Genium
CIVIL ENGINEERING
PO Box 15
Yass NSW 2582

20 April 2021

The General Manager
Yass Valley Council
PO Box 6
YASS NSW 2582

Attention: Arif Chohan

Dear Arif,

Additional Traffic Modelling Data

Further to the Traffic Impact Assessment (TIA) submitted with our planning proposal application, we have undertaken the following additional work in support of our application:

1. Matrix Traffic and Transport Data have undertaken an updated traffic count for Yass Valley Way for the AM and PM peak periods;

2. Traffic Engineering Centre have undertaken SIDRA intersection modelling utilising the updated peak hour traffic volumes for Yass Valley Way projected forward to 2030, and the estimated traffic generation for the 2030 scenario as presented in the TIA.

The results of the above studies have been attached and show that the proposed single access point to Yass Valley Way will have sufficient capacity to cater for the development and will operate with an overall Level of Service B which is categorised as *"acceptable delays and spare capacity".*

Yours Sincerely

Simon Cassidy
CPEng, NER

SIDRA Modelling of the proposed Yass Valley Way / New Subdivision Road intersection, in Yass, NSW

March 2021

Genium Civil Engineering

Traffic Engineering Centre
Our clients are our partners

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Traffic Engineering Centre

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Revision	Details	Date	Amended by

Distribution: Genium Civil Engineering, Traffic Engineering Centre (file)

Contents

Appendices

1. Introduction

Traffic Engineering Centre was commissioned by Genium Civil Engineering to undertake a Traffic Impact Assessment using the SIDRA intersection modelling software package to assess performance in the year 2030 of the proposed new intersection of Yass Valley Way and New Subdivisional Road, in Yass, NSW.

1.1 2030 Vehicular traffic volumes

Genium Civil Engineering has supplied Traffic Engineering Centre with predicted vehicular traffic volumes, for the Year 2030, for both AM and PM peak hours (refer to Figure 3.1 & 3.2, respectively).

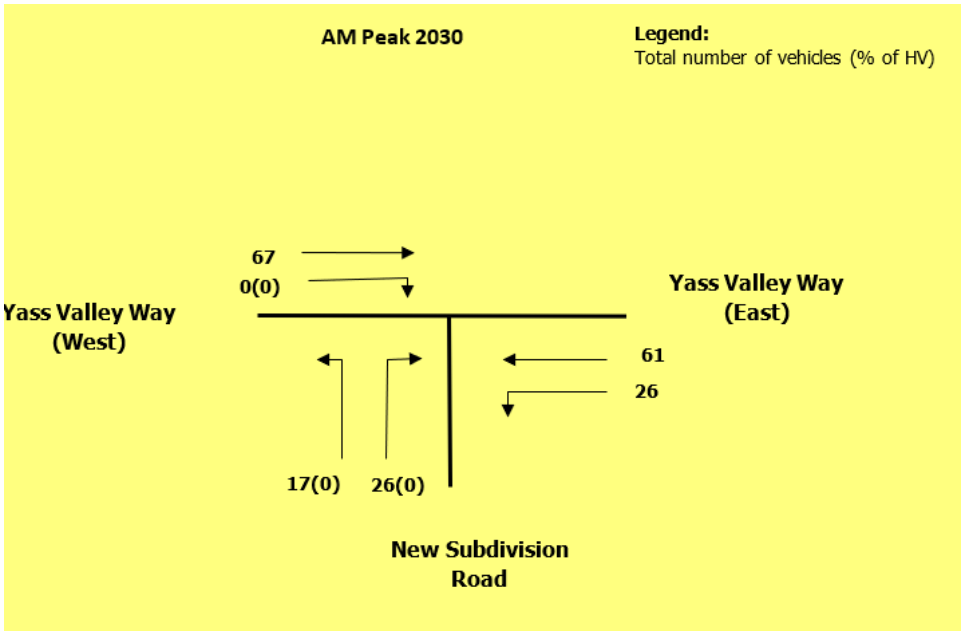


Figure 1.1: 2030 AM Peak hour traffic volumes
(Source: Genium Civil Engineering)

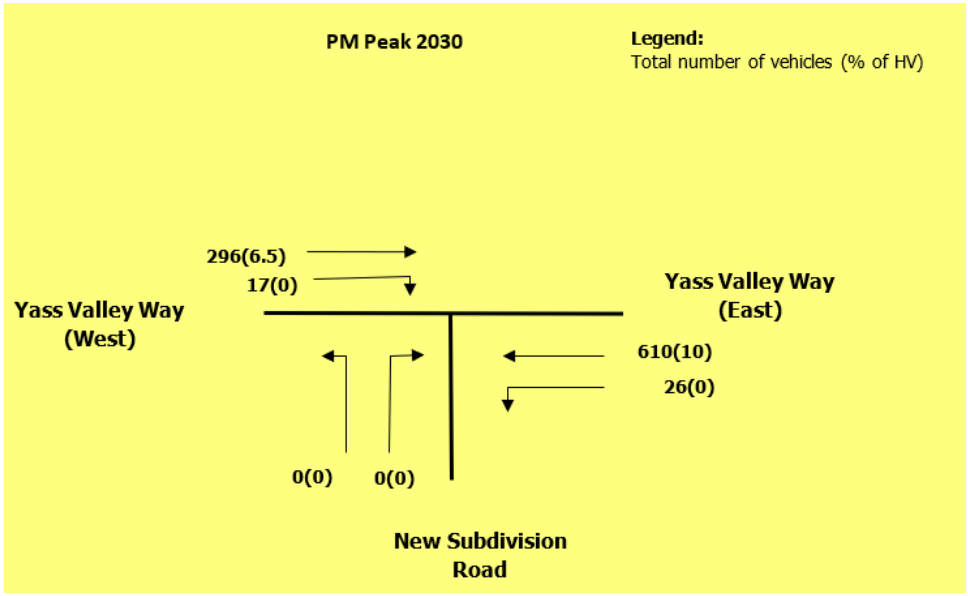


Figure 1.2: 2030 PM Peak hour traffic volumes
(Source: Genium Civil Engineering)

2. Intersection performance

2.1 SIDRA model and its performance indicators

The SIDRA package provides several useful indicators that describe intersection performance. This report has used four typical performance indicators as listed and described below:

- level of service (LoS)
- degree of saturation (DoS)
- average intersection delay, and
- queue length.

Level of Service (LOS)

LoS is a basic performance parameter used to describe the operation of an intersection. Levels of service range from A (indicating good intersection operation) to F (indicating over saturated conditions with long delays and queues). At signalised intersections, the LoS criteria are related to average intersection delay (seconds per vehicle). At priority controlled (give-way and stop controlled) and roundabout intersections, the LoS is based on the modelled delay (seconds per vehicle) for the most delayed movement (refer to Table 2.1). The Roads and Maritime Service typically consider a LoS D or better acceptable on most urban roads.

Table 2.1: Levels of Service

Level of service	Average delay (seconds per vehicle)	Traffic signals, Roundabout	Priority Intersection ('Stop' and 'Give Way')
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity; requires other control mode
F	Greater than 71	Unsatisfactory with excessive queuing	Unsatisfactory with excessive queuing; requires other control mode

Source: RMS Guide to Traffic Generating Developments

Degree of Saturation (DoS)

DoS is the ratio of demand flow to capacity, and therefore has no unit. As it approaches 1.0, extensive queues and delays could be expected. For a satisfactory situation, DoS should be less than the nominated practical degree of saturation, usually 0.9. The intersection DoS is based on the movement with the highest value.

