REPORT

Whitlam Stage 2 – Traffic Impact Assessment

PREPARED FOR SURBURBAN LAND AGENCY

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Appendix A ROAD HIERARCHY PLAN
Appendix B SIDRA OUTPUTS

1 Introduction

Calibre has been engaged by the Suburban Land Agency to undertake the Estate Development Plan (EDP), and associated design documentation for Whitlam Stage 2. As part of the design, investigations into the traffic and the performance of key intersections in Stage 2 has been undertaken. Calibre has determined traffic volumes based on the detailed block layout of Stages 1 and 2, high level yield numbers for Stages 3 & 4 and traffic generation rates specified in the Estate Development Code. These traffic volumes were used to produce the road hierarchy for the estate.

Figure 1.1: Whitlam Stages 1-4

2 Proposed Development

2.1 Stage 1

Whitlam is located approximately 10km west of the Canberra CBD and 6km south of the Belconnen Town Centre. Stage 1 lies between William Hovell Drive to the north and John Gorton Drive to the east. The only method of access to Stage 1 will be from John Gorton Drive through its intersection with Road 01. Internally, Road 01 will serve as the major traffic route that will connect traffic to future stages of Whitlam as well as the rest of the road network in Stage 1.

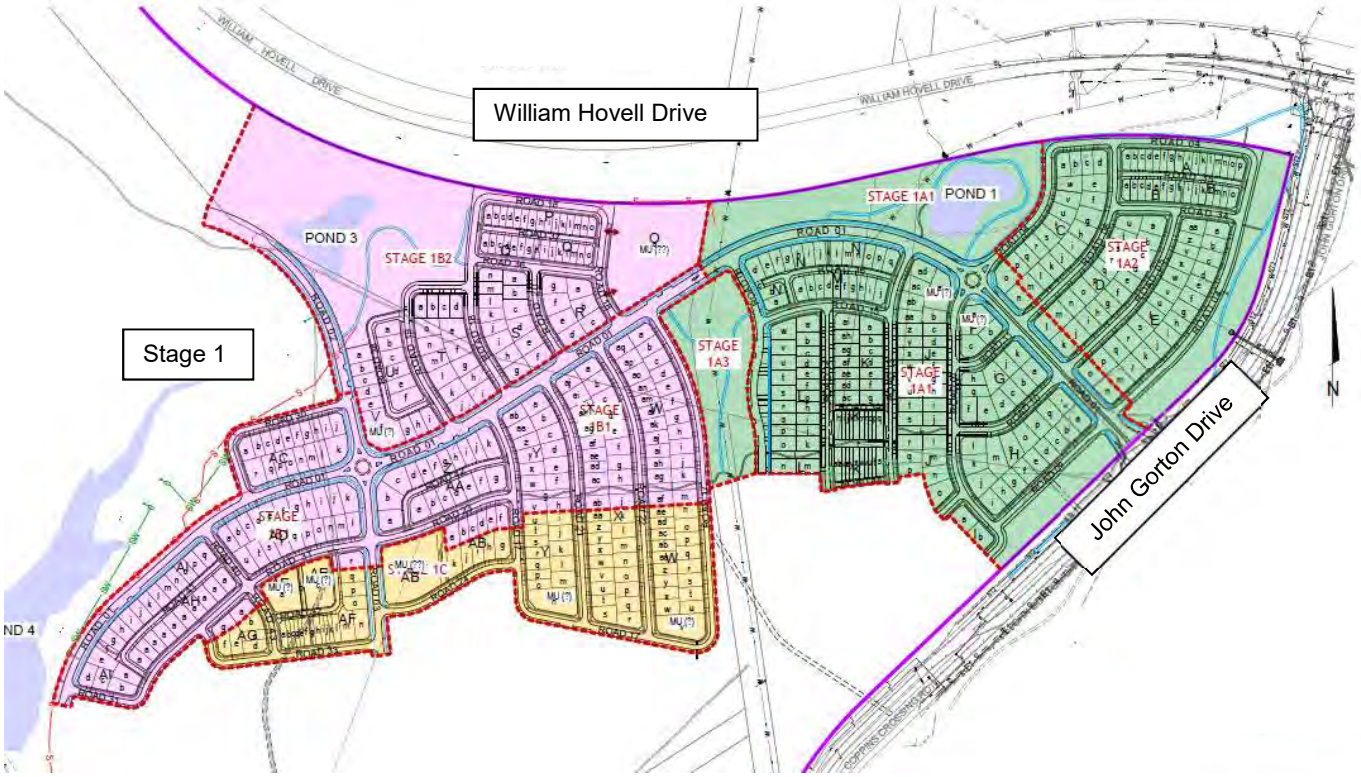


Figure 2.1: Whitlam Stage 1

2.2 Stage 2

Stage 2 is located to the south of Stage 1 of Whitlam. There are two main access roads into Stage 2 from Stage 1 of Whitlam through Roads 01 and 03. Figure 2.2 shows the layout of Stage 2. There are also two connections into Stage 2 from John Gorton Drive through Road 08, a left in/left out intersection and Road 03 a four-way signalised intersection. Internally, Road 01 and Road 03 will serve as the two major traffic routes within Stage 2 of Whitlam. Figure 2.2 shows the layout and staging of Stage 2.

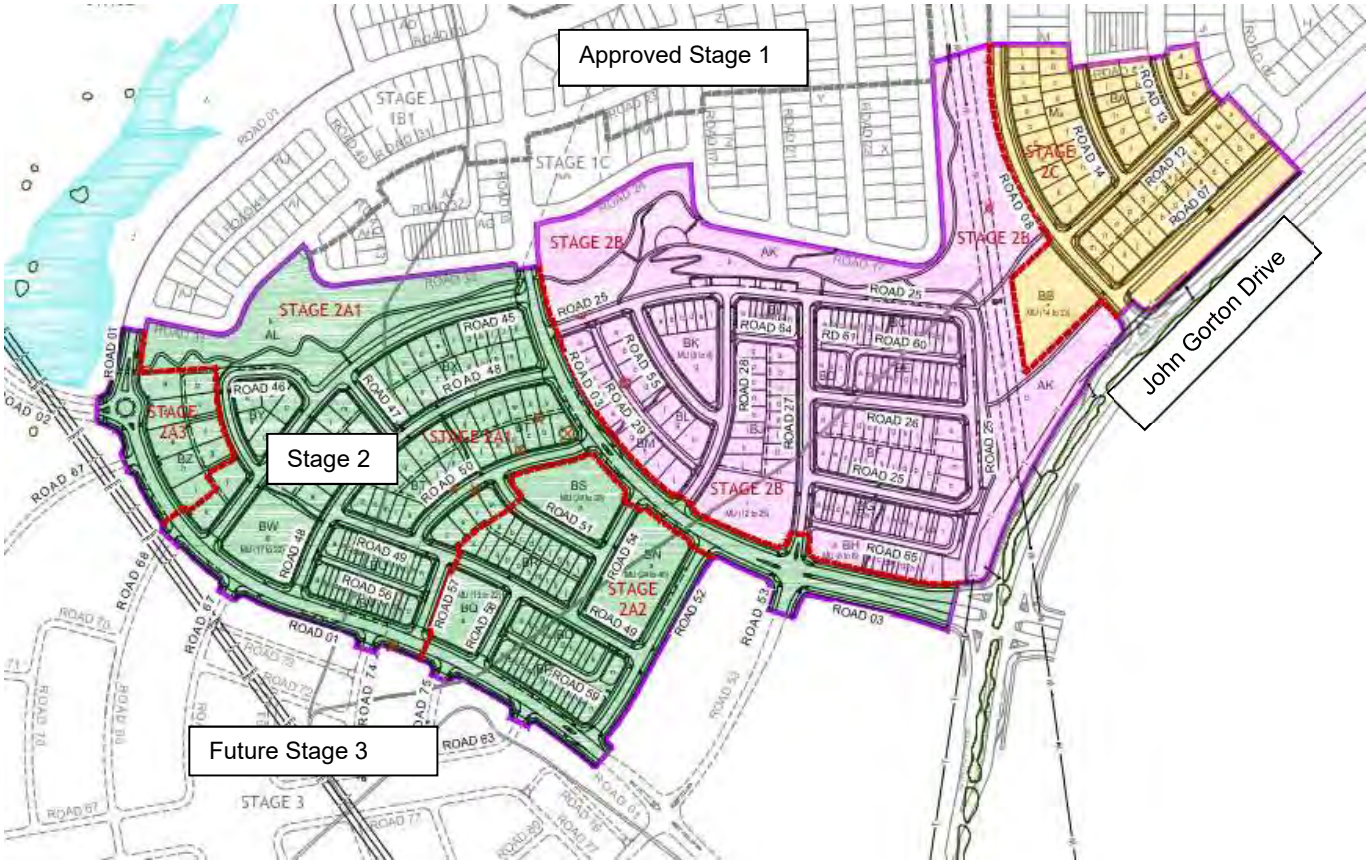


Figure 2.2: Whitlam Stage 2

3 Background Analysis

Calibre has developed a Road Hierarchy Plan as part of the traffic analysis for Whitlam Stage 2. The road hierarchy plan was utilised to determine the relevant road geometry through the estate. The hierarchy was produced using the road layout developed in conjunction with Spacelab (ACT) and has been included in the Whitlam Stage 2 EDP submission.

Traffic generation rates per dwelling utilised for the hierarchy analysis were derived from the Estate Development Code and were summarised as follow:

- Low density residential: 8 trips per day
- Medium density residential: 7 trips per day
- High density residential: 6 trips per day

The ultimate vehicle per day figures at critical points within Whitlam Stage 2 have been included on the road hierarchy plan. Refer to Appendix A for the Road Hierarchy Plan, which shows the expected ultimate traffic volumes and their locations in Stage 2. These ultimate traffic volumes are similar to that found in Stage 1. The two major roads within Stage 2 of the development carry the majority of the traffic throughout Stage 2 of Whitlam.

The development of the road hierarchy plan, as well as the traffic generation, takes into account the proposed usage and typology of blocks that has been developed by Calibre in conjunction with Spacelab (ACT). Figure 3.1 shows that the internal road system typically consists of collector roads and access roads which connect to them. Sections of Road 01 and Road 03 connecting to John Gorton Drive are categorised as major collector roads.

The five intersections circled in red in the below figure have been assessed for their performance upon full development of the Whitlam estate. These assessments are detailed in Section 4 of this report.

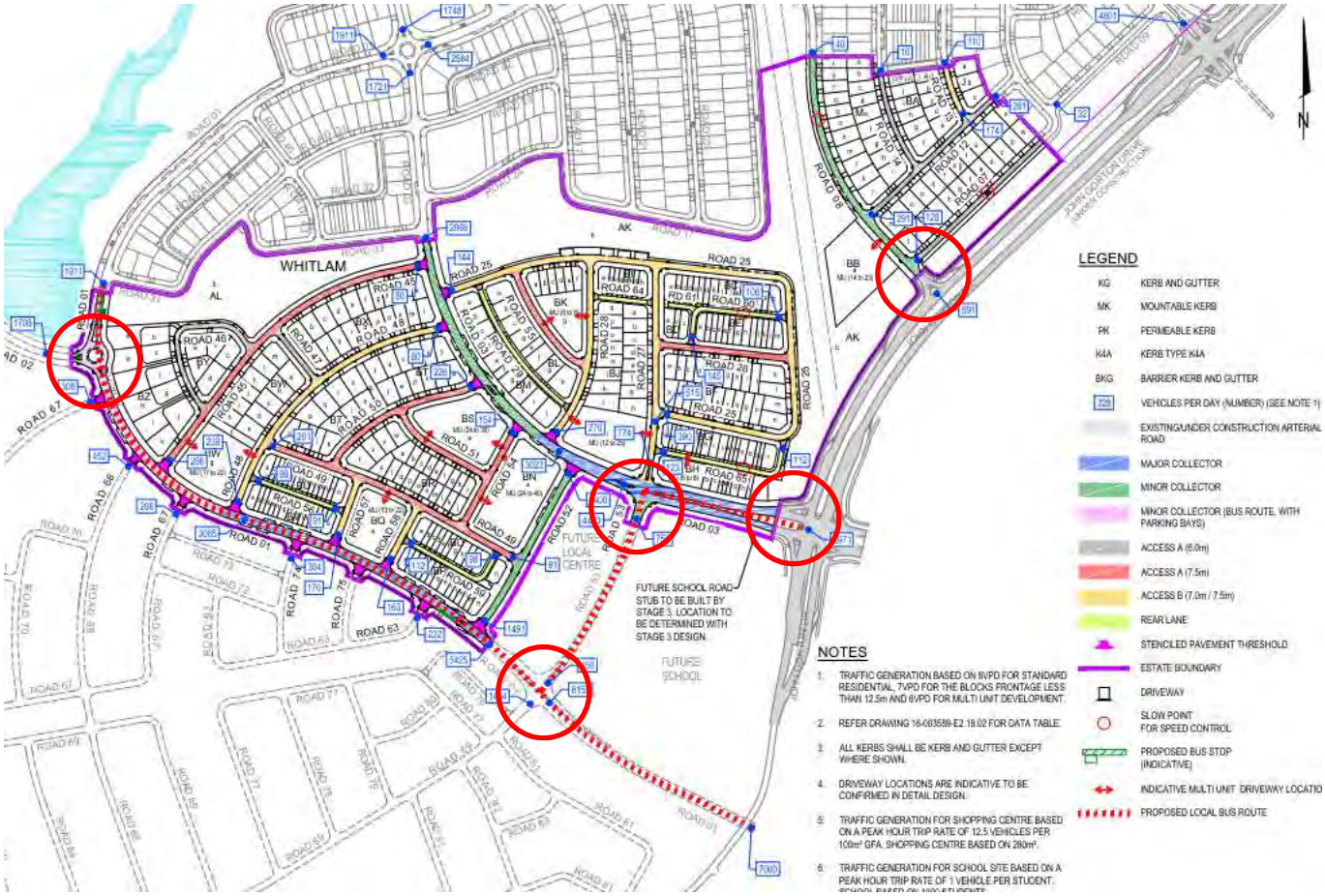


Figure 3.1: Road Hierarchy Plan – Whitlam Stage 2

4 Intersection Analysis

4.1 Capacity Analysis and LOS Criteria

For the analysis of intersections within this report, the level of service (LOS) of the intersection was the main method used to classify the performance of the intersection. The following table outlines the criteria for classifying the LOS of an intersection based only upon the delay of the vehicles (RMS NSW method).

Table 4-1: Level of Service Criteria – RMS NSW Method

LOS	Control delay per vehicle in seconds (d) (Including geometric delay)
	All intersection types
A	d<14
B	d<15 to 28
C	d<29 to 42
D	d<43 to 56
E	d<57 to 70
F	d>70

As part of the Whitlam Stage 2 Traffic Impact Assessment, analysis of six key intersections were undertaken. Five of these intersections are located within Stage 2. The future signalised Road 01 / Road 53 / Road 69 intersection in stage 3 was also included in a network with the Road 03 / Road 27 / Road 53 signalised intersection due to its network inter-connectivity and proximity to the school and local centre.

In accordance with Section 6.4.3 in ACT Design Standard DS06 – Pavement Design, the peak hour traffic volumes were calculated by multiplying the daily traffic volumes shown on the road hierarchy plan by 10%. Due to the residential nature of the development, it is expected that approximately 80% of the traffic generated will exit Whitlam Stage 2 during the AM peak hour, and 20% will enter. In the PM peak hour, it is expected that 70% of traffic will enter Whitlam Stage 2, with the remaining 30% entering. Full outputs from the SIDRA analysis are presented at Appendix B.

4.2 Road 01 / Road 02 Intersection

4.2.1 AM Peak Hour Traffic Splits

The Road 01 / Road 02 intersection is an un-signalised roundabout. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.1 below shows the entering and exiting traffic volumes used in the SIDRA analysis.

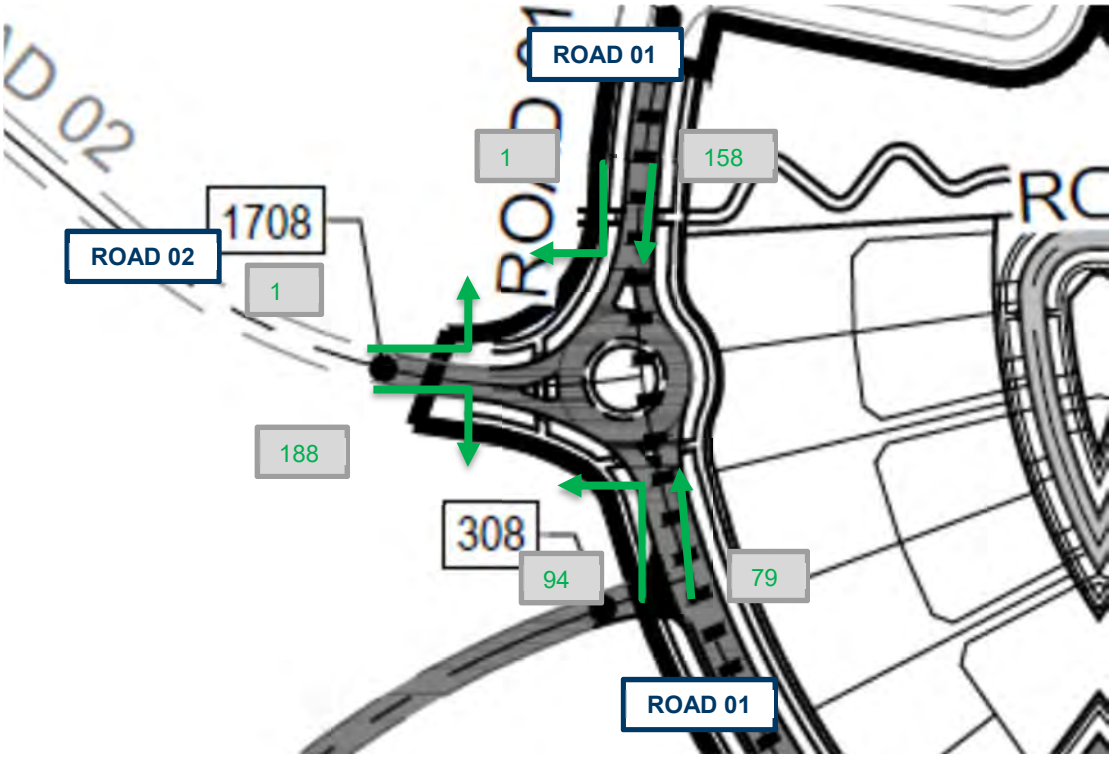


Figure 4.1: Road 01 / Road 02 Intersection – AM Peak Hour Splits

4.2.2 PM Peak Hour Traffic Splits

The same methodology was adopted to determine the PM peak hour traffic volumes as that outlined in the AM Peak. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.2 below shows the entering and exiting traffic volumes used in the SIDRA analysis.

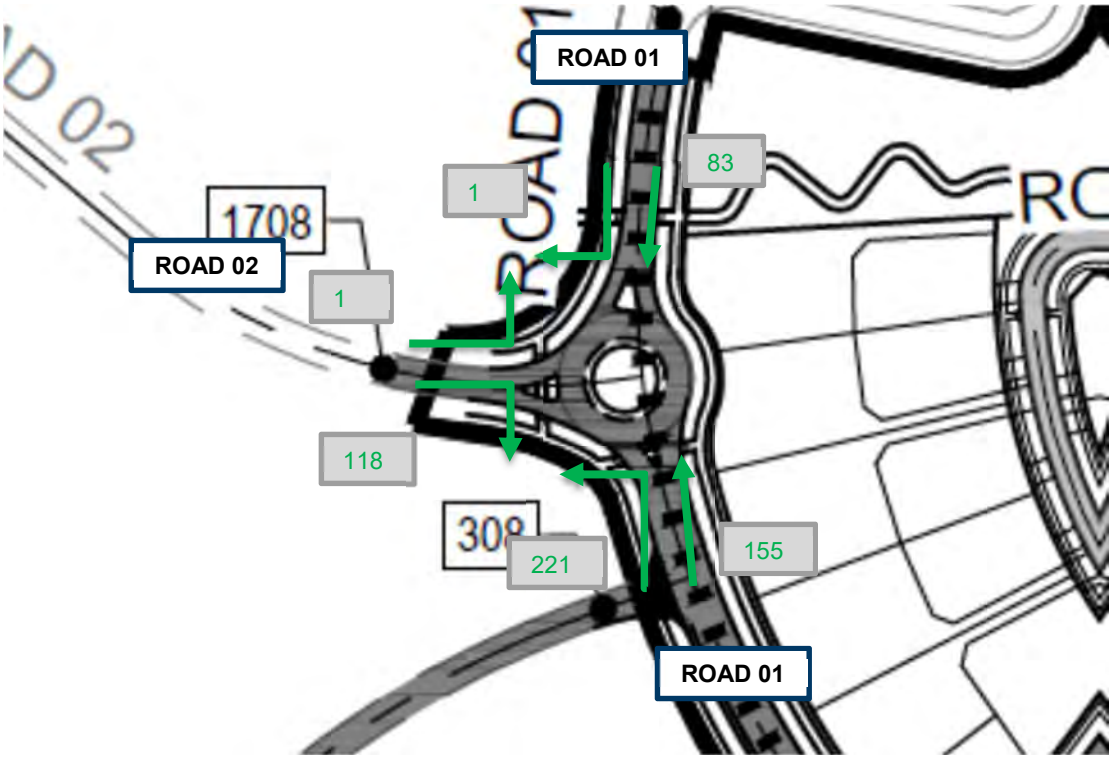


Figure 4.2: Road 01 / Road 02 Intersection – PM Peak Hour Splits

4.2.3 Analysis Results

The results of the intersection analysis, based upon full development of Whitlam for the Road 01 / Road 02 Intersection have been summarised in Table 4-2.

Table 4-2: Road 01 / Road 02 Intersection Performance Summary

Intersection	AM Peak Hour			PM Peak Hour		
	Average Delay (s)	LOS	95% Queue Distance (m)	Average Delay (s)	LOS	95% Queue Distance (m)
Road 01 / Road 02	6	A	6	5	A	9

As shown in Table 4-2, upon full development of Whitlam the intersection will operate at a good level of service, with minimal queuing.

4.3 Road 08 / John Gorton Drive Intersection

4.3.1 AM Peak Hour Traffic Splits

The Road 08 / John Gorton Drive intersection is an un-signalised left in/left out intersection. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.3 below shows the entering and exiting traffic volumes used in the SIDRA analysis.

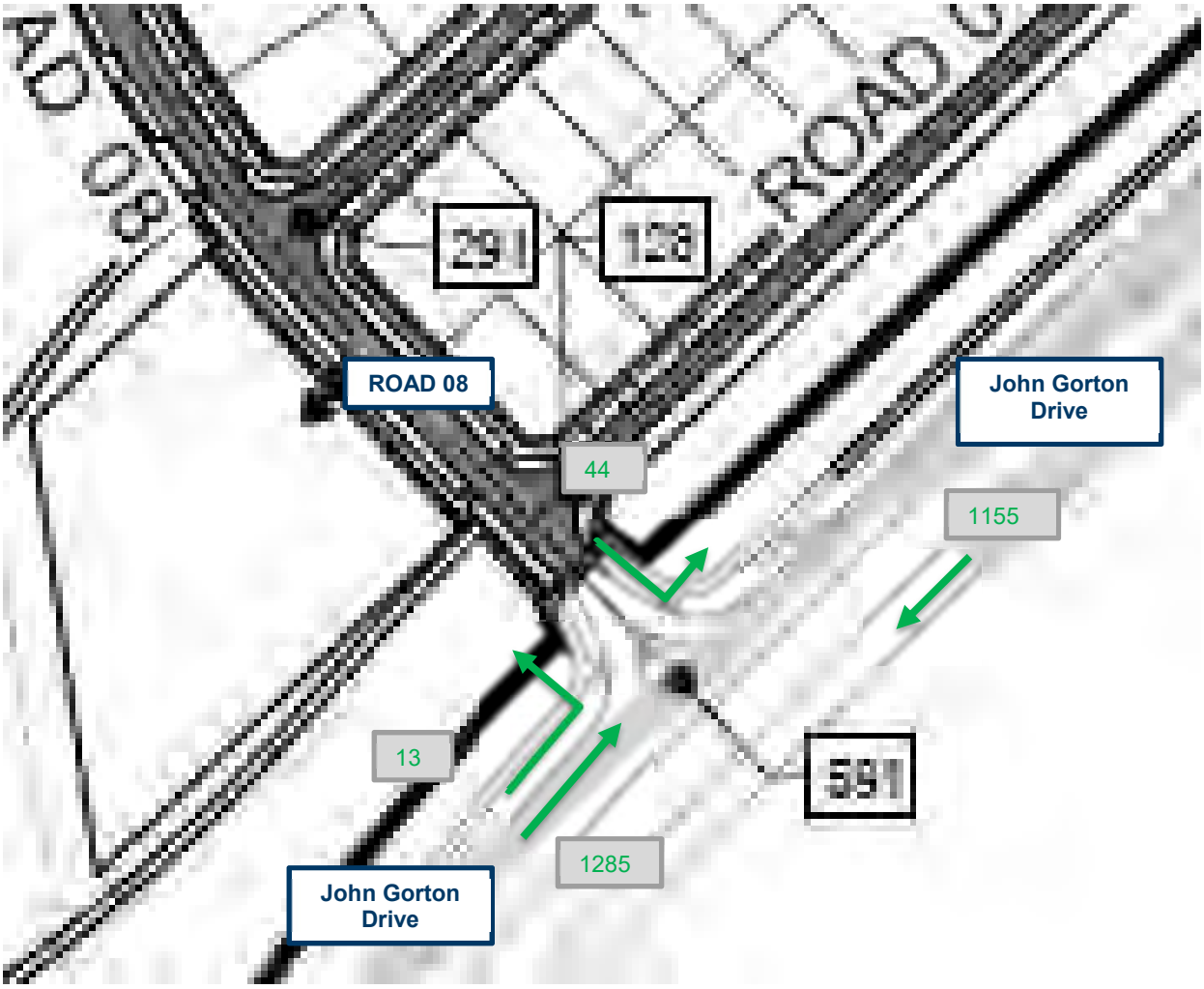


Figure 4.3: Road 08 / John Gorton Drive Intersection – AM Peak Hour Splits

4.3.2 PM Peak Hour Traffic Splits

The same methodology was adopted to determine the PM peak hour traffic volumes as that outlined in the AM Peak. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.4 below shows the entering and exiting traffic volumes used in the SIDRA analysis.

