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Cc: "admin@gassman.com.au" <admin@gassman.com.au>
Subject: 1803-4418 SRA application correspondence
Attachments: Approved Plans and Specifications - 1803-4418 SRA (1).pdf, DSDMIP Statement of reasons - 1803-4418 SRA.pdf, DSDMIP Response with conditions - 1803-4418 SRA.pdf
Importance: Normal

Please find attached a notice regarding application [1803-4418 SRA](#).

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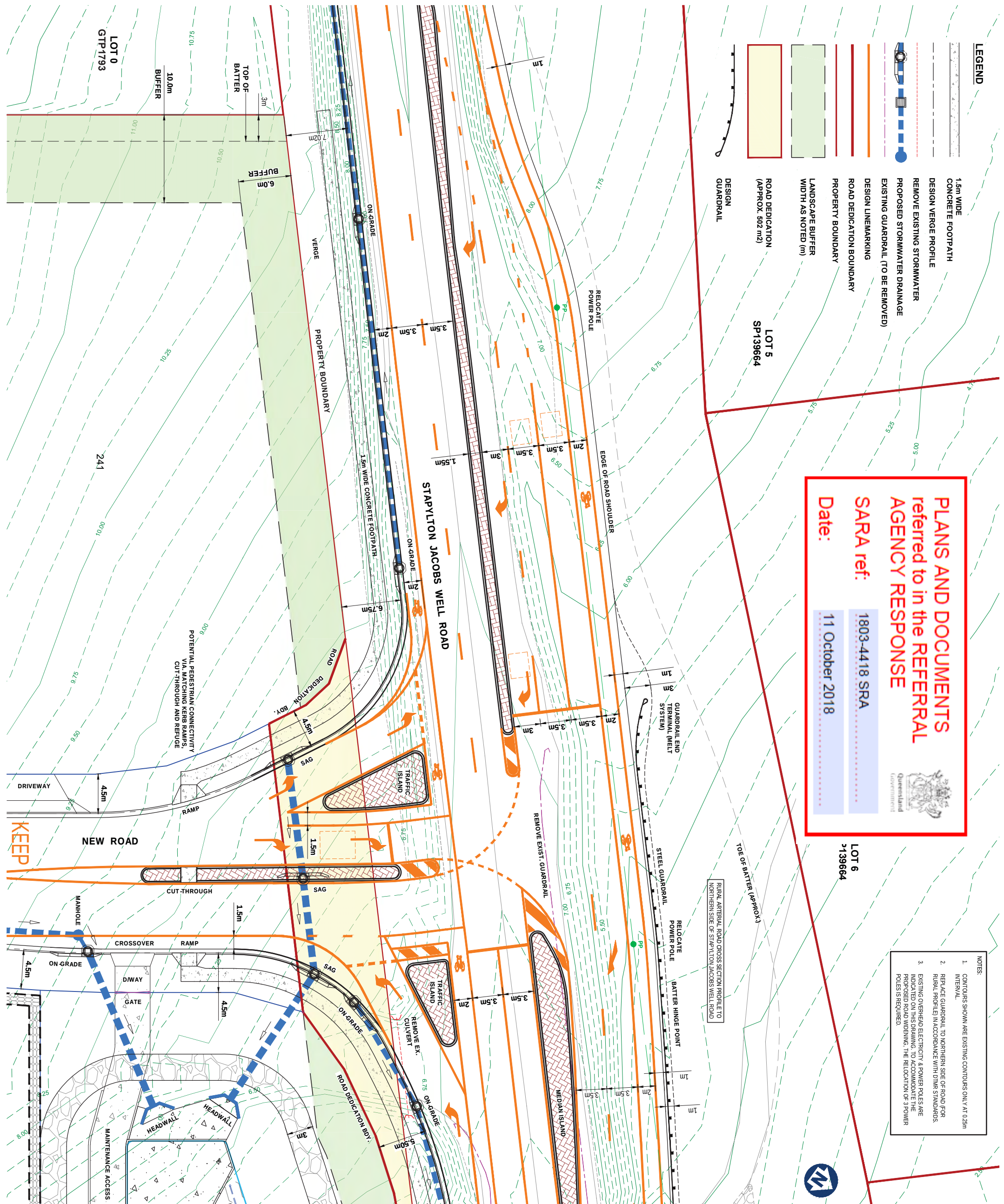
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RA6-N



Department of State Development,
Manufacturing, Infrastructure and Planning

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PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE



SARA ref: 1803-4418 SRA

Date: 11 October 2018

LOT 6
2139664

- NOTES:
1. CONTOURS SHOWN ARE EXISTING CONTOURS ONLY AT 0.25m INTERVAL.
 2. REPLACE GUARDRAIL TO NORTHERN SIDE OF ROAD FOR RURAL PROFILE IN ACCORDANCE WITH OTHER STANDARDS.
 3. EXISTING OVERHEAD ELECTRICITY & POWER POLES ARE INDICATED ON THIS DRAWING. TO ACCOMMODATE THE PROPOSED ROAD WIDENING, THE RELOCATION OF 3 POWER POLES IS REQUIRED.

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T: 3807 3333 | F: 3287 5461 | www.gasman.com.au
Gold Coast & Logan | 76 Business Street, Yatala QLD | PO Box 332, Beenleigh 4207

Client:

KS8 Pty. Ltd.

Site Address

60 STAPYLTON JACOBS
WELL ROAD, STAPYLTON

RPD: 1 on RP6882

Parish:	Albert
County:	Ward
Local Authority:	City of Gold Coast Council
Level Datum:	AHD
Meridian:	IS216853
Contour Interval:	-
PSM:	
RL:	

ISSUED FOR APPROVAL
NOT FOR CONSTRUCTION

DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTE

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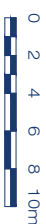
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DRAWING TITLE

FUNCTIONAL ROAD
LAYOUT PLAN AND
STORMWATER DRAINAGE
LAYOUT PLAN
SHEET 1 OF 2

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SCALE IN METRES



1:200 @ A1

Scale at A1: 1:200

Designed: IG

Dratted: IG

Approved:	
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RPEQ:	160
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Signed: _____

Date: 24-0

Drawing No.:

5738 ENG BE1 SK-004

- NOTES:
1. CONTOURS SHOWN ARE EXISTING CONTOURS ONLY AT 0.25m INTERVAL.
 2. REPLACE GUARDRAIL TO NORTHERN SIDE OF ROAD FOR RURAL PROFILE IN ACCORDANCE WITH TM 9 STANDARDS.
 3. EXISTING OVERHEAD ELECTRICITY & POWER POLES ARE INDICATED ON THIS DRAWING. TO ACCOMMODATE THE PROPOSED ROAD WIDENING, THE RELOCATION OF 3 POWER POLES IS REQUIRED.

LOT 6
SP139664

LOT 7
SP139664

LEGEND

- 1.5m WIDE CONCRETE FOOTPATH
- DESIGN VERGE PROFILE
- REMOVE EXISTING STORMWATER
- PROPOSED STORMWATER DRAINAGE
- EXISTING GUARDRAIL (TO BE REMOVED)
- DESIGN LINEMARKING
- ROAD DEDICATION BOUNDARY
- PROPERTY BOUNDARY
- LANDSCAPE BUFFER WIDTH AS NOTED (m)
- ROAD DEDICATION (APPROX. 502 m2)
- DESIGN GUARDRAIL

PLANS AND DOCUMENTS referred to in the REFERRAL AGENCY RESPONSE

SARA ref: 1803-4418 SRA

Date: 11 October 2018

60 STAPYLTON JACOBS WELL ROAD, STAPYLTON

RPD: 1 on RP6882
240 on W31320
4 on RP6843

Parrish: Albert

County: Ward

Local Authority: City of Gold Coast

Level Datum: AHD

Meridian: IS216853

Contour Interval: -

PSM: -

RL: -

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DRAWING TITLE
FUNCTIONAL ROAD LAYOUT PLAN AND STORMWATER DRAINAGE LAYOUT PLAN
SHEET 2 OF 2

SCALE IN METRES			
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1:200 @ A1			
AMENDMENTS AS PER OTHER REQUEST			
Rev	Date	Description	By
B	24-07-18		IG
A	16-07-18	ORIGINAL ISSUE	IG
Issue	Date	Description	By

Scale at A1: 1:200

Designed: IG

Drafted: IG

Approved: MG

RPEC: 16939

Signed: 

Date: 24-07-18

Drawing No: 5738 ENG BE1 SK-005

Rev. No: B

Queensland
Government

1803-4418 SRA

11 October 2018

FILLED AS PART OF INTERSECTION
EARTHWORKS TO AVOID LOCALISED
PONDING (TYPICAL FOR ALL SECTIONS)



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KS8 Pty. Ltd

60 STAPYLTON JACOBS
WELL ROAD, STAPYLTON

Lot / Plan:
1 on RP6882
240 on W3132C
4 on RP6843

Local Authority: City of Gold Coast

Contour Interval: 1000

PSM:
RL:

DRAWING TO BE READ IN CONJUNCTION WITH GENERAL NOTE

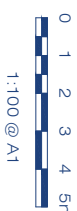
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TYPICAL CROSS SECTIONS
OF STAPYLTON JACOBS
WELL ROAD

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SCALE IN METRES



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Designed:

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Approved: _____

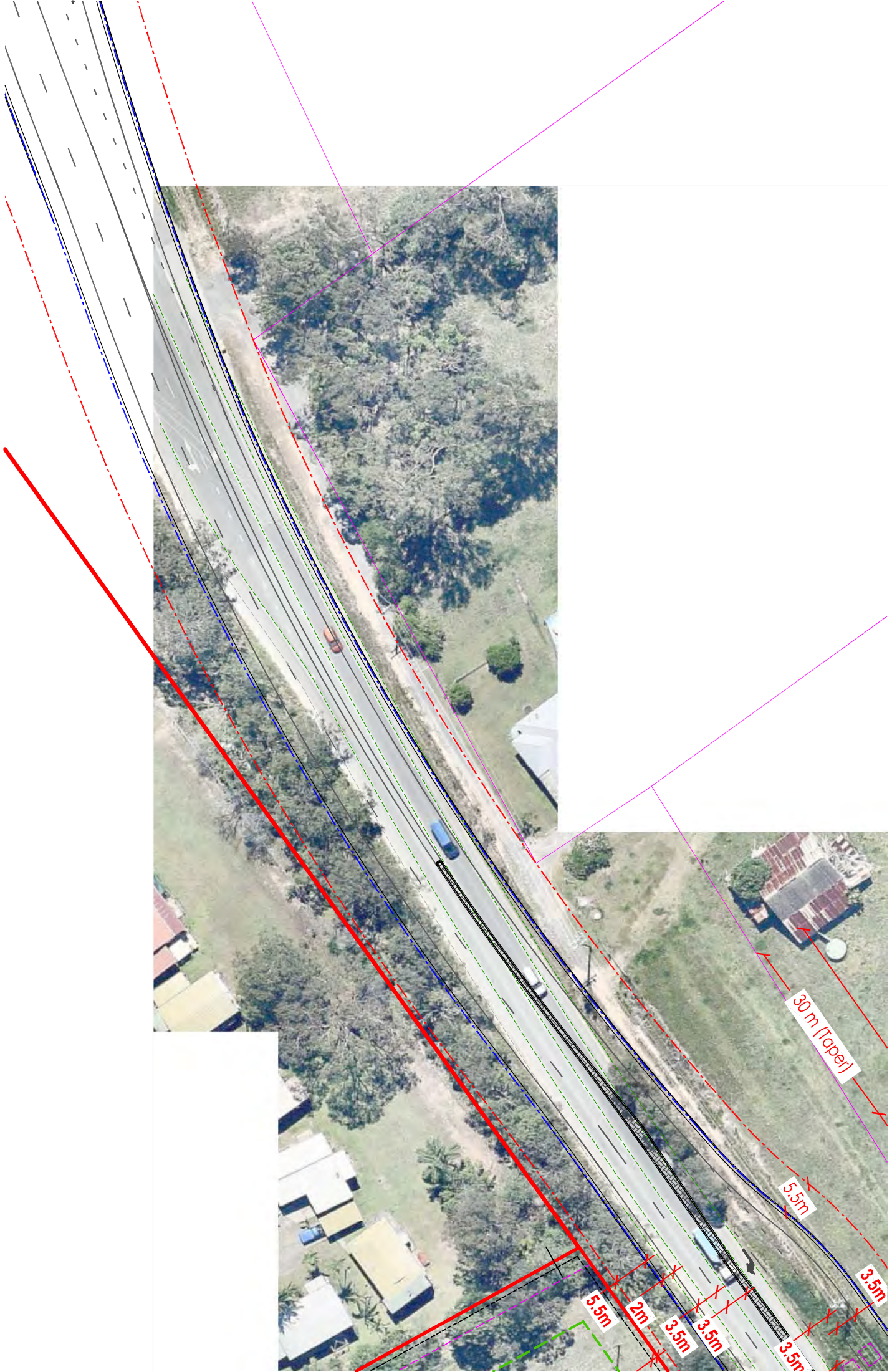
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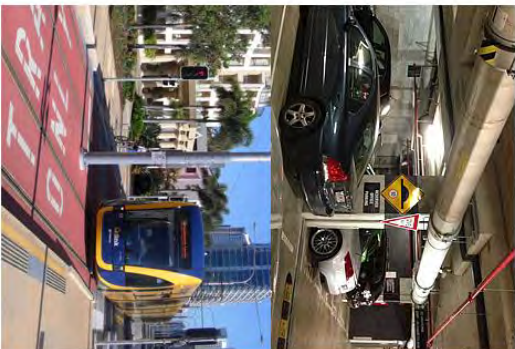
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Date: 24-07-18

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5738 ENG BE1 SK-006





TRAFFIC IMPACT ASSESSMENT

PROPOSED INDUSTRIAL ESTATE

60 STAPYLTON – JACOBS WELL ROAD & 82
CHRISTENSEN ROAD, STAPYLTON

LOT 1 ON RP6882, LOT 240 ON W31330

(RESPONSE TO SARA INFORMATION REQUEST)

**PLANS AND DOCUMENTS
referred to in the REFERRAL
AGENCY RESPONSE**



SARA ref: 1803-4418 SRA

Date: 11 October 2018

Prepared for

KS8 Pty Ltd

13 APRIL 2018

DOCUMENT REGISTER

Document 60 Stapylton Jacons Well Road
Traffic Impact Assessment (TIA)

RTG Reference 17450

Date 13 April 2018

Prepared by Dare Janzekovic, Luke Rytenskild

Document History

Version	Version date	Details	Reviewed and Authorised	
			Name / Position	Signature
1	30 January 2018	DRAFT	Luke Rytenskild Director RPEQ 6293	
2	2 February 2018	DA SUBMISSION	Luke Rytenskild Director RPEQ 6293	
3	13 April 2018	DA V2 – SARA IR RESPONSE	Luke Rytenskild Director RPEQ 6293	

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1.0 INTRODUCTION

1.1 Background

Rytenskild Traffic Engineering (RTE) has been engaged by KS8 Pty Ltd to prepare a Traffic Impact Assessment of its proposed new intersection in Yatala.