Delay

Delay is the difference between interrupted and uninterrupted travel times through the intersection and is measured in seconds per vehicle. At signalised intersections and roundabouts, the average intersection delay is usually reported. At priority controlled intersections, the average delay for the most delayed movement is usually reported.

Queue length

Queue length is directly related to the number of vehicles waiting at the stop line and is usually quoted as the 95th percentile back of queue, which is the value below which 95% of all observed queue lengths fall. It is measured as the length occupied by the vehicles per traffic lane at the start of the green period, when traffic starts moving again after a red signal. The intersection queue length is usually taken from the movement with the longest queue length.

2.2 Summary SIDRA Assessment Results

2.2.1 2030 AM Peak hour

Figure 2.1 shows the proposed intersection layout, the SIDRA modelling [performance] results for the 2030 AM peak hour, are presented in Tables 2.1.

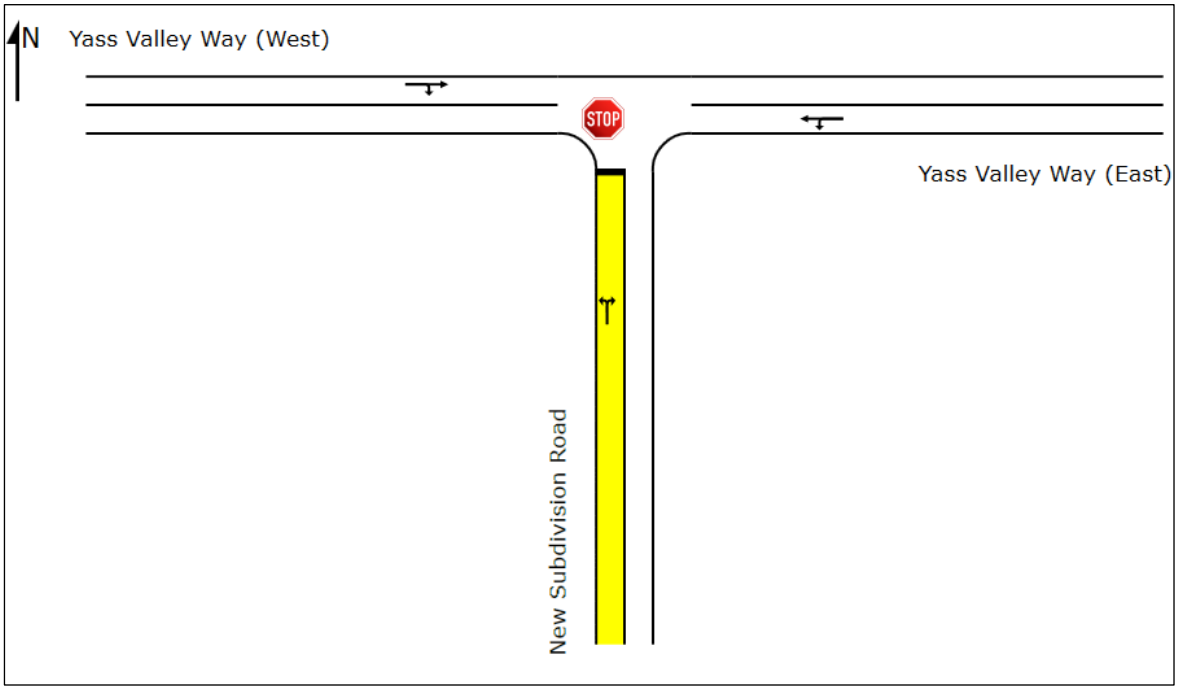


Figure 2.1: The intersection layout
(Source: SIDRA)

The results clearly indicate that, more likely than not, in 2030 AM Peak hour, the intersection would operate at an excellent [overall] excellent **Level of Service** of **A**.

The intersection would be functioning well within its designed capacity, during the 2030 AM peak hour, indicating sufficient spare capacity during the peak hour to accommodate any increase in the future traffic without affecting overall intersection performance.

The intersection is also seeming to be very well balanced, not experiencing long **delays** and/or **queues**.

More likely than not, the **maximum 95th percentile queue length** of only 2.0m would occur on New Development Road, while no queue would occur on Yass Valley Way, on either approach to the intersection.

The SIDRA modelling results suggest that, more likely than not, average delay of only 8.4s and 7.8s would be experienced by the traffic on Yass Valley Way (West) and Yass Valley Way (East) approach to the intersection, respectively, while the maximum average delay on New Development Road is likely to be 14.3s.

Table 2.2: 2030 AM Peak hour – intersection performance results

Approach and direction		Degree of Saturation (v/c)	Average Delay (sec/veh)	Level of Service (LOS)	95% Back of Queue (m)
Yass Valley Way (West)	**T**	0.315	0.0	A	0
	R	0.315	8.4	A	0
New Development Road	**L**	0.077	9.3	A	2
	R	0.077	14.3	B	2
Yass Valley Way (East)	**T**	0.112	0.0	A	0
	L	0.112	7.8	A	0

2.2.2 2030 PM Peak hour

The results clearly indicate that, more likely than not, in 2030 AM peak hour, the intersection would operate at an good [overall] **Level of Service**.

The intersection would be functioning well within its designed capacity, during the 2030 AM peak hour, indicating sufficient spare capacity during the peak hour to accommodate any increase in the future traffic without affecting overall intersection performance.

The intersection is also seeming to be very well balanced, not experiencing long **delays** and/or **queues**.

More likely than not, the **maximum 95th percentile queue length** of only 2.0m would occur on Yass Valley Way (West), while no queue would be unlikely to occur on New Development Road, and Yass Valley Way (East).

The SIDRA modelling results suggest that, more likely than not, average delay of only 11.6s and 7.9s would be experienced by the traffic on Yass Valley Way (West) and Yass Valley Way (East) approach to the intersection, respectively, while the maximum average delay on New Development Road is likely to be 17.0s.

Table 2.2: 2030 PM Peak hour – intersection performance results

Approach and direction		Degree of Saturation (v/c)	Average Delay (sec/veh)	Level of Service (LOS)	95% Back of Queue (m)
Yass Valley Way (West)	**T**	0.189	0.4	A	2.1
	R	0.189	11.6	B	2.1
New Development Road	**L**	0.005	12.3	B	0.1
	R	0.005	17.0	C	0.1
Yass Valley Way (East)	**T**	0.366	0.0	A	0.0
	L	0.366	7.9	A	0.0