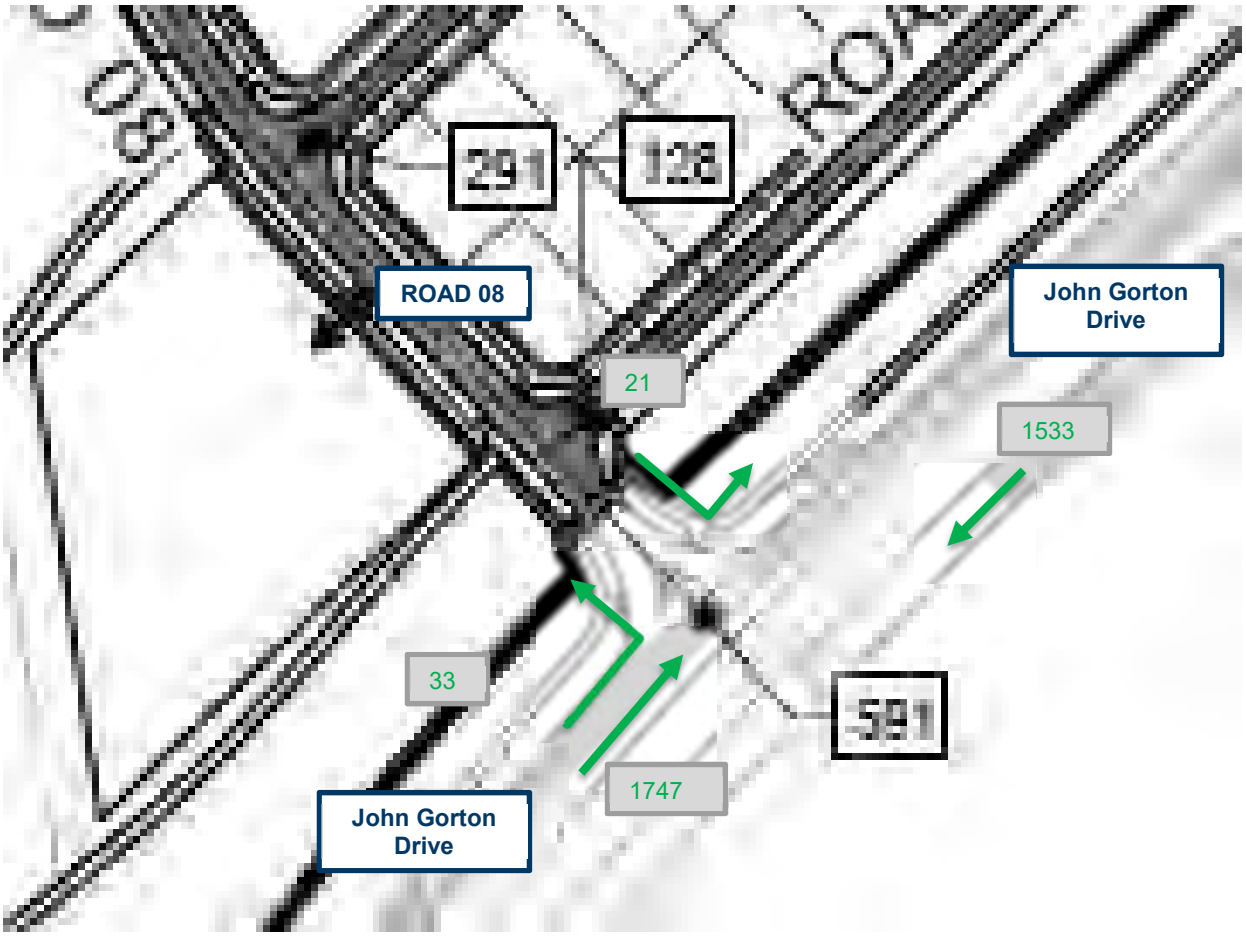


Figure 4.4: Road 08 / John Gorton Drive Intersection – PM Peak Hour Splits

4.3.3 Analysis Results

The results of the intersection analysis, based upon full development of Whitlam for the Road 08 / John Gorton Drive intersection has been summarised in Table 4-3.

Table 4-3: Road 08 / John Gorton Drive Intersection Performance Summary

Intersection	AM Peak Hour			PM Peak Hour		
	Average Delay (s)	LOS	95% Queue Distance (m)	Average Delay (s)	LOS	95% Queue Distance (m)
Road 08 / John Gorton Drive	0	A	2	0	A	1

As shown in Table 4-3, upon full development of Whitlam this intersection will operate at a good level of service, with minimal queuing.

4.4 Road 01 / Road 53 / Road 69 Intersection

4.4.1 AM Peak Hour Traffic Splits

The Road 01 / Road 53 / Road 69 intersection is a signalised intersection. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.5 below shows the entering and exiting traffic volumes used in the SIDRA analysis, while figure xx shows the adopted signal phasing and timing.

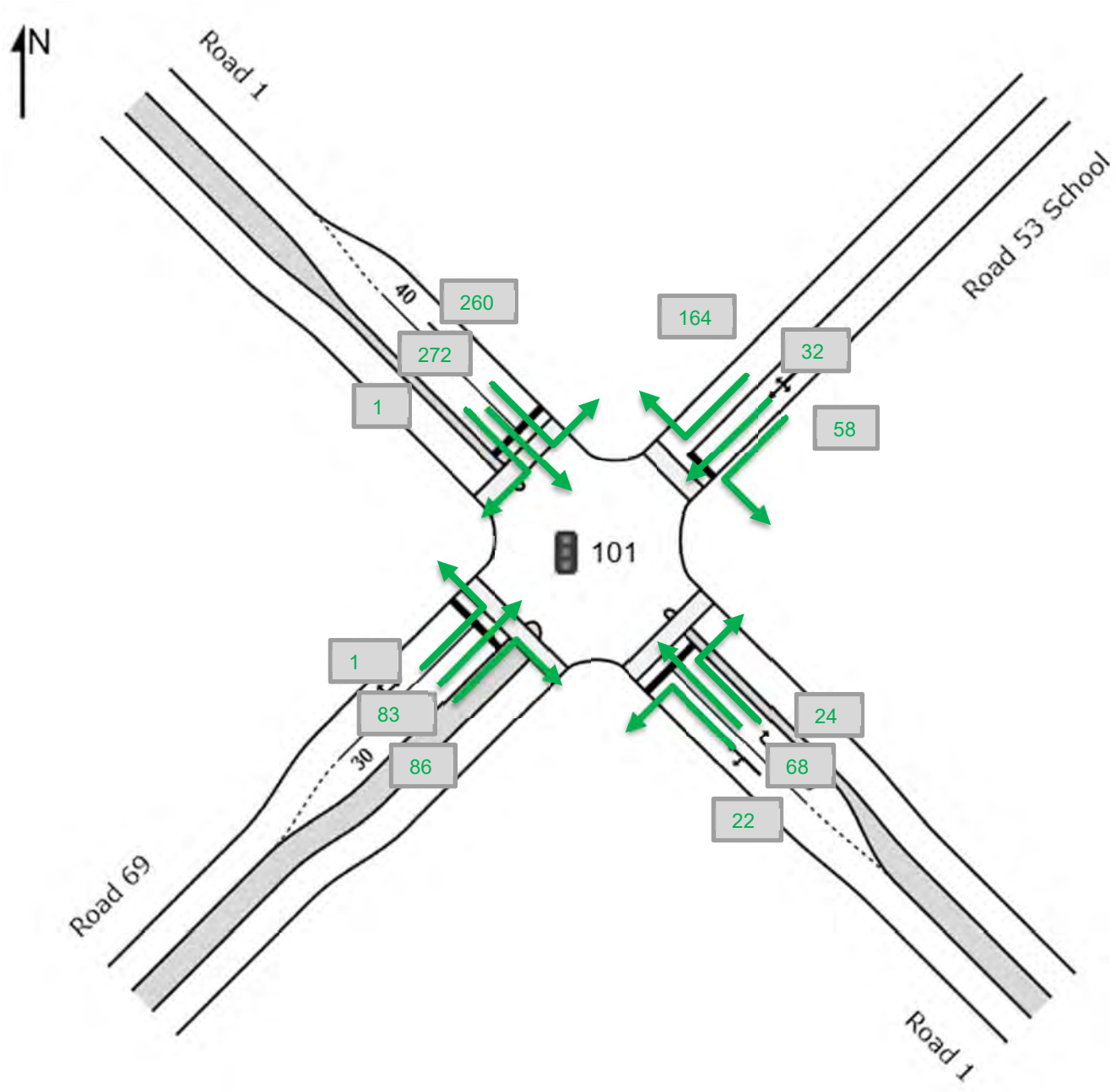


Figure 4.5: Road 01 / Road 53 / Road 69 Intersection – AM Peak Hour Splits

4.4.2 PM Peak Hour Traffic Splits

The same methodology was adopted to determine the PM peak hour traffic volumes as that outlined in the AM Peak. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.6 below shows the entering and exiting traffic volumes used in the SIDRA analysis.

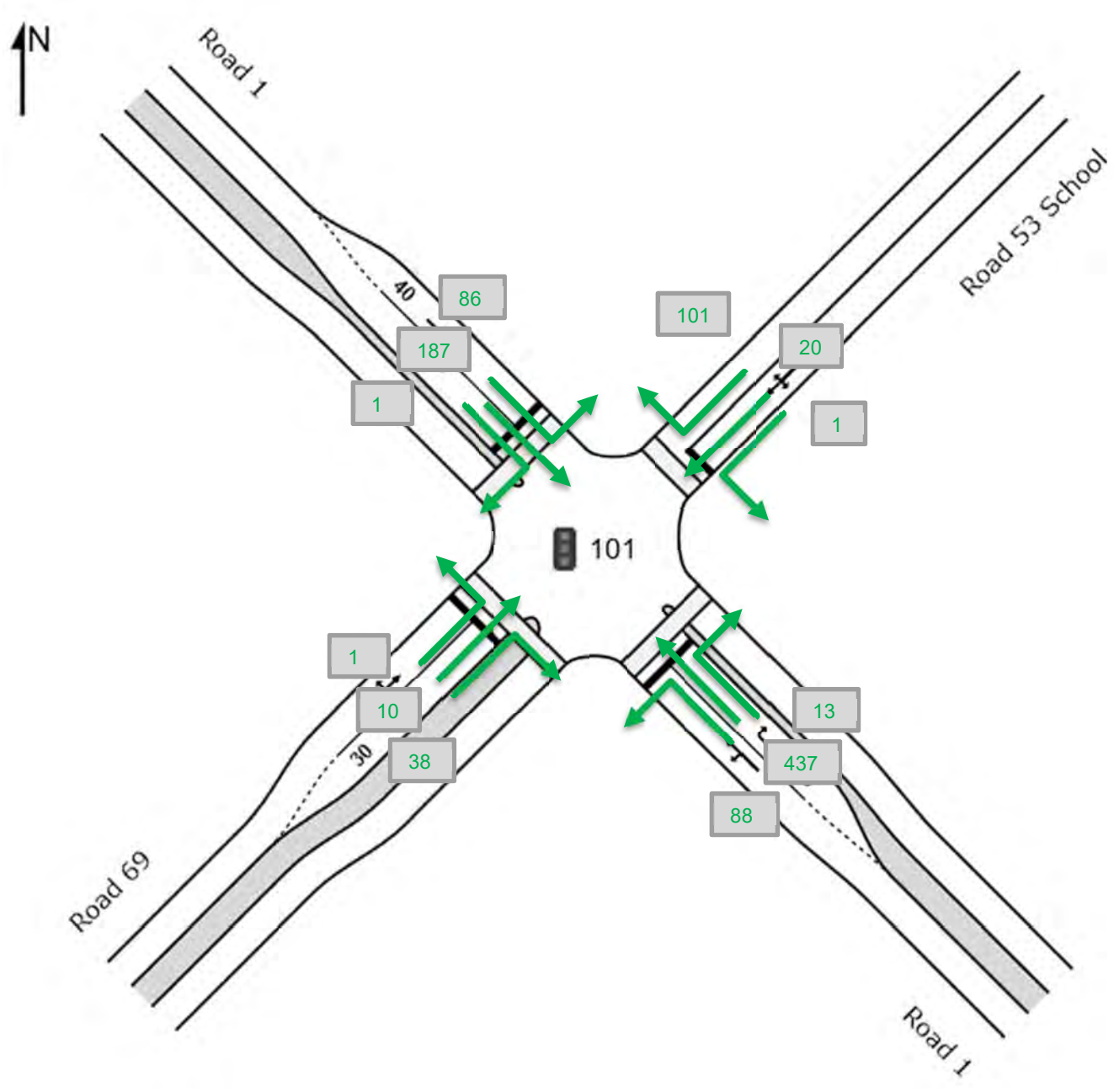


Figure 4.6: Road 01 / Road 53 / Road 69 Intersection – PM Peak Hour Splits

4.4.3 Analysis Results

The results of the intersection analysis, based upon full development of Whitlam for the Road 01 / Road 53 / Road 69 Intersection has been summarised in Table 4-4.

Table 4-4: Road 01 / Road 53 / Road 69 Intersection Performance Summary

Intersection	AM Peak Hour			PM Peak Hour		
	Average Delay (s)	LOS	95% Queue Distance (m)	Average Delay (s)	LOS	95% Queue Distance (m)
Road 1 / Road 53 / Road 69	27	B	66	35	B	146

As shown in Table 4-4, upon full development of Whitlam the intersection will operate at a satisfactory level of service, with acceptable queuing in both peak hours. The network model indicates that the vehicle queues at the Road 01 / Road 53 / Road 69 intersection do not impact the Road 03 / Road 27 / Road 53 intersection.

4.5 Road 03 / Road 27 / Road 53 Intersection

4.5.1 AM Peak Hour Traffic Splits

The Road 03 / Road 27 / Road 53 intersection is a four-way signalised intersection. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.7 below shows the traffic volumes for each movement, adopted in the SIDRA analysis. It should be noted that SIDRA analysis for this intersection was conducted in a network with the Road 03 / John Gorton Drive / Bindubi Street intersection.

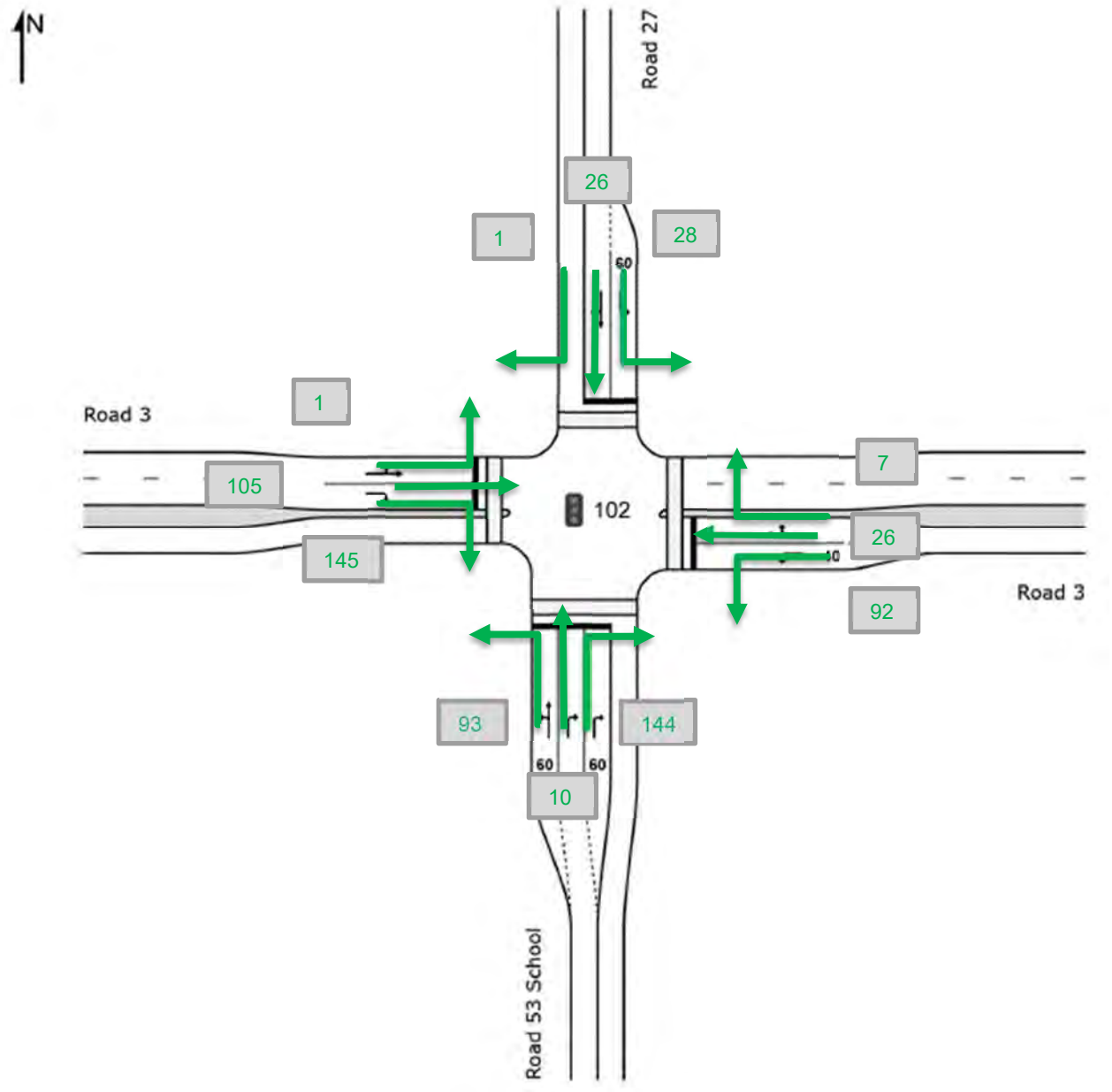


Figure 4.7: Road 03 / Road 27 / Road 53 Intersection – AM Peak Hour Splits

4.5.2 PM Peak Hour Traffic Splits

The same methodology was adopted to determine the PM peak hour traffic volumes as that outlined in the AM Peak. The peak hour vehicle movements have been determined through the intersection utilising the assumptions in Section 4. Figure 4.8 below shows the entering and exiting traffic volumes used in the SIDRA analysis.

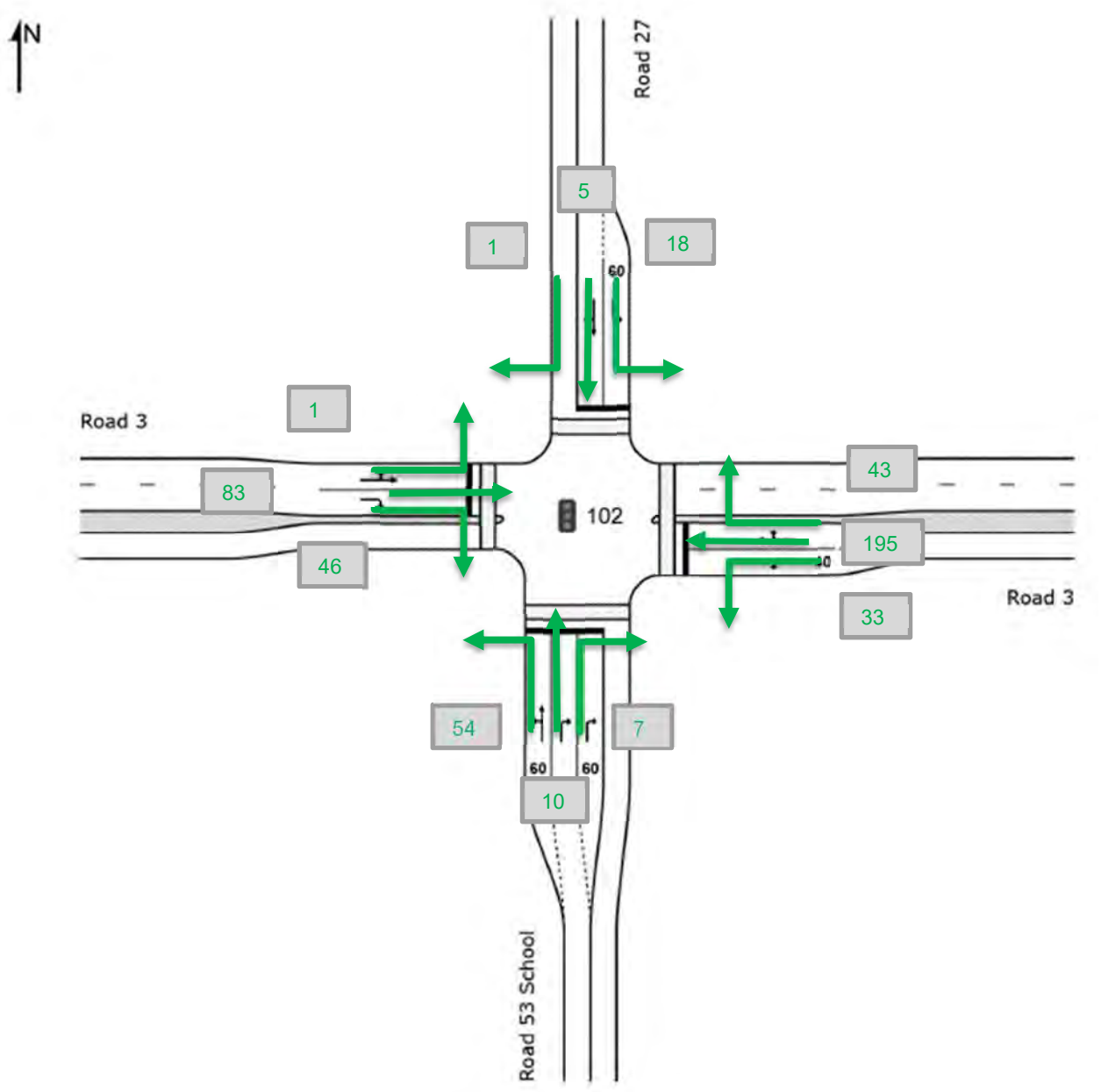


Figure 4.8: Road 03 / Road 27 / Road 53 Intersection – PM Peak Hour Splits

4.5.3 Analysis Results

The results of the intersection analysis, based upon full development of Whitlam, for the Road 03 / Road 27 / Road 53 Intersection has been summarised in Table 4-5.

Table 4-5: Road 03 / Road 27 / Road 53 Intersection Performance Summary

Intersection	AM Peak Hour			PM Peak Hour		
	Average Delay (s)	LOS	95% Queue Distance (m)	Average Delay (s)	LOS	95% Queue Distance (m)
Road 3 / Road 27 / Road 53	34	C	40	27	B	33

As shown in Table 4-5, upon full development of Whitlam, the intersection will operate at a satisfactory level of service and with minimal queueing in both peak hours. The network model indicates that the vehicle queues at the Road 03 / Road 27 / Road 53 intersection do not impact the Road 03 / John Gorton Drive / Bindubi Street intersection.

4.6 Road 03 / John Gorton Drive / Bindubi Street Intersection

The Road 3 / John Gorton Drive / Bindubi Street intersection forms a four-way signalised intersection. Traffic analysis was originally undertaken as part of the John Gorton Drive Stage 3A PSP project prepared by Calibre in July 2018. This analysis was based on forecasted traffic volumes prepared by SMEC, at a time when only high-level traffic volume data was available for stage 2 of the Whitlam estate. On this basis, the original analysis has been updated to reflect the more detailed traffic volume data prepared as part of the Whitlam 2 EDP.

4.6.1 AM Peak Hour Traffic Splits

The traffic volumes at the intersection are based on those provided by SMEC and adopted in the original analysis. The forecasted Whitlam 2 traffic volumes, detailed in this report, were then added to the relevant movements at the intersection.

The figure below shows the entering and exiting traffic volumes adopted in the updated SIDRA analysis. As noted above, the SIDRA analysis for this intersection was conducted in a network with the Road 03 / Road 27 / Road 53 intersection.

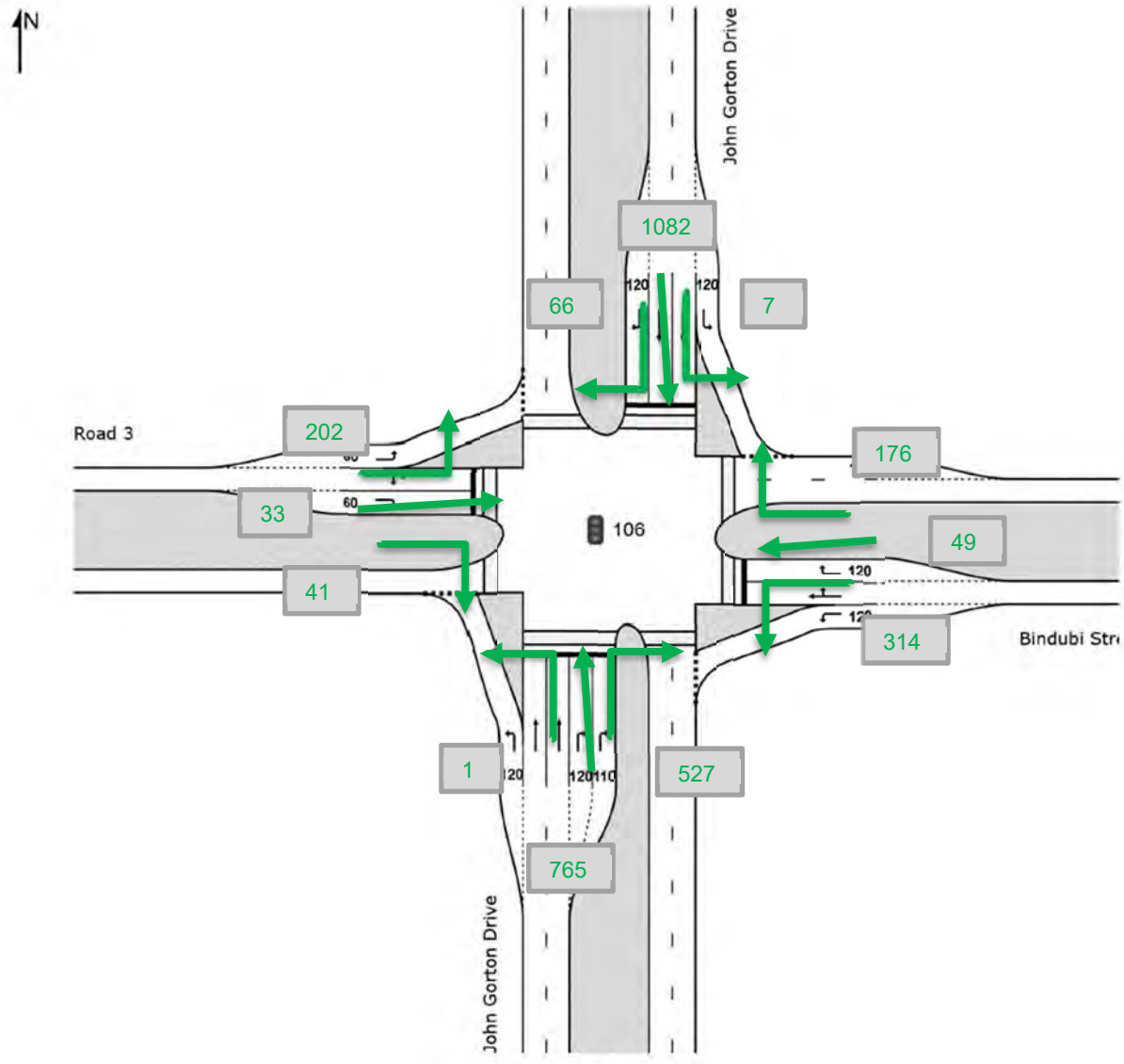


Figure 4.9: Road 03 / John Gorton Drive / Bindubi Street Intersection – AM Peak Hour Splits

4.6.2 PM Peak Hour Traffic Splits

The same methodology was adopted to determine the PM peak hour traffic volumes as for the AM Peak. The figure below shows the entering and exiting traffic volumes used by Calibre in the SIDRA analysis.