This report forms part of a Change to Approval. The intention of the report is to re-assess the impacts upon the surrounding State – controlled road network, with a view to achieving a more practical outcome with respect to road network upgrade requirements.

The Department of Transport and Main Roads is a referral agency for the application. This report has been prepared in accordance with the Guide to Traffic Impact Assessments 2017 (GTIA) and the Further Advice letter received on 23 November 2017 (ref: 1710-2228 SPD).

The RPEQ certification of this Traffic Impact Assessment (TIA) is provided in Appendix A.

This report is an amended version of that lodged with the DA and addresses the items discussed with the State Assessment and Referral Agency (SARA) in a meeting held on 7 March 2018. A response to each action discussed in the meeting is provided below, with additional information within the report where necessary.

1. *Applicant to provide a revised trip generation rate (along with rationale/justification) and resulting traffic estimates for the department's review.*

Response

A traffic generation survey has been carried out for an existing industrial area in the immediate vicinity of the proposal (Christensen Rd), using Metrocount equipment. A 'dead end' catchment was selected so that only traffic generated by uses in that area was recorded (ie no through traffic).

As presented in Section 4, and further discussed in Section D, the existing industrial catchment generates in the order of 0.21 peak hour trips per 100m² per peak hour. The surveyed area is similar in scale to the proposed estate and comprises a range of industrial users. The surveyed rate is consistent with surveys carried out by the NSW RMS in the Sydney area, and is considered to be appropriate for the subject site.

The trip generation rate used in the original assessment has been adopted for sensitivity testing.

2. *Once the trip generation rate and updated traffic modelling is agreed on, the applicant will determine if proposed works are still adequate or if other works are required.*

Response

An updated SIDRA analysis has been carried out at the proposed new access and the Exit 38 interchange. The revised trip generation rate of 0.21 trips per 100m² has been adopted for the assessment. As discussed in Section 5, the following mitigation works are proposed during Stages 1 and 2 to achieve a no-worsening effect to the existing road network.

STAGE 1 –

- 1) Construction of proposed access to planned four lane profile
- 2) Extension of the second approach lane on Stapylton Jacobs Well Road between the eastern roundabout and the proposed site access

STAGE 2 -

- 3) Construction of the second approach lane on Christensen Road.
- 4) Construction of the second approach lane on the northbound off-ramp (western site of the Exit 38 interchange)

The above mitigation works are considered to be sufficient to accommodate the development traffic impact upon the interchange. Additional contributions are proposed for the construction of Stage 3 and 4, to facilitate further upgrades along Christensen Road and/or Jacobs Well Road. Such contributions shall equate to the cost of constructing

3. *Applicant to provide a functional layout plan for the proposed SJW Rd signalised intersection.*

Response

A functional layout plan of the proposed site access intersections with Stapylton Jacobs Well Road is provided in Section 5 of the report. The intersection has been drawn within the existing road reserve. However, is slightly modified to suit the narrow section of road reserve to the west, which is yet to be resumed.

The concept design of the intersection assumes that the signalised intersection will be built in its ultimate alignment, with the geometry between the intersection and the interchange constructed once the appropriate land to the west is resumed.

1.2 Subject Site

As shown in Figure 2.1, the site is located on the southern side of Stapylton Jacobs Well Road. The subject site is identified as Lot 1 on RP6882 & Lot 240 on W31330 and has an approximate site area of 62.65 hectares.



FIGURE 1.1 – LOCATION OF SUBJECT SITE

1.3 Comparison with Other Approvals in the Yatala Enterprise Area

Rytenskild Traffic Engineering has been involved with numerous applications in the Yatala Enterprise Area. To our knowledge, the following requirements have been applied to various projects:

- 1 Eastern Service Road – requirement for an upgrade to the Christensen Road approach to the eastern roundabout at the Exit 38 interchange.
- Caterpillar Warehouse – 71 Elderslie Road, Yatala – Contribution of approximately \$ 225,000 for State – controlled road impacts.
- New industrial estate at 125 Pearson Road, Yatala (Frasers Property) – no requirements.
- Empire Estate (Stages 1 – 4) – Peachey Road, Luscombe – no requirements.

The Referral Agency’s response from TMR requires a contribution of \$45 per square metre of Gross Floor Area to be made to offset the potential impact of the proposed development. In recent years, this rate has been applied by TMR to numerous industrial development proposals located outside of the Yatala Enterprise Area. Such has been justified on the basis that these applications are outside of the Yatala Enterprise Area and therefore have not been considered by the TMR in its planning of the surrounding State controlled road network. Given that the subject site is located within the Yatala Enterprise Area, it is considered inappropriate for the rate to have been applied to the site. This report identifies those upgrade works that are required to mitigate the impact of the development, and therefore should be required.

2.0 DEVELOPMENT PROPOSAL

It is proposed that the estate will be developed over four stages, with the following developable areas:

Stage One:	115,945m ²
Stage Two:	288,165m ²
Stage Three:	91,992m ²
Stage Four:	10,750m ²
Total:	506,852m²

It is noted that the above area is conservative as it includes area required for batters. The actual developable area is in the order of 455,000m².

It is estimated that the Gross Floor Area (GFA) will be approximately 45% of the above developable area. These calculations are shown in Section 4.0.

The proposed plan of development allows for future road connections to the adjoining properties to the east which will occur in due course. It is proposed that primary access be gained via a single signalised intersection on the Stapylton – Jacob's Well Road. A road connection linking Stapylton Jacobs Well Road to Christensen Road will be constructed as part of the overall project. Stages 3 and 4 will gain access from Christensen Road.

It is noted that the latest Hyder report was based on a total developable area of 262,500m², however, the proposed master plan was amended during the Decision Notice phase of the Development Application.

The approved staging plan is shown in Figure 2.1. It is proposed that access be achieved as follows:

Stage 1 -	via DeBortoli Street
Stage 2 -	via De Bortoli Street (through stage 1) and Stapylton – Jacob's Well Road
Stage 3 -	via De Bortoli Street and Stapylton – Jacob's Well Rd (through stages 1 & 2)
Stage 4 -	via Christensen Road, with connectivity to S-JW Rd and DeBortoli Street.

It is estimated that Stage 4 will not be developed until beyond the year 2023.

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3.0 SURROUNDING ROAD NETWORK

3.1 Interchange Layout

As shown in Figure 3.1, the Exit 38 interchange comprises of a roundabout on each side of the Motorway with a four lane connection road beneath the Motorway. The western roundabout has two circulating lanes and five legs, including the northbound on and off ramps. The western roundabout has two circulating lanes and six legs, including the southbound on and off ramps.

The interchange has recently been upgraded, as follows:

Eastern roundabout:

- A second approach lane on the Stapylton – Jacob's Well Road leg;
- A signal meter on the Elderslie Road (underpass) approach.

Western roundabout:

- A second approach lane on the Elderslie road approach;
- A signal meter on the Elderslie Road (underpass) approach.

In addition, Nyholt Drive was connected to Martens Street which has provided some relief to the interchange as local traffic is now able to access Beenleigh without using the motorway.

The existing layout of the Exit 38 interchange is shown in Figure 3.1.

3.2 Planned Road Upgrades

The Department of Transport and Main Roads has carried out planning for the future upgrade of the Stapylton – Jacob's Well Road. Current concept planning layouts are provided as Appendix B. as shown, it is planned that the Stapylton – Jacob's Well Road will be upgraded to a four – lane divided road with provision made for a signalised intersection providing access to the subject site.

3.3 Traffic Volumes

Traffic count data for each roundabout at the Yatala North interchange have been provided by the Department of Transport and Main Roads. The data was collected in May 2014 on a typical Thursday. This data was collected to the implementation of signal metering on Elderslie Road (underpass) and prior to the connection of Nyholt Drive to Martens Street. These works have significantly improved the performance of the interchange.

Given the above changes, RTE engaged Austraffic to carry out peak period traffic counts in January 2018 (during the first of the school term). During these surveys it was observed that the performance of the roundabouts have significantly improved, particularly with reduced queuing on the off-ramps. Overall, traffic volumes increased at a rate of approximately 3% per annum since the 2014 surveys.

A summary of the January 2018 count data is provided as Appendix C.



FIGURE 3.1 – EXISTING YATALA NORTH INTERCHANGE (PHOTO AUGUST 2015)

4.0 DEVELOPMENT TRAFFIC ESTIMATES

4.1 Trip Generation Rate

Given the size of the subject site and the proposed lot areas, it is considered appropriate that surveyed trip generation from similar developments in the area be used as a basis for estimating vehicle trip generation.

The TMR Road Planning and Design Manual states the following trip generation rates for industrial development:

Table 3.7 Traffic generation data – industrial uses

Description	Peak rate /unit	Daily rate	Unit	Source*
Factories	1	5	100m ² GFA	RTA
	N/A	4-5	100m ² GFA	QT
Warehouses	0.5	4	100m ² GFA	RTA
Light Industrial	0.9	9	100m ² GFA	QT

Notes:
 Factories are sites where articles are manufactured.
 For warehouses, generation rates can vary depending on the type of goods being stored. Also, if the warehouse has a retail component, the daily generation rate may be higher.
 The light industrial category is considered to encompass sites with established uses such as storehouses, light fabrication, building supplies and showrooms.
 * Abbreviations are as follows:
 RTA – Roads and Traffic Authority, NSW
 QT – Queensland Transport

Recent trip generation surveys carried out by the NSW RMS indicate the following range of trip rates for various types of industrial development:

Business parks and industrial estates

In 2012 eleven of these two types of sites were surveyed, four within the Sydney urban area, four within the Lower Hunter, one in the Illawarra and one in Dubbo. Summary vehicle trip generation rates were as follows:

Weekday Rates	Sydney Average	Sydney Range	Regional Average	Regional Range
AM peak (1 hour) vehicle trips per 100 m ² of GFA.	0.52	0.15-1.31	0.70	0.32-1.20
PM peak (1 hour) vehicle trips per 100 m ² of GFA.	0.56	0.16-1.50	0.78	0.39-1.30
Daily total vehicle trips	4.60	1.89-10.47	7.83	3.78-11.99

In order to more accurately estimate the likely trip generation of future development in the proposed estate a traffic survey has been carried out for an existing industrial area at the southern end of Christensen Road. This area was selected because:

- It comprises a range of industrial users which are representative of what may occupy the subject site. It is a dead end area so that only trips generated by the land uses within that catchment were recorded.
- The area is in the same area as the subject site and would therefore exhibit similar travel characteristics.
- The size of the surveyed catchment is similar to the subject site.

As shown below, the results of the analysis indicate a peak hour traffic generation potential of **approximately 0.21 trips / 100m² GFA / peak hour, and 2 trips / 100m² GFA / day.**

Surveyed area:	266,224m ²
Floor area estimate:	119,800m ² (estimate 45% floor coverage factor)
Daily vehicle trips:	1,300 trips per day
Peak hour vehicle trips:	245 trips per peak hour.

Detailed area calculations and the traffic survey results are shown in Appendix D.

The above rate is within the range of trip generation rates surveyed by the NSW RMS for the Sydney area.

Furthermore, in 2015, RTG in conjunction with Griffith University carried out trip generation surveys at a range of industrial developments located across the Gold Coast, Logan and Brisbane. The purpose of the study was to review the trip generation of various types of industrial developments and considering the locational characteristics of each. Of relevance is the Motorway Circuit catchment, which is considered to be similar to the proposal, given:

- The lot sizes are comparable;
- The zoning is the same (Low Impact Industry);
- It is located in the same area;
- The catchment comprises a mix of small warehouse tenancies and manufacturers.

The Motorway Circuit catchment has a total gross floor area of approximately 45,000m². As shown in Appendix G, Motorway Circuit carries in the order of 1,900 vehicles per day and 190 vehicles per hour. **This equates to a trip generation rate of approximately 0.42 trips / 100m² GFA / peak hour, and 4 trips / 100m² GFA / day.** It is considered that this rate should be adopted for the purposes of the sensitivity analysis.

4.2 Development Trip Generation

Potential floor areas have been estimated through application of a 45% site coverage. Resultant estimates of development trip generation estimates are provided below.

The resultant traffic estimates and calculations for the sensitivity analysis are shown in Appendix F, with the summary of the development trip estimates (based on the 0.21 trips per 100m²) shown below in Table 4.1.