Appendix A

SIDRA results

2030 AM Peak

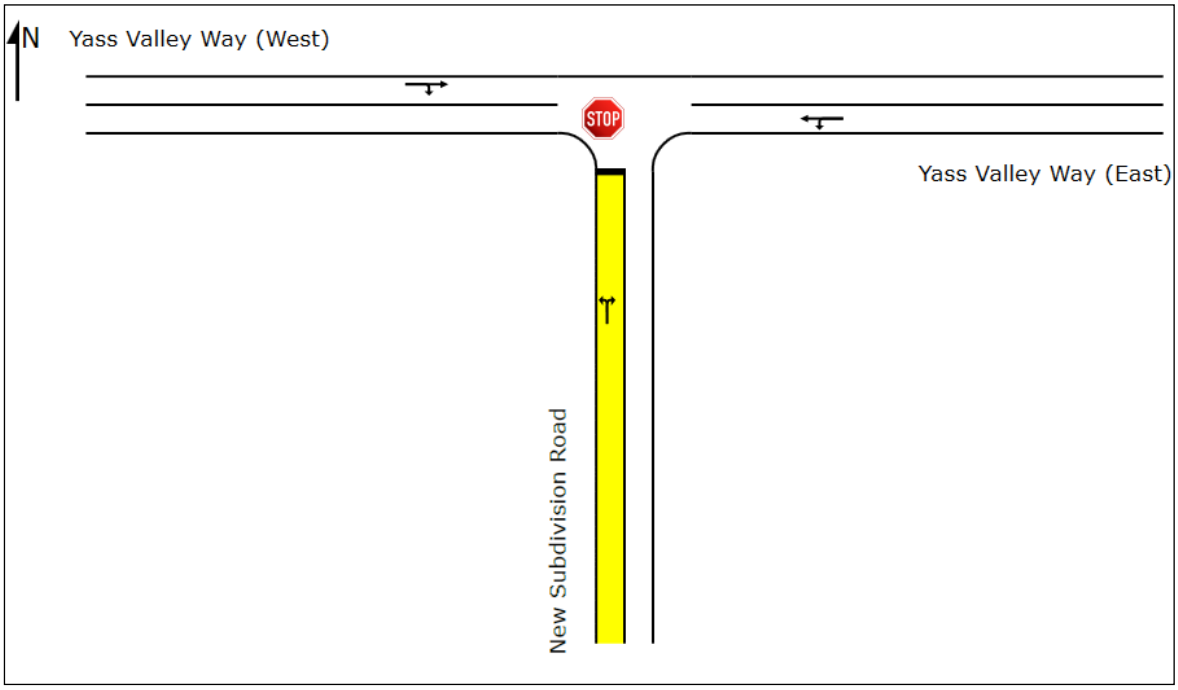


Figure 1.1: Intersection geometry

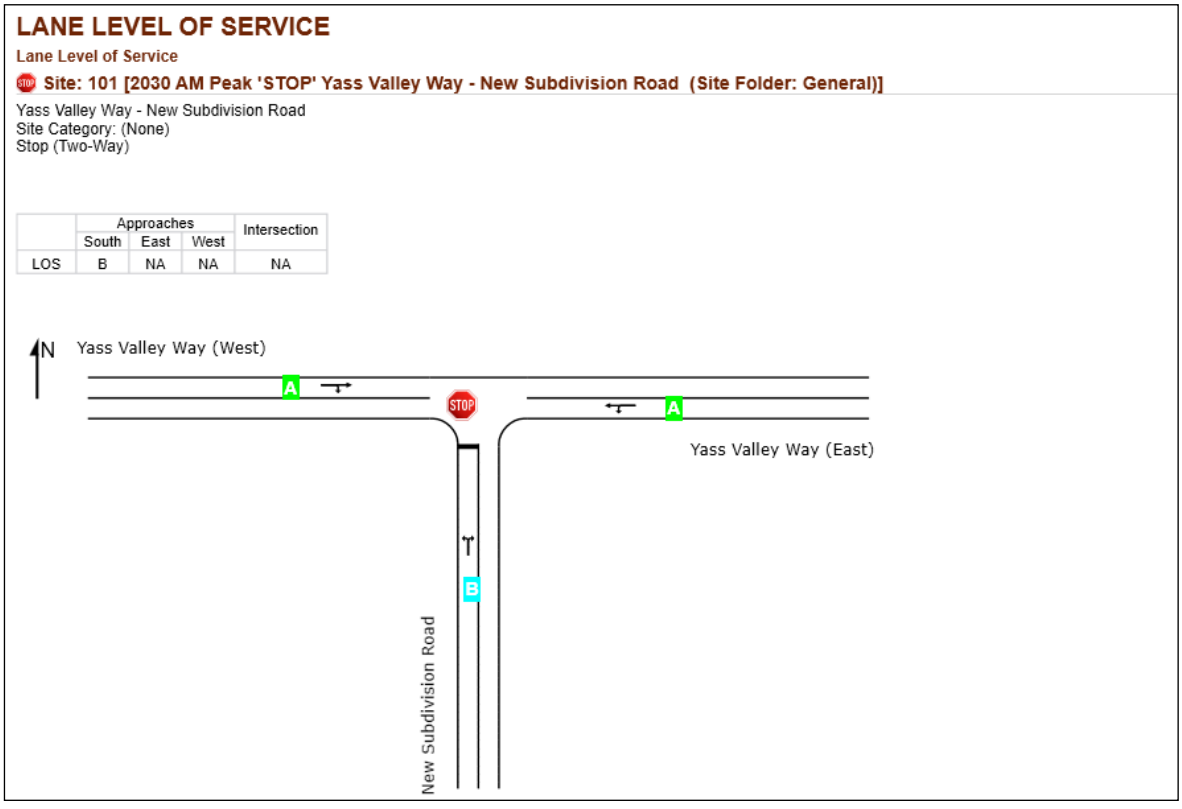


Figure 1.2: Level of Service (LOS) – 2030 AM Peak hour

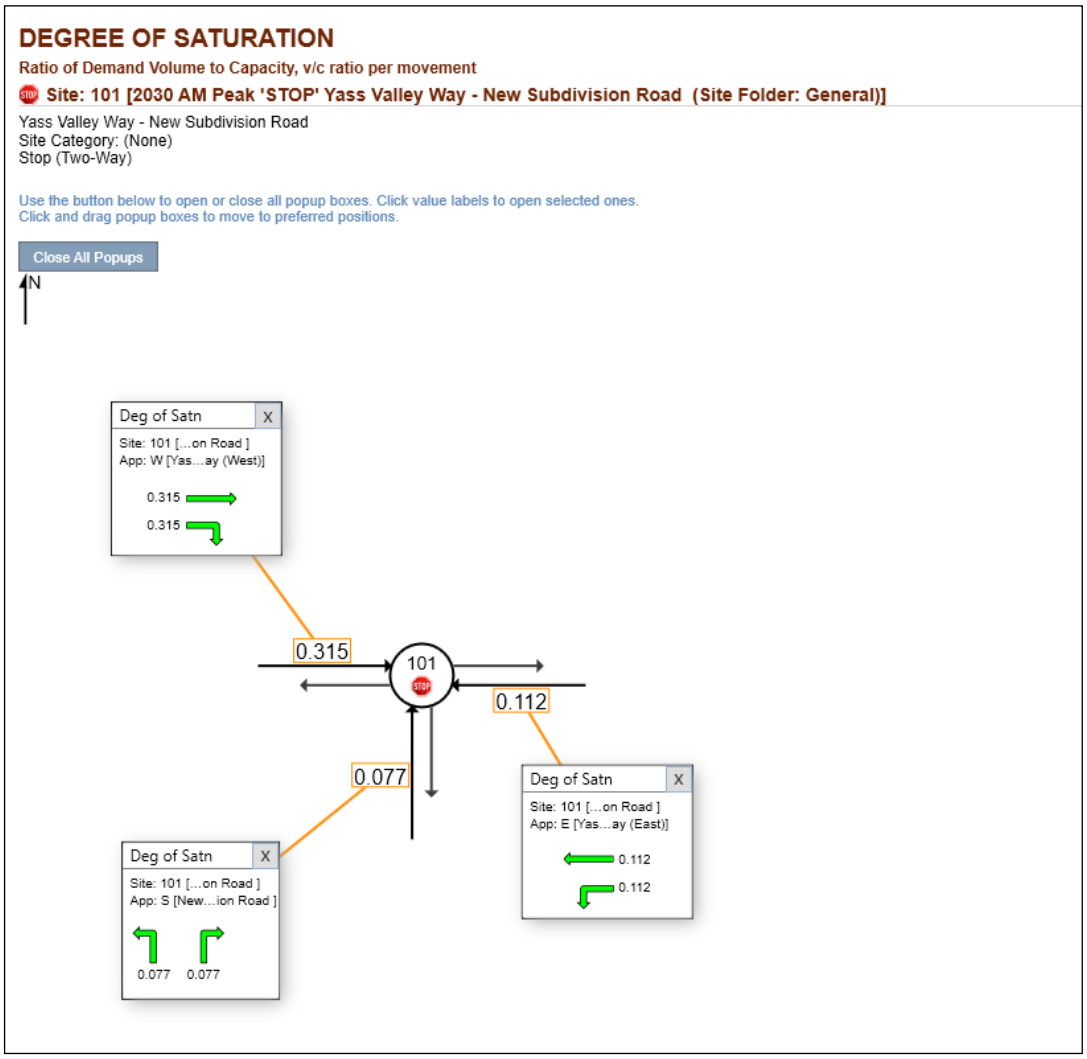


Figure 1.3: Degree of Saturation (DOS) – 2030 AM Peak hour

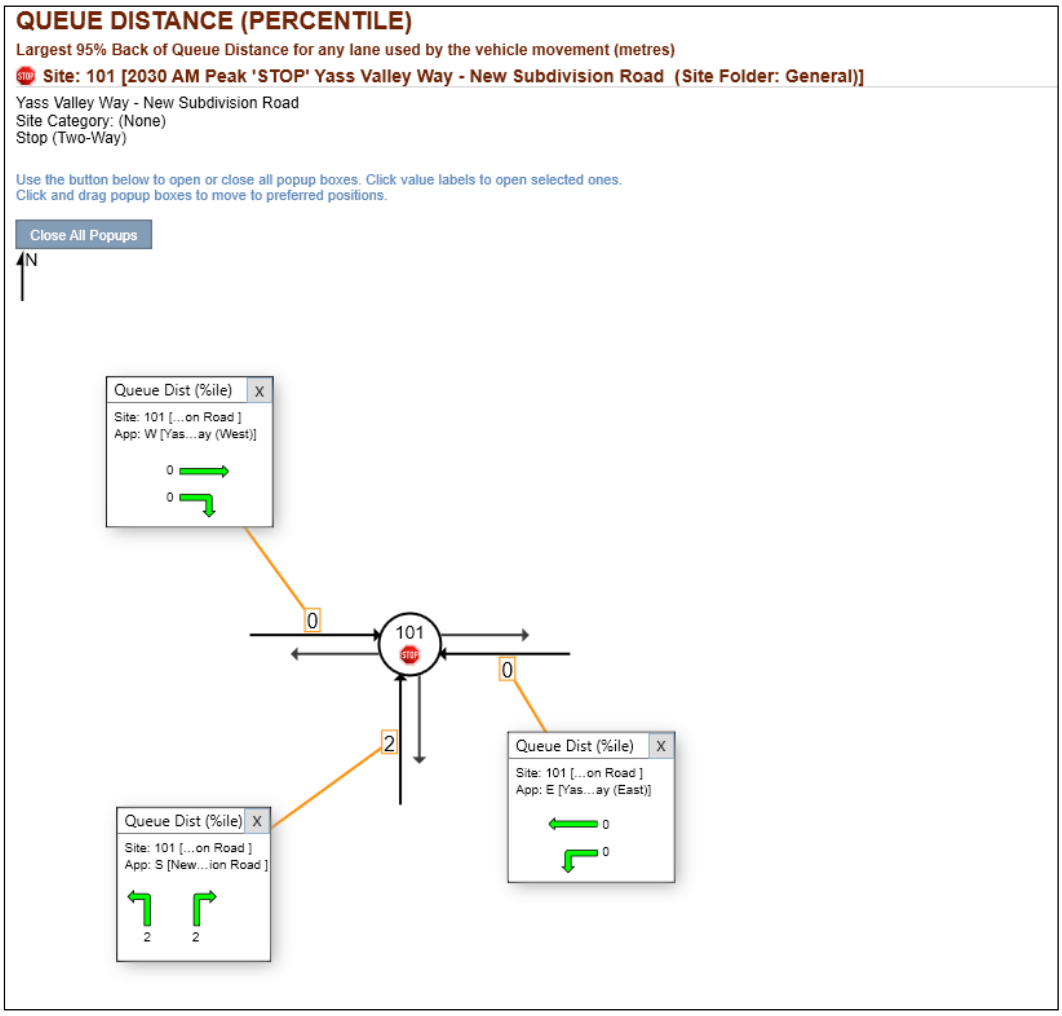


Figure 1.4: 95%-ille Queuing Distance – 2030 AM Peak hour

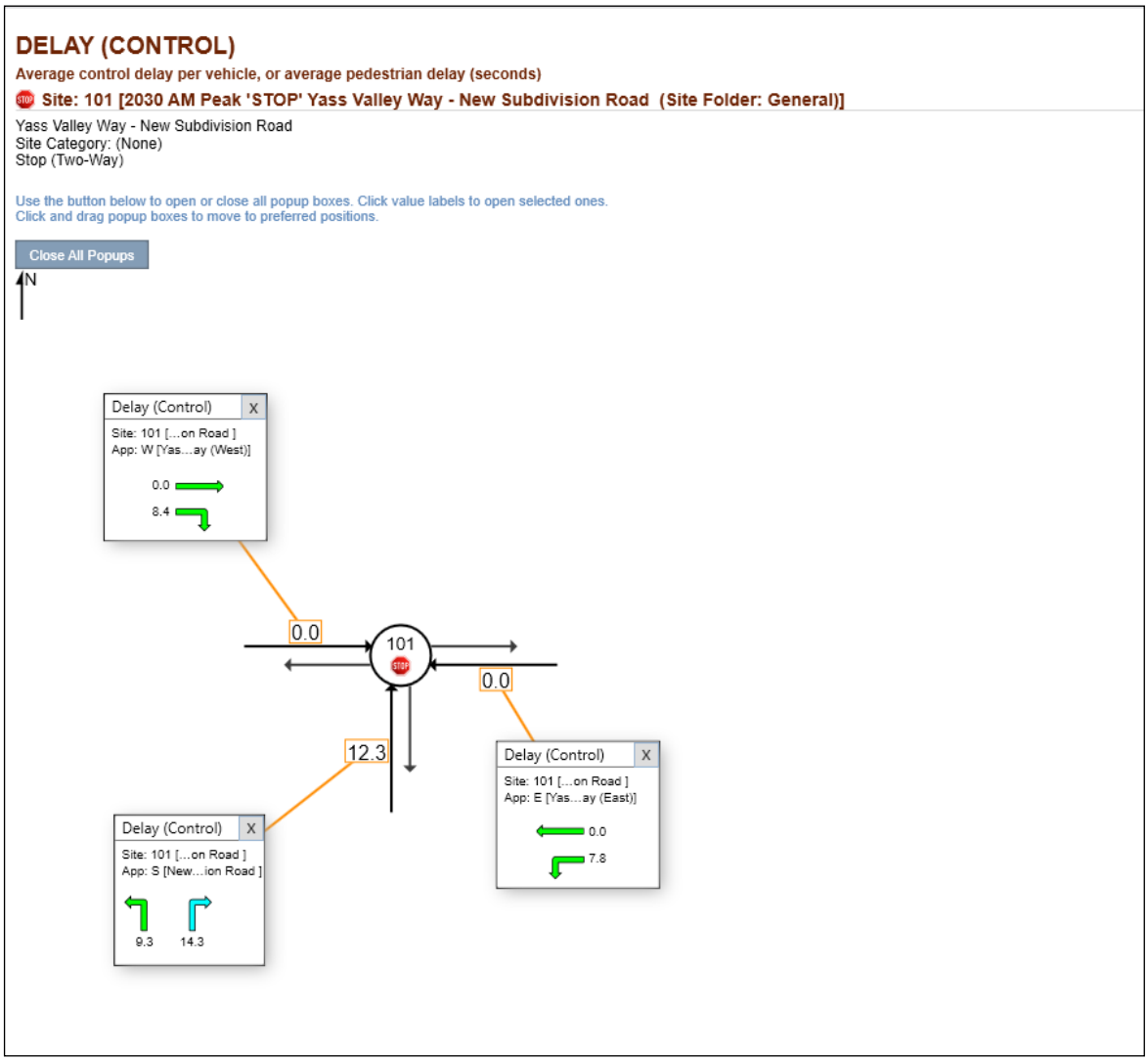


Figure 1.5: Delay – 2030 AM Peak hour

MOVEMENT SUMMARY

Site: 101 [2030 AM Peak 'STOP' Yass Valley Way - New Subdivision Road (Site Folder: General)]

Yass Valley Way - New Subdivision Road
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New Subdivision Road														
1	L2	17	0.0	18	0.0	0.077	9.3	LOS A	0.3	1.8	0.44	0.93	0.44	57.6
3	R2	25	0.0	26	0.0	0.077	14.3	LOS B	0.3	1.8	0.44	0.93	0.44	57.2
Approach		42	0.0	44	0.0	0.077	12.3	LOS B	0.3	1.8	0.44	0.93	0.44	57.4
East: Yass Valley Way (East)														
4	L2	1	0.0	1	0.0	0.112	7.8	LOS A	0.0	0.0	0.00	0.00	0.00	80.5
5	T1	194	10.3	204	10.3	0.112	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