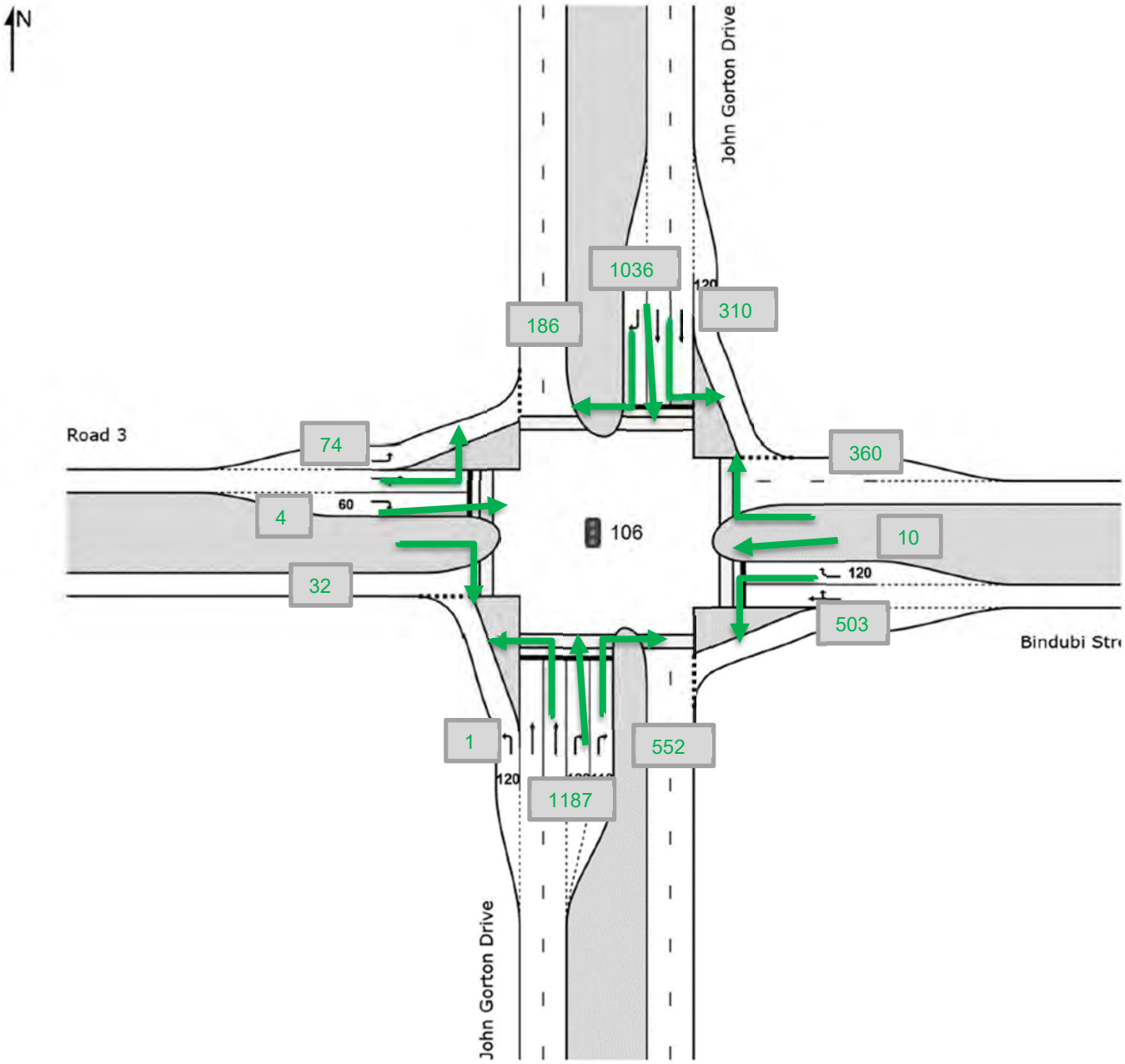


Figure 4.10: Road 03 / John Gorton Drive / Bindubi Street Intersection – PM Peak Hour Splits

4.6.3 Analysis Results

The results of the intersection analysis for Road 03 / John Gorton Drive / Bindubi Street intersection are summarised in the following table.

Table 4-6: Road 03 / John Gorton Drive / Bindubi Street Intersection Performance Summary

Intersection	AM Peak Hour			PM Peak Hour		
	Average Delay (s)	LOS	95% Queue Distance (m)	Average Delay (s)	LOS	95% Queue Distance (m)
Road 03 / John Gorton Drive / Bindubi Street	37	C	216	40	C	241

As shown in Table 4-6, upon full development of Whitlam, the intersection will operate with a satisfactory overall level of service and acceptable queuing in both peak hours. In the PM peak hour, the 95th percentile queue in the right (median) side right-turn lane on the south approach (John Gorton Drive) is expected to marginally extend beyond the storage length of the short lane. It is however noted that due to the increased storage length of the left (non-median) side right-turn lane, the combined 95th percentile queue of right-turning vehicles is expected to be contained within the dual right-turn lanes.

5 Conclusion

Calibre was engaged by the Suburban Land Agency to undertake the EDP for Whitlam Stages 1 and 2 with associated design documentation. As part of the Stage 2 EDP Calibre has developed a road hierarchy plan based on ultimate dwelling numbers as well as surrounding land usages for Whitlam and traffic generation rates specified in the Estate Development Code. The forecast traffic volumes on each road were shown on the road hierarchy plan and were utilised to analyse the performance of four key intersections within Stage 2 and the Road 01 / Road 53 / Road 69 intersection located within Stage 3.

As shown in the intersection performance summary tables in Section 4, the five intersections satisfy the Roads ACT requirements for level of service. Three of the intersections (Road 01 / Road 02 and Road 08 / John Gorton Drive) are expected to operate well (LOS A or LOS B) during both peak hours. The Road 03 / Road 27 / Road 53 intersection is expected to operate satisfactorily (LOS C) in the AM peak hour and with minimal delays (LOS B) in the PM peak hour. The final intersection (Road 03 / John Gorton Drive / Bindubi Street) is expected to operate satisfactorily (LOS C) in both peak hours. 95th percentile queue lengths in short lanes have been checked against the storage capacity for each respective movement and are not expected to extend back to impact adjacent full-length lanes.

On this basis, the analysis indicates that, upon full development of the Whitlam estate, the five key intersections will meet the performance requirements of Roads ACT.

WHITLAM STAGE 2 – TRAFFIC IMPACT ASSESSMENT

Appendix A ROAD HIERARCHY PLAN

SURBURBAN LAND AGENCY

WHITLAM STAGE 2 – TRAFFIC IMPACT ASSESSMENT

Appendix B SIDRA OUTPUTS

SURBURBAN LAND AGENCY

USER REPORT FOR SITE

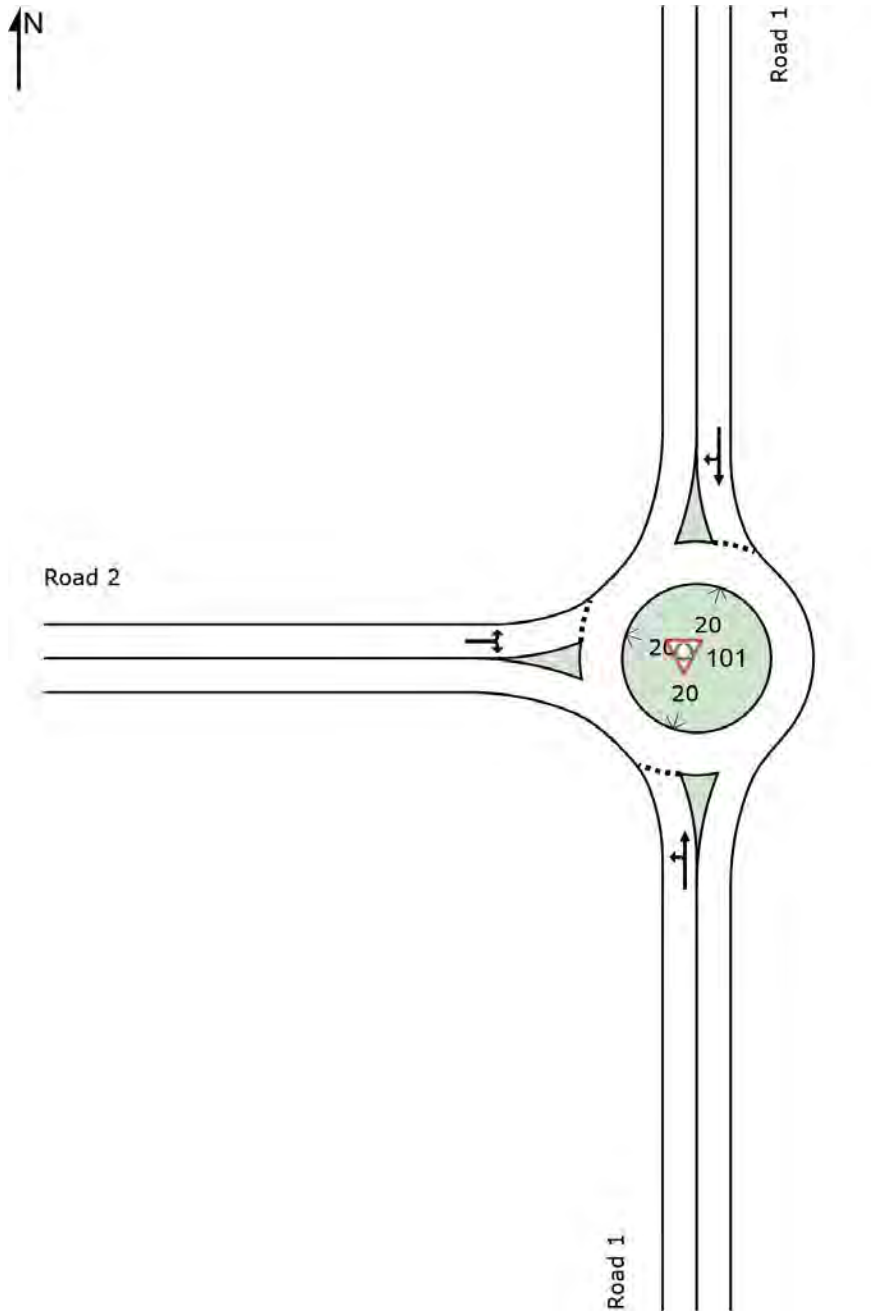
Project: Whitlam Stage 2 20190607

Template: Standard Site User Report

Site: 101 [Rd 1 / Rd 2 AM]

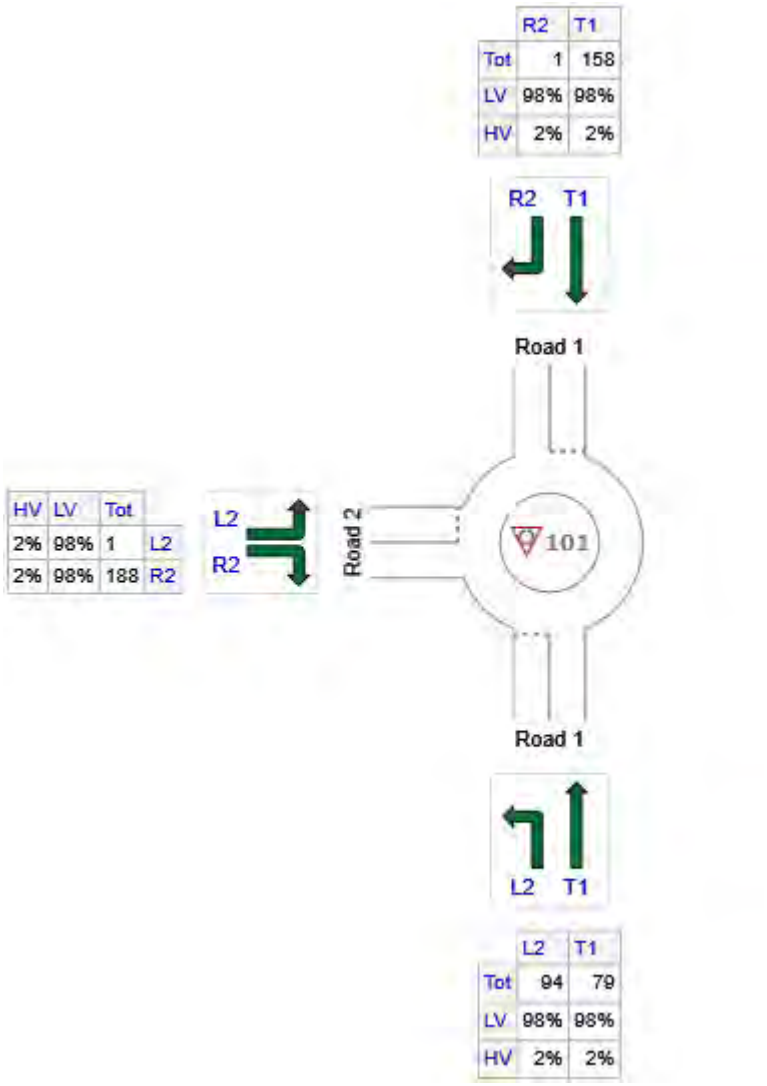
Site Category: (None)
Roundabout

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Road 1	173	170	3
N: Road 1	159	156	3
W: Road 2	189	185	4
Total	521	511	10

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Road 1												
1	L2	99	2.0	0.105	3.9	LOS A	0.5	3.8	0.02	0.45	0.02	55.4
2	T1	83	2.0	0.105	4.0	LOS A	0.5	3.8	0.02	0.45	0.02	56.8
Approach		182	2.0	0.105	4.0	LOS A	0.5	3.8	0.02	0.45	0.02	56.0
North: Road 1												
8	T1	166	2.0	0.140	5.0	LOS A	0.7	5.3	0.38	0.48	0.38	55.0
9	R2	1	2.0	0.140	9.7	LOS A	0.7	5.3	0.38	0.48	0.38	54.9
Approach		167	2.0	0.140	5.0	LOS A	0.7	5.3	0.38	0.48	0.38	55.0
West: Road 2												
10	L2	1	2.0	0.145	4.3	LOS A	0.8	5.6	0.22	0.61	0.22	51.3
12	R2	198	2.0	0.145	9.1	LOS A	0.8	5.6	0.22	0.61	0.22	52.4
Approach		199	2.0	0.145	9.0	LOS A	0.8	5.6	0.22	0.61	0.22	52.4
All Vehicles		548	2.0	0.145	6.1	LOS A	0.8	5.6	0.20	0.52	0.20	54.3

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

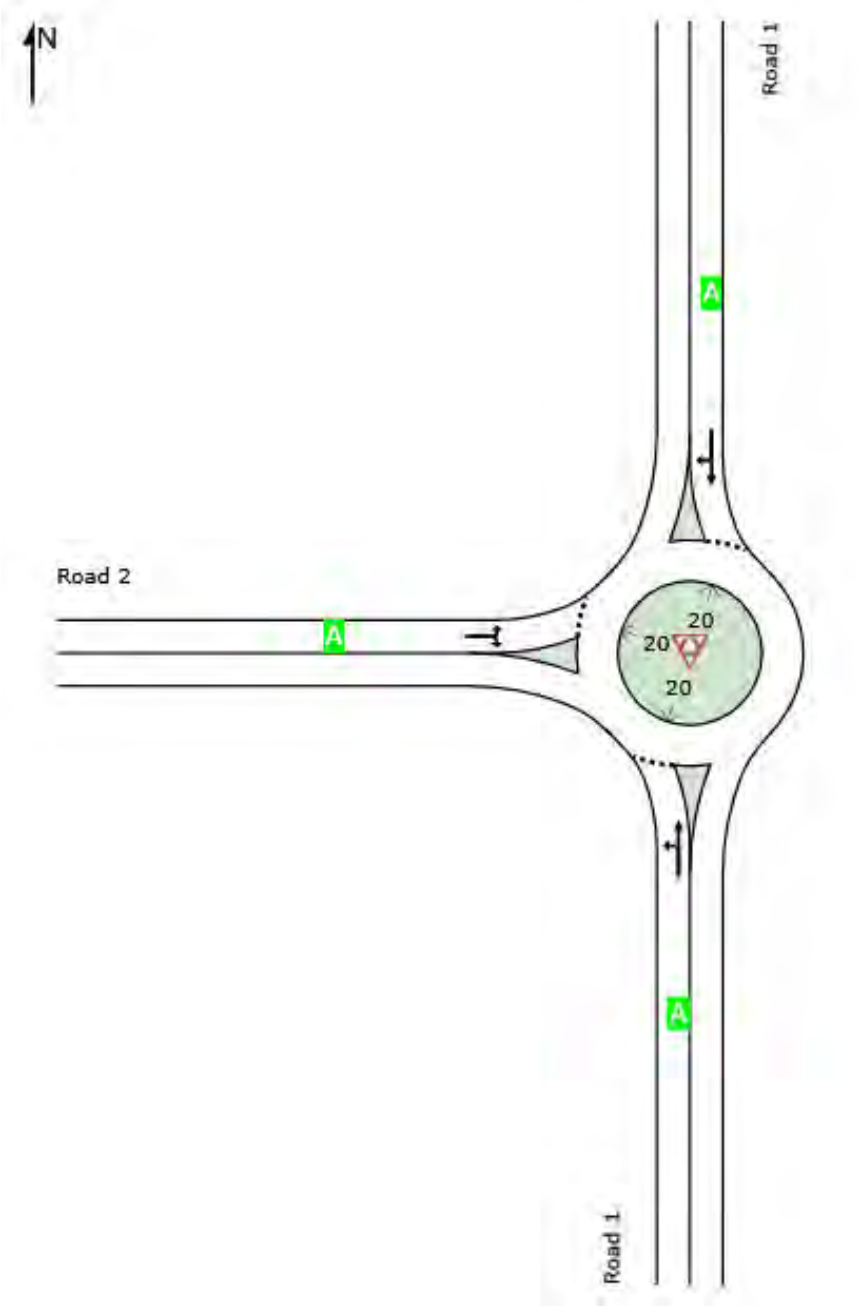
Lane Use and Performance													
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Road 1													
Lane 1[d]	182	2.0	1726	0.105	100	4.0	LOS A	0.5	3.8	Full	500	0.0	0.0
Approach	182	2.0		0.105		4.0	LOS A	0.5	3.8				
North: Road 1													
Lane 1[d]	167	2.0	1195	0.140	100	5.0	LOS A	0.7	5.3	Full	500	0.0	0.0
Approach	167	2.0		0.140		5.0	LOS A	0.7	5.3				
West: Road 2													
Lane 1[d]	199	2.0	1370	0.145	100	9.0	LOS A	0.8	5.6	Full	500	0.0	0.0
Approach	199	2.0		0.145		9.0	LOS A	0.8	5.6				
Intersection	548	2.0		0.145		6.1	LOS A	0.8	5.6				

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

d Dominant lane on roundabout approach

LOS Summary

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

USER REPORT FOR SITE

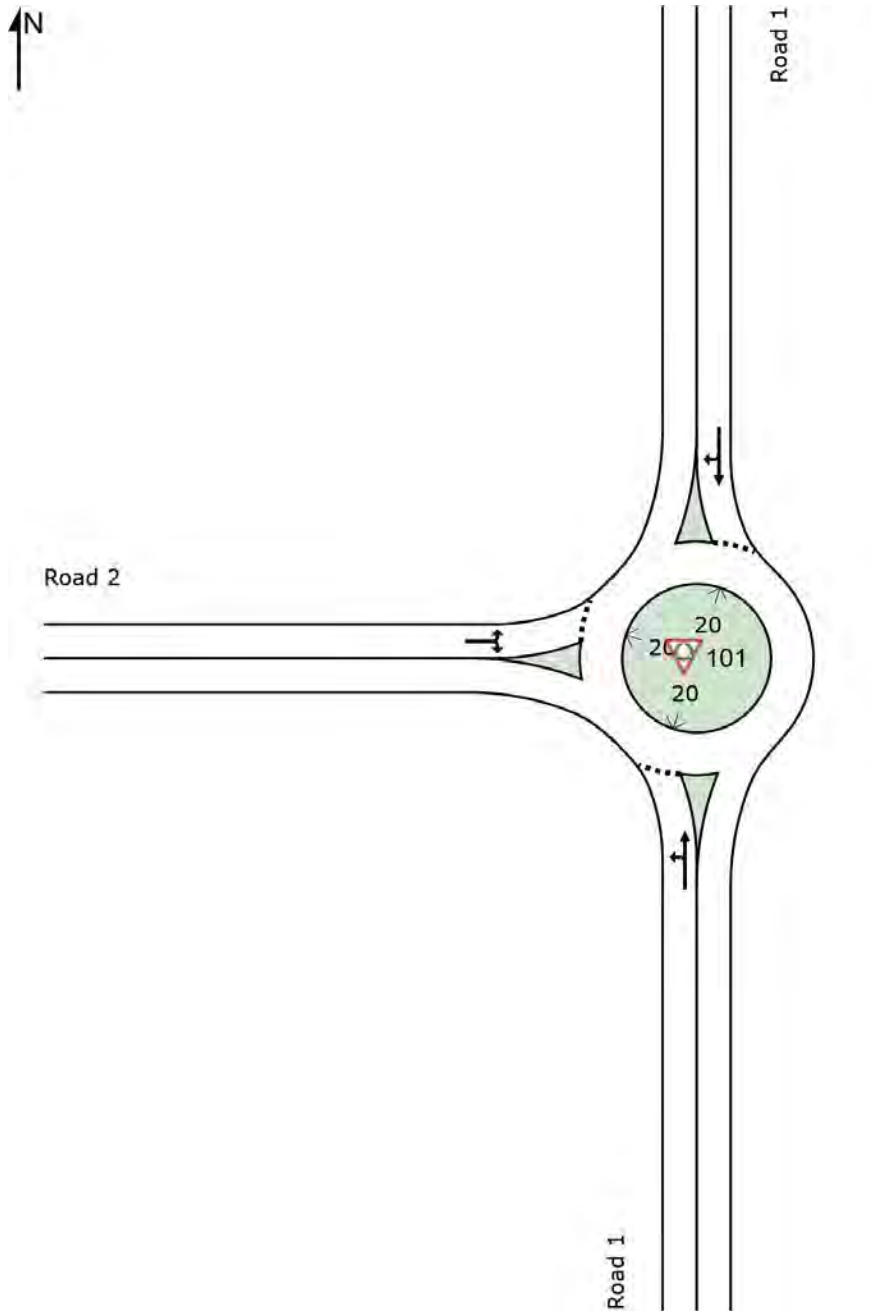
Project: Whitlam Stage 2 20190607

Template: Standard Site User Report

Site: 101 [Rd 1 / Rd 2 PM]

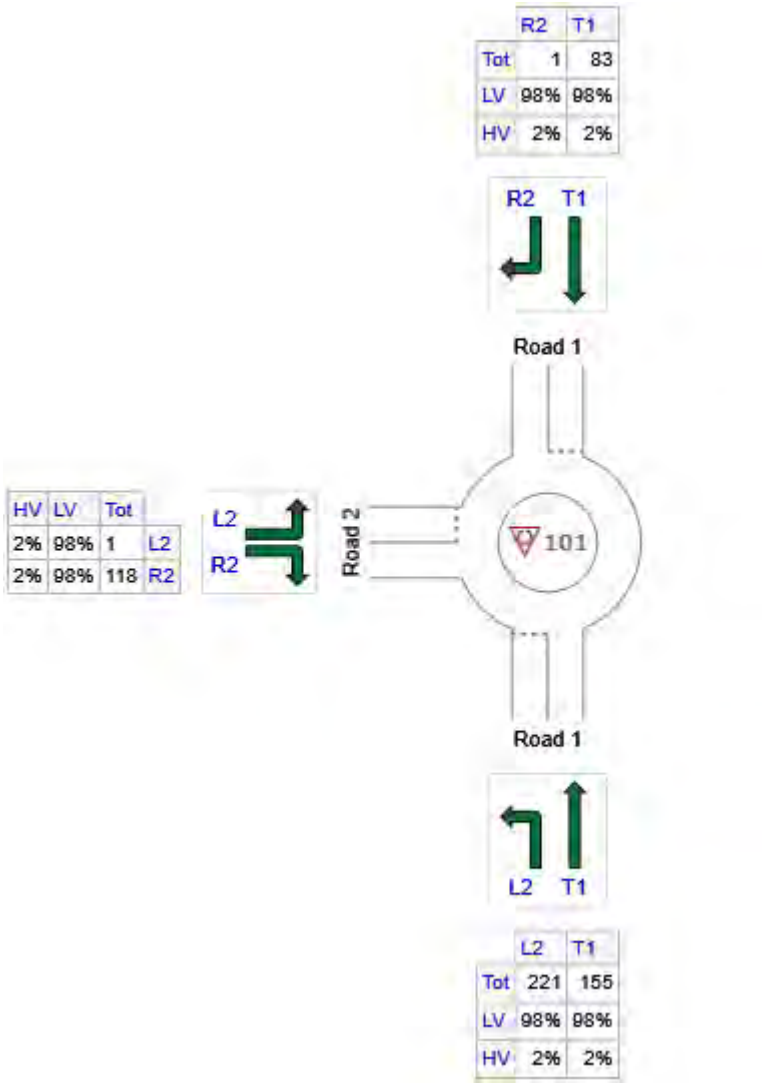
Site Category: (None)
Roundabout

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Road 1	376	368	8
N: Road 1	84	82	2
W: Road 2	119	117	2
Total	579	567	12

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Road 1												
1	L2	233	2.0	0.228	3.9	LOS A	1.3	9.0	0.02	0.45	0.02	55.4
2	T1	163	2.0	0.228	4.1	LOS A	1.3	9.0	0.02	0.45	0.02	56.8
Approach		396	2.0	0.228	4.0	LOS A	1.3	9.0	0.02	0.45	0.02	56.0
North: Road 1												
8	T1	87	2.0	0.070	4.6	LOS A	0.4	2.6	0.29	0.43	0.29	55.4
9	R2	1	2.0	0.070	9.2	LOS A	0.4	2.6	0.29	0.43	0.29	55.3
Approach		88	2.0	0.070	4.7	LOS A	0.4	2.6	0.29	0.43	0.29	55.4
West: Road 2												
10	L2	1	2.0	0.101	4.6	LOS A	0.5	3.8	0.32	0.62	0.32	51.0
12	R2	124	2.0	0.101	9.5	LOS A	0.5	3.8	0.32	0.62	0.32	52.1
Approach		125	2.0	0.101	9.4	LOS A	0.5	3.8	0.32	0.62	0.32	52.1
All Vehicles		609	2.0	0.228	5.2	LOS A	1.3	9.0	0.12	0.48	0.12	55.0