Table 4.1 – Estimated Development Peak Hour Traffic Generation (overall estate)

Stage	Lot Area (m2)	GFA (m2)	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Cat A (STAGE 1)	115,945	52,175	71	39	110	22	88	110
Cat B (STAGE 2)	288,165	129,674	176	96	272	54	218	272
Cat C (STAGE 3)	91,992	41,396	56	31	87	17	70	87
Cat D (STAGE 4)	10,750	4838	7	3	10	2	8	10
OVERALL ESTATE	506,852	228,083	310	169	479	95	384	479

Assumes 45% site cover
Peak Hour Distribution: AM Peak 65 / 35, PM Peak 20/80

4.3 Development Trip Distribution

To be consistent with the Hyder Consulting report submitted with the Development Application, it is assumed that development traffic will distribute throughout the road network in accordance with the following splits:

- 80% to and from the Pacific Motorway
- 20% to and from the east via the Staplyton – Jacob’s Well Road.

Further, it is assumed that development traffic would distribute evenly to the north and south on the Pacific Motorway. It is noted that some traffic will use Christensen Road to access Burnside Road to the south, when Christensen Road is extended in the future. Furthermore, the proposed internal road network will allow some non-development traffic to travel between the Staplyton – Jacob’s Well Road and Christensen Road without using the eastern roundabout at the Yatala North interchange.

Resultant estimates of peak hour development traffic volumes are shown in Figure 4.2. As shown, a different distribution has been applied for Stages 1, 2 and 3 / 4, to allow for the change in road network conditions. That is, the distribution has been adjusted to allow for the proposed connection between Christensen Road and the Staplyton – Jacobs Well Road.

The development traffic distribution rates have been maintained as per the current approval prepared by Hyder Consulting. Consistently with the approved traffic assessment, it is estimated that approximately 60% of development traffic will distribute via Staplyton Jacobs Well Road, with the balance distributing on Christensen Road.

The traffic distribution at each road frontage is estimated to be as follows:

<u>Staplyton – Jacob’s Well Road</u>	
To / from the west (via the interchange):	80%
To / from the east:	20%
<u>Christensen Road</u>	
To / from the north (via the interchange):	85%
To / from the east:	15%

The development traffic estimates at each intersection are presented in Figure 4.1 and 4.2, with the full traffic estimate at the Yatala Interchange (Exit 38) shown in Figure 4.3.

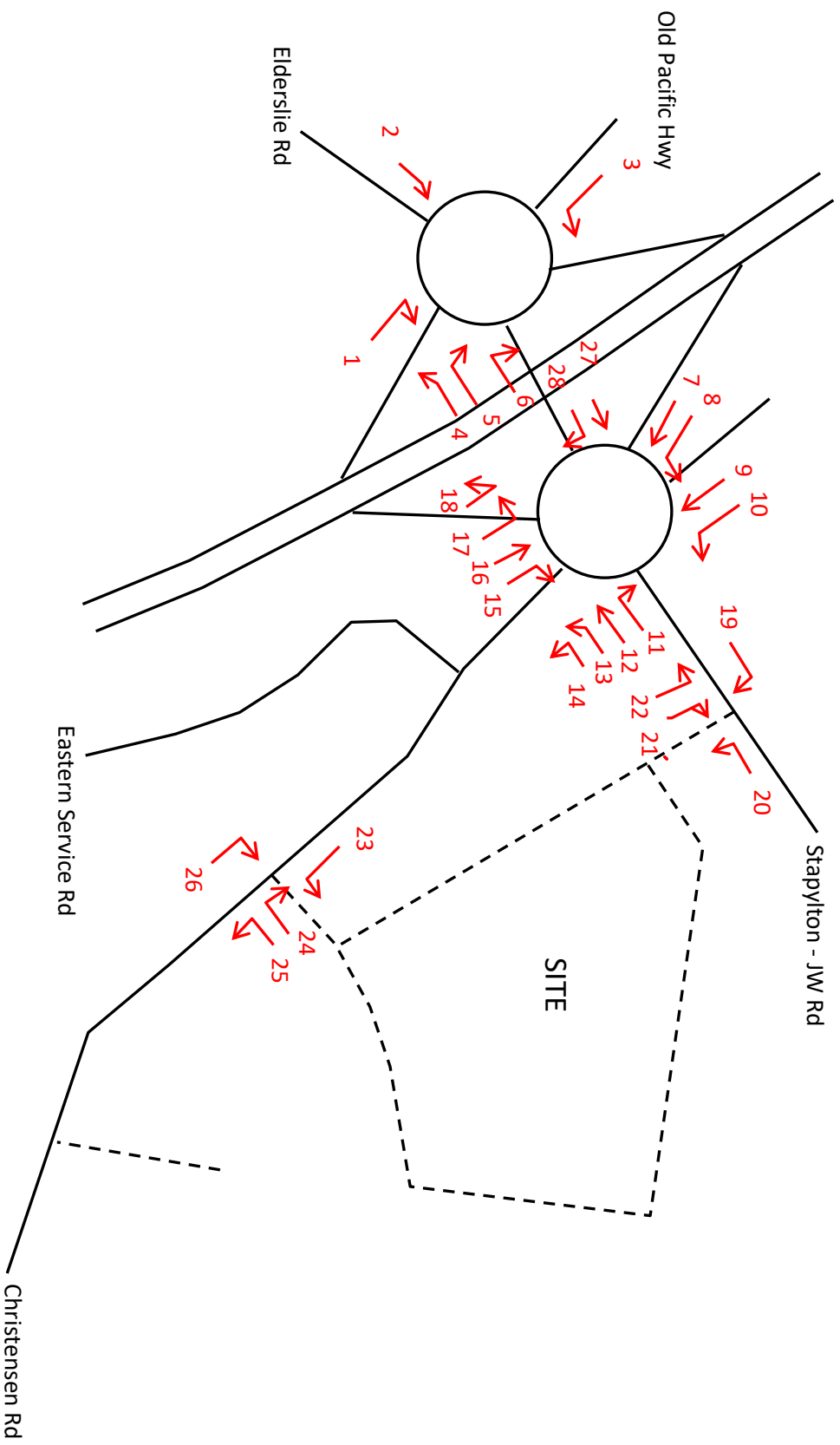


FIGURE 4.1 – KEY DIAGRAM FOR FIG 4.2

Morning peak hour																													
Development Stage		Intersection movement (refer to Figure 4.1)																											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Distribution stage 1	0.33	0.1	0.02	0.1	0.02	0.33	0	0.31	0	0.04	0.02	0.45	0.35	0.1	0.1	0	0	0	0.8	0.2	0.2	0.2	0.8	N/A	N/A	N/A	N/A	0.45	0
Distribution stage 2	0.33	0.1	0.02	0.1	0.02	0.33	0.12	0.19	0.02	0.02	0.05	0.3	0.25	0	0	0.05	0.18	0.07	0.48	0.2	0.2	0.2	0.48	N/A	N/A	N/A	N/A	0.27	0.18
Distribution stages 3 / 4	0.33	0.1	0.02	0.1	0.02	0.33	0.31	0	0.04	0	0	0	0	0	0	0.04	0.35	0.41	0	0.2	0.2	0	N/A	N/A	N/A	N/A	0	0.41	
Surveyed 2018 Vol	248	232	91	652	100	267	197	234	38	60	63	273	95	31	14	36	140	24	0	0	0	0	N/A	N/A	N/A	N/A	245	176	
Estimated Year 2020	263	246	96	691	106	283	209	248	40	64	67	289	101	33	15	38	148	25	0	0	0	0	N/A	N/A	N/A	N/A	260	187	
Estimated Year 2023	294	275	108	774	119	317	234	278	45	71	75	324	113	37	17	43	166	28	0	0	0	0	N/A	N/A	N/A	N/A	291	209	
STAGE 1	23	7	1	4	1	13	0	22	0	3	1	18	14	4	4	0	0	0	57	14	8	31	N/A	N/A	N/A	N/A	32	0	
STAGE 2	58	18	4	10	2	32	21	33	4	4	5	29	24	0	0	5	17	7	84	35	19	46	N/A	N/A	N/A	N/A	48	32	
STAGE 3 & 4	21	6	1	6	1	21	20	0	3	0	0	0	0	0	0	3	22	26	0	13	13	0	N/A	N/A	N/A	N/A	0	26	
STAGES 1 & 2	82	25	5	14	3	45	21	55	4	6	6	46	38	4	4	5	17	7	141	49	27	77	N/A	N/A	N/A	N/A	79	32	
ALL STAGES	102	31	6	20	4	65	41	55	6	6	6	46	38	4	4	7	39	33	141	62	40	77	N/A	N/A	N/A	N/A	79	58	
% STAGE 1	8.9%	2.9%	1.5%	0.6%	0.7%	4.5%	0.0%	8.9%	0.0%	4.5%	1.2%	6.1%	13.6%	11.9%	26.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.3%	0.0%	
% STAGES 1 & 2	31.0%	10.0%	5.1%	2.0%	2.5%	15.7%	10.1%	22.4%	8.7%	10.0%	8.4%	16.0%	37.4%	11.9%	26.3%	12.6%	11.6%	26.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	30.6%	17.0%	
% ALL STAGES	34.7%	11.3%	5.7%	2.6%	3.3%	20.6%	17.4%	20.0%	13.4%	8.9%	7.5%	14.3%	33.4%	10.6%	23.5%	17.1%	23.7%	114.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	27.3%	27.5%	

Afternoon peak hour																														
Development Stage		Intersection movement (refer to Figure 4.1)																												
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Distribution stage 1	0.33	0.1	0.02	0.1	0.02	0.33	0	0.31	0	0.04	0.02	0.45	0.35	0.1	0.1	0	0	0	0.8	0.2	0.2	0.2	0.8	N/A	N/A	N/A	N/A	N/A	0.45	0
Distribution stage 2	0.33	0.1	0.02	0.1	0.02	0.33	0.12	0.19	0.02	0.02	0.05	0.3	0.25	0	0	0.05	0.18	0.07	0.48	0.2	0.2	0.2	0.48	N/A	N/A	N/A	N/A	N/A	0.27	0.18
Distribution stages 3 / 4	0.33	0.1	0.02	0.1	0.02	0.33	0.31	0	0.04	0	0	0	0	0	0	0.04	0.35	0.41	0	0.2	0.2	0	N/A	N/A	N/A	N/A	N/A	0	0.41	
Surveyed 2018 Vol	133	386	121	485	104	548	58	201	31	79	89	404	183	23	15	71	284	76	0	0	0	0	N/A	N/A	N/A	N/A	N/A	144	68	
Estimated Year 2020	141	409	128	514	110	581	61	213	33	84	94	428	194	24	16	75	301	81	0	0	0	0	N/A	N/A	N/A	N/A	N/A	153	72	
Estimated Year 2023	158	458	144	576	123	651	69	239	37	94	106	480	217	27	18	84	337	90	0	0	0	0	N/A	N/A	N/A	N/A	N/A	171	81	
STAGE 1	7	2	0	9	2	29	0	7	0	1	2	40	31	9	9	0	0	0	18	4	18	70	N/A	N/A	N/A	N/A	N/A	10	0	
STAGE 2	18	5	1	22	4	72	6	10	1	1	11	65	55	0	0	11	39	15	26	11	44	105	N/A	N/A	N/A	N/A	N/A	15	10	
STAGE 3 & 4	6	2	0	2	0	6	6	0	1	0	0	0	0	0	0	1	7	8	0	4	4	0	N/A	N/A	N/A	N/A	N/A	0	8	
STAGES 1 & 2	25	8	2	31	6	101	6	17	1	2	13	105	85	9	9	11	39	15	44	15	61	175	N/A	N/A	N/A	N/A	N/A	24	10	
ALL STAGES	31	10	2	33	7	107	12	17	2	2	13	105	85	9	9	12	46	23	44	19	65	175	N/A	N/A	N/A	N/A	N/A	24	18	
% STAGE 1	5.1%	0.5%	0.3%	1.7%	1.6%	5.0%	0.0%	3.2%	0.0%	1.1%	1.9%	9.2%	15.9%	36.1%	55.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.5%	0.0%	
% STAGES 1 & 2	17.8%	1.9%	1.2%	6.0%	5.6%	17.4%	10.5%	8.0%	3.3%	2.3%	13.4%	24.5%	44.0%	36.1%	55.3%	14.5%	13.0%	18.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.0%	13.5%	
% ALL STAGES	19.9%	2.1%	1.3%	5.6%	5.3%	16.5%	18.0%	7.2%	5.0%	2.1%	12.0%	21.9%	39.3%	32.2%	49.4%	13.8%	13.6%	25.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	21.7%	

FIGURE 4.2 – TRAFFIC GENERATION & % IMPACT CALCULATIONS

5.0 ROAD NETWORK IMPACT

5.1 General

As shown in Figure 4.2, the traffic generation of the proposed development will exceed 5% of background traffic volumes at the Exit 38 interchange. On this basis, a detailed analysis of impacts is required to identify any mitigation works warranted.

Traffic modelling using SIDRA software has been carried out to determine the performance of the intersections under current and project future conditions, and identify upgrade works required to mitigate the impact of the proposal.

In accordance with Section 3.5 and Table 4 of the Guide to Traffic Impact Assessments (2017), the assessment is required to examine impacts for the anticipated year of opening of each stage and the final stage. For the purposes of this assessment it has been assumed that the first stage of development would be completed by the year 2020, and the full development by the year 2023.

It is proposed that the estate access intersection with the Stapylton – Jacob's Well Road be constructed to its ultimate layout (two through lanes in each direction plus turning lanes / traffic signal control) prior to the commencement of stage 1. This new intersection will benefit the operation of the eastern intersection at the Exit 38 interchange by 'metering' the westbound traffic flow on the Stapylton – Jacob's Well Road. The proposal to provide a new road link (through the site) linking Christensen Road to the Stapylton – Jacob's Well Road will also provide a significant improvement to the local road network, as traffic will be able to move between these roads without using the Exit 38 interchange.

5.2 SIDRA Modelling

The proposed signalised intersection with the Stapylton – Jacob's Well Road will improve the operation of the eastern roundabout at the Exit 38 interchange by bunching the traffic flow in the westbound direction. This has been reflected in the modelling by implementing a 15% bunching factor.