Approach		195	10.2	205	10.2	0.112	0.0	NA	0.0	0.0	0.00	0.00	0.00	99.7
West: Yass Valley Way (West)														
11	T1	558	6.5	587	6.5	0.315	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	99.9
12	R2	1	0.0	1	0.0	0.315	8.4	LOS A	0.0	0.1	0.00	0.00	0.00	80.4
Approach		559	6.5	588	6.5	0.315	0.0	NA	0.0	0.1	0.00	0.00	0.00	99.9
All Vehicles		796	7.1	838	7.1	0.315	0.7	NA	0.3	1.8	0.02	0.05	0.02	97.1

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

Organisation: TRAFFIC ENGINEERING CENTRE PTY LTD | Licence: PLUS / 1PC | Processed: Thursday, 18 March 2021 4:34:23 PM
Project: D:\Back up 2015.08.31\2021-PR-08-0418 SIDRA Yass Genuin Civil\4. SIDRA modelling\Yass Valley Road New Subdivision Road intersection 2030.sip9

INTERSECTION SUMMARY

Site: 101 [2030 AM Peak 'STOP' Yass Valley Way - New Subdivision Road (Site Folder: General)]

Yass Valley Way - New Subdivision Road
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	97.1 km/h	97.1 km/h
Travel Distance (Total)	832.5 veh-km/h	999.0 pers-km/h
Travel Time (Total)	8.6 veh-h/h	10.3 pers-h/h
Desired Speed (Program)	99.5 km/h	
Speed Efficiency	0.98	
