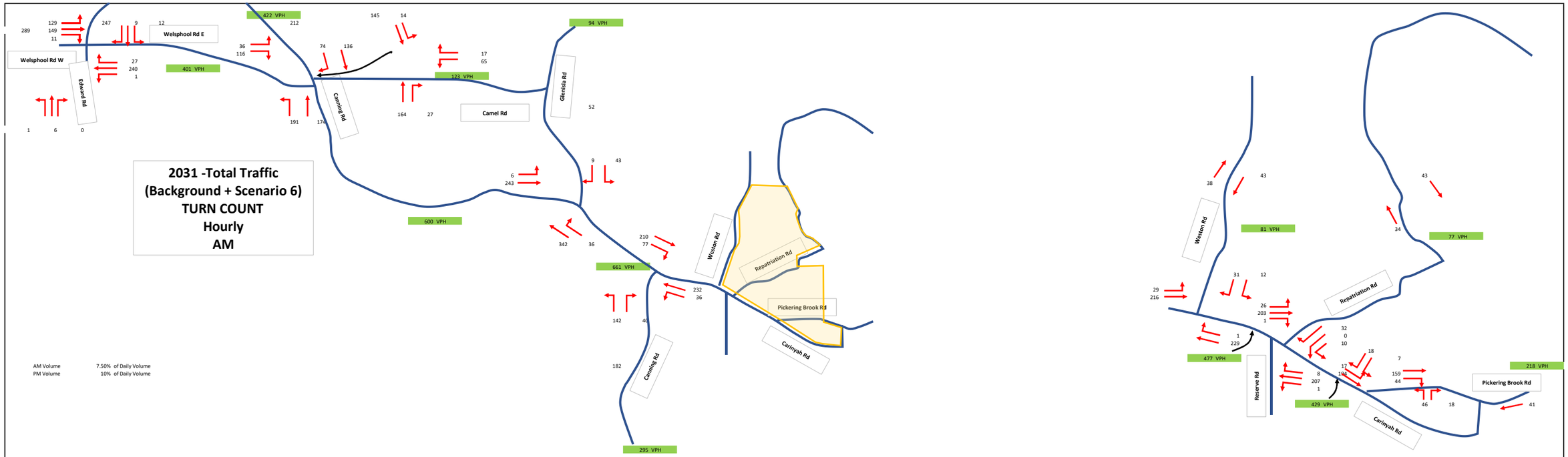
Traffic Distribution Maps

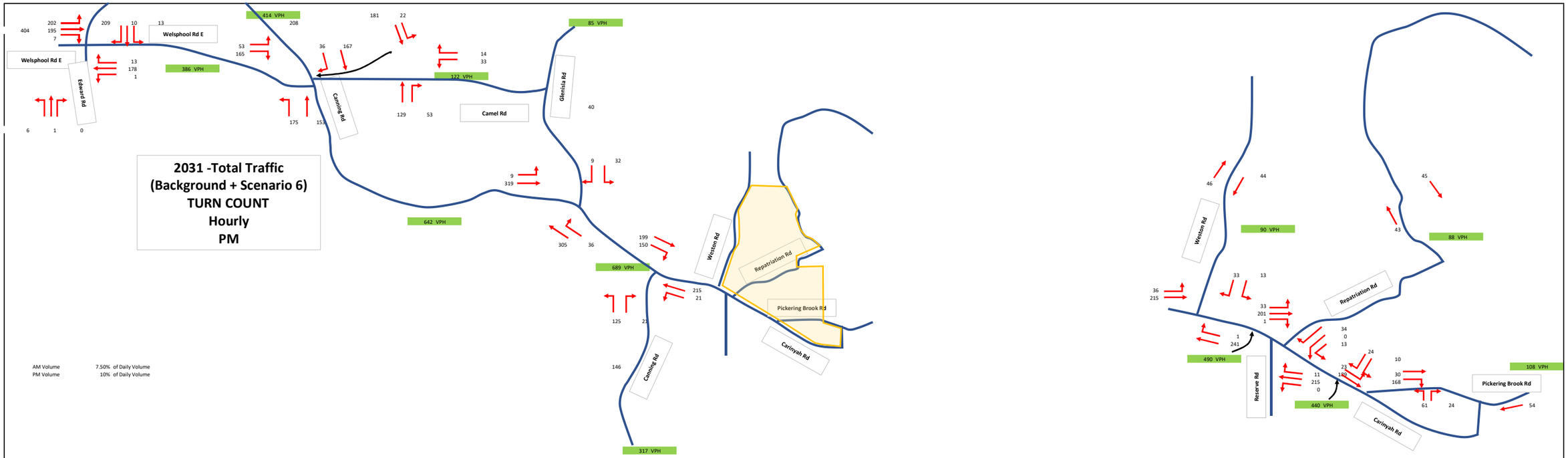

2031 - AM Traffic
(Background Only)
Growth rate is assume to be 22.68% based on STEM data
122.68%
425 VPH
349 VPH
687 VPH
311 VPH
115 VPH
75 VPH
27 VPH
430 VPH
473 VPH
280 VPH
25 VPH
21 VPH
294 VPH
273 VPH
Welshpool Rd E
Edward Rd
Camms Rd
Camel Rd
Glenisla Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Reserve Rd