As discussed in Section 4.0, the Year 2023 model (with the full development) allows for the internal connection to Christensen Road and Stapylton – Jacob's Well Road. Numerous iterations to the SIDRA modelling indicates that the following works would mitigate the impact of the proposed development :

- The introduction of the proposed signalised intersection at the estate access (resulting in bunching in the westbound approach to the eastern roundabout).
- A second lane be provided in the northbound Off- Ramp approach to the western roundabout ;
- A second departure lane be provided on the Stapylton – Jacob's Well Road leg of the eastern roundabout ;
- A second approach lane be provided in the Christensen Road approach to the eastern roundabout.

Concept drawings of these modifications are shown in Figures 5.1 – 5.2.

SIDRA modelling at the Exit 38 interchange has been carried out for the following scenarios :

ESTIMATED TRIP GENERATION OF SITE

- Year 2020 AM and PM peak hour conditions, without the proposed development ;
- Year 2020 AM and PM peak hour conditions, with proposed road conditions and Stage 1 traffic;
- Year 2020 AM and PM peak hour conditions, with proposed road conditions and Stage 2 traffic;
- Year 2023 AM and PM peak hour conditions, without the proposed development ;
- Year 2023 AM and PM peak hour conditions, with the proposed road conditions and the full development.

SENSITIVITY ANALYSIS

- Year 2020 AM and PM peak hour conditions, with proposed road conditions and Stage 1 traffic;
- Year 2020 AM and PM peak hour conditions, with proposed road conditions and Stage 2 traffic;
- Year 2023 AM and PM peak hour conditions, with the proposed road conditions and the full development.

Criteria for interpreting the SIDRA results are provided in Appendix H.

Detail results of the SIDRA modelling for the development trips and the sensitivity analysis are provided as Appendix H and I. Summarised result of the SIDRA assessment are provided below in Table 5.1. and 5.2 respectively:

Table 5.1 – Summary of SIDRA Results (0.21 Trip Generation Rate)

Intersection:	Year / Period	Location Intersection	Development	Overall Degree of Saturation	Overall Level of Service	Critical Queue (m)	Off – Ramp Queuing (m)
Western	2020 AM	Existing	None	0.883	C	236	236
	2020 PM	Existing	None	0.750	B	126	18
	2023 AM	Existing	None	0.970	E	685	685
	2023 PM	Existing	None	0.797	B	147	22
	2020 AM	Existing	Stage One	0.905	C	345	320
	2020 PM	Existing	Stage One	0.764	B	137	19
	2020 AM	Upgrade B	Stage Two	0.778	B	194	38
	2020 PM	Upgrade B	Stage Two	0.782	B	157	17
	2023 AM	Upgrade B	Full	0.814	B	238	67
	2023 PM	Upgrade B	Full	0.855	B	188	20
Eastern	2020 AM	Existing	None	0.659	A	52	27
	2020 PM	Existing	None	1.101	D	471	20
	2023 AM	Existing	None	0.698	B	56	40
	2023 PM	Existing	None	1.378	F	1364	25
	2020 AM	Upgrade A	Stage One	0.666	A	60	28
	2020 PM	Upgrade A	Stage One	1.019	C	195	20
	2020 AM	Upgrade B	Stage Two	0.670	A	68	38
	2020 PM	Upgrade B	Stage Two	0.753	B	99	22
	2023 AM	Upgrade B	Full	0.911	C	213	213
	2023 PM	Upgrade B	Full	0.934	C	161	53

Table 5.2 – Summary of SIDRA Results (SENSITIVITY ANALYSIS)

Intersection:	Year / Period	Location Intersection	Development	Overall Degree of Saturation	Overall Level of Service	Critical Queue (m)	Off – Ramp Queuing (m)
Western	2020 AM	Existing	Stage One	0.917	D	428	428
	2020 PM	Existing	Stage One	0.777	B	149	20
	2023 AM	Upgrade B	Full	0.801	B	245	136
	2023 PM	Upgrade B	Full	0.920	C	228	27
Eastern	2020 AM	Upgrade A	Stage One	1.065	C	353	21
	2020 PM	Upgrade A	Stage One	0.658	A	66	33
	2020 AM	Upgrade B	Stage Two	0.751	B	62	43
	2020 PM	Upgrade B	Stage Two	0.898	B	124	25
	2023 AM	Upgrade B	Full	1.040	F	1079	884
	2023 PM	Upgrade B	Full	1.127	F	909	75