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

Lane Use and Performance

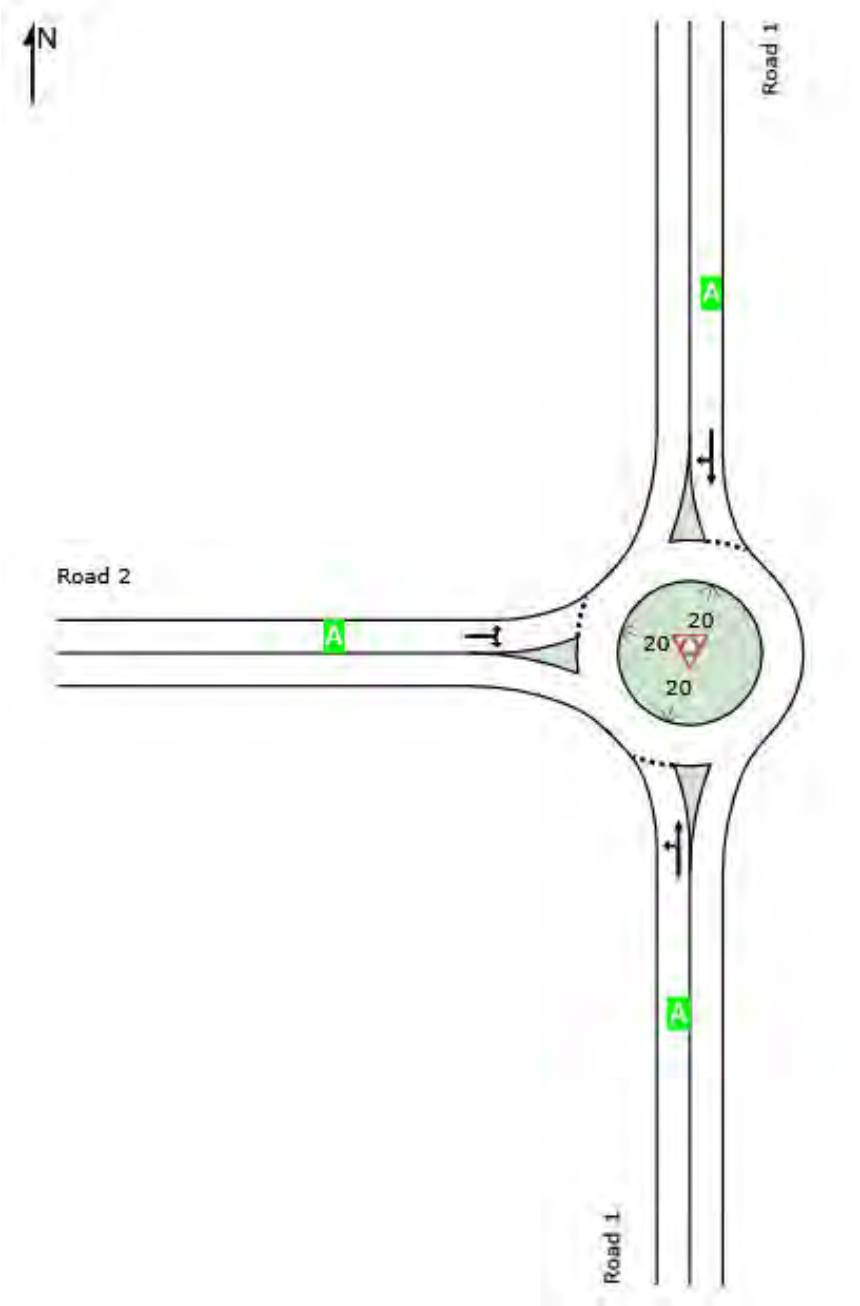
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Road 1													
Lane 1[d]	396	2.0	1736	0.228	100	4.0	LOS A	1.3	9.0	Full	500	0.0	0.0
Approach	396	2.0		0.228		4.0	LOS A	1.3	9.0				
North: Road 1													
Lane 1[d]	88	2.0	1264	0.070	100	4.7	LOS A	0.4	2.6	Full	500	0.0	0.0
Approach	88	2.0		0.070		4.7	LOS A	0.4	2.6				
West: Road 2													
Lane 1[d]	125	2.0	1245	0.101	100	9.4	LOS A	0.5	3.8	Full	500	0.0	0.0
Approach	125	2.0		0.101		9.4	LOS A	0.5	3.8				
Intersection	609	2.0		0.228		5.2	LOS A	1.3	9.0				

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

d Dominant lane on roundabout approach

LOS Summary

	Approaches			Intersection
	South	North	West	
LOS	A	A	A	A

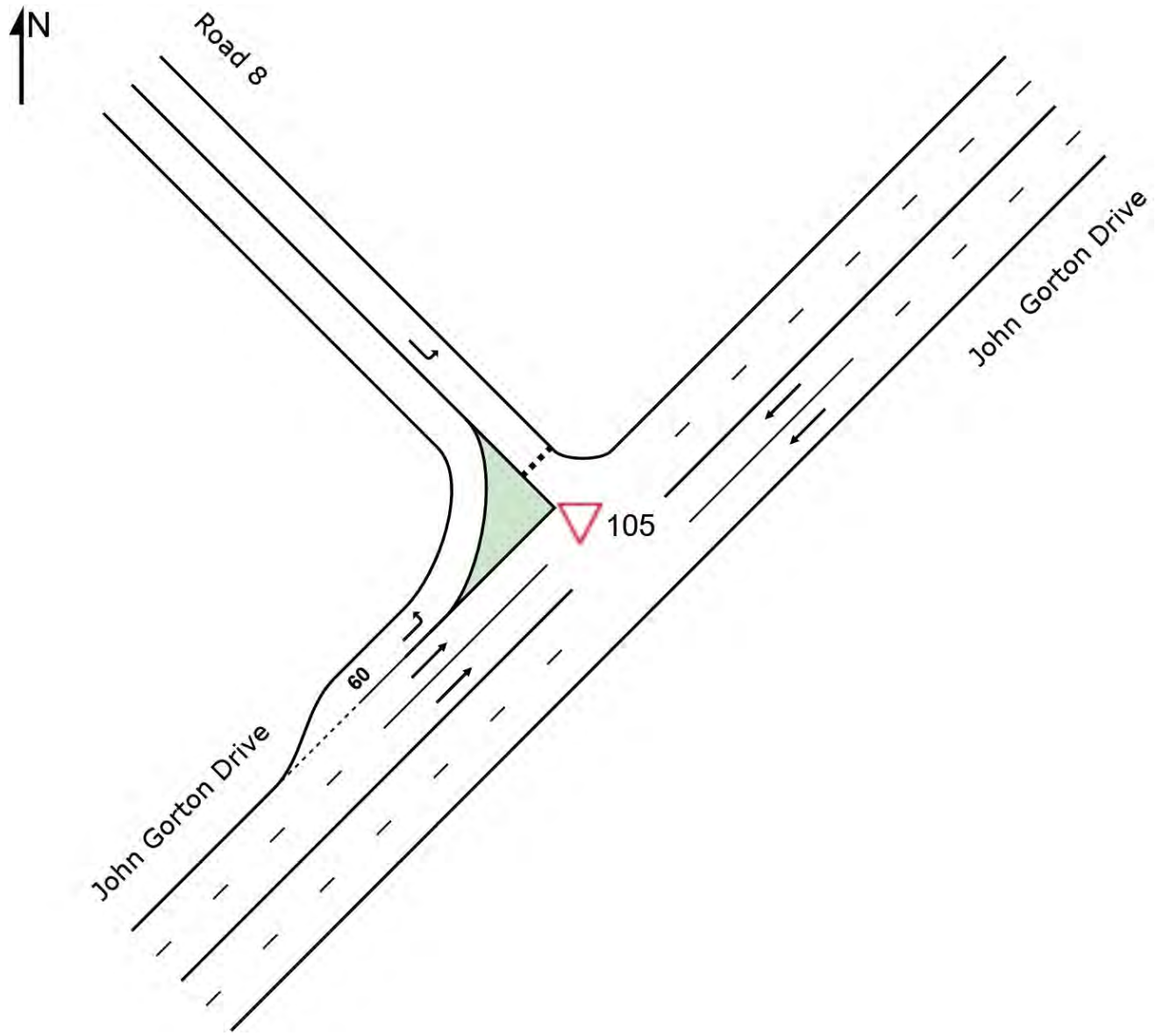


Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site: 105 [Rd 8 / John Gorton Dr AM]

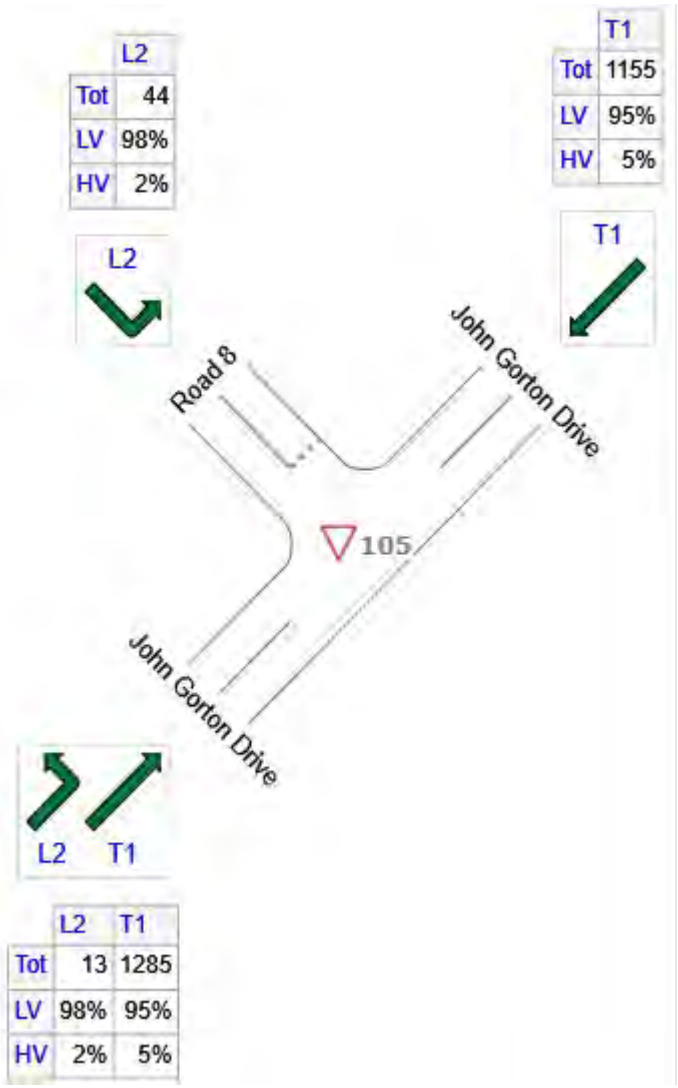
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: John Gorton Drive	1155	1097	58
NW: Road 8	44	43	1
SW: John Gorton Drive	1298	1233	65
Total	2497	2374	123

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
NorthEast: John Gorton Drive												
8	T1	1216	5.0	0.319	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1216	5.0	0.319	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
NorthWest: Road 8												
10	L2	46	2.0	0.074	9.8	LOS A	0.3	1.9	0.56	0.77	0.56	51.2
Approach		46	2.0	0.074	9.8	LOS A	0.3	1.9	0.56	0.77	0.56	51.2
SouthWest: John Gorton Drive												
1	L2	14	2.0	0.007	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	58.6
2	T1	1353	5.0	0.354	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1366	5.0	0.354	0.1	NA	0.0	0.0	0.00	0.01	0.00	69.7
All Vehicles		2628	4.9	0.354	0.2	NA	0.3	1.9	0.01	0.02	0.01	69.2

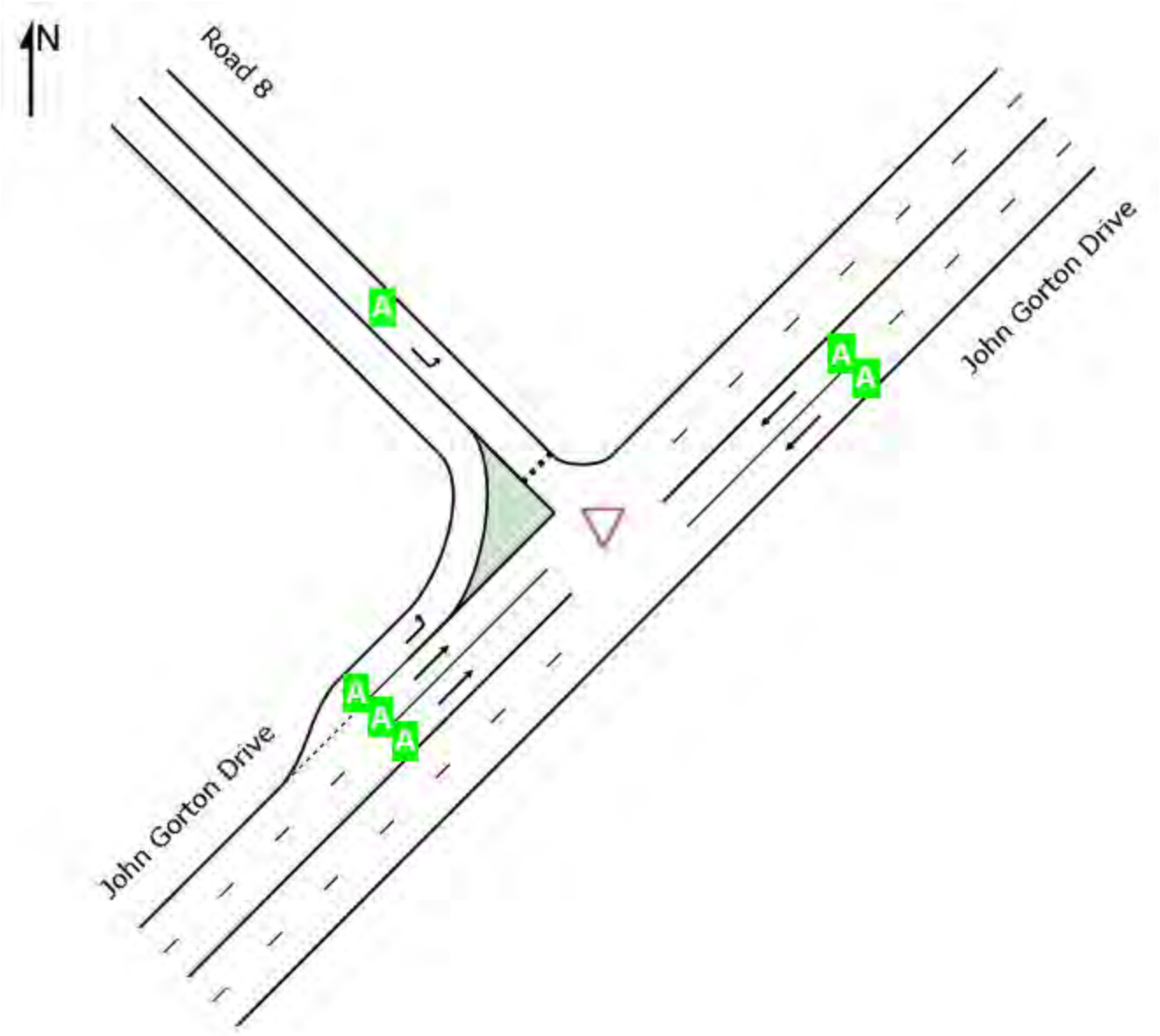
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS 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.
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.

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. %
NorthEast: John Gorton Drive													
Lane 1	608	5.0	1908	0.319	100	0.0	LOS A	0.0	0.0	Full	400	0.0	0.0
Lane 2	608	5.0	1908	0.319	100	0.0	LOS A	0.0	0.0	Full	400	0.0	0.0
Approach	1216	5.0		0.319		0.0	NA	0.0	0.0				
NorthWest: Road 8													
Lane 1	46	2.0	623	0.074	100	9.8	LOS A	0.3	1.9	Full	500	0.0	0.0
Approach	46	2.0		0.074		9.8	LOS A	0.3	1.9				
SouthWest: John Gorton Drive													
Lane 1	14	2.0	1850	0.007	100	6.7	LOS A	0.0	0.0	Short	60	0.0	NA
Lane 2	676	5.0	1908	0.354	100	0.0	LOS A	0.0	0.0	Full	300	0.0	0.0
Lane 3	676	5.0	1908	0.354	100	0.0	LOS A	0.0	0.0	Full	300	0.0	0.0
Approach	1366	5.0		0.354		0.1	NA	0.0	0.0				
Intersection	2628	4.9		0.354		0.2	NA	0.3	1.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

LOS Summary

	Approaches			Intersection
	Northeast	Northwest	Southwest	
LOS	NA	A	NA	NA



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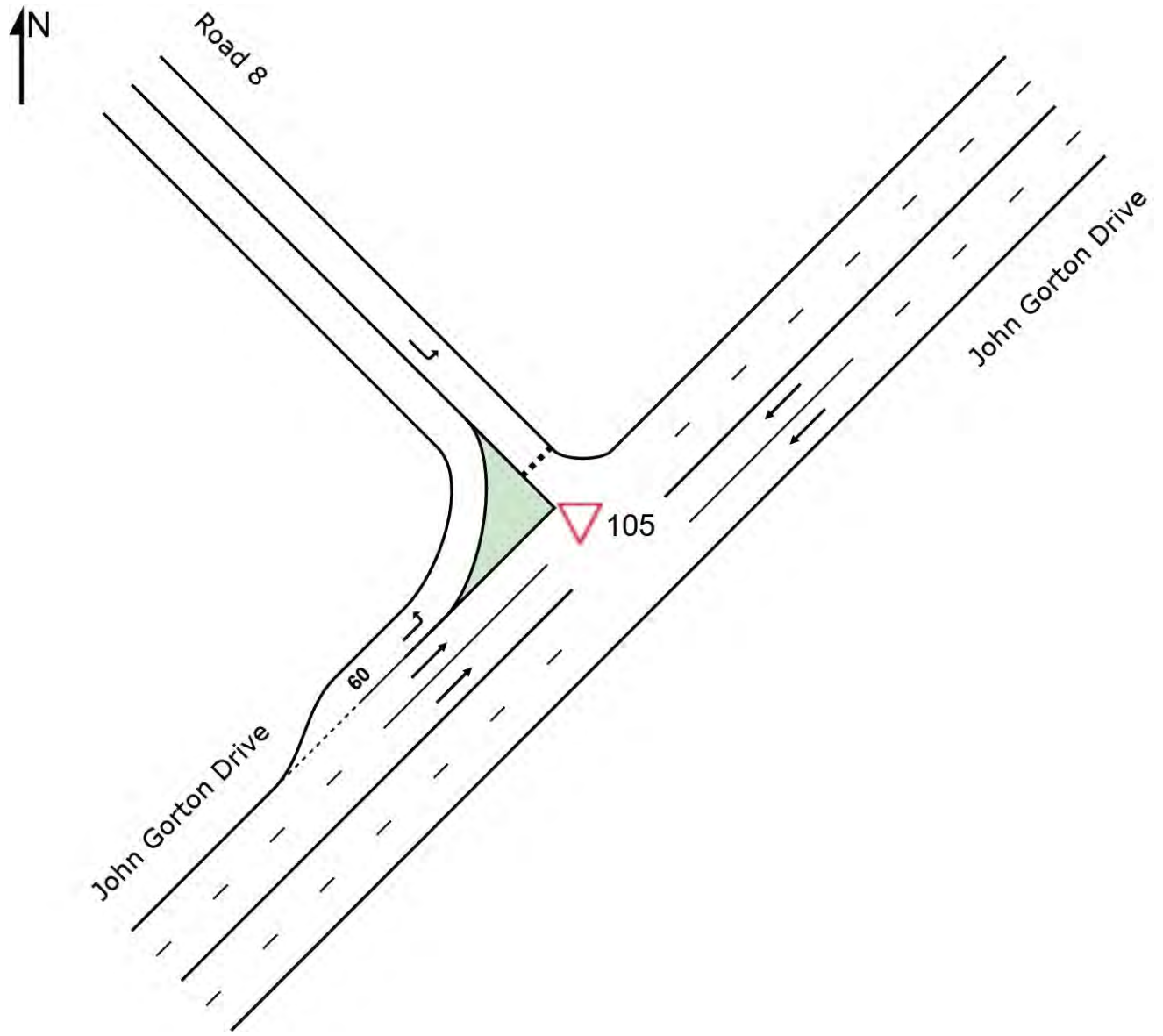
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site: 105 [Rd 8 / John Gorton Dr PM]

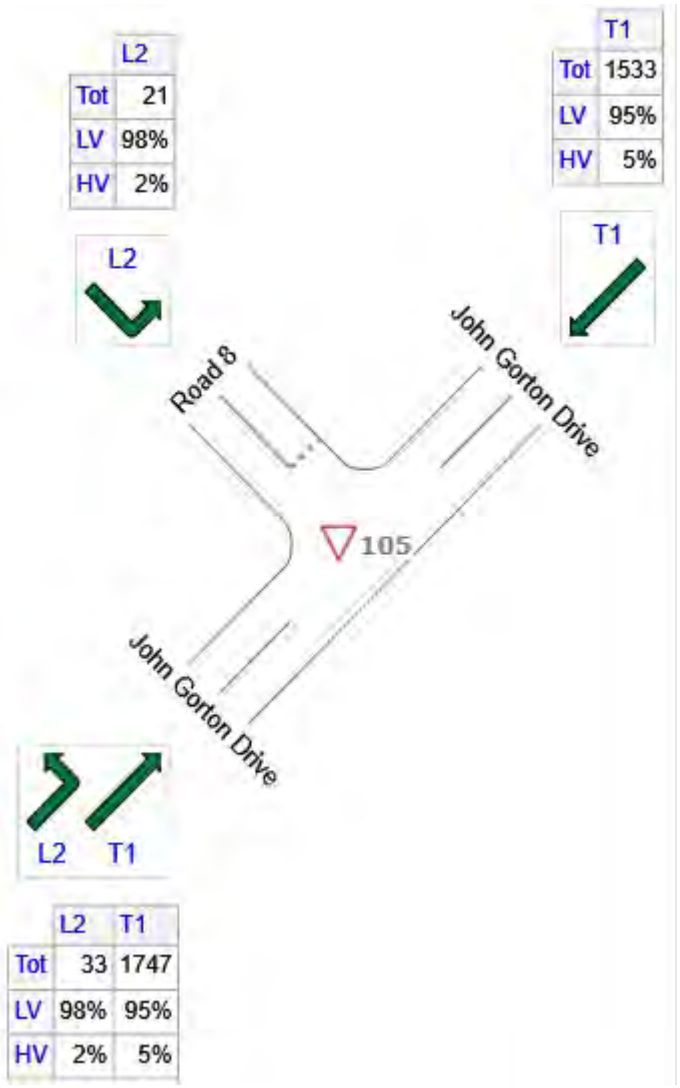
Site Category: (None)
Giveway / Yield (Two-Way)

Site Layout



Input Volumes

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: John Gorton Drive	1533	1456	77
NW: Road 8	21	21	0
SW: John Gorton Drive	1780	1692	88
Total	3334	3169	165

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
NorthEast: John Gorton Drive												
8	T1	1614	5.0	0.423	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
Approach		1614	5.0	0.423	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.8
NorthWest: Road 8												
10	L2	22	2.0	0.053	13.0	LOS A	0.2	1.3	0.69	0.87	0.69	48.8
Approach		22	2.0	0.053	13.0	LOS A	0.2	1.3	0.69	0.87	0.69	48.8
SouthWest: John Gorton Drive												
1	L2	35	2.0	0.019	6.7	LOS A	0.0	0.0	0.00	0.57	0.00	58.6
2	T1	1839	5.0	0.482	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.8
Approach		1874	4.9	0.482	0.2	NA	0.0	0.0	0.00	0.01	0.00	69.5
All Vehicles		3509	5.0	0.482	0.2	NA	0.2	1.3	0.00	0.01	0.00	69.4

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.
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.