2031 - PM Traffic
(Background Only)
Growth rate is assume to be 22.68% based on STEM data
122.68%
442 VPH
317 VPH
678 VPH
266 VPH
112 VPH
61 VPH
24 VPH
415 VPH
160 VPH
297 VPH
16 VPH
14 VPH
245 VPH
231 VPH
Welshpool Rd E
Edward Rd
Camming Rd
Camel Rd
Glenisla Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Reserve Rd


2031 -Total Traffic
(Background + Scenario 3)
TURN COUNT
Hourly
AM
AM Volume 7.50% of Daily Volume
PM Volume 10% of Daily Volume
Welshpool Rd W
Welshpool Rd E
Edward Rd
Camms Rd
Camel Rd
Glenisla Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Reserve Rd
355 VPH
385 VPH
119 VPH
85 VPH
513 VPH
565 VPH
288 VPH
25 VPH
21 VPH
392 VPH
371 VPH
176 VPH
Turn split in grey cell is derived by assuming a 50/50 split into Weston Rd and Repatriation Rd from any direction
Turn split in green cell is derived by multipying the outgoing traffic with the destination split

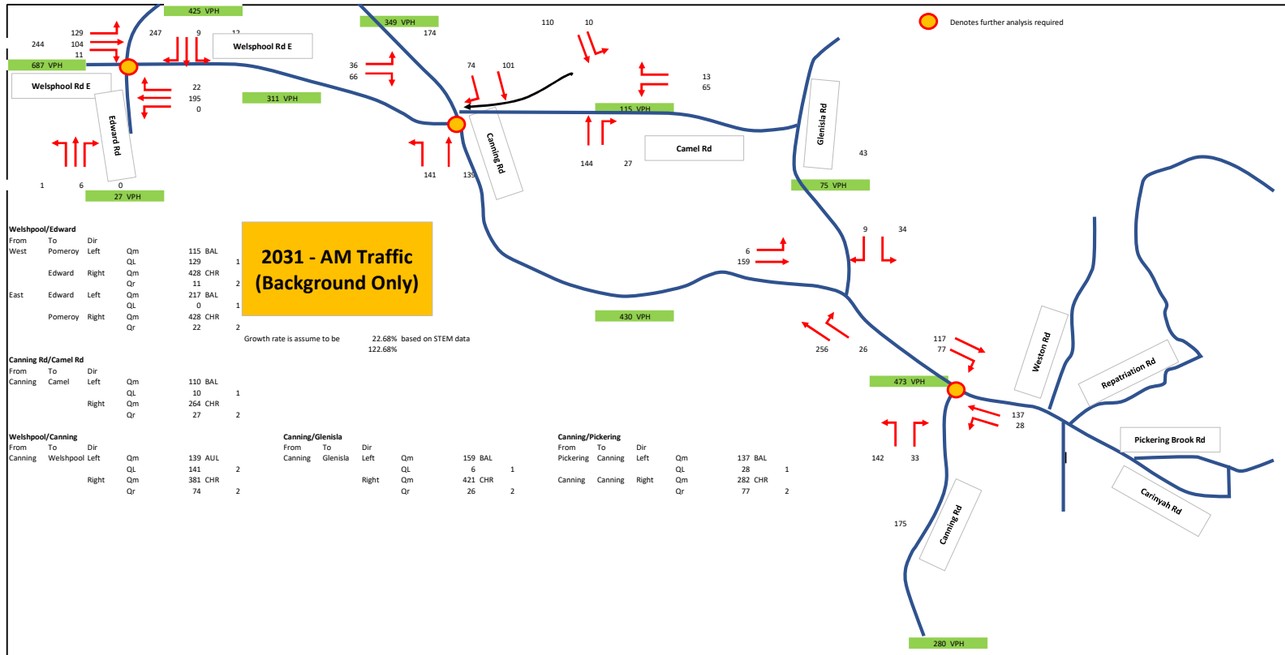

2031 -Total Traffic
(Background + Scenario 3)
TURN COUNT
Hourly
PM
AM Volume 7.50% of Daily Volume
PM Volume 10% of Daily Volume
Welshpool Rd E
Welshpool Rd E
Edward Rd
Camms Rd
Camel Rd
Glenisla Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Camms Rd
Weston Rd
Repatriation Rd
Reserve Rd
Pickering Brook Rd
Carinyah Rd
365 VPH
325 VPH
73 VPH
118 VPH
526 VPH
561 VPH
307 VPH
16 VPH
14 VPH
376 VPH
362 VPH
54 VPH
Turn split in grey cell is derived by assuming a 50/50 split into Weston Rd and Repatriation Rd from any direction
Turn split in green cell is derived by multipying the outgoing traffic with the destination split