Travel Time Index	9.74	
Congestion Coefficient	1.02	
Demand Flows (Total)	838 veh/h	1005 pers/h
Percent Heavy Vehicles (Demand)	7.1 %	
Degree of Saturation	0.315	
Practical Spare Capacity	211.5 %	
Effective Intersection Capacity	2663 veh/h	
Control Delay (Total)	0.16 veh-h/h	0.19 pers-h/h
Control Delay (Average)	0.7 sec	0.7 sec
Control Delay (Worst Lane)	12.3 sec	
Control Delay (Worst Movement)	14.3 sec	14.3 sec
Geometric Delay (Average)	0.4 sec	
Stop-Line Delay (Average)	0.2 sec	
Idling Time (Average)	0.2 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.3 veh	
95% Back of Queue - Distance (Worst Lane)	1.8 m	
Ave. Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	42 veh/h	51 pers/h
Effective Stop Rate	0.05	0.05
Proportion Queued	0.02	0.02
Performance Index	9.1	9.1
Cost (Total)	459.00 $/h	459.00 $/h
Fuel Consumption (Total)	77.8 L/h	
Carbon Dioxide (Total)	186.3 kg/h	
Hydrocarbons (Total)	0.023 kg/h	
Carbon Monoxide (Total)	0.512 kg/h	
NOx (Total)	0.375 kg/h	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 69.1% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles	Persons