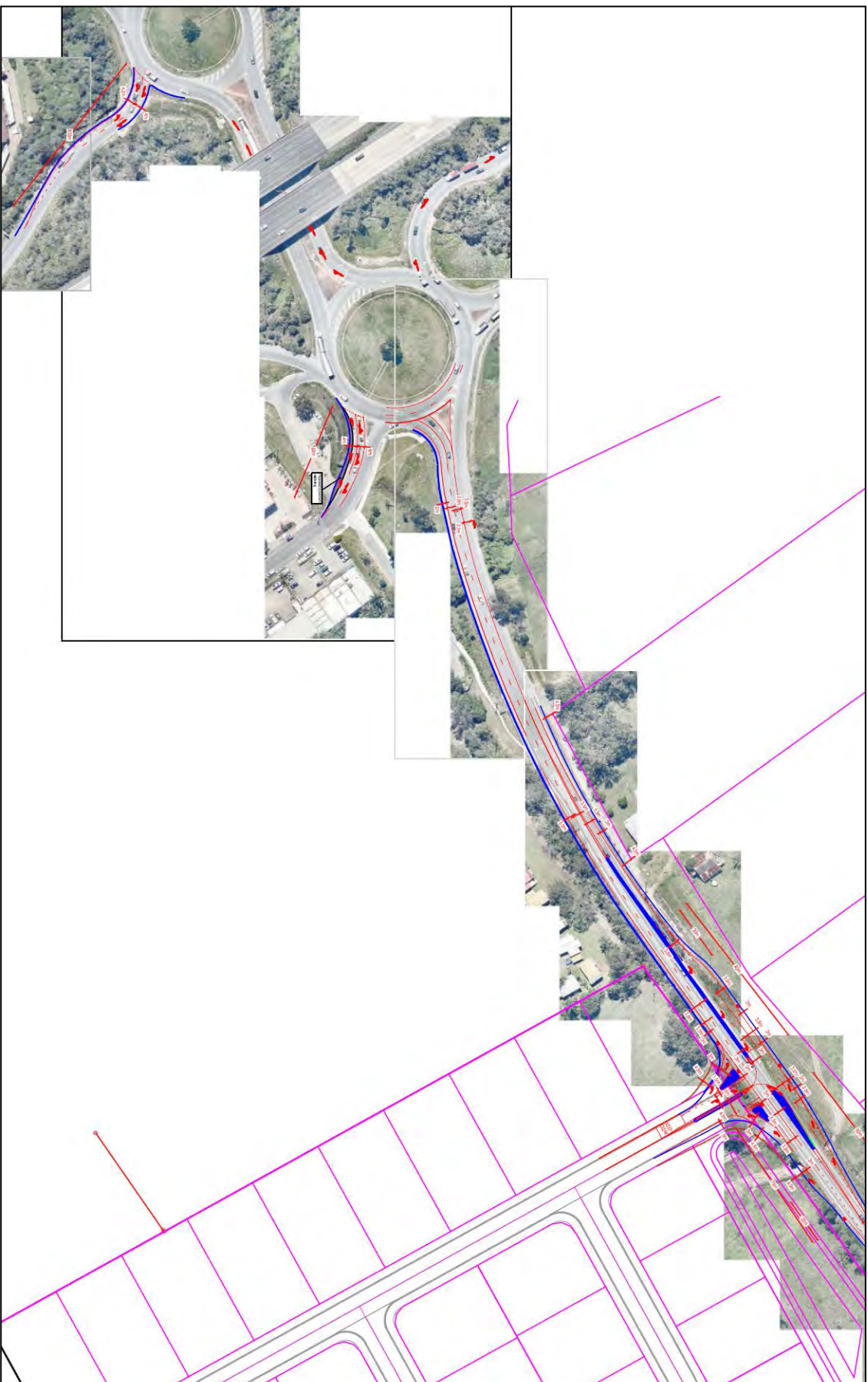


FIGURE 5.1 – PROPOSED INTERSECTION ARRANGEMENTS

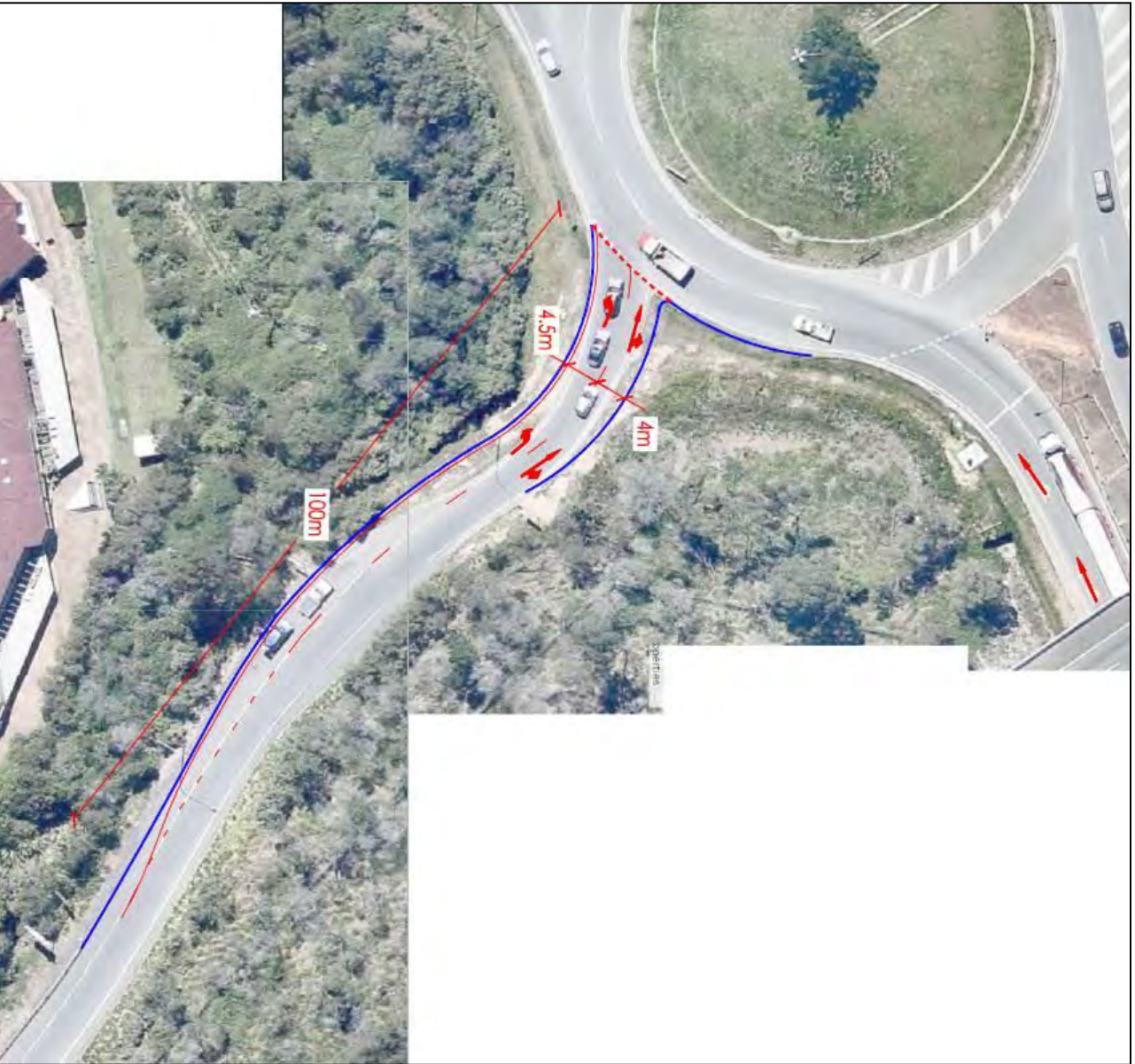


FIGURE 5.2 – PROPOSED INTERSECTION ARRANGEMENTS

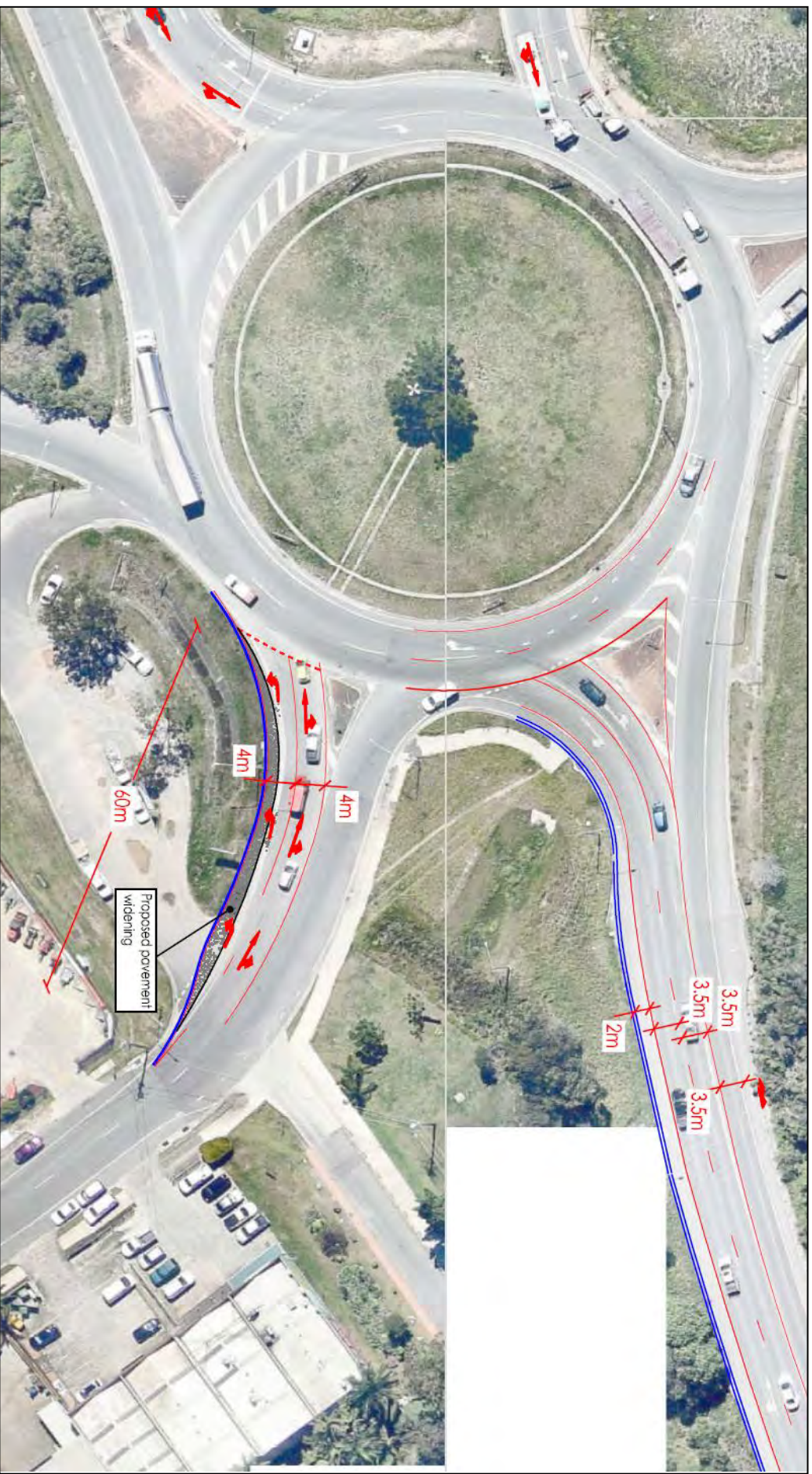


FIGURE 5.3 – PROPOSED INTERSECTION ARRANGEMENTS



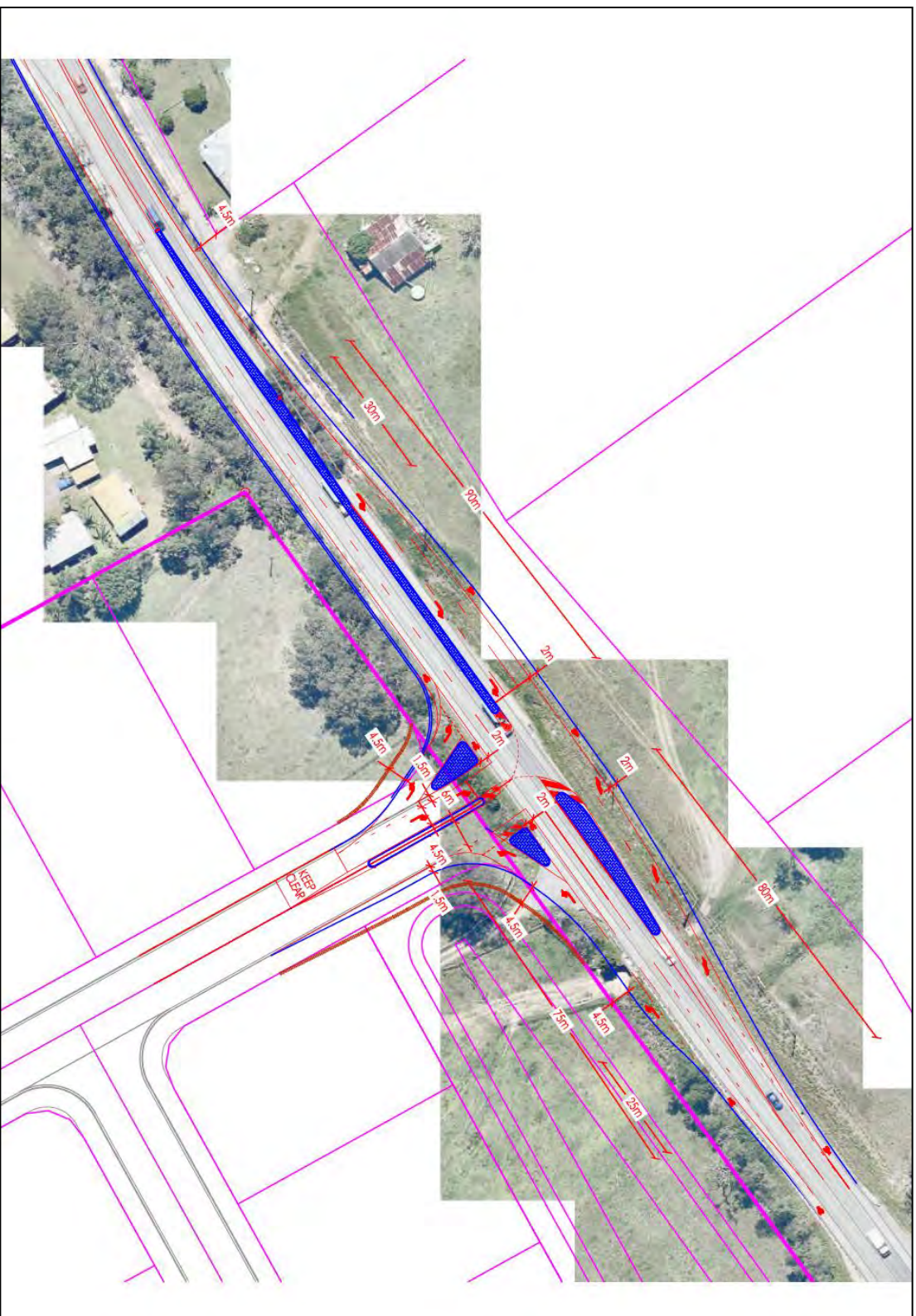


FIGURE 5.5 –PROPOSED ACCESS INTERSECTION WITH STAPYLTON JACOBS WELL ROAD

5.3 Timing of Works and Contributions

It is proposed that the following works be carried out prior to the completion of Stage 1 (UPGRADE A):

- Construction of the proposed access intersection to its ultimate four lane profile, including traffic signals.
- Extension of the second approach lane on Stapylton Jacobs Well Road between the new intersection and the eastern roundabout at the interchange.

The following works are proposed to be completed prior to the completion of Stage 2 (UPGRADE B):

- Construction of second approach lane in Christensen Road approach to the eastern roundabout.
- Construction of the second approach lane on the northbound off ramp (western side of Exit 38 interchange).

As previously discussed, the modelling has identified that the addition of a second departure lane on the Stapylton Jacobs Well Road leg of the eastern roundabout would mitigate the impact of the balance of the development. However, it is not proposed that these works be carried out as they are not consistent with TMR's future planning for the interchange. As an alternative, it is proposed that the cost of these works be contributed by the Applicant, to be paid prior to the ceiling of Stage 3 of the project. Gassman Development Perspectives have estimated the cost of these works at \$720,000.

6.0 SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

- The subject site is located on the southern side of Stapylton Jacobs Well Road. The subject site is identified as Lot 1 on RP6882 and Lot 240 on W31330, and has an approximate site area of 62.65 hectares.
- It is proposed that the estate will be developed over four stages. The proposed plan of development allows for future road connections to the adjoining properties to the east which will occur in due course. It is proposed that primary access be gained via a single signalised intersection on the Stapylton – Jacob's Well Road. A road connection linking Stapylton Jacobs Well Road to Christensen Road will be constructed as part of the overall project. Stages 3 and 4 will gain access from Christensen Road.
- The intention of the report is to re-assess the impacts upon the surrounding State – controlled road network, with a view to achieving a more practical outcome with respect to road network upgrade requirements. More accurate trip generation data has been adopted through a survey of similar uses in the surrounding area. This approach is recommended by the GARID and other sources such as the NSW RMS Guide to Traffic Generating Developments.
- It is noted that other approvals in the area have either not been required to contribute to the surrounding road network or only been required to make minor contributions to a similar scale recommended in this report (Refer to Section 1.3).
- The impact of the proposed development upon the surrounding State controlled road network has been carried out in accordance with the Guide to Traffic Impacts Assessments (2017). The analysis has been carried out using up to date traffic count data (January 2018).
- The Exit 38 interchange has recently been upgraded to include an additional approach lane on the Elderslie Road approach to the western roundabout, an additional lane on the Stapylton Jacobs Well Road approach to the eastern roundabout. In addition, signal metering has been implemented on the Elderslie Road approach (underpass) to each roundabout. These upgrades have significantly improved conditions at the interchange and in particular reduced queuing on the north and southbound off ramps.
- It is proposed that a new signalised intersection be constructed on Stapylton Jacobs Well Road, serving as the primary access point to the new estate. Secondary access will be gained off Christensen road in due course as the estate develops. A new internal connection road will link Stapylton Jacobs Well Road to Christensen Road upon completion of the project. This future link road will significantly benefit the local area by allowing local traffic to move between Stapylton Jacobs Well Road and Christensen Road without using the Exit 38 interchange.

- The design of the proposed new signalised intersection on Stapylton Jacobs Well Road is consistent with TMR's future planning, and therefore will contribute to such works. The introduction of the signalised intersection during the initial stage of the intersection will also benefit the performance of the eastern roundabout at the Exit 38 interchange by 'bunching' the traffic flow in the westbound direction.
- The SIDRA modelling has identified some upgrade works required to mitigate the impact of the development. These works comprise of an additional lane on the northbound off-ramp to the western roundabout; an additional lane in the Christensen Road approach to the eastern roundabout; an additional departure lane on the Stapylton Jacobs Well leg of the eastern roundabout. These works will mitigate the impact of the proposal so that the various intersections function satisfactorily.
- The works proposed to be carried out as part of the project are consistent with TMR's planning for the local area and will benefit the performance of the Motorway interchange and benefit the local area by providing improved connectivity for local traffic. A monetary contribution is proposed in lieu of works that are not consistent with future planning.
- It is proposed that the required mitigation works be carried out in accordance with the timing discussed in Section 5.3. A monetary contribution is proposed to be made to mitigate the impact of traffic generated by the stages 3 and 4 of the development. This contribution (\$ 720,000) will be made prior to sealing of the Stage 3 subdivision plan.

APPENDICES

APPENDIX A – RPEQ CERTIFICATION
APPENDIX B – TMR CONCEPT PLANNING FOR THE STAPYLTON-JACOB'S WELL ROAD
APPENDIX C – 2018 TRAFFIC COUNT DATA (M1 EXIT 38 INTERCHANGE)
APPENDIX D – SURVEY OF IMMEDIATE CATCHMENT TO THE PROPOSED DEVELOPMENT
APPENDIX E – SURVEYED TRIP GENERATION DATA (RTE / GRIFFITH UNIVERSITY)
APPENDIX F – SENSITIVITY ANALYSIS CALCULATIONS
APPENDIX G – CRITERIA FOR INTERPRETING THE SIDRA RESULTS
APPENDIX H – DETAIL SIDRA RESULTS OF DEVELOPMENT TRAFFIC GENERATION
APPENDIX I –DETAIL SIDRA RESULTS OF SENSITIVITY ANALYSIS

APPENDIX A – RPEQ CERTIFICATION

CERTIFICATION OF TRAFFIC IMPACT ASSESSMENT REPORT REGISTERED PROFESSIONAL ENGINEER QUEENSLAND

for

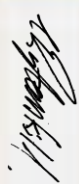
Project title:

As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

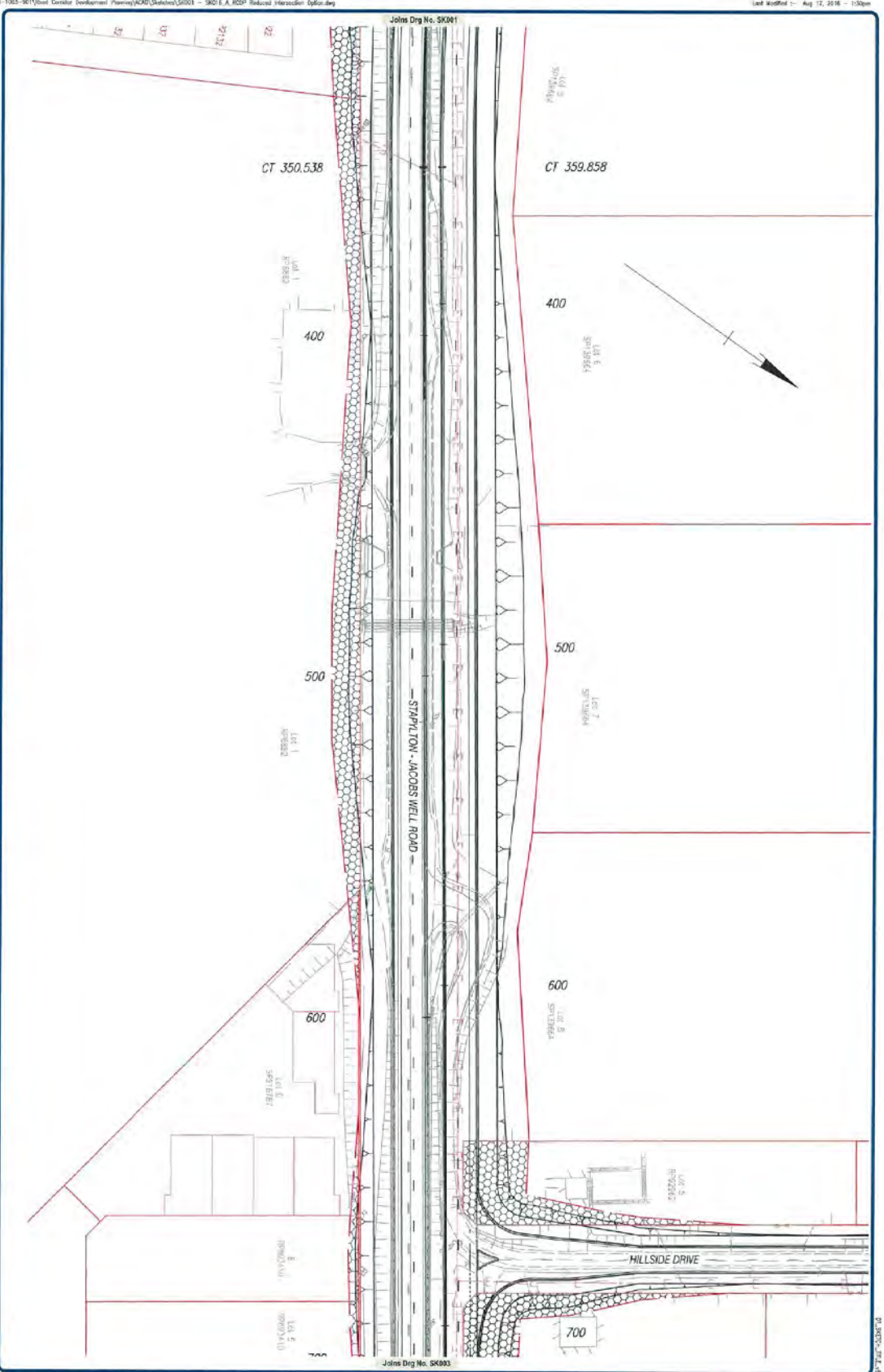
- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

- I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the Guide to Traffic Impact Assessment published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and
- where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment, and that
- the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that
- I believe the strategies recommended for mitigating impacts by this traffic impact assessment, embrace contemporary practice initiatives and will deliver the desired outcomes.