2031 -Total Traffic
(Background + Scenario 6)
TURN COUNT
Hourly
AM
Welshpool Rd W
Welshpool Rd E
Edward Rd
Camning Rd
Camel Rd
Glenisla Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Reserve Rd
401 VPH
422 VPH
123 VPH
94 VPH
600 VPH
661 VPH
295 VPH
81 VPH
77 VPH
477 VPH
429 VPH
218 VPH
AM Volume 7.50% of Daily Volume
PM Volume 10% of Daily Volume
Turn split in grey cell is derived by assuming a 50/50 split into Weston Rd and Repatriation Rd from any direction
Turn split in green cell is derived by multipying the outgoing traffic with the destination split


2031 -Total Traffic
(Background + Scenario 6)
TURN COUNT
Hourly
PM
AM Volume 7.50% of Daily Volume
PM Volume 10% of Daily Volume
Welshpool Rd E
Welshpool Rd E
Edward Rd
Camms Rd
Camel Rd
Glenisla Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Camms Rd
414 VPH
386 VPH
122 VPH
85 VPH
642 VPH
689 VPH
317 VPH
90 VPH
88 VPH
490 VPH
440 VPH
108 VPH
Reserve Rd
Weston Rd
Repatriation Rd
Pickering Brook Rd
Carinyah Rd
Turn split in grey cell is derived by assuming a 50/50 split into Weston Rd and Repatriation Rd from any direction
Turn split in green cell is derived by multipying the outgoing traffic with the destination split

APPENDIX D

Turn Treatment Assessment



2031 - AM Traffic (Background Only)

Welshpool/Edward

From	To	Dir			
West	Pomeroy	Left	Qm	115	BAL
			QL	129	1
	Edward	Right	Qm	428	CHR
			Qr	11	2
East	Edward	Left	Qm	217	BAL
			QL	0	1
	Pomeroy	Right	Qm	428	CHR
			Qr	22	2

Growth rate is assume to be 22.68% based on STEM data
122.68%

Canning Rd/Camel Rd

From	To	Dir			
Canning	Camel	Left	Qm	110	BAL
			QL	10	1
		Right	Qm	264	CHR
			Qr	27	2

Welshpool/Canning

From	To	Dir			
Canning	Welshpool	Left	Qm	139	AUL
			QL	141	2
		Right	Qm	381	CHR
			Qr	74	2

Canning/Glenisla

From	To	Dir			
Canning	Glenisla	Left	Qm	159	BAL
			QL	6	1
		Right	Qm	421	CHR
			Qr	26	2

Canning/Pickering

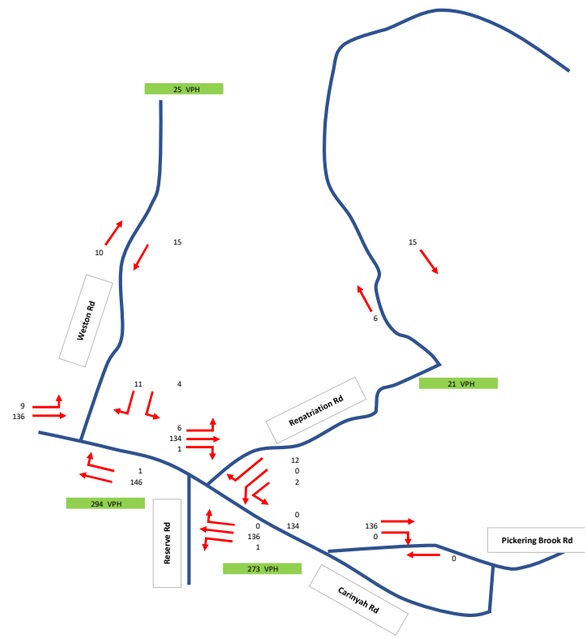
From	To	Dir			
Pickering	Canning	Left	Qm	137	BAL
			QL	28	1
Canning	Canning	Right	Qm	282	CHR
			Qr	77	2