2030 PM Peak

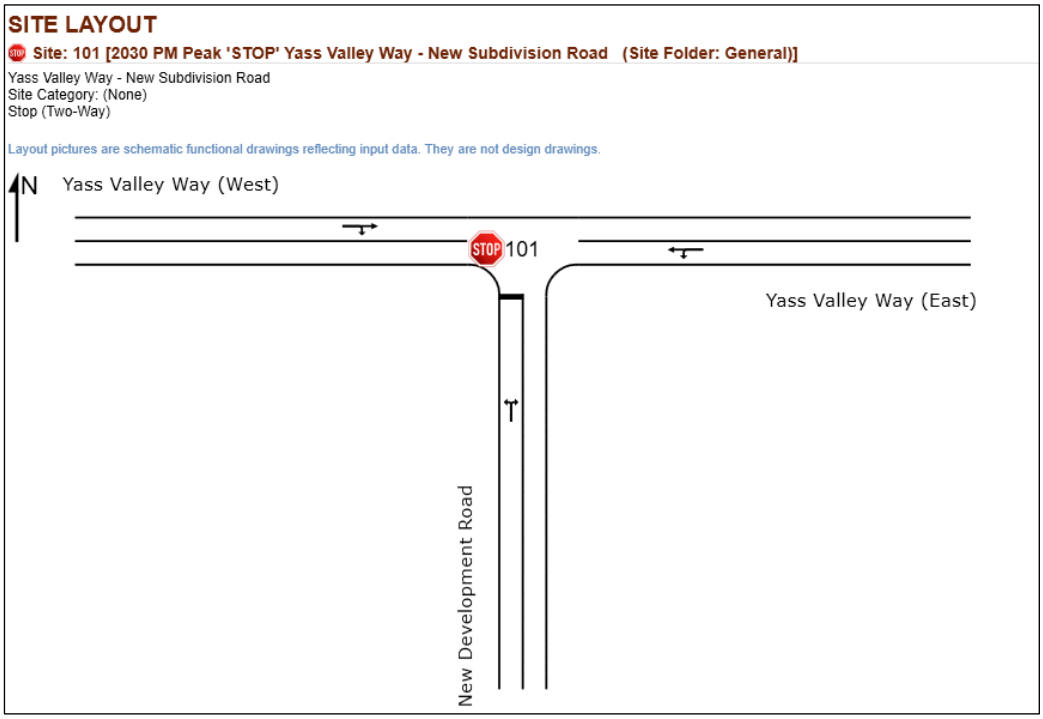


Figure 1.1: Intersection layout

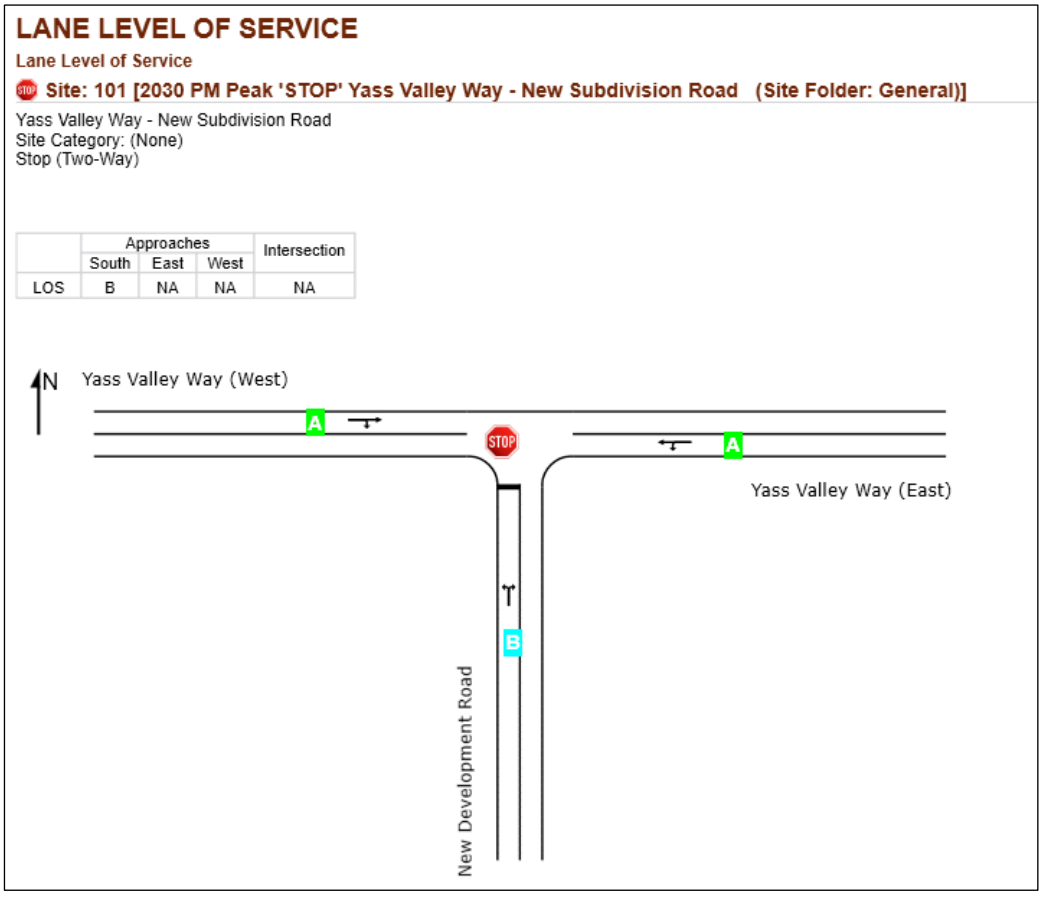


Figure 1.2: Level of Service (LOS) – 2030 PM Peak hour

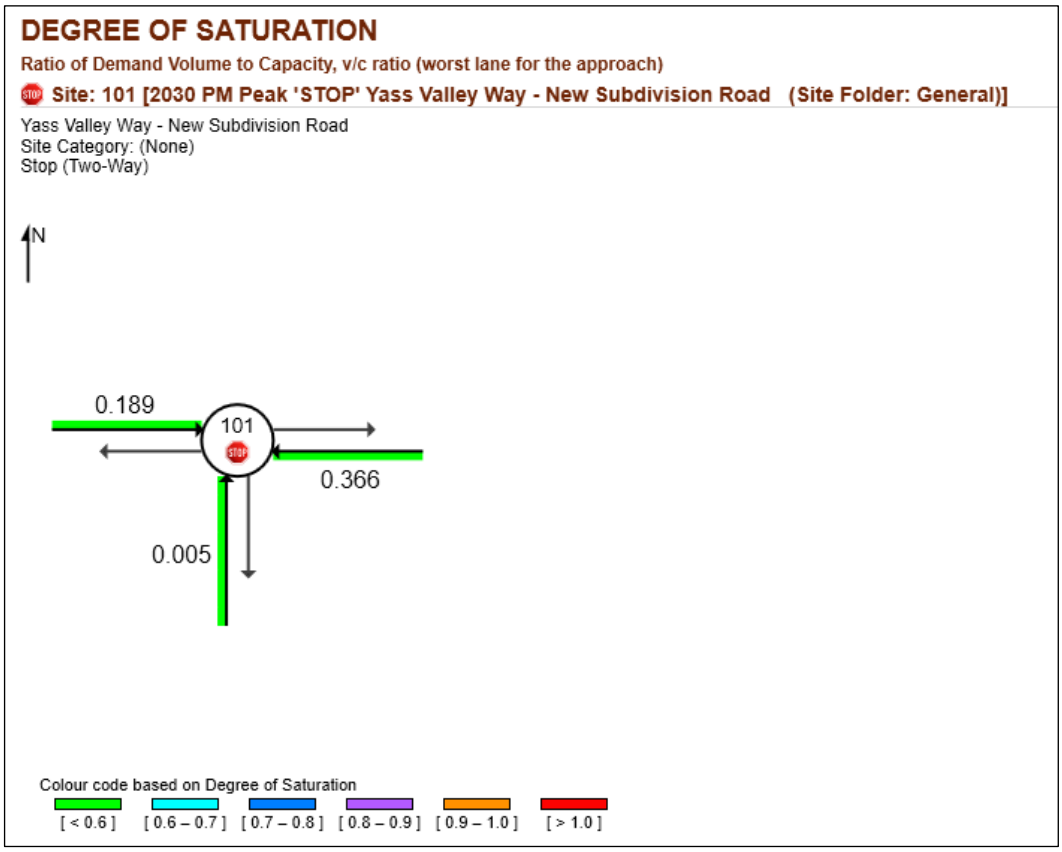


Figure 1.3: Degree of Saturation (DOS) – 2030 PM Peak hour

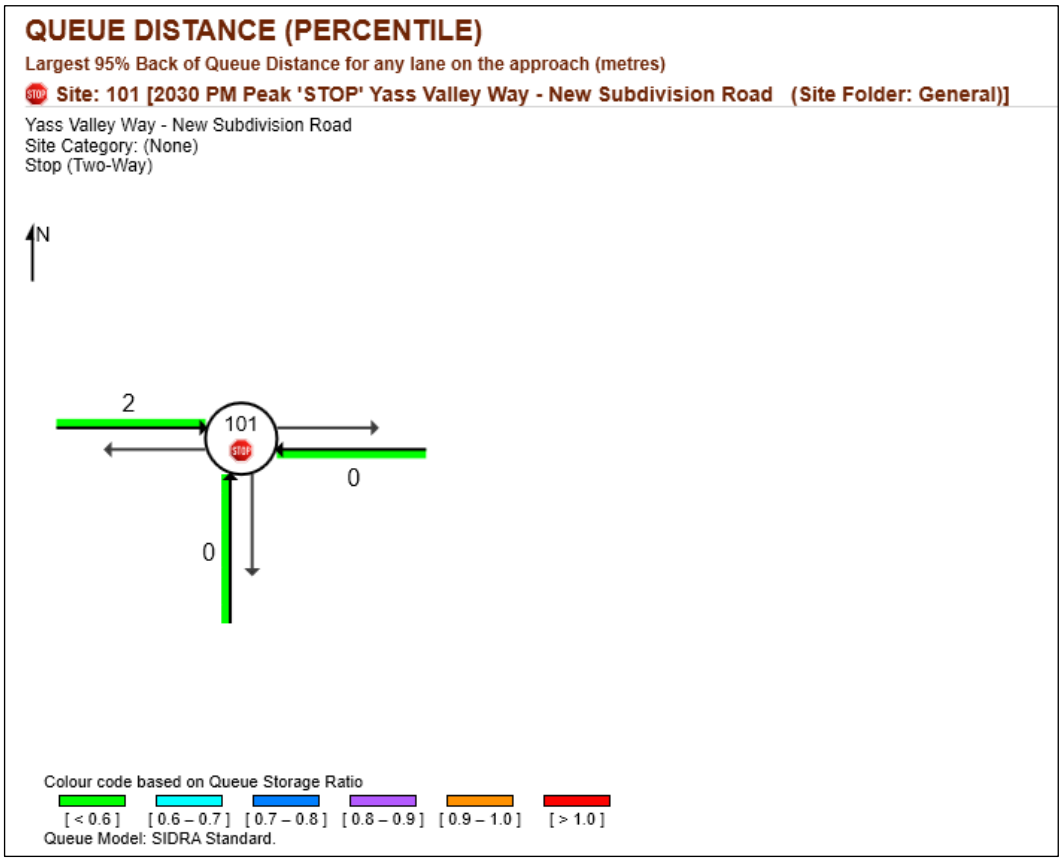


Figure 1.4: 95%-ille Queuing Distance – 2030 PM Peak hour

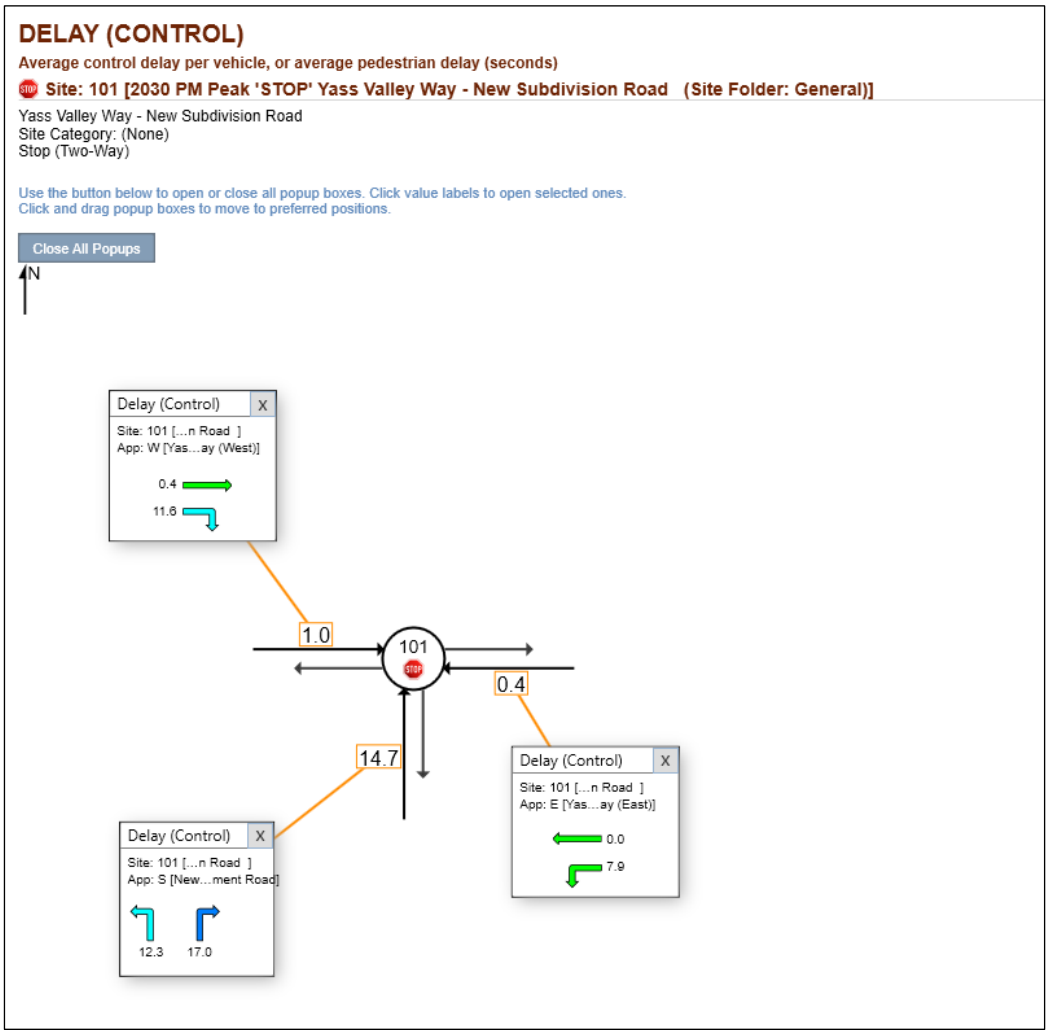


Figure 1.5: Delay – 2030 PM Peak hour

MOVEMENT SUMMARY

Site: 101 [2030 PM Peak 'STOP' Yass Valley Way - New Subdivision Road (Site Folder: General)]

Yass Valley Way - New Subdivision Road
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New Development Road														