Name:	Luke Rytenskild	RPEQ No:	6293
RPEQ competencies:	Civil Engineer (Traffic Engineering)		
Signature:		Date:	13.4.18
Postal address:	Po Box 17 Surfers Paradise QLD 4217		
Email:	luke@rytenskildtraffic.com		





Comments:

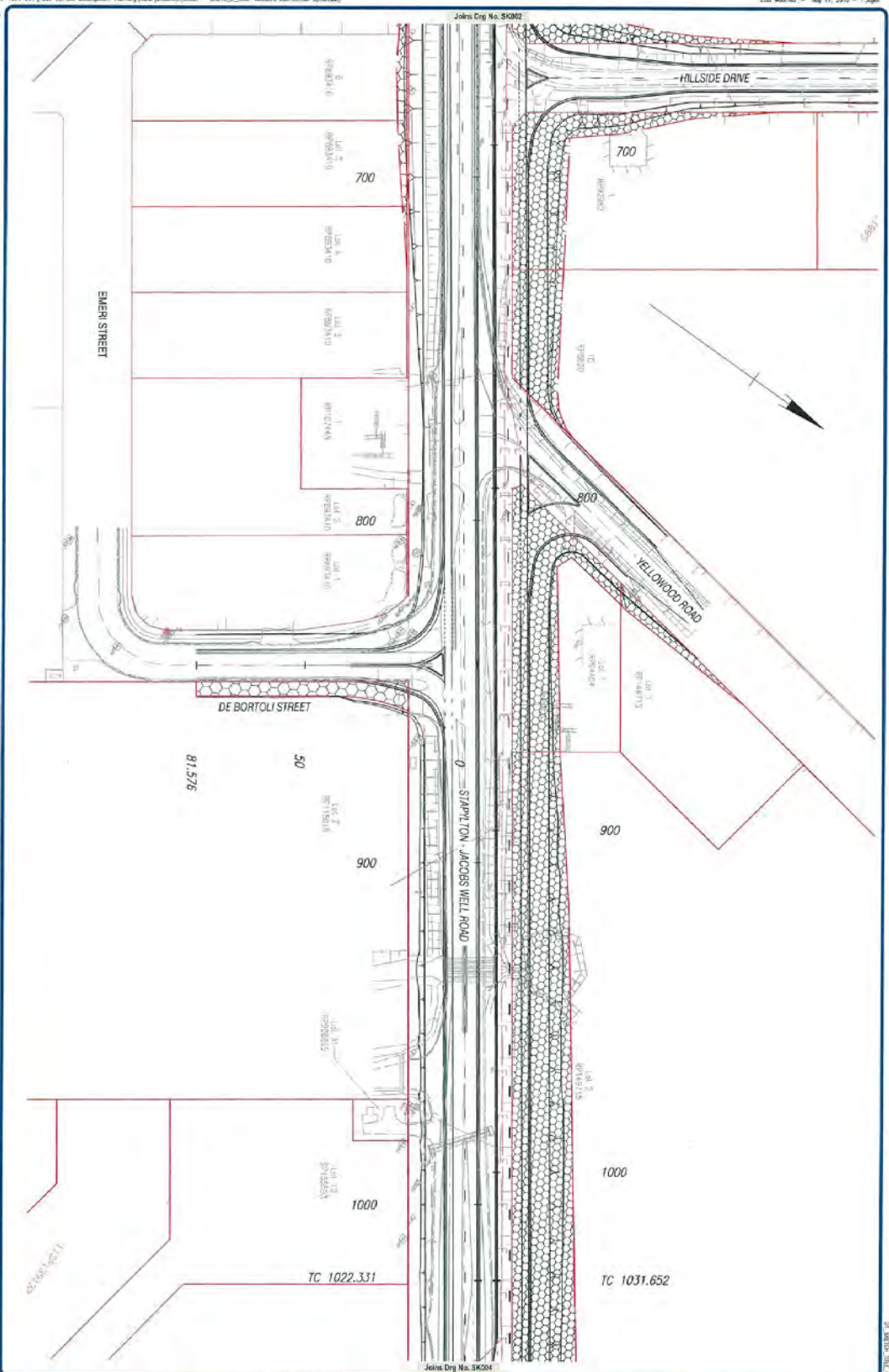
Staplyton - Jacobs Well Road Corridor Development Planning
Reduced Intersections Option
Sheet 2 of 16



Drawing No. SK002 (A)
Drawn: S. READ
Design: S. READ
Engineer:

STAPLYTON - JACOBS WELL ROAD | 160 / 1003 / 901





Comments:

Stapylton - Jacobs Well Road Corridor Development Planning
Reduced Intersections Option
Sheet 3 of 16

0 10 20m

Drawing No. SK003 (A)
Drawn: S. READ
Design: S. READ
Engineer:



STAPYLTON - JACOBS WELL ROAD | 160 / 1003 / 961

APPENDIX C – 2018 TRAFFIC COUNT DATA (M1 EXIT 38 INTERCHANGE)

AUSTRAFIIC VIDEO INTERSECTION COUNT

Site No.: 1 Weather: Fine

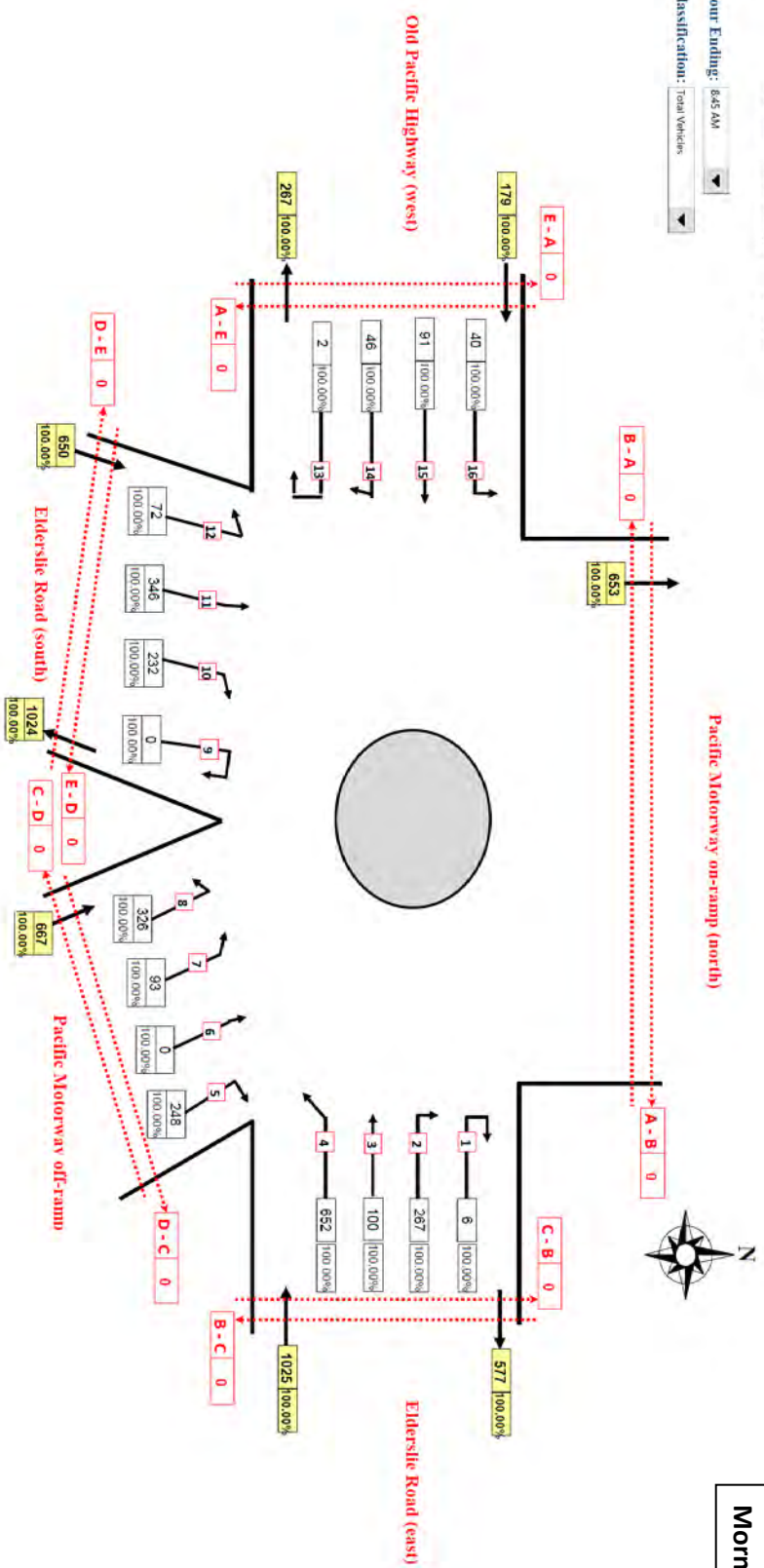
Location: Stuyllon-Jacobs Well Road Old Pacific Highway/Stannore Road/MI Ramps

Day/Date: Tuesday, 23 January 2018

Summary: AM Peak: *How ending - 8:45 AM*

PM Peak: *Hour ending - 4:30 PM*Hour Ending: 6:45 AM

Classification: Total Vehicles ▼



Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 Weather: Fine

Location: Staplyton-Jacobs Well Road/Henry Hester Drive/Christensen Road/NI Ramps

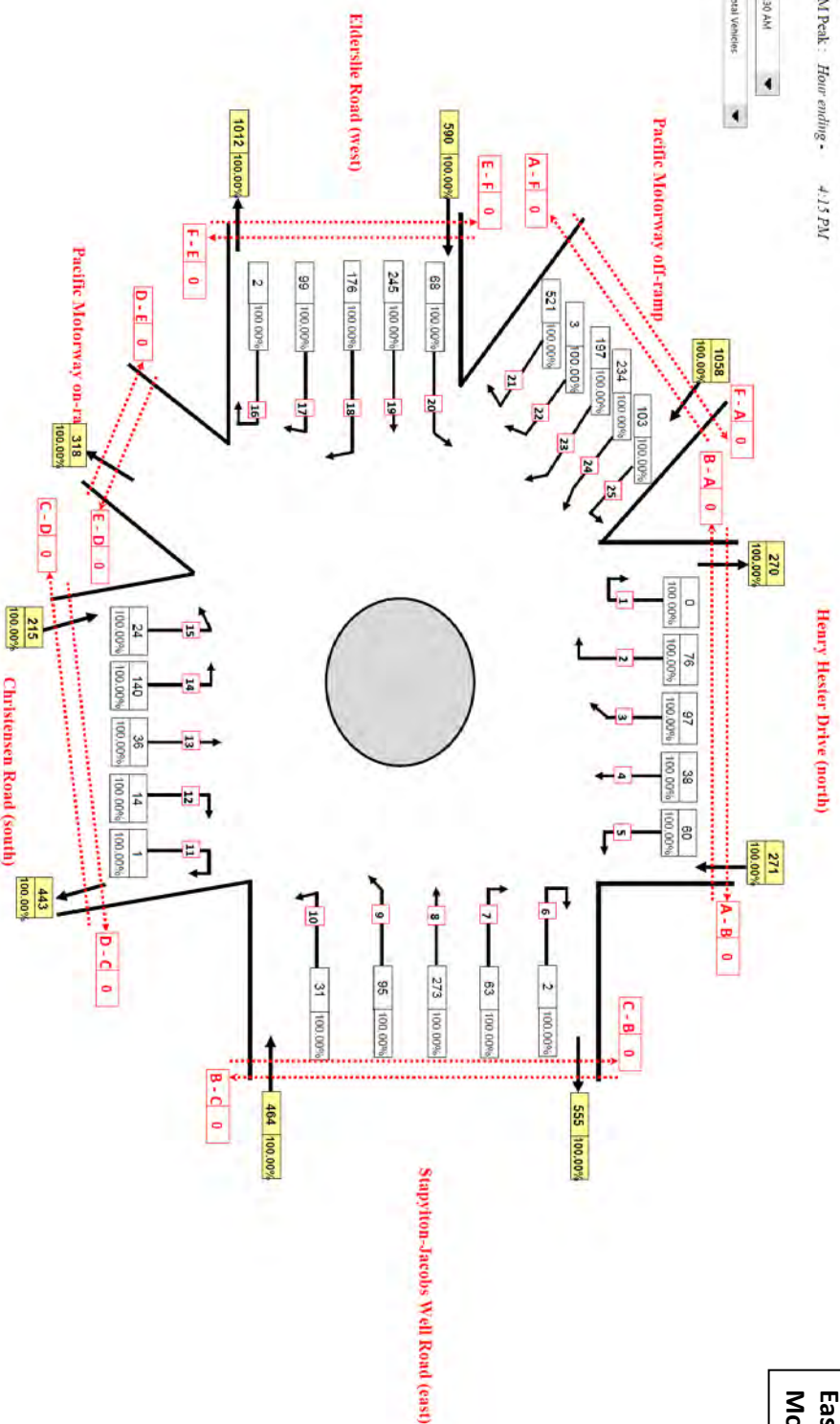
Day/Date: Tuesday, 23 January 2018

Summary: AM Peak : Hour ending - 8:30 AM

PM Peak : Hour ending - 4:15 PM

Hour Ending: 8:30 AM

Classification: Total Vehicles



Note: 3.28% = Proportion of selected vehicle classification as a percentage of total vehicles