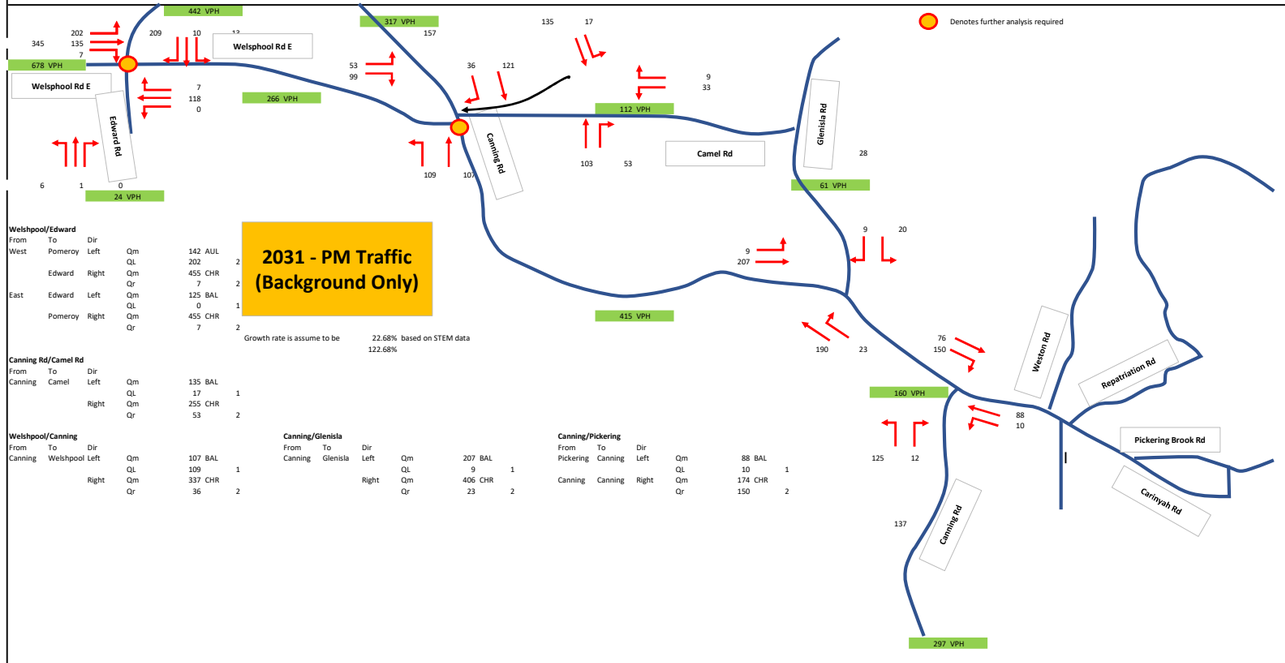
Pickering/Weston

From	To	Dir			
Pickering	Weston	Left	Qm	136	BAL
			QL	9	1
Pickering	Weston	Right	Qm	291	BAR
			Qr	1	1

Pickering/Repatriation

From	To	Dir			
Pickering	Repa	Left	Qm	135	BAL
			QL	6	1
Pickering	Repa	Right	Qm	277	BAR
			Qr	0	1





2031 - PM Traffic (Background Only)

Welshpool/Edward

From	To	Dir			
West	Pomeroy	Left	Qm	142	AUL
			QL	202	2
	Edward	Right	Qm	455	CHR
			Qr	7	2
East	Edward	Left	Qm	125	BAL
			QL	0	1
	Pomeroy	Right	Qm	455	CHR
			Qr	7	2

Growth rate is assume to be 22.68% based on STEM data
122.68%

Canning Rd/Camel Rd

From	To	Dir			
Canning	Camel	Left	Qm	135	BAL
			QL	17	1
		Right	Qm	255	CHR
			Qr	53	2

Welshpool/Canning

From	To	Dir			
Canning	Welshpool	Left	Qm	107	BAL
			QL	109	1
		Right	Qm	337	CHR
			Qr	36	2

Canning/Glenisla

From	To	Dir			
Canning	Glenisla	Left	Qm	207	BAL
			QL	9	1
		Right	Qm	406	CHR
			Qr	23	2

Canning/Pickering

From	To	Dir			
Pickering	Canning	Left	Qm	88	BAL
			QL	10	1
Canning	Canning	Right	Qm	174	CHR
			Qr	150	2

Pickering/Weston

From	To	Dir			
Pickering	Weston	Left	Qm	108	BAL
			QL	10	1
Pickering	Weston	Right	Qm	248	BAR
			Qr	1	1

Pickering/Repatriation

From	To	Dir			
Pickering	Repa	Left	Qm	110	BAL
			QL	7	1
Pickering	Repa	Right	Qm	236	BAR
			Qr	0	1