1	L2	1	0.0	1	0.0	0.005	12.3	LOS B	0.0	0.1	0.66	0.87	0.66	55.2
3	R2	1	0.0	1	0.0	0.005	17.0	LOS C	0.0	0.1	0.66	0.87	0.66	54.8
Approach		2	0.0	2	0.0	0.005	14.7	LOS B	0.0	0.1	0.66	0.87	0.66	55.0
East: Yass Valley Way (East)														
4	L2	26	0.0	27	0.0	0.366	7.9	LOS A	0.0	0.0	0.00	0.03	0.00	79.7
5	T1	610	10.3	642	10.3	0.366	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	98.8
Approach		636	9.9	669	9.9	0.366	0.4	NA	0.0	0.0	0.00	0.03	0.00	98.1
West: Yass Valley Way (West)														
11	T1	296	6.5	312	6.5	0.189	0.4	LOS A	0.3	2.1	0.10	0.04	0.10	97.1
12	R2	17	0.0	18	0.0	0.189	11.6	LOS B	0.3	2.1	0.10	0.04	0.10	77.8
Approach		313	6.1	329	6.1	0.189	1.0	NA	0.3	2.1	0.10	0.04	0.10	96.2
All Vehicles		951	8.6	1001	8.6	0.366	0.6	NA	0.3	2.1	0.04	0.03	0.04	97.4