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 Weather: Fine

Location: Stapledon-Jacobs Well Road/Old Pacific Highway/Stammore Road/NI1 Ramps

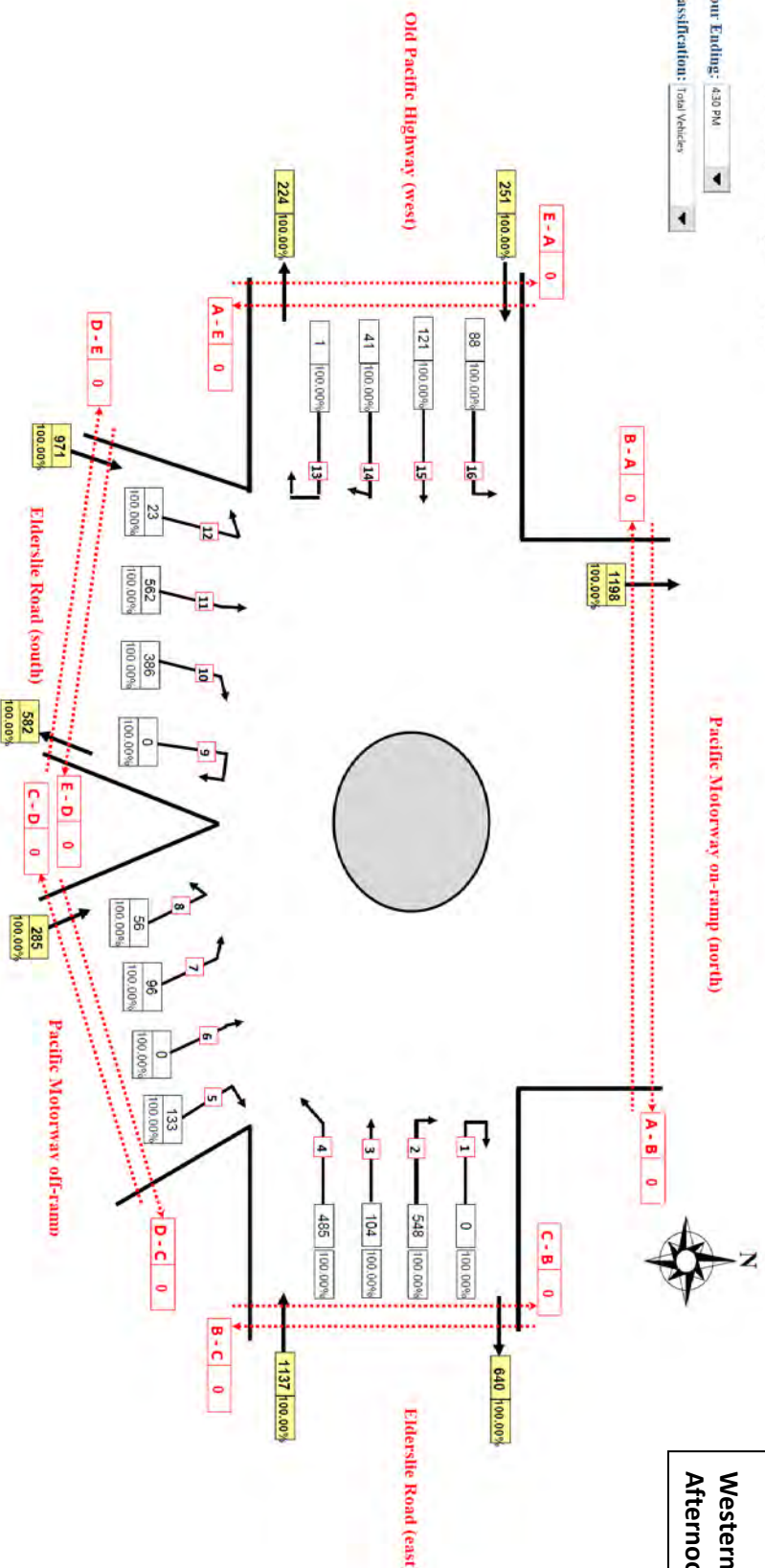
Day/Date: Tuesday, 23 January 2018

Summary: AM Peak : Hour ending - 8:45 AM

PM Peak : Hour ending - 4:30 PM

Hour Ending: 4:30 PM

Classification: Total Vehicles



Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

Western Roundabout
Afternoon Peak Hour
Western Roundabout
Afternoon Peak Hour

AUSTRAFIIC VIDEO INTERSECTION COUNT

Weather: Fine

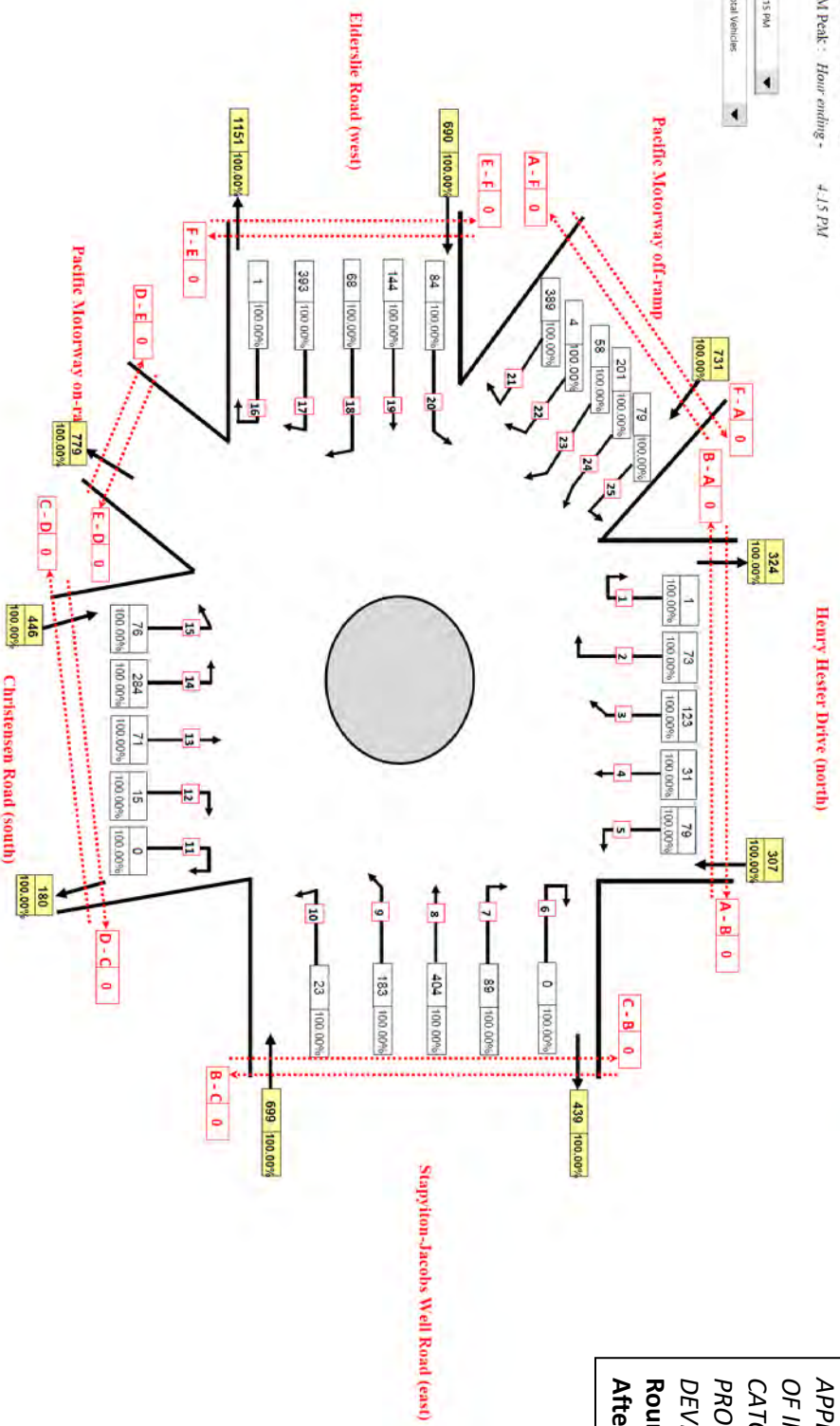
Stapleton-Jacobs Well Road/Henry Hester Drive/Christensen Road/M1 Raump

Tuesday, 23 January 2018

AM Peak - Hour ending - 8:30 AM

PM Peak : Hour ending - 4:15 PM

Ending: 4:15 PM

Location: Total Vehicles

**Eastern Roundabout
Afternoon Peak Hour**

**APPENDIX D – SURVEY
OF IMMEDIATE
CATCHMENT TO THE
PROPOSED
DEVELOPMENT**

**Eastern
Roundabout
Afternoon Peak Hour**

Note: 3.28% = proportion of selected vehicle classification as a percentage of total vehicles

APPENDIX D – SURVEY OF IMMEDIATE CATCHMENT TO THE PROPOSED DEVELOPMENT (CHRISTENSEN ROAD CATCHMENT)

AUTOMATIC TUBE COUNT OUTPUT

Weekly Vehicle Counts

WeeklyVehicle-29

Site: Christensen Rd Yatala.0.1NS
Description: Christensen Rd, Yatala just south of Maiella St
Filter time: 20:21 Sunday, 11 March 2018 => 21:52 Thursday, 15 March 2018
Scheme: Vehicle classification (AustRoads94)
Filter: Cls(1-12) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100) Lane(0-16)

Hour	Mon 12 Mar	Tue 13 Mar	Wed 14 Mar	Thu 15 Mar	Fri 16 Mar	Sat 17 Mar	Sun 18 Mar	Averages 1 - 5	1 - 7
0000-0100	3	4	7	12	*	*	*	6.5	6.5
0100-0200	6	10	10	18	*	*	*	11.0	11.0
0200-0300	6	7	6	10	*	*	*	7.3	7.3
0300-0400	17	22	20	22	*	*	*	20.3	20.3
0400-0500	77	74	85	82	*	*	*	79.5	79.5
0500-0600	243	242	249	230	*	*	*	241.0	241.0
0600-0700	196	226	208	180	*	*	*	202.5	202.5
0700-0800	214	236	241	217	*	*	*	227.0	227.0
0800-0900	225	234	200	235	*	*	*	223.5	223.5
0900-1000	198	235	218	219	*	*	*	217.5	217.5
1000-1100	220	230	216	188	*	*	*	213.5	213.5
1100-1200	209	216	192	216	*	*	*	208.3	208.3
1200-1300	217	198	227	232	*	*	*	218.5	218.5
1300-1400	207	237	241	234	*	*	*	229.8	229.8
1400-1500	258	244	284	267	*	*	*	263.3	263.3
1500-1600	244	239	245	243	*	*	*	242.8	242.8
1600-1700	222	222	233	234	*	*	*	227.8	227.8
1700-1800	107	94	103	108	*	*	*	103.0	103.0
1800-1900	32	38	46	35	*	*	*	37.8	37.8
1900-2000	15	14	19	0	*	*	*	12.0	12.0
2000-2100	7	5	14	0	*	*	*	6.5	6.5
2100-2200	9	11	10	0	*	*	*	7.5	7.5
2200-2300	19	16	23	*	*	*	*	19.3	19.3
2300-2400	0	4	3	*	*	*	*	2.3	2.3
Totals									
0700-1900	2353	2423	2446	2428	*	*	*	2412.5	2412.5
0600-2200	2580	2679	2697	2608	*	*	*	2641.0	2641.0
0600-0000	2599	2699	2723	*	*	*	*	2662.7	2662.7
0000-0000	2951	3058	3100	*	*	*	*	3028.2	3028.2
AM Peak	0500	0500	0500	0800	*	*	*		
	243	242	249	235	*	*	*		
PM Peak	1400	1400	1400	*	*	*	*		
	258	244	284	*	*	*	*		

SURVEYED CATCHMENT AREAS

CATCHMENT AREA: A



CATCHMENT AREA: B



CATCHMENT AREA: C



CATCHMENT AREA: D



CATCHMENT AREA: E



CATCHMENT AREA: F



CATCHMENT AREA: G



APPENDIX E – SURVEYED TRIP GENERATION DATA (RTE / GRIFFITH UNIVERSITY)



Location:	Motorway Circuit, Ormeau
Use:	Warehouse / manufacturing
GFA:	Approx 45,000m ² GFA
Surveyed trip generation:	AM peak - 170 vehicles per hour PM peak - 190 vehicles per hour
Surveyed trip rate:	AM peak hour - 0.38 trips per 100m ² GFA PM peak hour - 0.42 trips per 100m ² GFA

Weekly Vehicle Counts

WeeklyVehicle-1052
 Site: 1.0.0E 2.0.0W
 Description: Multiple sites - See Header sheet for site descriptions.
 Filter time: 14:14 Sunday, 22 March 2015 => 18:50 Sunday, 29 March 2015
 Scheme: Vehicle classification (AusRoads94)
 Filter: Cis(1 2 3 4 5 6 7 8 9 10 11 12) Dir(NESW) Sp(10,160) Headway(>0)