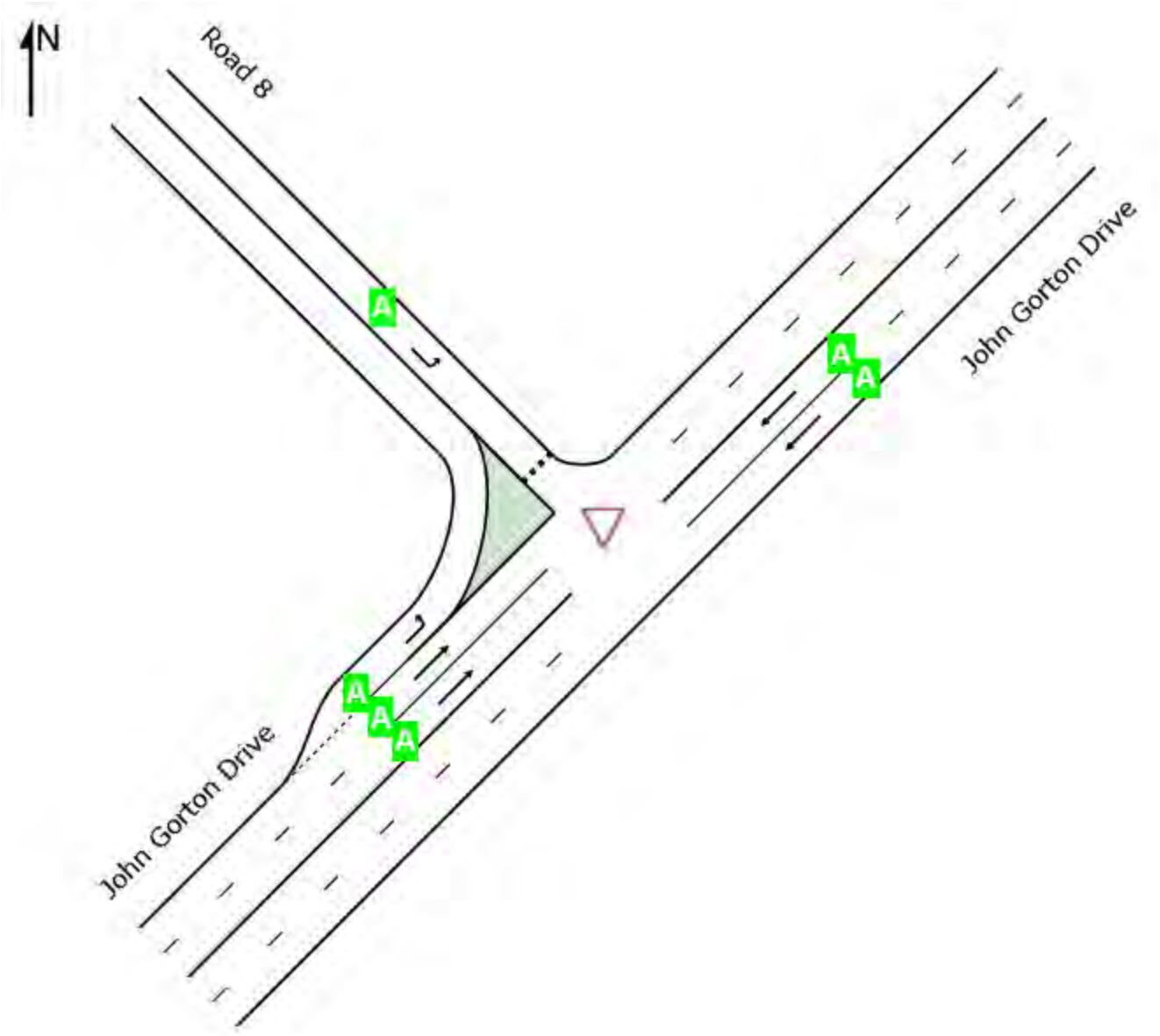
Lane Use and Performance

	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. %
NorthEast: John Gorton Drive													
Lane 1	807	5.0	1908	0.423	100	0.0	LOS A	0.0	0.0	Full	400	0.0	0.0
Lane 2	807	5.0	1908	0.423	100	0.0	LOS A	0.0	0.0	Full	400	0.0	0.0
Approach	1614	5.0		0.423		0.0	NA	0.0	0.0				
NorthWest: Road 8													
Lane 1	22	2.0	419	0.053	100	13.0	LOS A	0.2	1.3	Full	500	0.0	0.0
Approach	22	2.0		0.053		13.0	LOS A	0.2	1.3				
SouthWest: John Gorton Drive													
Lane 1	35	2.0	1850	0.019	100	6.7	LOS A	0.0	0.0	Short	60	0.0	NA
Lane 2	919	5.0	1908	0.482	100	0.0	LOS A	0.0	0.0	Full	300	0.0	0.0
Lane 3	919	5.0	1908	0.482	100	0.0	LOS A	0.0	0.0	Full	300	0.0	0.0
Approach	1874	4.9		0.482		0.2	NA	0.0	0.0				
Intersection	3509	5.0		0.482		0.2	NA	0.2	1.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

LOS Summary

	Approaches			Intersection
	Northeast	Northwest	Southwest	
LOS	NA	A	NA	NA



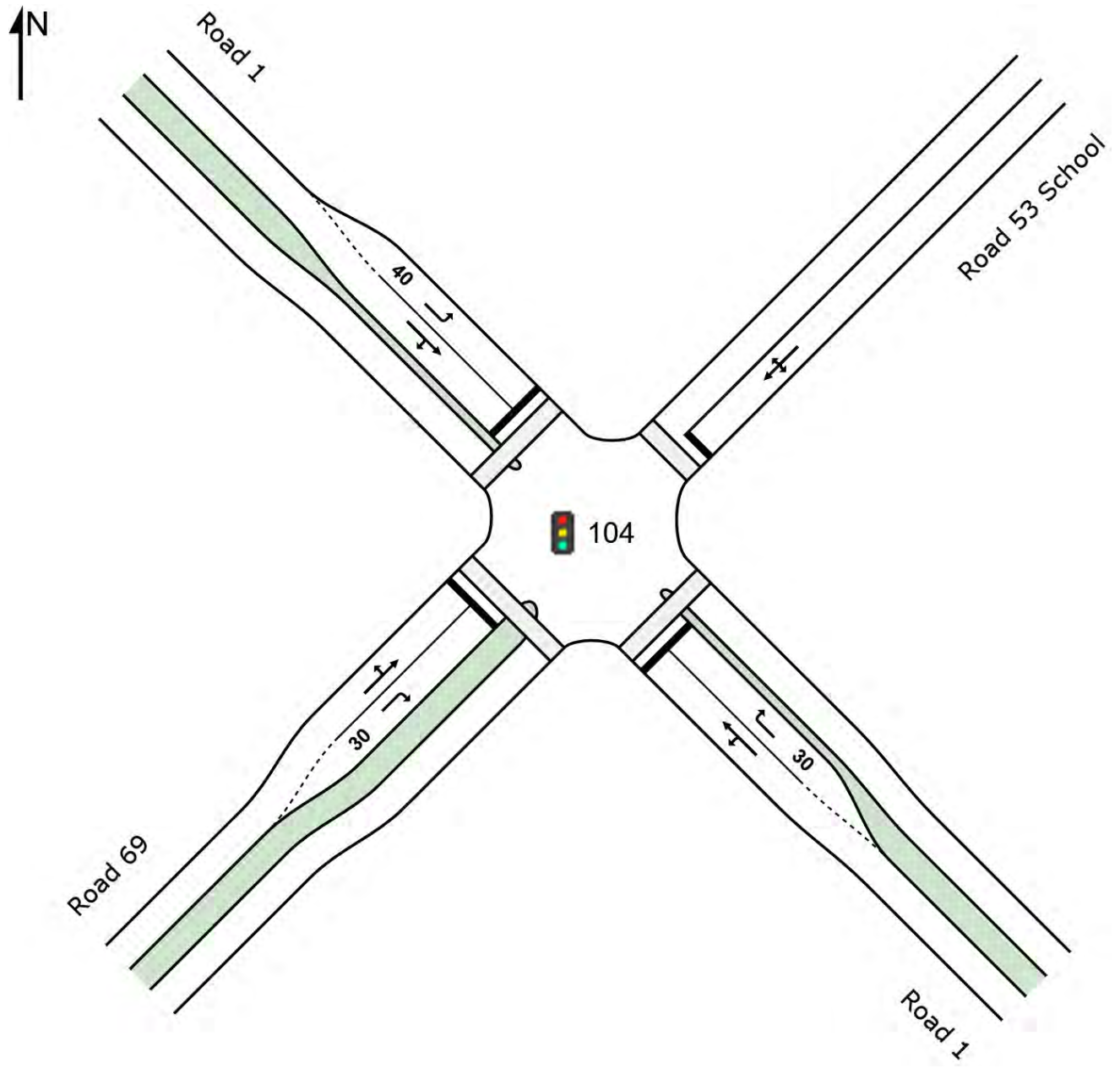
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS 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.

Site: 104 [Rd 1 / Rd 53 / Rd 69 AM]

Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout

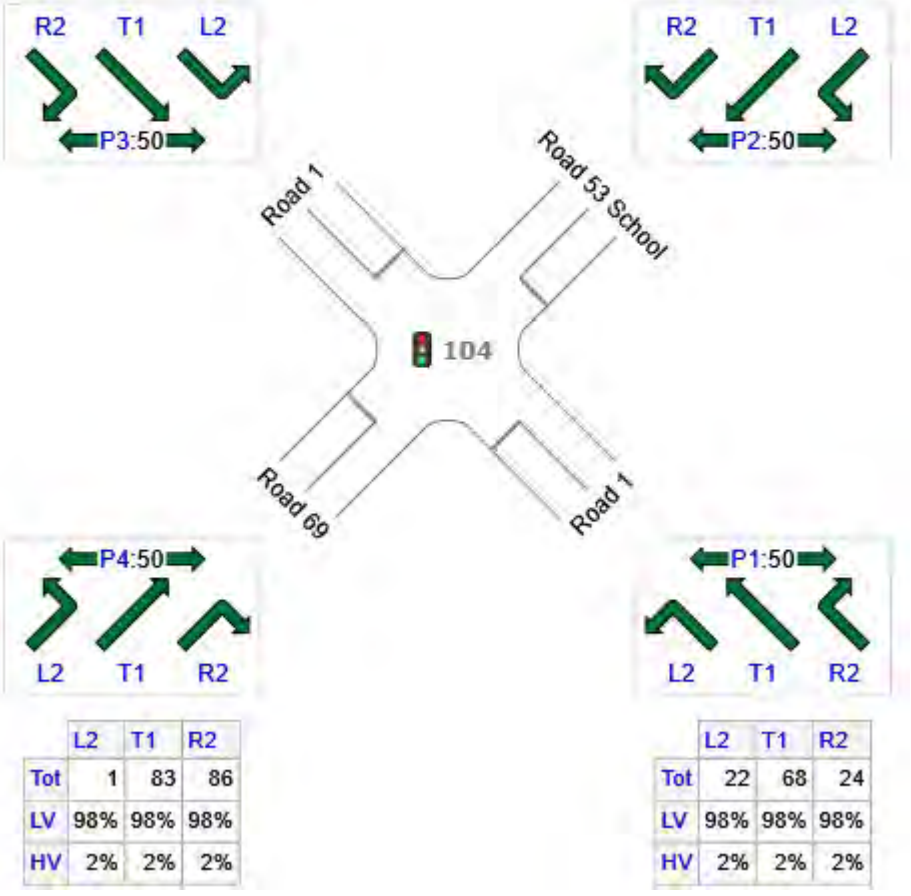


Input Volumes

Volume Display Method: Total and %

	R2	T1	L2
Tot	1	272	260
LV	98%	98%	98%
HV	2%	2%	2%

	R2	T1	L2
Tot	164	32	58
LV	98%	98%	98%
HV	2%	2%	2%



	L2	T1	R2
Tot	1	83	86
LV	98%	98%	98%
HV	2%	2%	2%

	L2	T1	R2
Tot	22	68	24
LV	98%	98%	98%
HV	2%	2%	2%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Road 1	114	112	2
NE: Road 53 School	254	249	5
NW: Road 1	533	522	11
SW: Road 69	170	167	3
Total	1071	1050	21

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	13	30	42
Green Time (sec)	7	11	6	12
Phase Time (sec)	13	17	12	18
Phase Split	22%	28%	20%	30%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Road 1												
1	L2	23	2.0	0.454	32.1	LOS C	2.8	19.9	0.97	0.76	0.97	28.4
2	T1	72	2.0	0.454	28.7	LOS C	2.8	19.9	0.97	0.76	0.97	33.2
3	R2	25	2.0	0.117	30.5	LOS C	0.7	5.0	0.93	0.70	0.93	24.4
Approach		120	2.0	0.454	29.7	LOS C	2.8	19.9	0.96	0.74	0.96	30.5
NorthEast: Road 53 School												
4	L2	61	2.0	0.747	31.2	LOS C	8.2	58.5	0.99	0.93	1.17	24.6
5	T1	34	2.0	0.747	27.8	LOS B	8.2	58.5	0.99	0.93	1.17	27.6
6	R2	173	2.0	0.747	31.3	LOS C	8.2	58.5	0.99	0.93	1.17	31.8
Approach		267	2.0	0.747	30.8	LOS C	8.2	58.5	0.99	0.93	1.17	29.7
NorthWest: Road 1												
7	L2	274	2.0	0.423	14.1	LOS A	3.5	25.1	0.81	0.78	0.81	41.0
8	T1	286	2.0	0.806	32.7	LOS C	9.3	66.1	1.00	0.97	1.28	32.2
9	R2	1	2.0	0.806	35.9	LOS C	9.3	66.1	1.00	0.97	1.28	33.6
Approach		561	2.0	0.806	23.7	LOS B	9.3	66.1	0.91	0.88	1.05	35.9
SouthWest: Road 69												
10	L2	1	2.0	0.457	33.0	LOS C	2.6	18.8	0.98	0.75	0.98	33.9
11	T1	87	2.0	0.457	29.6	LOS C	2.6	18.8	0.98	0.75	0.98	27.9
12	R2	91	2.0	0.489	33.3	LOS C	2.7	19.4	0.99	0.76	0.99	27.3
Approach		179	2.0	0.489	31.5	LOS C	2.7	19.4	0.98	0.76	0.98	27.6
All Vehicles		1127	2.0	0.806	27.2	LOS B	9.3	66.1	0.95	0.86	1.06	32.2

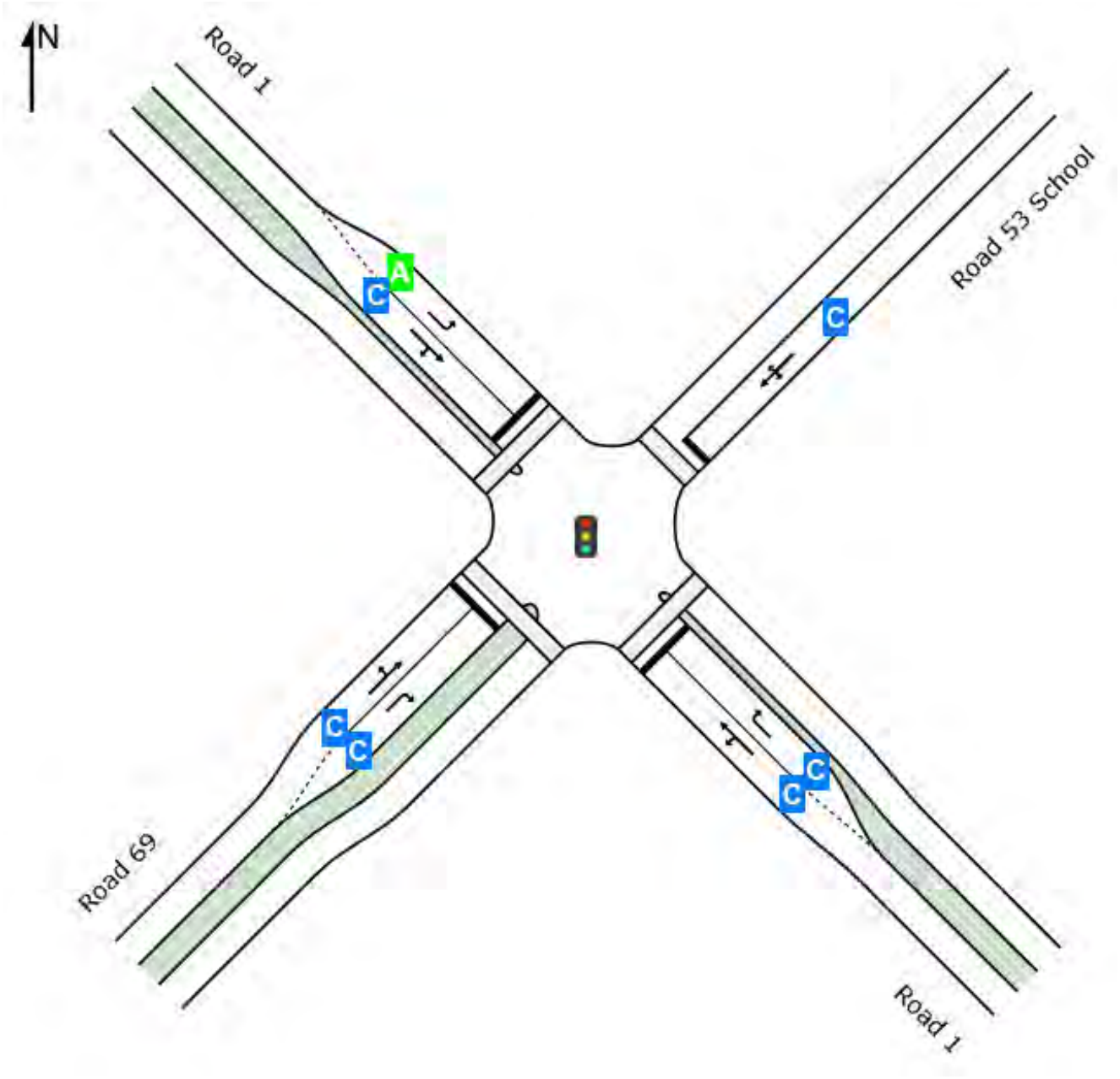
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard 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.

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. %
SouthEast: Road 1													
Lane 1	95	2.0	209	0.454	100	29.5	LOS C	2.8	19.9	Full	275	0.0	0.0
Lane 2	25	2.0	216	0.117	100	30.5	LOS C	0.7	5.0	Short	30	0.0	NA
Approach	120	2.0		0.454		29.7	LOS C	2.8	19.9				
NorthEast: Road 53 School													
Lane 1	267	2.0	358	0.747	100	30.8	LOS C	8.2	58.5	Full	250	0.0	0.0
Approach	267	2.0		0.747		30.8	LOS C	8.2	58.5				
NorthWest: Road 1													
Lane 1	274	2.0	648	0.423	100	14.1	LOS A	3.5	25.1	Short	40	0.0	NA
Lane 2	287	2.0	357	0.806	100	32.7	LOS C	9.3	66.1	Full	500	0.0	0.0
Approach	561	2.0		0.806		23.7	LOS B	9.3	66.1				
SouthWest: Road 69													
Lane 1	88	2.0	194	0.457	100	29.7	LOS C	2.6	18.8	Full	500	0.0	0.0
Lane 2	91	2.0	185	0.489	100	33.3	LOS C	2.7	19.4	Short	30	0.0	NA
Approach	179	2.0		0.489		31.5	LOS C	2.7	19.4				
Intersection	1127	2.0		0.806		27.2	LOS B	9.3	66.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all 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.

LOS Summary

	Approaches				Intersection
	Southeast	Northeast	Northwest	Southwest	
LOS	C	C	B	C	B



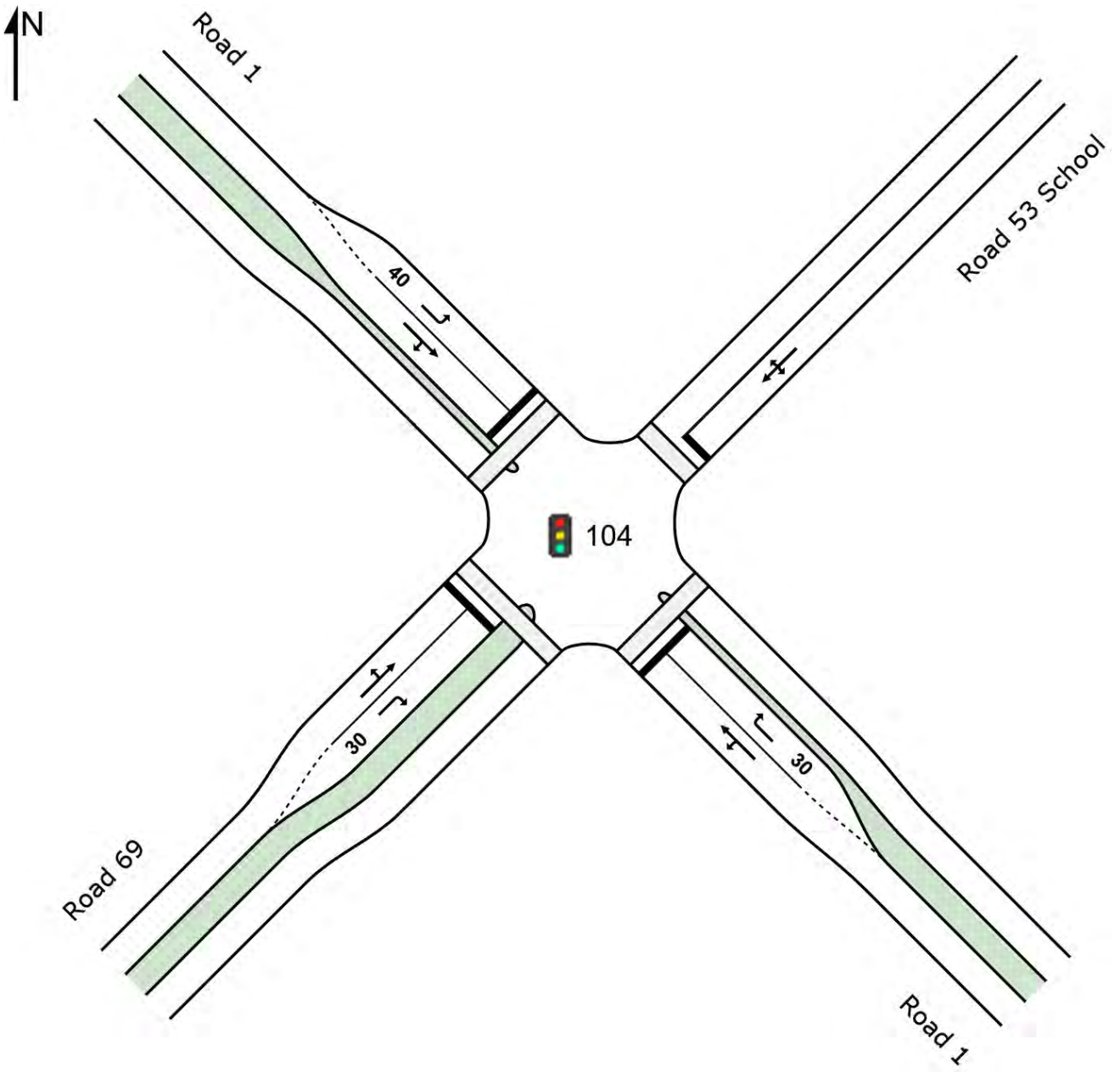
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site: 104 [Rd 1 / Rd 53 / Rd 69 PM]

Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Split Phasing
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout

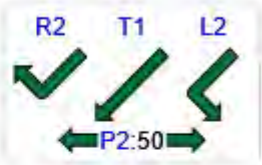


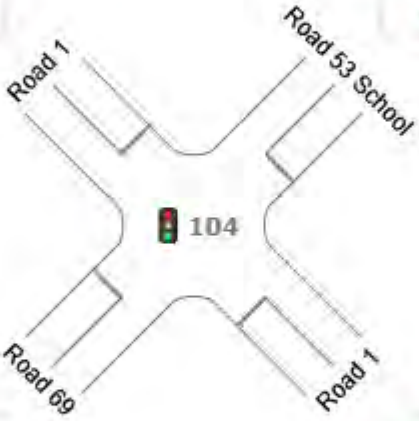
Input Volumes

Volume Display Method: Total and %

	R2	T1	L2
Tot	1	187	86
LV	98%	98%	98%
HV	2%	2%	2%

	R2	T1	L2
Tot	101	20	1
LV	98%	98%	98%
HV	2%	2%	2%





	L2	T1	R2
Tot	1	10	38
LV	98%	98%	98%
HV	2%	2%	2%

	L2	T1	R2
Tot	88	437	13
LV	98%	98%	98%
HV	2%	2%	2%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Road 1	538	527	11
NE: Road 53 School	122	120	2
NW: Road 1	274	269	5
SW: Road 69	49	48	1
Total	983	963	20

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	36	52	66
Green Time (sec)	30	10	8	8
Phase Time (sec)	36	16	14	14
Phase Split	45%	20%	18%	18%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Road 1												
1	L2	93	2.0	0.785	32.2	LOS C	20.5	146.0	0.94	0.90	1.03	31.7
2	T1	460	2.0	0.785	26.7	LOS B	20.5	146.0	0.94	0.90	1.03	37.9
3	R2	14	2.0	0.020	22.2	LOS B	0.3	2.4	0.65	0.67	0.65	31.0
Approach		566	2.0	0.785	27.5	LOS B	20.5	146.0	0.94	0.89	1.02	36.6
NorthEast: Road 53 School												
4	L2	1	2.0	0.690	44.5	LOS D	5.3	37.7	1.00	0.87	1.14	22.5
5	T1	21	2.0	0.690	41.1	LOS C	5.3	37.7	1.00	0.87	1.14	24.4
6	R2	106	2.0	0.690	44.6	LOS D	5.3	37.7	1.00	0.87	1.14	27.6
Approach		128	2.0	0.690	44.0	LOS D	5.3	37.7	1.00	0.87	1.14	27.0
NorthWest: Road 1												
7	L2	91	2.0	0.489	44.6	LOS D	3.6	25.3	0.99	0.77	0.99	28.2
8	T1	197	2.0	0.814	42.7	LOS D	8.5	60.5	1.00	0.95	1.29	31.5
9	R2	1	2.0	0.814	48.2	LOS D	8.5	60.5	1.00	0.95	1.29	30.8
Approach		288	2.0	0.814	43.3	LOS D	8.5	60.5	1.00	0.89	1.20	30.4
SouthWest: Road 69												
10	L2	1	2.0	0.061	39.8	LOS C	0.4	3.0	0.93	0.64	0.93	31.8
11	T1	11	2.0	0.061	36.4	LOS C	0.4	3.0	0.93	0.64	0.93	26.1
12	R2	40	2.0	0.216	41.0	LOS C	1.5	10.8	0.95	0.72	0.95	26.8
Approach		52	2.0	0.216	40.1	LOS C	1.5	10.8	0.95	0.70	0.95	26.8
All Vehicles		1035	2.0	0.814	34.6	LOS C	20.5	146.0	0.96	0.88	1.08	32.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