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

INTERSECTION SUMMARY

Site: 101 [2030 PM Peak 'STOP' Yass Valley Way - New Subdivision Road (Site Folder: General)]

Yass Valley Way - New Subdivision Road
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values

Performance Measure	Vehicles	Persons
Travel Speed (Average)	97.4 km/h	97.4 km/h
Travel Distance (Total)	997.0 veh-km/h	1196.4 pers-km/h
Travel Time (Total)	10.2 veh-h/h	12.3 pers-h/h
Desired Speed (Program)	99.6 km/h	
Speed Efficiency	0.98	
Travel Time Index	9.75	
Congestion Coefficient	1.02	
Demand Flows (Total)	1001 veh/h	1201 pers/h
Percent Heavy Vehicles (Demand)	8.6 %	
Degree of Saturation	0.366	
Practical Spare Capacity	167.7 %	
Effective Intersection Capacity	2735 veh/h	
Control Delay (Total)	0.17 veh-h/h	0.21 pers-h/h
Control Delay (Average)	0.6 sec	0.6 sec
Control Delay (Worst Lane)	14.7 sec	
Control Delay (Worst Movement)	17.0 sec	17.0 sec
Geometric Delay (Average)	0.4 sec	
Stop-Line Delay (Average)	0.3 sec	
Idling Time (Average)	0.0 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.3 veh	
95% Back of Queue - Distance (Worst Lane)	2.1 m	
Ave. Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	34 veh/h	40 pers/h
Effective Stop Rate	0.03	0.03
Proportion Queued	0.04	0.04
Performance Index	10.7	10.7
Cost (Total)	559.85 $/h	559.85 $/h
Fuel Consumption (Total)	98.1 L/h	
Carbon Dioxide (Total)	235.6 kg/h	
Hydrocarbons (Total)	0.028 kg/h	
Carbon Monoxide (Total)	0.603 kg/h	
NOx (Total)	0.558 kg/h	

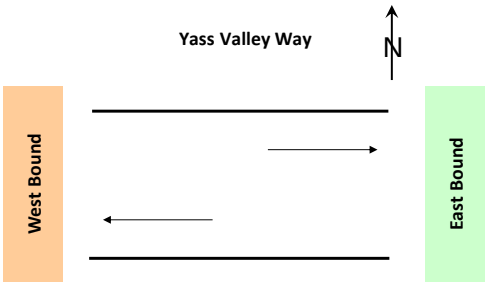
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 77.8% 6.5% 0.0%

Intersection Performance - Annual Values

Yass Valley Way - March 2021 Peak Hour Counts

Job No. : A132
Client : Genium
Suburb : Yass Valley Way
Location : 1. Yass Valley Way

Day/Date : Wed, 3rd March 2021
Weather : Fine
Description : Mid-block Count
: Peak Hour Summary



	Approach		West Bound			East Bound			Grand Total
	Time Period		Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:00	8:00	139	16	**155**	418	29	**447**	**602**
PM	16:45	17:45	466	22	**488**	229	8	**237**	**725**

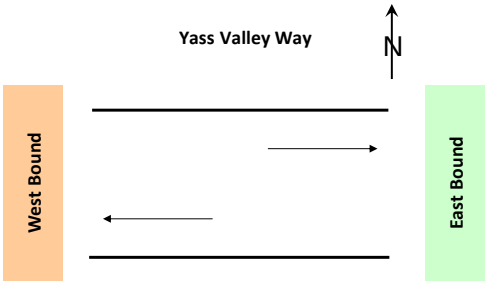
MATRIX Traffic and Transport Data

Approach		West Bound			East Bound			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	
6:30	7:30	86	15	**101**	405	34	**439**	**540**
6:45	7:45	95	12	**107**	416	35	**451**	**558**
7:00	8:00	139	16	**155**	418	29	**447**	**602**
7:15	8:15	181	15	**196**	366	23	**389**	**585**
7:30	8:30	226	20	**246**	328	10	**338**	**584**
7:45	8:45	275	23	**298**	294	6	**300**	**598**
8:00	9:00	275	21	**296**	253	7	**260**	**556**
8:15	9:15	257	19	**276**	258	9	**267**	**543**
8:30	9:30	222	17	**239**	253	9	**262**	**501**
AM Totals		**534**	**52**	**586**	**986**	**53**	**1,039**	**1,625**
15:30	16:30	348	16	**364**	244	15	**259**	**623**
15:45	16:45	368	20	**388**	244	12	**256**	**644**
16:00	17:00	389	24	**413**	242	5	**247**	**660**
16:15	17:15	419	28	**447**	241	10	**251**	**698**
16:30	17:30	432	30	**462**	236	8	**244**	**706**
16:45	17:45	466	22	**488**	229	8	**237**	**725**
17:00	18:00	470	22	**492**	221	9	**230**	**722**
17:15	18:15	445	20	**465**	210	4	**214**	**679**
17:30	18:30	400	13	**413**	172	5	**177**	**590**
PM Totals		**1,180**	**59**	**1,239**	**652**	**28**	**680**	**1,919**

Yass Valley Way – Projected 2030 Peak Hour Counts

Job No. : A132
Client : Genium
Suburb : Yass Valley Way
Location : 1. Yass Valley Way

Day/Date Estimated 2030 Volumes
Weather : Fine
Description : Mid-block Count
: Peak Hour Summary



	Approach		West Bound			East Bound			Grand Total
	Time Period		Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:00	8:00	174	20	**194**	522	36	**558**	**752**
PM	16:45	17:45	582	27	**610**	286	10	**296**	**906**

Approach		West Bound			East Bound			Grand Total
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	
6:30	7:30	107	19	**126**	506	42	**548**	**674**
6:45	7:45	119	15	**134**	520	44	**563**	**697**
7:00	8:00	174	20	**194**	522	36	**558**	**752**
7:15	8:15	226	19	**245**	457	29	**486**	**731**
7:30	8:30	282	25	**307**	410	12	**422**	**729**
7:45	8:45	343	29	**372**	367	7	**375**	**747**
8:00	9:00	343	26	**370**	316	9	**325**	**694**
8:15	9:15	321	24	**345**	322	11	**333**	**678**
8:30	9:30	277	21	**299**	316	11	**327**	**626**
AM Totals		**667**	**65**	**732**	**1,232**	**66**	**1,298**	**2,030**
15:30	16:30	435	20	**455**	305	19	**323**	**778**
15:45	16:45	460	25	**485**	305	15	**320**	**804**
16:00	17:00	486	30	**516**	302	6	**309**	**824**
16:15	17:15	523	35	**558**	301	12	**313**	**872**
16:30	17:30	540	37	**577**	295	10	**305**	**882**
16:45	17:45	582	27	**610**	286	10	**296**	**906**
17:00	18:00	587	27	**615**	276	11	**287**	**902**
17:15	18:15	556	25	**581**	262	5	**267**	**848**
17:30	18:30	500	16	**516**	215	6	**221**	**737**
PM Totals		**1,474**	**74**	**1,548**	**814**	**35**	**849**	**2,397**