Lane Use and Performance

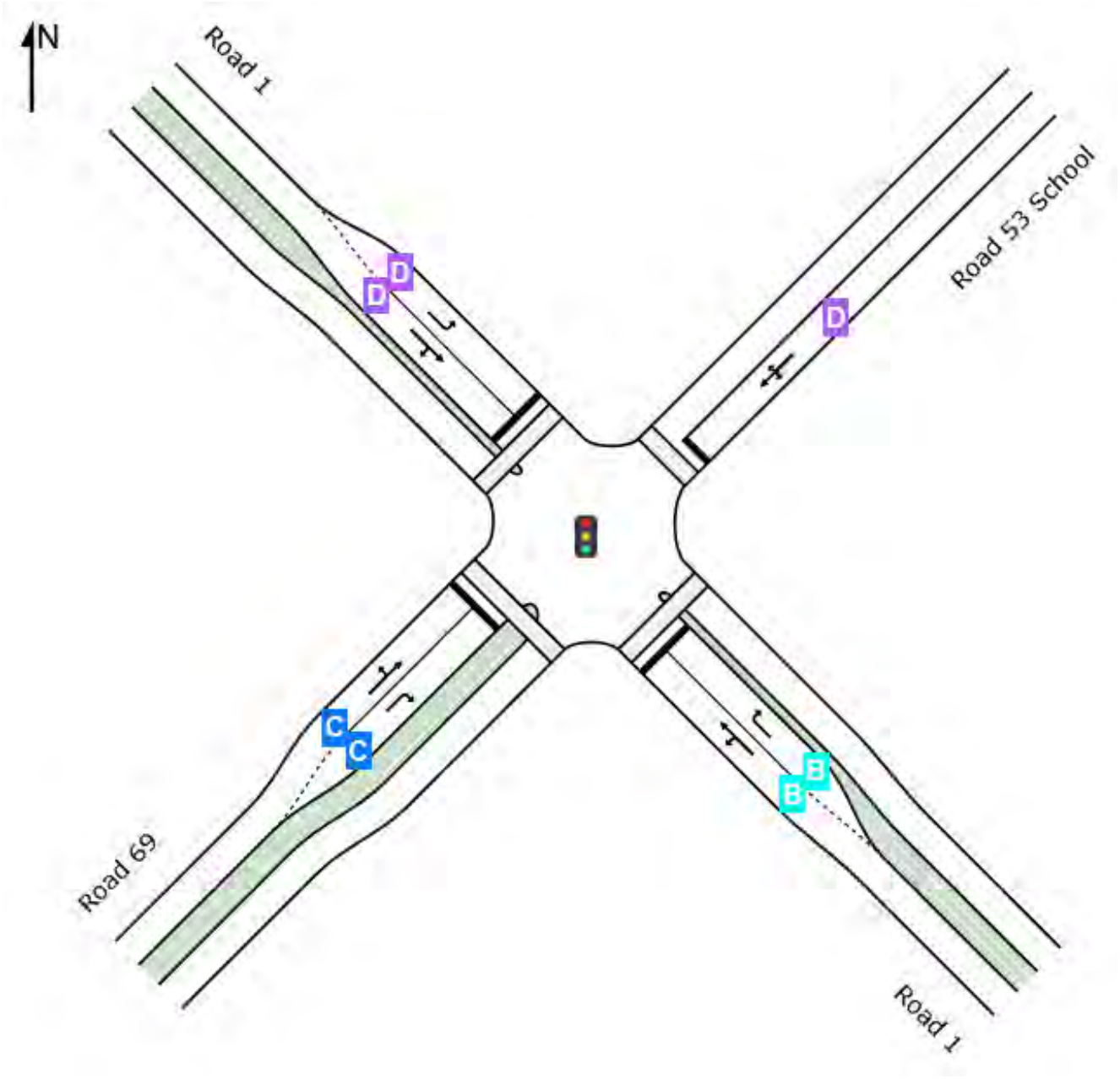
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Road 1													
Lane 1	553	2.0	704[1]	0.785	100	27.6	LOS B	20.5	146.0	Full	275	0.0	0.0
Lane 2	14	2.0	694	0.020	100	22.2	LOS B	0.3	2.4	Short	30	0.0	NA
Approach	566	2.0		0.785		27.5	LOS B	20.5	146.0				
NorthEast: Road 53 School													
Lane 1	128	2.0	186	0.690	100	44.0	LOS D	5.3	37.7	Full	250	0.0	0.0
Approach	128	2.0		0.690		44.0	LOS D	5.3	37.7				
NorthWest: Road 1													
Lane 1	91	2.0	185	0.489	100	44.6	LOS D	3.6	25.3	Short	40	0.0	NA
Lane 2	198	2.0	243	0.814	100	42.7	LOS D	8.5	60.5	Full	500	0.0	0.0
Approach	288	2.0		0.814		43.3	LOS D	8.5	60.5				
SouthWest: Road 69													
Lane 1	12	2.0	189	0.061	100	36.7	LOS C	0.4	3.0	Full	500	0.0	0.0
Lane 2	40	2.0	185	0.216	100	41.0	LOS C	1.5	10.8	Short	30	0.0	NA
Approach	52	2.0		0.216		40.1	LOS C	1.5	10.8				
Intersection	1035	2.0		0.814		34.6	LOS C	20.5	146.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all 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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

LOS Summary

	Approaches				Intersection
	Southeast	Northeast	Northwest	Southwest	
LOS	B	D	D	C	C



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

USER REPORT FOR NETWORK SITE

Project: Whitlam Stage 2 20190607

Template: Standard Site User Report

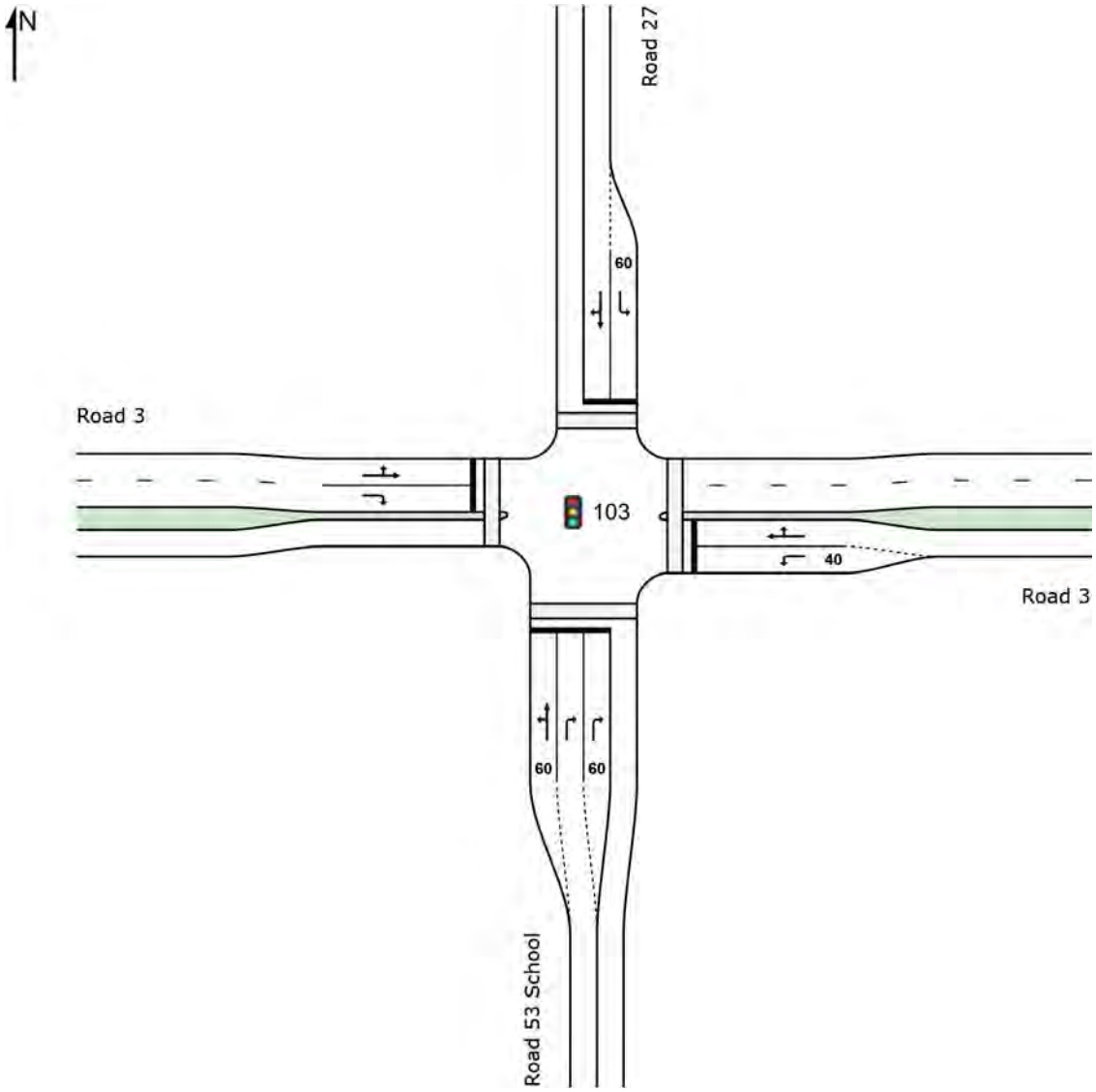
Site: 103 [Rd 3 / Rd 53 / Rd 27 AM]

Network: 1 [AM Peak Hour]

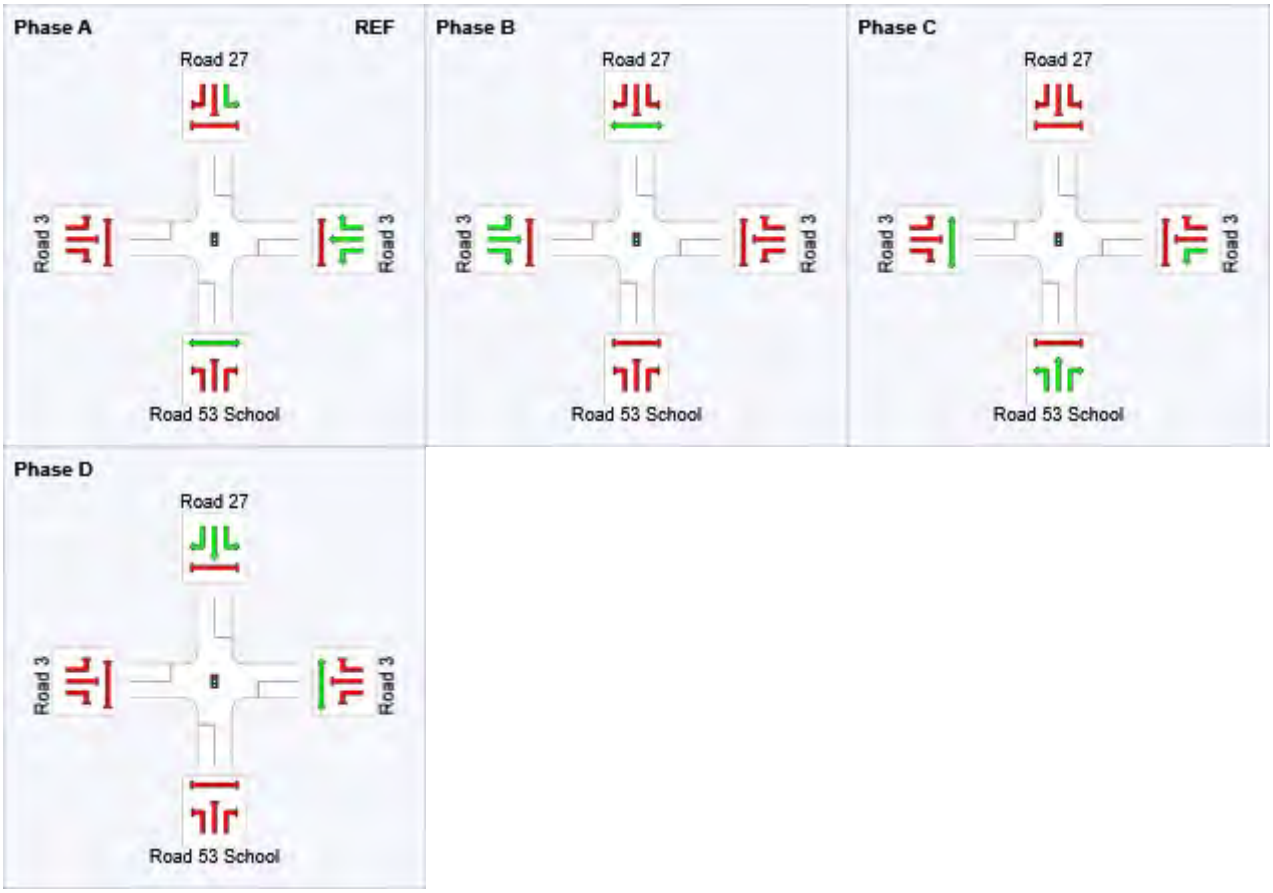
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Split Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout



Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	70	84	18	53
Green Time (sec)	11	40	29	11
Phase Time (sec)	15	46	35	14
Phase Split	14%	42%	32%	13%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Road 53 School														
10	L2	98	2.0	98	2.0	0.245	39.5	LOS C	4.7	33.4	0.84	0.74	0.84	29.1
11	T1	11	2.0	11	2.0	0.245	36.1	LOS C	4.7	33.4	0.84	0.74	0.84	22.6
12	R2	152	2.0	152	2.0	0.155	36.9	LOS C	3.1	22.2	0.80	0.72	0.80	15.7
Approach		260	2.0	260	2.0	0.245	37.8	LOS C	4.7	33.4	0.82	0.73	0.82	22.4
East: Road 3														
1	L2	97	2.0	97	2.0	0.156	17.4	LOS B	2.0	14.0	0.58	0.65	0.58	27.7
2	T1	27	2.0	27	2.0	0.181	54.9	LOS D	1.9	13.5	1.00	0.73	1.00	24.1
3	R2	7	2.0	7	2.0	0.181	58.3	LOS E	1.9	13.5	1.00	0.73	1.00	17.5
Approach		132	2.0	132	2.0	0.181	27.4	LOS B	2.0	14.0	0.69	0.67	0.69	25.7
North: Road 27														
4	L2	29	2.0	29	2.0	0.076	41.1	LOS C	1.3	9.1	0.84	0.69	0.84	16.4
5	T1	27	2.0	27	2.0	0.146	50.1	LOS D	1.4	10.2	0.95	0.69	0.95	20.2
6	R2	1	2.0	1	2.0	0.146	53.5	LOS D	1.4	10.2	0.95	0.69	0.95	26.6
Approach		58	2.0	58	2.0	0.146	45.6	LOS D	1.4	10.2	0.89	0.69	0.89	18.7
West: Road 3														
7	L2	1	2.0	1	2.0	0.158	30.7	LOS C	4.0	28.5	0.71	0.68	0.71	34.5
8	T1	111	2.0	111	2.0	0.158	27.6	LOS B	4.0	28.5	0.71	0.68	0.71	31.7
9	R2	153	2.0	153	2.0	0.227	31.5	LOS C	5.6	40.2	0.73	0.76	0.73	32.7
Approach		264	2.0	264	2.0	0.227	29.9	LOS C	5.6	40.2	0.72	0.72	0.72	32.4
All Vehicles		714	2.0	714	2.0	0.245	33.6	LOS C	5.6	40.2	0.77	0.71	0.77	26.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

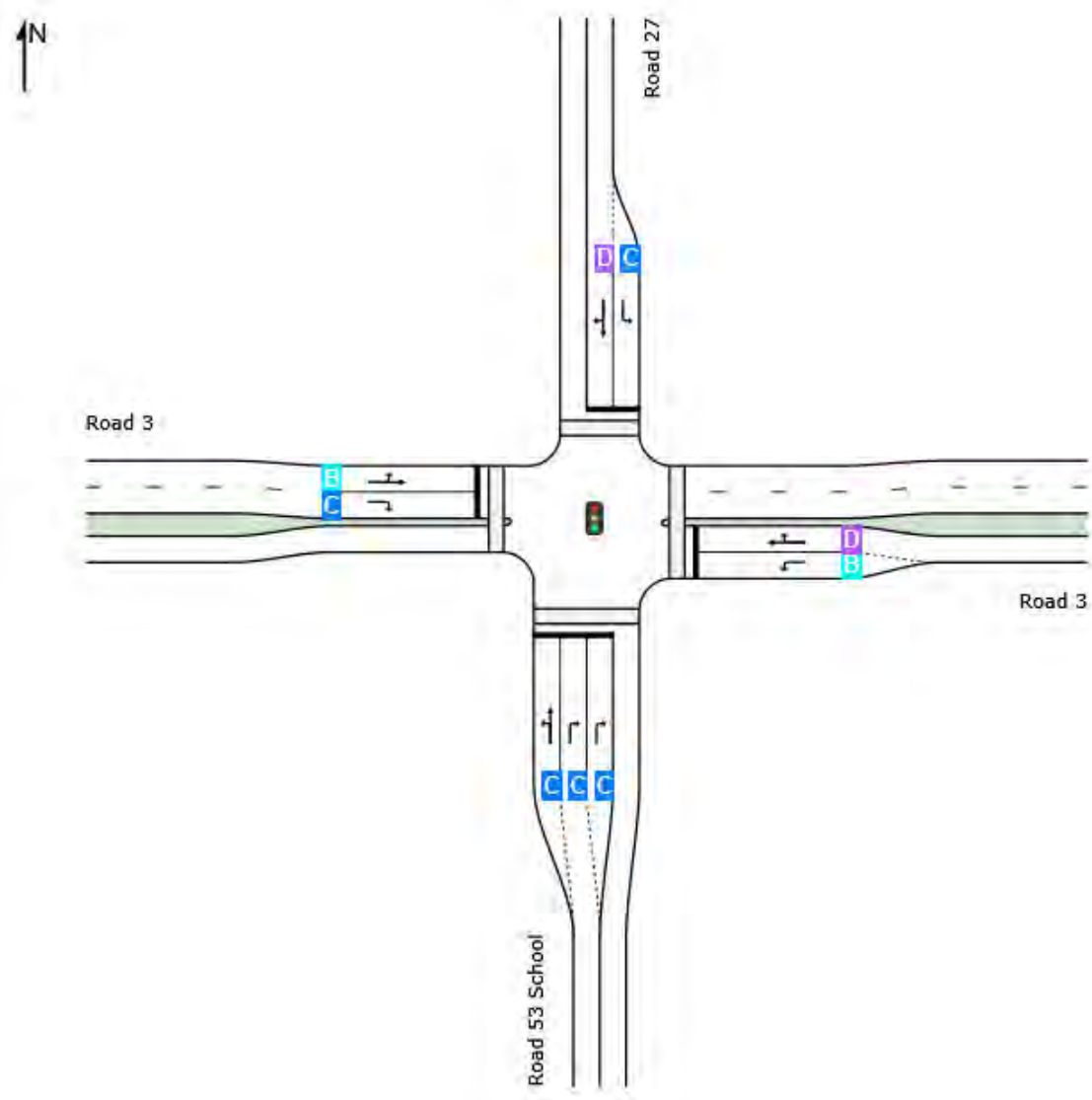
Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Road 53 School															
Lane 1	108	2.0	108	2.0	443	0.245	100	39.1	LOS C	4.7	33.4	Short	60	0.0	NA
Lane 2	76	2.0	76	2.0	488	0.155	100	36.9	LOS C	3.1	22.2	Full	250	0.0	0.0
Lane 3	76	2.0	76	2.0	488	0.155	100	36.9	LOS C	3.1	22.2	Short	60	0.0	NA
Approach	260	2.0	260	2.0		0.245		37.8	LOS C	4.7	33.4				
East: Road 3															
Lane 1	97	2.0	97	2.0	622	0.156	100	17.4	LOS B	2.0	14.0	Short	40	0.0	NA
Lane 2	35	2.0	35	2.0	192	0.181	100	55.6	LOS D	1.9	13.5	Full	160	0.0	0.0
Approach	132	2.0	132	2.0		0.181		27.4	LOS B	2.0	14.0				
North: Road 27															
Lane 1	29	2.0	29	2.0	387	0.076	100	41.1	LOS C	1.3	9.1	Short	60	0.0	NA
Lane 2	28	2.0	28	2.0	194	0.146	100	50.2	LOS D	1.4	10.2	Full	300	0.0	0.0
Approach	58	2.0	58	2.0		0.146		45.6	LOS D	1.4	10.2				
West: Road 3															
Lane 1	112	2.0	112	2.0	706	0.158	100	27.6	LOS B	4.0	28.5	Full	500	0.0	0.0
Lane 2	153	2.0	153	2.0	673	0.227	100	31.5	LOS C	5.6	40.2	Full	500	0.0	0.0
Approach	264	2.0	264	2.0		0.227		29.9	LOS C	5.6	40.2				
Intersection	714	2.0	714	2.0		0.245		33.6	LOS C	5.6	40.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all 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.

LOS Summary

	Approaches				Intersection
	South	East	North	West	
LOS	C	B	D	C	C



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

USER REPORT FOR NETWORK SITE

Project: Whitlam Stage 2 20190607

Template: Standard Site User Report

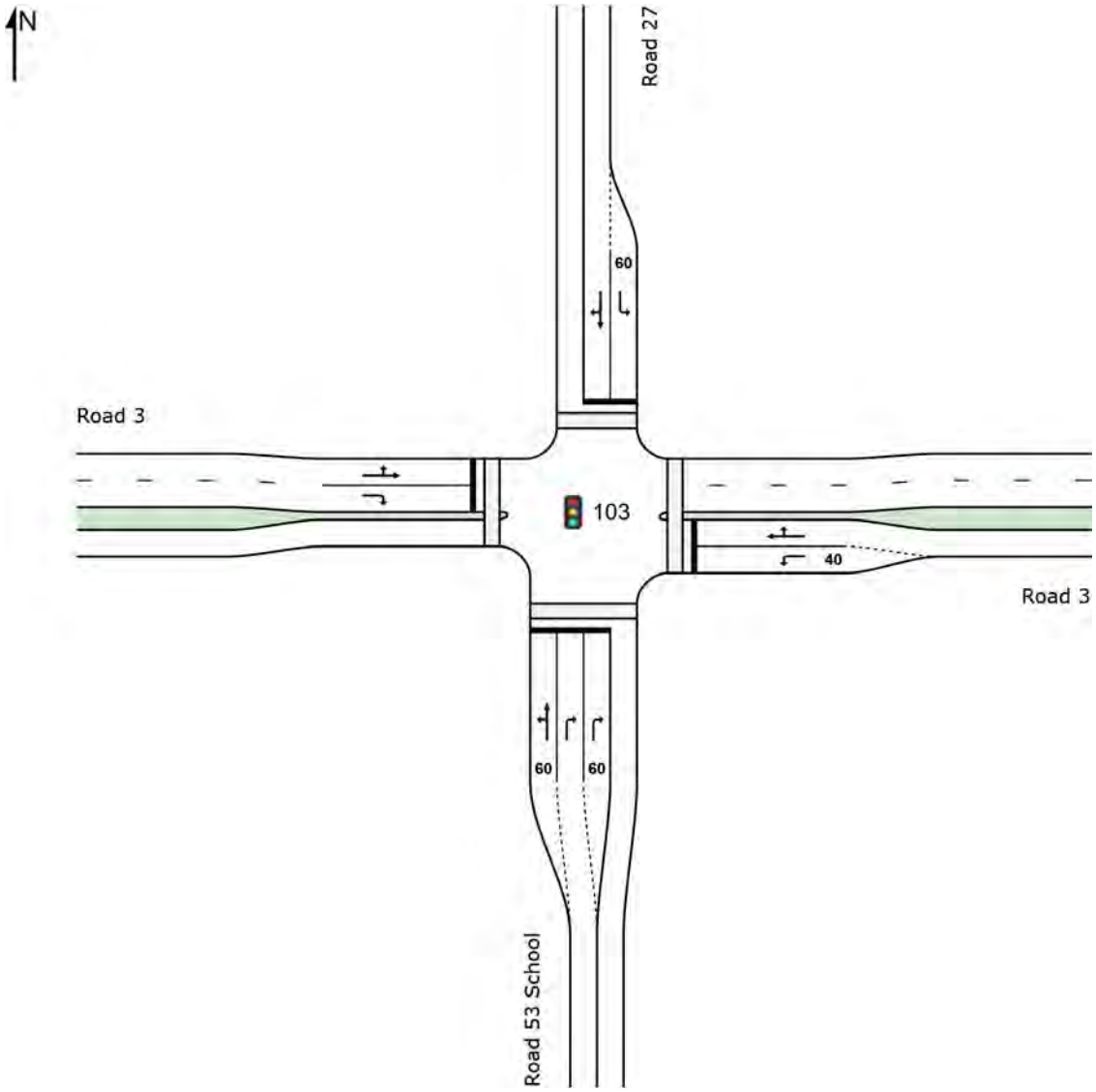
Site: 103 [Rd 3 / Rd 53 / Rd 27 PM]

Network: 2 [PM Peak Hour]

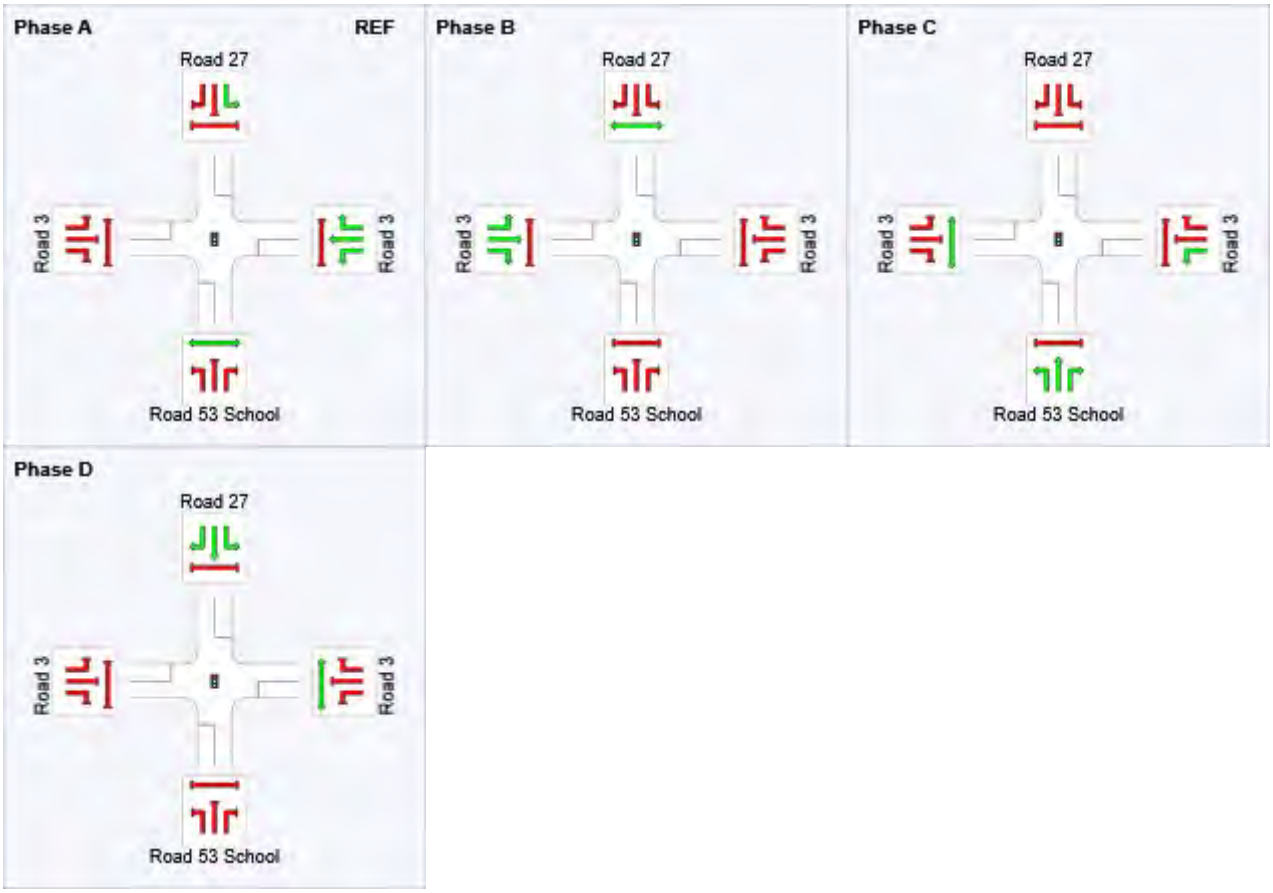
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Split Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Site Layout



Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	77	14	39	60
Green Time (sec)	54	19	15	11
Phase Time (sec)	60	25	21	14
Phase Split	50%	21%	18%	12%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Road 53 School														
10	L2	57	2.0	57	2.0	0.351	58.7	LOS E	3.8	26.9	0.97	0.76	0.97	24.2
11	T1	11	2.0	11	2.0	0.351	55.3	LOS D	3.8	26.9	0.97	0.76	0.97	18.7
12	R2	7	2.0	7	2.0	0.016	53.1	LOS D	0.2	1.3	0.90	0.63	0.90	12.4
Approach		75	2.0	75	2.0	0.351	57.6	LOS E	3.8	26.9	0.96	0.74	0.96	22.6
East: Road 3														
1	L2	35	2.0	35	2.0	0.033	7.7	LOS A	0.2	1.3	0.15	0.60	0.15	38.0
2	T1	205	2.0	205	2.0	0.289	7.6	LOS A	3.6	25.5	0.26	0.30	0.26	49.5
3	R2	45	2.0	45	2.0	0.289	13.2	LOS A	3.6	25.5	0.26	0.30	0.26	37.5
Approach		285	2.0	285	2.0	0.289	8.5	LOS A	3.6	25.5	0.25	0.34	0.25	46.5
North: Road 27														
4	L2	19	2.0	19	2.0	0.018	14.4	LOS A	0.5	3.2	0.44	0.58	0.44	26.6
5	T1	5	2.0	5	2.0	0.036	54.3	LOS D	0.3	2.4	0.94	0.62	0.94	19.3
6	R2	1	2.0	1	2.0	0.036	57.7	LOS E	0.3	2.4	0.94	0.62	0.94	25.5
Approach		25	2.0	25	2.0	0.036	24.5	LOS B	0.5	3.2	0.56	0.59	0.56	23.7
West: Road 3														
7	L2	1	2.0	1	2.0	0.287	54.2	LOS D	4.6	33.0	0.92	0.72	0.92	27.7
8	T1	87	2.0	87	2.0	0.287	48.6	LOS D	4.6	33.0	0.92	0.72	0.92	23.4
9	R2	48	2.0	48	2.0	0.165	53.1	LOS D	2.5	17.7	0.90	0.74	0.90	26.0
Approach		137	2.0	137	2.0	0.287	50.2	LOS D	4.6	33.0	0.92	0.73	0.92	24.5
All Vehicles		522	2.0	522	2.0	0.351	27.3	LOS B	4.6	33.0	0.54	0.51	0.54	32.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

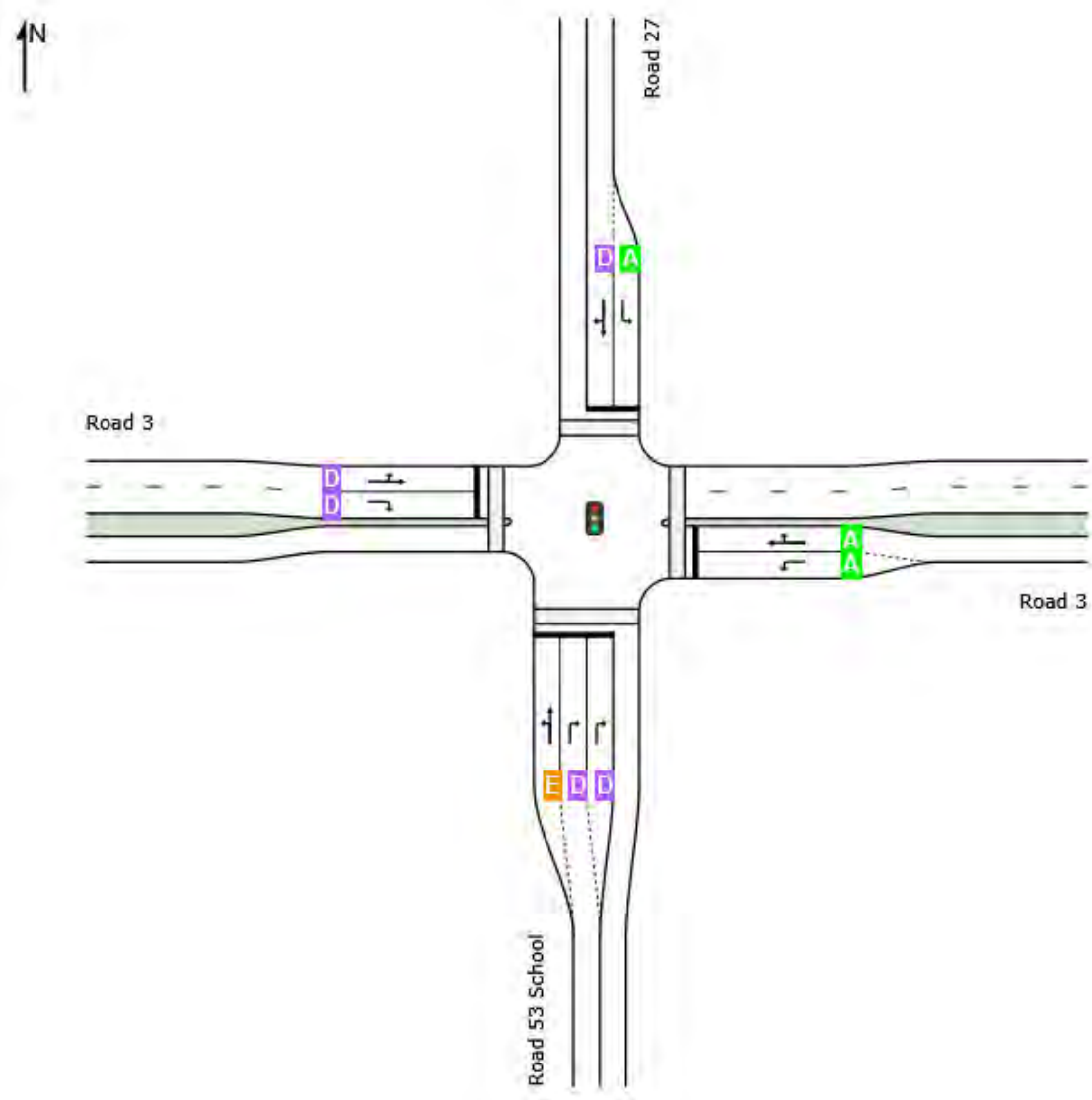
Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Road 53 School															
Lane 1	67	2.0	67	2.0	192	0.351	100	58.1	LOS E	3.8	26.9	Short	60	0.0	NA
Lane 2	4	2.0	4	2.0	231	0.016	100	53.1	LOS D	0.2	1.3	Full	250	0.0	0.0
Lane 3	4	2.0	4	2.0	231	0.016	100	53.1	LOS D	0.2	1.3	Short	60	0.0	NA
Approach	75	2.0	75	2.0		0.351		57.6	LOS E	3.8	26.9				
East: Road 3															
Lane 1	35	2.0	35	2.0	1048	0.033	100	7.7	LOS A	0.2	1.3	Short	40	0.0	NA
Lane 2	251	2.0	251	2.0	867	0.289	100	8.6	LOS A	3.6	25.5	Full	160	0.0	0.0
Approach	285	2.0	285	2.0		0.289		8.5	LOS A	3.6	25.5				
North: Road 27															
Lane 1	19	2.0	19	2.0	1079	0.018	100	14.4	LOS A	0.5	3.2	Short	60	0.0	NA
Lane 2	6	2.0	6	2.0	177	0.036	100	54.9	LOS D	0.3	2.4	Full	300	0.0	0.0
Approach	25	2.0	25	2.0		0.036		24.5	LOS B	0.5	3.2				
West: Road 3															
Lane 1	88	2.0	88	2.0	308	0.287	100	48.7	LOS D	4.6	33.0	Full	500	0.0	0.0
Lane 2	48	2.0	48	2.0	293	0.165	100	53.1	LOS D	2.5	17.7	Full	500	0.0	0.0
Approach	137	2.0	137	2.0		0.287		50.2	LOS D	4.6	33.0				
Intersection	522	2.0	522	2.0		0.351		27.3	LOS B	4.6	33.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all 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.

LOS Summary

	Approaches				Intersection
	South	East	North	West	
LOS	E	A	B	D	B



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

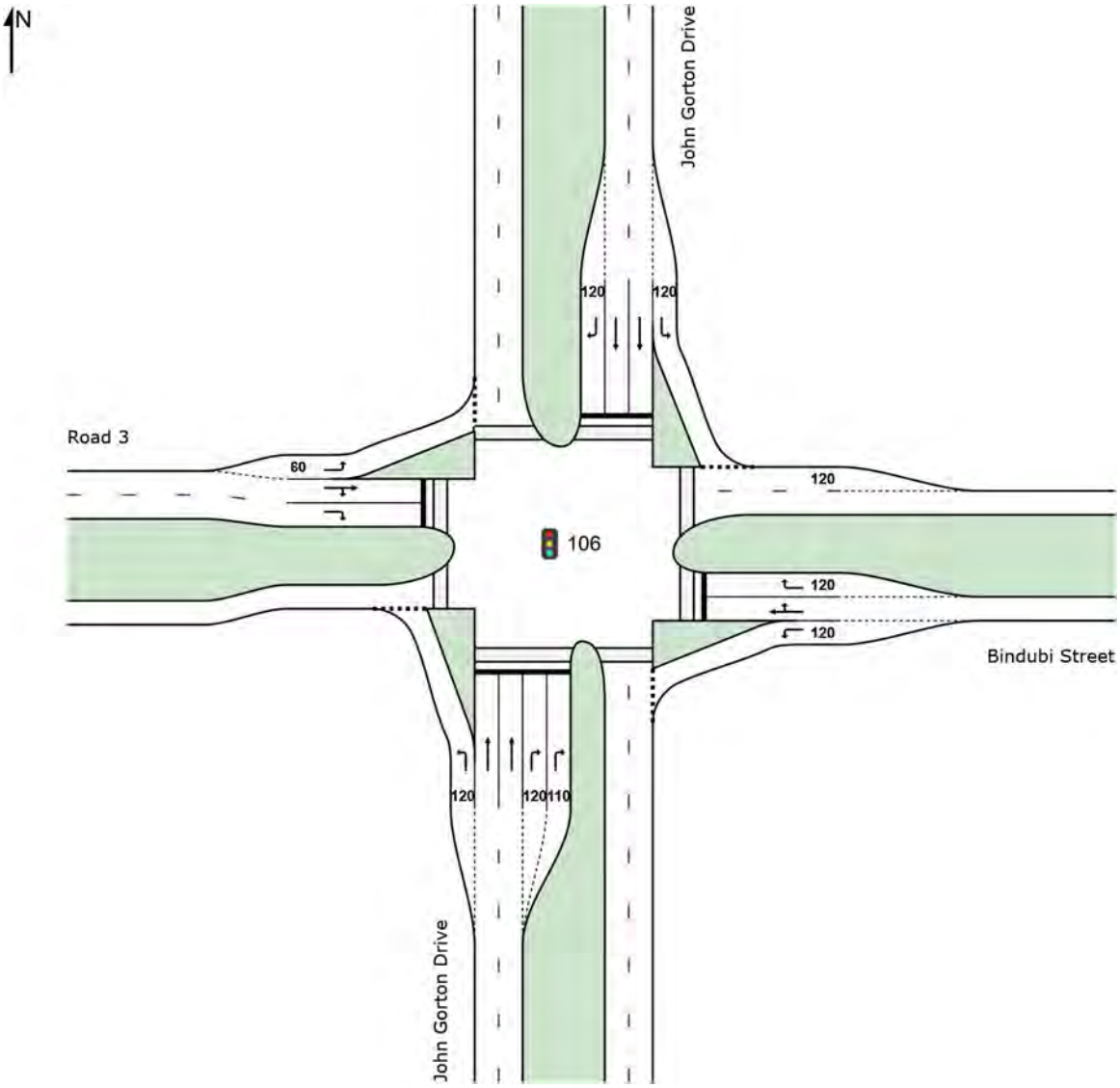
Site: 106 [Rd 3 / John Gorton Dr / Bindubi St AM]

Network: 1 [AM Peak Hour]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Leading-Lagging RT
Reference Phase: Phase D
Input Phase Sequence: A, B, C, D, E
Output Phase Sequence: A, B, C, D, E

Site Layout



Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D	E
Phase Change Time (sec)	48	66	81	0	17
Green Time (sec)	10	10	24	9	23
Phase Time (sec)	15	15	32	17	31
Phase Split	14%	14%	29%	15%	28%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: John Gorton Drive														
1	L2	1	2.0	1	2.0	0.001	7.7	LOS A	0.0	0.0	0.20	0.59	0.20	54.3
2	T1	805	5.0	805	5.0	0.566	29.4	LOS C	17.1	125.1	0.85	0.74	0.85	44.8
3	R2	555	2.0	555	2.0	0.822	53.2	LOS D	18.6	132.5	0.98	0.88	1.07	33.0
Approach		1361	3.8	1361	3.8	0.822	39.1	LOS C	18.6	132.5	0.90	0.80	0.94	39.1
East: Bindubi Street														
4	L2	331	2.0	331	2.0	0.317	15.3	LOS B	8.0	56.7	0.55	0.72	0.55	49.2
5	T1	52	2.0	52	2.0	0.697	56.1	LOS D	6.7	47.5	1.00	0.84	1.11	20.8
6	R2	185	2.0	185	2.0	0.697	61.8	LOS E	6.7	47.5	1.00	0.84	1.12	30.6
Approach		567	2.0	567	2.0	0.697	34.2	LOS C	8.0	56.7	0.74	0.77	0.79	38.6
North: John Gorton Drive														
7	L2	7	2.0	7	2.0	0.006	10.7	LOS A	0.1	0.7	0.34	0.62	0.34	53.7
8	T1	1139	5.0	1139	5.0	0.821	38.0	LOS C	29.6	216.3	0.97	0.92	1.05	40.6
9	R2	69	2.0	69	2.0	0.180	45.3	LOS D	3.1	22.0	0.86	0.75	0.86	26.0
Approach		1216	4.8	1216	4.8	0.821	38.3	LOS C	29.6	216.3	0.96	0.91	1.04	40.0
West: Road 3														
10	L2	213	2.0	213	2.0	0.244	8.4	LOS A	1.7	12.0	0.20	0.61	0.20	51.8
11	T1	35	2.0	35	2.0	0.227	54.7	LOS D	2.1	15.3	1.00	0.74	1.00	25.6
12	R2	43	2.0	43	2.0	0.227	57.9	LOS E	2.1	15.3	0.97	0.73	0.97	25.6
Approach		291	2.0	291	2.0	0.244	21.3	LOS B	2.1	15.3	0.41	0.64	0.41	40.6
All Vehicles		3435	3.7	3435	3.7	0.822	36.5	LOS C	29.6	216.3	0.85	0.82	0.90	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

Lane Use and Performance

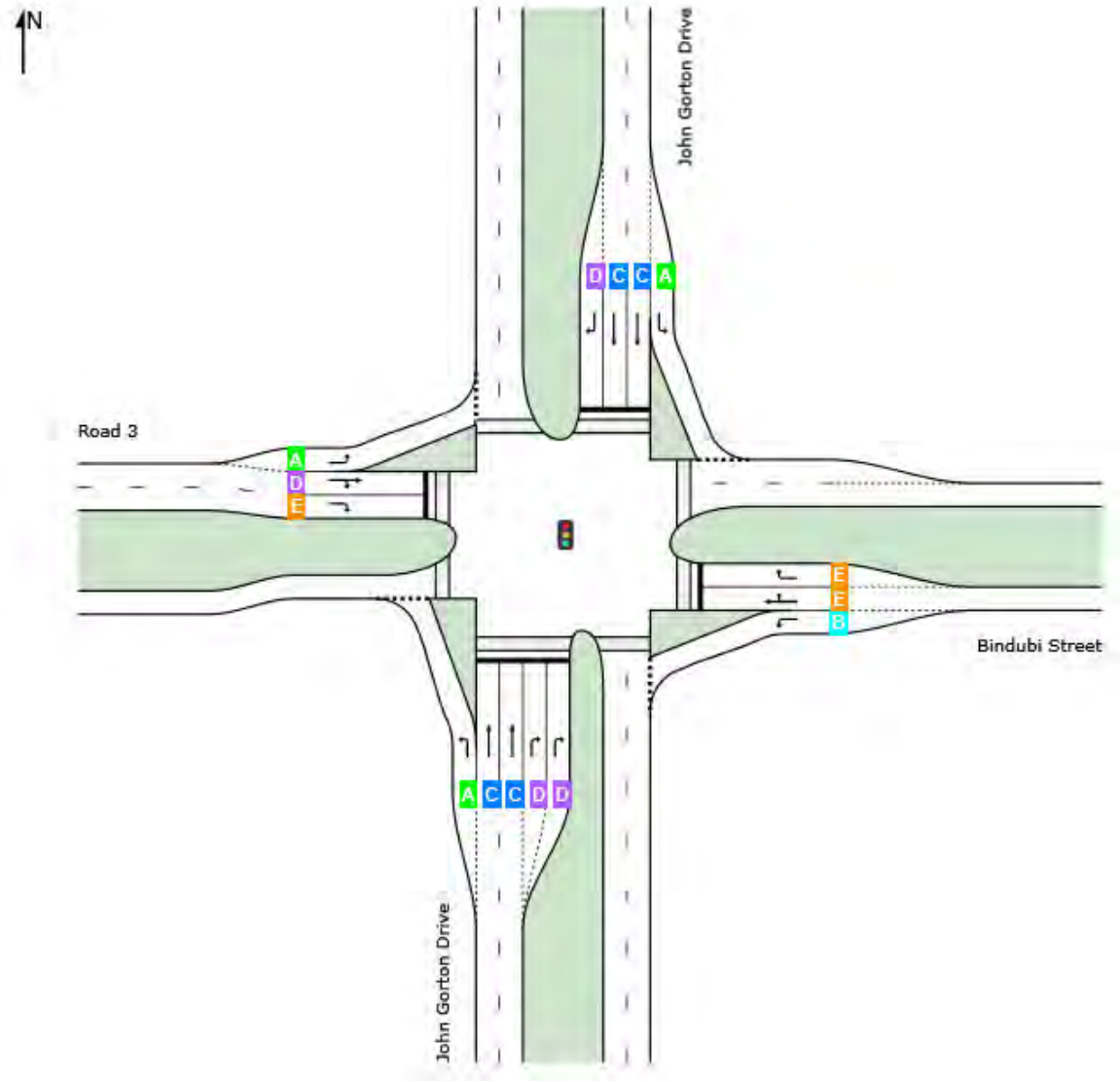
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: John Gorton Drive															
Lane 1	1	2.0	1	2.0	1422	0.001	100	7.7	LOS A	0.0	0.0	Short	120	0.0	NA
Lane 2	403	5.0	403	5.0	711	0.566	100	29.4	LOS C	17.1	125.1	Full	500	0.0	0.0
Lane 3	403	5.0	403	5.0	711	0.566	100	29.4	LOS C	17.1	125.1	Full	500	0.0	0.0
Lane 4	223	2.0	223	2.0	404	0.552	67[6]	48.3	LOS D	10.8	76.8	Short	120	0.0	NA
Lane 5	332	2.0	332	2.0	404	0.822	100	56.5	LOS D	18.6	132.5	Short	110	0.0	NA
Approach	1361	3.8	1361	3.8		0.822		39.1	LOS C	18.6	132.5				
East: Bindubi Street															
Lane 1	331	2.0	331	2.0	1044	0.317	100	15.3	LOS B	8.0	56.7	Short	120	0.0	NA
Lane 2	120	2.0	120	2.0	172	0.697	100	59.3	LOS E	6.7	47.5	Full	500	0.0	0.0
Lane 3	117	2.0	117	2.0	168	0.697	100	61.8	LOS E	6.5	46.6	Short	120	0.0	NA
Approach	567	2.0	567	2.0		0.697		34.2	LOS C	8.0	56.7				
North: John Gorton Drive															
Lane 1	7	2.0	7	2.0	1179	0.006	100	10.7	LOS A	0.1	0.7	Short	120	0.0	NA
Lane 2	569	5.0	569	5.0	694	0.821	100	38.0	LOS C	29.6	216.3	Full	500	0.0	0.0
Lane 3	569	5.0	569	5.0	694	0.821	100	38.0	LOS C	29.6	216.3	Full	500	0.0	0.0
Lane 4	69	2.0	69	2.0	387	0.180	100	45.3	LOS D	3.1	22.0	Short	120	0.0	NA
Approach	1216	4.8	1216	4.8		0.821		38.3	LOS C	29.6	216.3				
West: Road 3															
Lane 1	213	2.0	213	2.0	872	0.244	100	8.4	LOS A	1.7	12.0	Short	60	0.0	NA
Lane 2	40	2.0	40	2.0	176	0.227	100	55.4	LOS D	2.1	15.3	Full	160	0.0	0.0
Lane 3	38	2.0	38	2.0	168	0.227	100	57.6	LOS E	2.0	14.1	Full	160	0.0	0.0
Approach	291	2.0	291	2.0		0.244		21.3	LOS B	2.1	15.3				
Intersection	3435	3.7	3435	3.7		0.822		36.5	LOS C	29.6	216.3				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all 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.

6 Lane under-utilisation due to downstream effects

LOS Summary

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	C	B	C



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

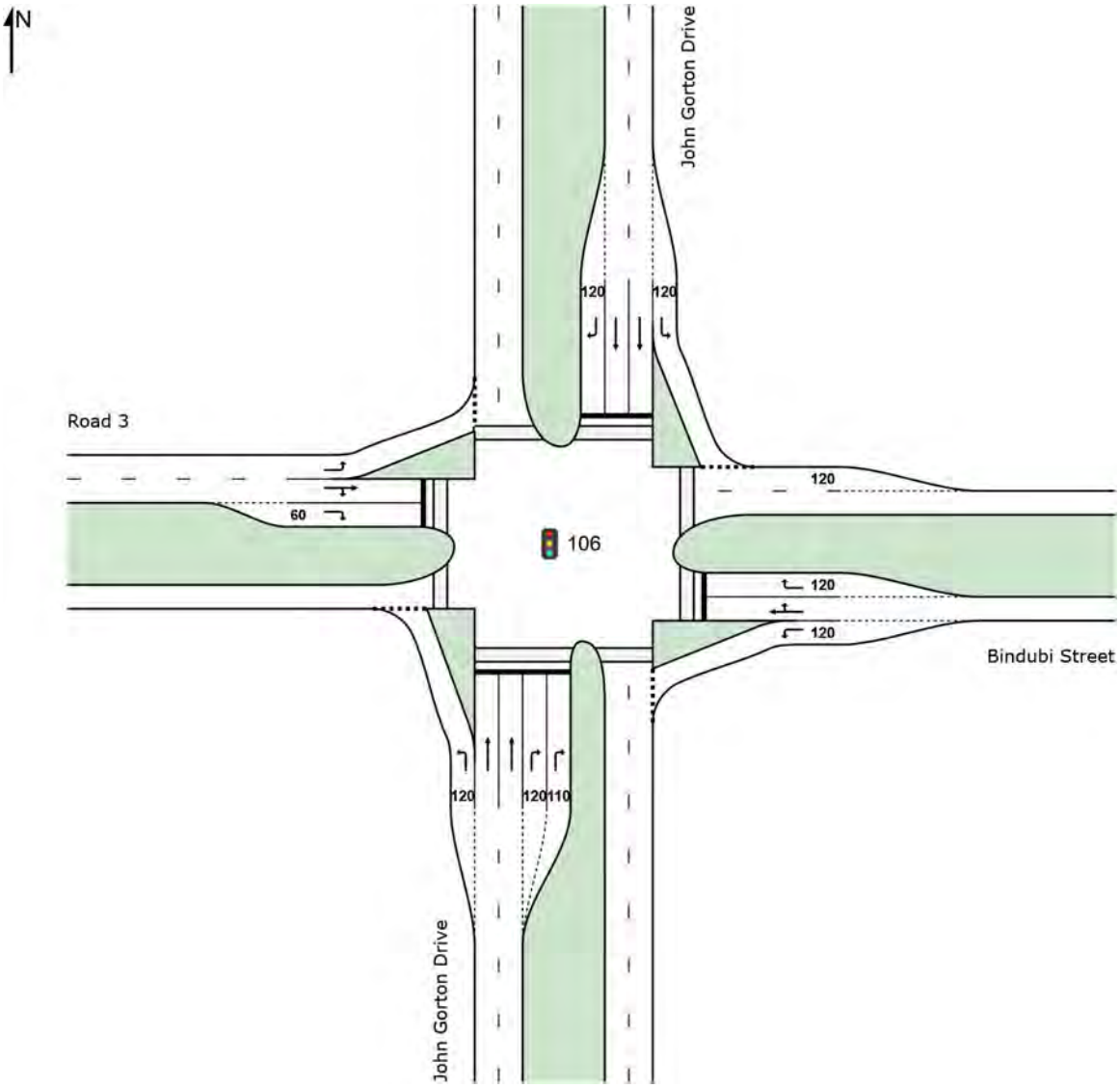
Site: 106 [Rd 3 / John Gorton Dr / Bindubi St PM]

Network: 2 [PM Peak Hour]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Manual - Major Lead-Lag RT
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D, E
Output Phase Sequence: A, B, C, D, E

Site Layout



Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D	E
Phase Change Time (sec)	0	18	38	71	97
Green Time (sec)	10	15	27	18	15
Phase Time (sec)	15	21	35	26	23
Phase Split	13%	18%	29%	22%	19%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: John Gorton Drive														
1	L2	1	2.0	1	2.0	0.001	8.7	LOS A	0.0	0.1	0.24	0.59	0.24	52.8
2	T1	1249	5.0	1249	5.0	0.756	29.7	LOS C	31.0	226.2	0.90	0.81	0.90	44.7
3	R2	581	2.0	581	2.0	0.698	53.5	LOS D	15.9	113.4	0.98	0.85	0.99	32.9
Approach		1832	4.0	1832	4.0	0.756	37.2	LOS C	31.0	226.2	0.92	0.82	0.93	40.1
East: Bindubi Street														
4	L2	529	2.0	529	2.0	0.488	17.1	LOS B	15.7	111.8	0.62	0.75	0.62	48.0
5	T1	11	2.0	11	2.0	0.841	63.2	LOS E	12.4	88.3	1.00	0.94	1.26	18.8
6	R2	379	2.0	379	2.0	0.841	68.9	LOS E	12.4	88.3	1.00	0.94	1.26	28.7
Approach		919	2.0	919	2.0	0.841	39.0	LOS C	15.7	111.8	0.78	0.83	0.89	37.3
North: John Gorton Drive														
7	L2	326	2.0	326	2.0	0.264	10.5	LOS A	5.0	35.8	0.37	0.69	0.37	53.9
8	T1	1091	5.0	1091	5.0	0.860	46.7	LOS D	32.9	240.4	0.99	0.97	1.12	37.1
9	R2	196	2.0	196	2.0	0.847	70.2	LOS E	12.5	89.1	1.00	0.92	1.27	19.3
Approach		1613	4.0	1613	4.0	0.860	42.2	LOS C	32.9	240.4	0.87	0.91	0.98	37.3
West: Road 3														
10	L2	78	2.0	78	2.0	0.122	27.8	LOS B	3.4	24.5	0.91	0.78	0.91	36.8
11	T1	4	2.0	4	2.0	0.122	60.5	LOS E	1.1	8.1	1.00	0.71	1.00	23.3
12	R2	34	2.0	34	2.0	0.122	66.1	LOS E	1.1	8.1	1.00	0.71	1.00	23.5
Approach		116	2.0	116	2.0	0.122	40.2	LOS C	3.4	24.5	0.94	0.76	0.94	31.0
All Vehicles		4479	3.6	4479	3.6	0.860	39.5	LOS C	32.9	240.4	0.87	0.85	0.94	38.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

Lane Use and Performance

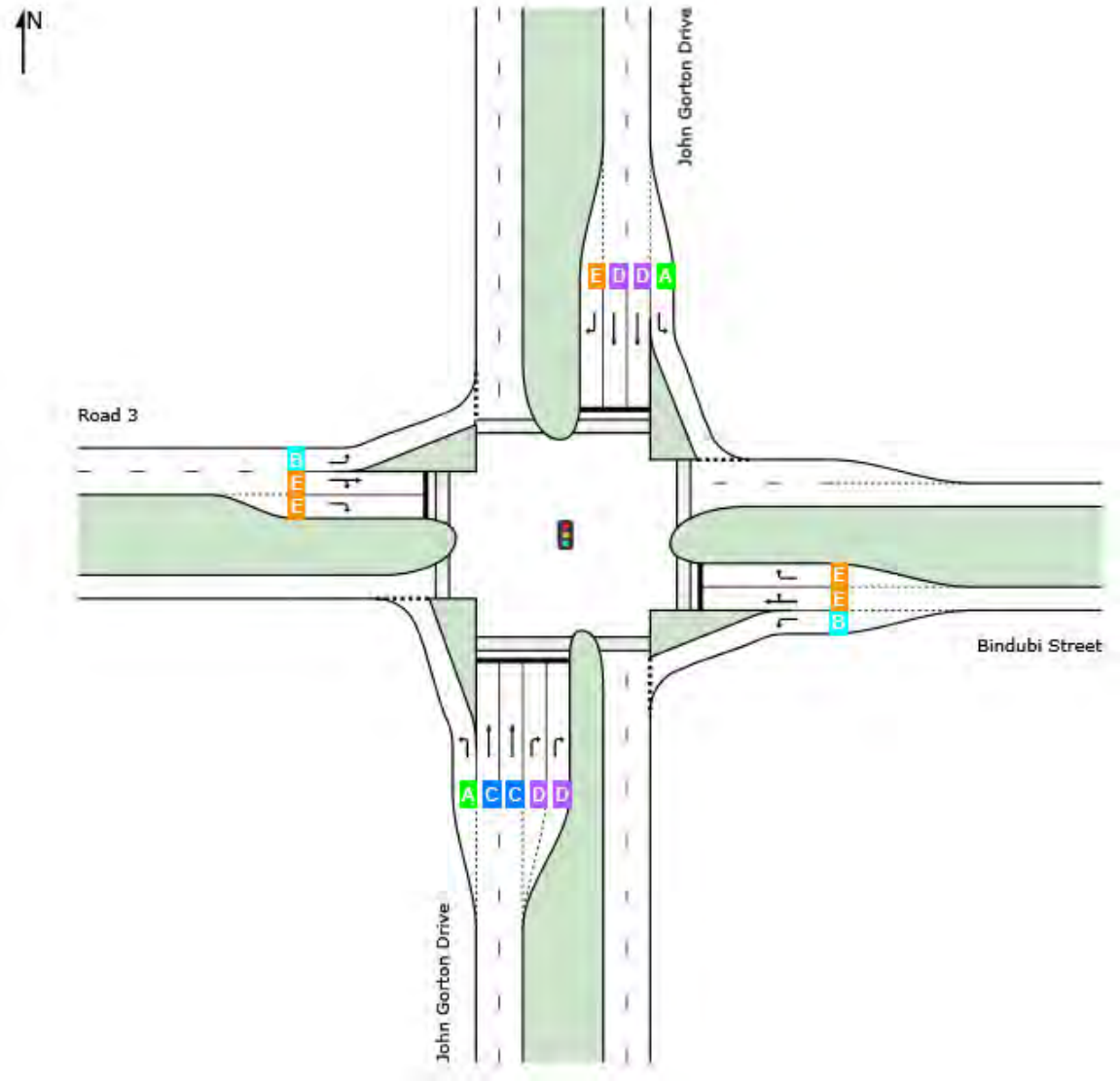
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: John Gorton Drive															
Lane 1	1	2.0	1	2.0	1396	0.001	100	8.7	LOS A	0.0	0.1	Short	120	0.0	NA
Lane 2	637	5.0	637	5.0	843[1]	0.756	100	30.0	LOS C	31.0	226.2	Full	500	0.0	0.0
Lane 3	613	5.0	613	5.0	811[1]	0.756	100	29.4	LOS C	29.3	213.6	Full	500	0.0	0.0
Lane 4	291	2.0	291	2.0	416	0.698	100	53.5	LOS D	15.9	113.4	Short	120	0.0	NA
Lane 5	291	2.0	291	2.0	416	0.698	100	53.5	LOS D	15.9	113.4	Short	110	0.0	NA
Approach	1832	4.0	1832	4.0		0.756		37.2	LOS C	31.0	226.2				
East: Bindubi Street															
Lane 1	529	2.0	529	2.0	1086	0.488	100	17.1	LOS B	15.7	111.8	Short	120	0.0	NA
Lane 2	195	2.0	195	2.0	232	0.841	100	68.5	LOS E	12.4	88.3	Full	500	0.0	0.0
Lane 3	194	2.0	194	2.0	231	0.841	100	68.9	LOS E	12.4	88.1	Short	120	0.0	NA
Approach	919	2.0	919	2.0		0.841		39.0	LOS C	15.7	111.8				
North: John Gorton Drive															
Lane 1	326	2.0	326	2.0	1234	0.264	100	10.5	LOS A	5.0	35.8	Short	120	0.0	NA
Lane 2	548	5.0	548	5.0	638	0.860	100	46.7	LOS D	32.9	240.4	Full	500	0.0	0.0
Lane 3	542	5.0	542	5.0	631[1]	0.860	100	46.6	LOS D	32.5	237.3	Full	500	0.0	0.0
Lane 4	196	2.0	196	2.0	231	0.847	100	70.2	LOS E	12.5	89.1	Short	120	0.0	NA
Approach	1613	4.0	1613	4.0		0.860		42.2	LOS C	32.9	240.4				
West: Road 3															
Lane 1	78	2.0	78	2.0	641	0.122	100	27.8	LOS B	3.4	24.5	Full	160	0.0	0.0
Lane 2	19	2.0	19	2.0	156	0.122	100	64.9	LOS E	1.1	8.1	Full	160	0.0	0.0
Lane 3	19	2.0	19	2.0	154	0.122	100	66.2	LOS E	1.1	8.0	Short	60	0.0	NA
Approach	116	2.0	116	2.0		0.122		40.2	LOS C	3.4	24.5				
Intersection	4479	3.6	4479	3.6		0.860		39.5	LOS C	32.9	240.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all 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.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

LOS Summary

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	C	C	C



Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

5. Traffic and Transport

This section of the design report undertakes a review of the traffic and transport implications of the project including a description of the scope, existing conditions, forecast traffic volumes, assessment of intersections and construction traffic.

5.1 Scope

The scope of the project is to construct JGD3C which will be a dual carriageway arterial road replacing the existing Coppins Crossing Road. The road will be two lanes in each direction with a speed limit 70 km/h from the JGD3B project interface to CH16050 and a speed limit of 60km/h from CH16050 to the JGD2A project interface.

The scope features a signalised 3-way intersection north of the Molonglo River bridge that will provide access to residential developments in Whitlam. A signalised 4-way intersection to the south of the bridge adjacent to the MTC. Immediately north of the project will be a new intersection with the proposed Bindubi Street extension (designed by others).

5.1.1 Limitations of assessment

In preparing this assessment the following has been assumed:

- Traffic forecasts have been determined from the Canberra Strategic Transport Model (CSTM) for 2031 and 2041.
- A new priority-controlled intersection is proposed as part of a future project at CH16000, which will provide access to Molonglo 2 East. The side road has been assumed to be accessed from the southbound carriageway with a left-in, left-out access arrangement based on the CSTM data.
- The forecasts completed for the Sculthorpe Avenue intersection, provided by Calibre Consulting, do not reflect the layout of Sculthorpe Avenue and therefore the traffic modelling has assessed nominal traffic volumes at this location. These volumes should not be assumed to replace a more accurate assessment of traffic generation. It is recommended that a more detailed estimate of traffic volumes based on land use and likely distribution into and out of Sculthorpe Avenue is undertaken during the next phase of the project when clarification on traffic volumes is available.

5.2 Existing conditions

JGD2A currently ends south of the project and joins Coppins Crossing Road. Coppins Crossing Road is a two-way, two lane rural road with a speed limit of 80km/h. It currently carries in the order of 4000 vehicles per day. Coppins Crossing Road crosses the Molonglo River via a low-level bridge.

The key local roads are:

- Tuggeranong Parkway – A dual carriageway freeway with two lanes in each direction and speed limit of 100km/h. It connects Drakeford Drive to Caswell Drive and features grade separated interchanges at Cotter Road and William Hovell Drive.
- William Hovell Drive - An arterial road with dual carriageway and two lanes in each direction and a speed limit of 80km/h.
- Cotter Road - A dual carriageway arterial road that links the Tuggeranong Parkway to John Gorton Drive.
- John Gorton Drive – A dual carriageway arterial road that will connect Cotter Road to William Hovell Drive. When John Gorton Drive 3C is constructed, it will become a critical 7.2km arterial road link.

Figure 5.1 Road network

5.3 Forecast traffic volumes

Traffic forecasts have been based on the Canberra Strategic Transport Model. The forecast volumes are shown in Table 5.1 and

Table 5.2 for 2031 and 2041 respectively.

Table 5.1 2031 Peak hour traffic volume forecasts

	Morning Peak Hour	Evening Peak Hour
Northbound	1,050	1,565
Southbound	1,509	1,123
Combined	2,559	2,688

Table 5.2 2041 Peak hour traffic volume forecasts

	Morning Peak Hour	Evening Peak Hour
Northbound	704	1,669
Southbound	1,670	827
Combined	2,374	2,496

The forecast traffic volumes for 2041 are predicted to decrease relative to the volumes of 2031. In addition, the peak direction is more distinct in 2041 than 2031. This is likely due to the construction of local roads that would allow traffic to access the broader arterial road network directly and not need to use JGD. The forecasts are counter intuitive as the peak flow directions are south in the morning peak and north in the evening peak.

5.4 Operational performance

5.4.1 Volume capacity ratio

Volume to capacity (V/C) ratio has been used to provide an assessment of the assuming a capacity of 1000 veh/hour/lane. The performance evaluation criteria are shown in Table 5.3.

Table 5.3 V/C Performance Evaluation

V/C Value	Performance
V/C <= 0.85	Under capacity
0.85< V/C <= 0.95	Near capacity
0.95< V/C <=1.00	At capacity
V/C >1.00	Over capacity

Source: HCM (1994)

The results of the V/C analysis are provided in Table 5.4 for 2031. It shows that JGD3C would operate near capacity in the peak flow directions.

Table 5.4 2031 Volume capacity ratio

	Morning Peak Hour	Evening Peak Hour
Northbound	0.62	0.92
Southbound	0.89	0.66

The results of the V/C analysis are provided Table 5.5 for 2041. It shows that JGD3C would continue to operate near capacity.

Table 5.5 2041 Volume capacity ratio

	Morning Peak Hour	Evening Peak Hour
Northbound	0.41	0.98
Southbound	0.98	0.49

5.4.2 Intersection performance

Intersection performance has been assessed using SIDRA intersection models. The following has been assumed for the modelling assessment:

- 75 vehicles per turn per hour on side streets in the morning peak and 50 vehicles per hour per turn for movements into and out of Sculthorpe Avenue (Whitlam access). Vice versa in the evening peak period.
- Traffic volumes at all other intersections derived from the Canberra Strategic Transport Model.

Three new intersections have been assumed as shown in Figure 5.2, Figure 5.3 and Figure 5.4.

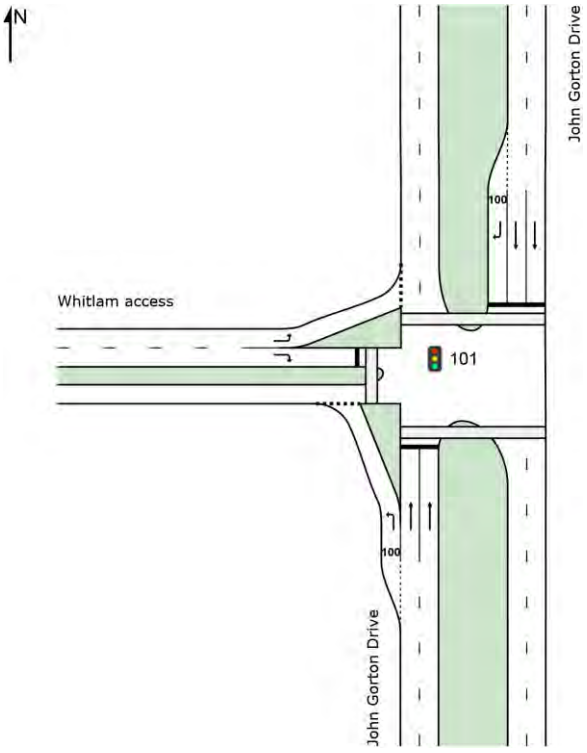


Figure 5.2 Sculthorpe Avenue (Whitlam access)

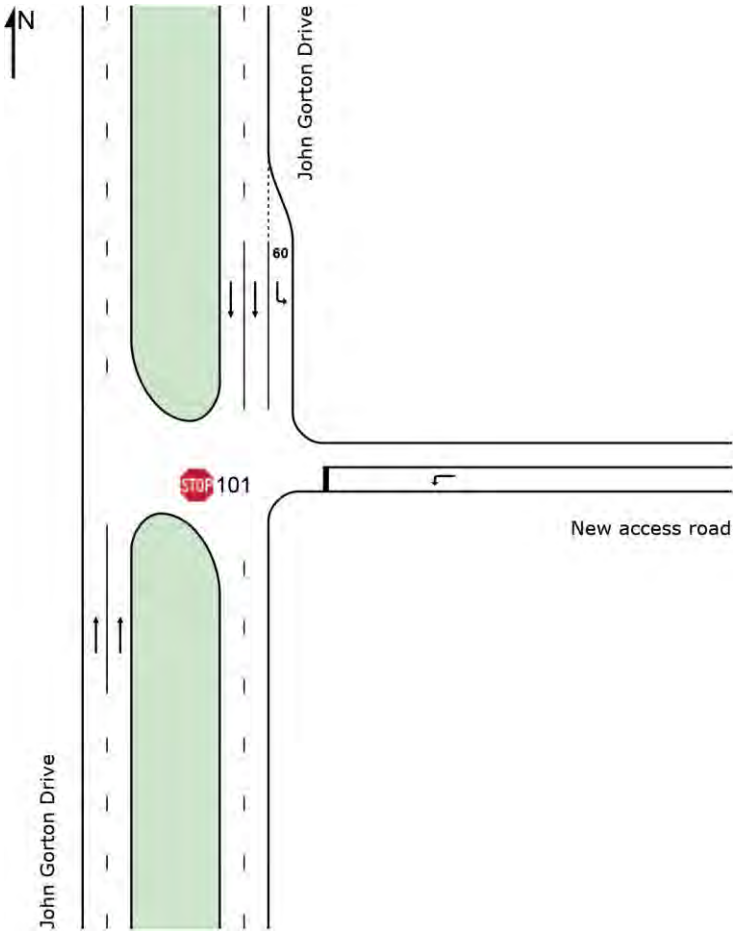


Figure 5.3 Molonglo 2 East - New access road (by others)

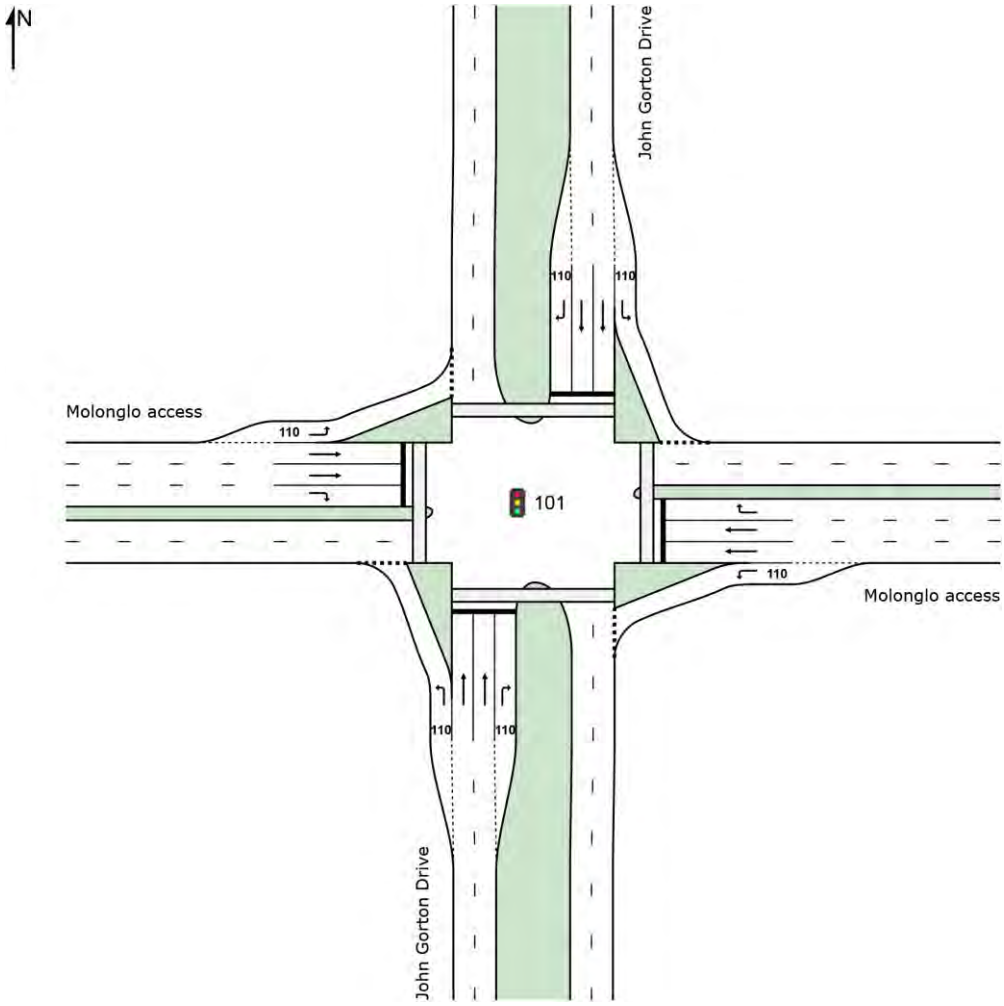


Figure 5.4 MTC Intersection (Local access intersection)

The assessment the of road network has been based on the performance of the intersections. The average delay assessed for the 2 signalised intersections is for all movements, and for priority (sign-controlled) intersections is for the worst movement and is expressed in seconds per vehicle. It is generally accepted that the target Level of Service (LoS) for intersection performance should be D or better. However, when assessing each intersections performance for parts of the road network that already experience substantial congestion over the course of the day or with future demand, achieving LoS D or better may not represent good value for money, or not be physically possible within the constraints of JGD3C. In these locations, consideration needs to be given to whether achieving LoS D is practical within the constraints of the project (Refer to Appendix B for SIDRA analysis).

Table 5.6 Level of service definitions

LoS	Average delay per vehicle (seconds / vehicle)	Traffic signals and roundabouts
A	Less than 10	Good operation
B	10 to 20	Good with acceptable delays and spare capacity
C	20 to 35	Satisfactory
D	35 to 50	Operating near capacity
E	55 to 80	At capacity; at signal,
F	Over 80	Extra capacity required

Degree of Saturation is defined as the ratio of demand (arrival) flow to capacity (also known as volume to capacity ratio. Degree of Saturation above 1.0 represent oversaturation conditions (demand flow exceeds capacity), and Degree of Saturation below 1.0 represent undersaturated conditions (demand flows are below capacity). The results of the SIDRA intersection modelling are presented in Table 5.7 and Table 5.8.

Table 5.7 SIDRA intersection modelling results 2031

Intersection	Peak hour	Average Delay	LoS	DoS
Sculthorpe Avenue (Whitlam Access)	Morning	10	A	0.72
	Evening	10	A	0.76
Molonglo 2 East Access (by others)	Morning	16	B	0.44
	Evening	12	A	0.50
MTC Intersection	Morning	12	A	0.73
	Evening	45	D	0.96

Table 5.8 SIDRA intersection modelling results 2041

Intersection	Peak hour	Average Delay	LoS	DoS
Sculthorpe Avenue (Whitlam Access)	Morning	10	A	0.80
	Evening	31	C	0.95
Molonglo 2 East Access (by others)	Morning	18	B	0.49
	Evening	10	A	0.64
MTC Intersection	Morning	10	A	0.71
	Evening	>100	F	>1

As shown in the tables above, all intersections are forecast to operate at an acceptable level of service except for the MTC intersection which is likely to approach capacity in 2031 and deteriorate to a poor level of service by 2041. This is based on the assumption that all vehicles which would perform a right turn from the proposed Molonglo 2 East Access onto the JGD3C northbound carriageway would instead perform the right turn at the MTC intersection.

A sensitivity test during the evening peak hour was undertaken to determine the proportion of vehicles that would undertake a right-turn at the Molonglo 2 East Access intersection that could be accommodated at the MTC intersection via a westbound right turn, with the remaining vehicles assumed to travel further south to perform the right turn. Results of the sensitivity test is shown in Table 5.9.

Table 5.9 MTC Intersection – sensitivity test

Intersection	Year (peak hour)	Average Delay	LoS	DoS
MTC Intersection	2031 (evening)	40	C	0.96
	2041 (evening)	42	C	0.93

During the 2031 evening peak hour, the westbound right-turn at the MTC intersection could accommodate 75 per cent of these vehicles. During the 2041 evening peak hour, the westbound right-turn at the MTC intersection could accommodate 25 per cent of the vehicles.

5.5 Public transport

Refer to section 4.2.4 and section 4.10 for detailed information on future light rail and bus stops respectively along the JGD3C alignment.

5.6 Pedestrians and cyclists

The typical cross-sections along the JGD3C alignment, Sculthorpe Avenue and the MTC Link Roads provide provision for a 2m on-road cycle lane. This matches the fixed constraints of JGD3B, JGD2A and the Whitlam development. A standard shared path arrangement is also included on both sides of all carriageways to provide a safe, off-road pedestrian and cycling option.

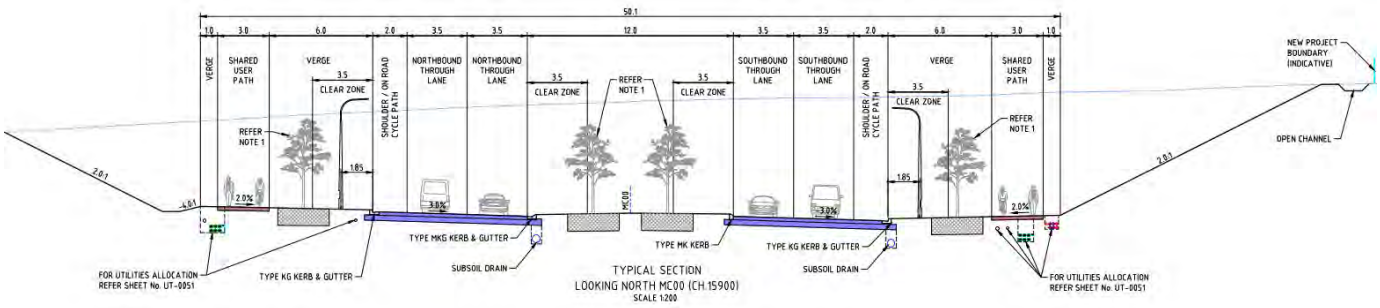


Figure 5.5 Typical Cross Section Standard Crossfall

5.7 Construction impacts

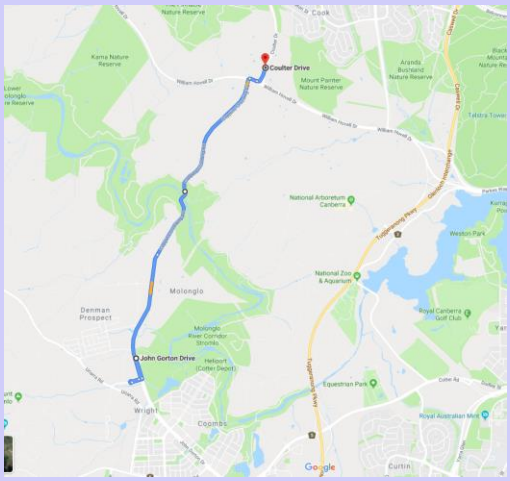
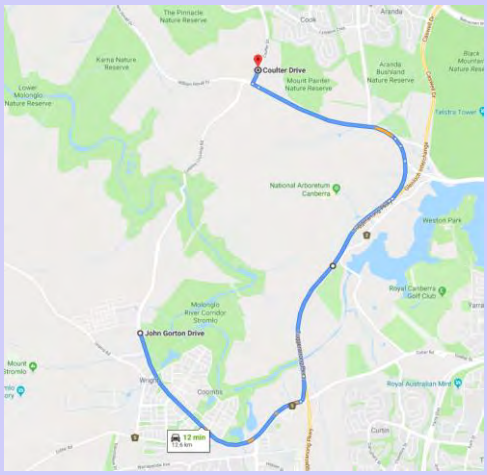
Refer to section 7.6.1 for construction sequencing of the bridge and section 18 for construction staging which outline the impact the construction phase of the project has on existing traffic conditions along JGD and Coppins Crossing Road.

5.7.1 Closure of Coppins Crossing Road

During construction of the bridge there may be short periods where Coppins Crossing Road will need to be closed to traffic to allow for cranes to operate over the road. At these times, traffic would need to be diverted via the Tuggeranong Parkway.

A vehicle travelling from Denman Prospect south of the project to Coulter Drive would be diverted along Cotter Road, the Tuggeranong Parkway and William Hovell Drive. In this example the direct route vs the diversion route is compared in Table 5.10.

Table 5.10 Diversion route comparison

	Direct route	Diversion Route
		
Time	7 minutes	12 minutes
Distance	5.6 km	12.6km

In this example the diversion route would increase the travel time by 5 minutes and the distance by 7km. It is assumed for this example that the relative speed limits on each road are adopted. It may appear that the diversion route is quick, but this averages out to be at an average speed of 63km/h in comparison to an average speed of 48km/h via the direct route from the same starting point.

A construction traffic management plan will need to be completed once the construction planning is undertaken to manage the impacts of construction on traffic.