Hour	Mon 23 Mar	Tue 24 Mar	Wed 25 Mar	Thu 26 Mar	Fri 27 Mar	Sat 28 Mar	Sun 29 Mar	Averages 1 - 5	1 - 7
0000-0100	0	4	4	8	3	0	0	3.8	2.7
0100-0200	2	0	0	0	0	0	0	0.4	0.3
0200-0300	0	3	1	2	0	0	0	1.2	0.9
0300-0400	6	11	14	11	3	0	0	9.0	6.4
0400-0500	15	20	23	16	7	0	0	16.2	11.6
0500-0600	115	127	128	124	120	0	0	122.8	87.7
0600-0700	90	100	105	89	107	0	0	98.2	70.1
0700-0800	139	143<	129	133	107	0	0	130.2	93.0
0800-0900	150	124	152	149	120	0	0	139.0	99.3
0900-1000	164<	142	136	170<	166<	0	0	155.6<	111.1<
1000-1100	132	131	159<	125	129	0	0	135.2	96.6
1100-1200	137	139	128	163	152	0<	0<	143.8	102.7
1200-1300	150	155	139	155	158	0	0	151.4	108.1
1300-1400	163	149	128	178	149	0	0	153.4	109.6
1400-1500	192<	190<	186<	197<	185<	0	0	190.0<	135.7<
1500-1600	166	181	127	146	171	0	0	158.2	113.0
1600-1700	161	165	164	145	117	0	0	150.4	107.4
1700-1800	68	55	80	59	39	0	0	60.2	43.0
1800-1900	17	31	25	22	15	0	0	22.0	15.7
1900-2000	2	6	5	7	0	0	0	4.0	3.3
2000-2100	8	2	2	0	0	0	0	2.4	2.0
2100-2200	9	5	6	5	0	0	0	5.0	4.2
2200-2300	9	11	9	7	0	0	0	7.2	6.0
2300-2400	4	10	2	6	0	0<	0	4.4	3.7
Totals									
0700-1900	1639	1605	1553	1642	1508	0	0	1589.4	1135.3
0600-2200	1748	1718	1671	1743	1615	0	0	1699.0	1214.9
0600-0000	1761	1739	1682	1756	1615	0	0	1710.6	1224.6
0000-0000	1899	1904	1852	1917	1748	0	0	1864.0	1334.2
AM Peak	0900	0700	1000	0900	0900	1100	1100		
	164	143	159	170	166	0	0		
PM Peak	1400	1400	1400	1400	1400	2300	0		
	192	190	186	197	185	0	0		

* - No data.

APPENDIX F – SENSITIVITY ANALYSIS CALCULATIONS

Table F.1 – Sensitivity Analysis Peak Hour Development Traffic Generation (overall estate)
TRIG GENERATION RATE OF 0.42 TRIPS PER 100m² / PEAK HOUR

Stage	Lot Area (m ²)	GFA (m ²)	Morning Peak Hour			Afternoon Peak Hour		
			In	Out	Total	In	Out	Total
Cat A (STAGE 1)	115945	52175	142	77	219	44	175	219
Cat B (STAGE 2)	288165	129674	354	191	545	109	436	545
Cat C (STAGE 3)	91992	41396	113	61	174	35	139	174
Cat D (STAGE 4)	10750	4838	13	7	20	8	12	20
OVERALL ESTATE	506852	228083	623	335	958	196	762	958

Assumes 45% site cover
 Peak Hour Distribution: AM Peak 65 / 35, PM Peak 20/80

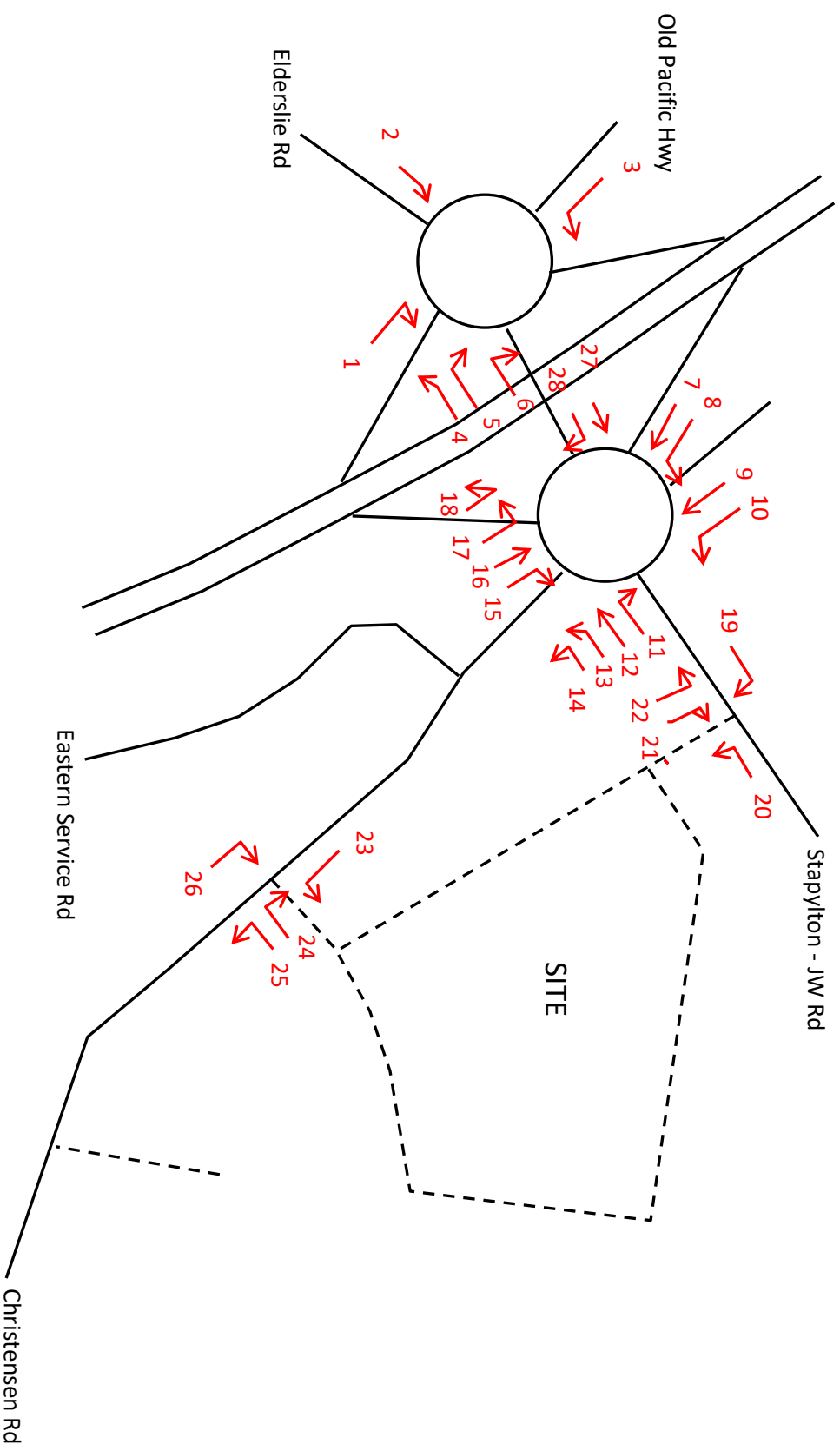


FIGURE F.1 – SENSITIVITY ANALYSIS KEY MAP (TRAFFIC DISTRIBUTION)

Morning peak hour

Development	Intersection movement (refer to Figure F.1)																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Stage																												
Distribution stage 1	0.33	0.1	0.02	0.1	0.02	0.33	0	0.31	0	0.04	0.02	0.45	0.35	0.1	0.1	0	0	0	0.8	0.2	0.2	0.8	N/A	N/A	N/A	N/A	0.45	0
Distribution stage 2	0.33	0.1	0.02	0.1	0.02	0.33	0.12	0.19	0.02	0.02	0.05	0.3	0.25	0	0	0.05	0.18	0.07	0.48	0.2	0.2	0.48	N/A	N/A	N/A	N/A	0.27	0.18
Distribution stages 3 / 4	0.33	0.1	0.02	0.1	0.02	0.33	0.31	0	0.04	0	0	0	0	0	0	0.04	0.35	0.41	0	0.2	0.2	0	N/A	N/A	N/A	N/A	0	0.41
Surveyed 2018 Vol	248	232	91	652	100	267	197	234	38	60	63	273	95	31	14	36	140	24	0	0	0	0	N/A	N/A	N/A	N/A	245	176
Estimated Year 2020	263	246	96	691	106	283	209	248	40	64	67	289	101	33	15	38	148	25	0	0	0	0	N/A	N/A	N/A	N/A	260	187
Estimated Year 2023	294	275	108	774	119	317	234	278	45	71	75	324	113	37	17	43	166	28	0	0	0	0	N/A	N/A	N/A	N/A	291	209
STAGE 1	47	14	3	8	2	25	0	44	0	6	2	35	27	8	8	0	0	0	114	28	15	61	N/A	N/A	N/A	N/A	64	0
STAGE 2	117	35	7	19	4	63	42	67	7	7	10	57	48	0	0	10	34	13	170	71	38	91	N/A	N/A	N/A	N/A	96	64
STAGE 3 & 4	42	13	3	13	3	42	39	0	5	0	0	0	0	0	0	5	44	52	0	25	25	0	N/A	N/A	N/A	N/A	0	52
STAGES 1 & 2	164	50	10	27	5	88	42	111	7	13	11	92	74	8	8	10	34	13	284	99	53	153	N/A	N/A	N/A	N/A	160	64
ALL STAGES	205	62	12	39	8	130	82	111	12	13	11	92	74	8	8	15	78	65	284	124	79	153	N/A	N/A	N/A	N/A	160	115
% STAGE 1	17.9%	5.8%	3.0%	1.1%	1.4%	8.9%	0.0%	17.8%	0.0%	9.0%	2.3%	11.9%	26.7%	23.3%	51.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	24.7%	0.0%
% STAGES 1 & 2	62.3%	20.2%	10.3%	3.9%	5.0%	31.2%	20.3%	44.9%	17.6%	20.1%	16.6%	31.7%	74.0%	23.3%	51.7%	25.0%	23.1%	52.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	61.5%	34.2%
% ALL STAGES	69.8%	22.6%	11.5%	5.1%	6.6%	40.3%	34.9%	40.1%	26.9%	17.9%	14.8%	28.3%	66.1%	20.8%	46.1%	34.1%	47.2%	228.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	54.9%	55.2%

Afternoon peak hour

Development	Intersection movement (refer to Figure F.1)																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Stage																												
Distribution stage 1	0.33	0.1	0.02	0.1	0.02	0.33	0	0.31	0	0.04	0.02	0.45	0.35	0.1	0.1	0	0	0	0.8	0.2	0.2	0.8	N/A	N/A	N/A	N/A	0.45	0
Distribution stage 2	0.33	0.1	0.02	0.1	0.02	0.33	0.12	0.19	0.02	0.02	0.05	0.3	0.25	0	0	0.05	0.18	0.07	0.48	0.2	0.2	0.48	N/A	N/A	N/A	N/A	0.27	0.18
Distribution stages 3 / 4	0.33	0.1	0.02	0.1	0.02	0.33	0.31	0	0.04	0	0	0	0	0	0	0.04	0.35	0.41	0	0.2	0.2	0	N/A	N/A	N/A	N/A	0	0.41
Surveyed 2018 Vol	133	386	121	485	104	548	58	201	31	79	89	404	183	23	15	71	284	76	0	0	0	0	N/A	N/A	N/A	N/A	144	68
Estimated Year 2020	141	409	128	514	110	581	61	213	33	84	94	428	194	24	16	75	301	81	0	0	0	0	N/A	N/A	N/A	N/A	153	72
Estimated Year 2023	158	458	144	576	123	651	69	239	37	94	106	480	217	27	18	84	337	90	0	0	0	0	N/A	N/A	N/A	N/A	171	81
STAGE 1	14	4	1	18	4	58	0	14	0	2	4	79	61	18	18	0	0	0	35	9	35	140	N/A	N/A	N/A	N/A	20	0
STAGE 2	36	11	2	44	9	144	13	21	2	2	22	131	109	0	0	22	78	30	52	22	87	209	N/A	N/A	N/A	N/A	29	20
STAGE 3 & 4	14	4	1	4	1	14	13	0	2	0	0	0	0	0	0	2	15	18	0	9	9	0	N/A	N/A	N/A	N/A	0	18
STAGES 1 & 2	50	15	3	61	12	202	13	34	2	4	25	210	170	18	18	22	78	30	87	31	122	349	N/A	N/A	N/A	N/A	49	20
ALL STAGES	65	20	4	65	13	216	26	34	4	4	25	210	170	18	18	24	93	48	87	39	131	349	N/A	N/A	N/A	N/A	49	37
% STAGE 1	10.3%	1.1%	0.7%	3.4%	3.2%	10.0%	0.0%	6.4%	0.0%	2.1%	3.7%	18.4%	31.6%	71.9%	110.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.9%	0.0%
% STAGES 1 & 2	35.8%	3.7%	2.4%	11.9%	11.1%	34.7%	21.3%	16.1%	6.6%	4.7%	26.8%	48.9%	87.8%	71.9%	110.3%	28.9%	26.1%	37.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	32.2%	27.2%
% ALL STAGES	40.9%	4.3%	2.7%	11.4%	10.6%	33.2%	38.3%	14.4%	10.6%	4.2%	23.9%	43.7%	78.4%	64.2%	98.4%	27.9%	27.7%	53.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	28.7%	46.1%

FIGURE F.2 – SENSITIVITY ANALYSIS TRAFFIC GENERATION & % IMPACT CALCULATIONS

APPENDIX G – CRITERIA FOR INTERPRETING SIDRA RESULTS

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'B'	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
'C'	Satisfactory.	Satisfactory but accident study required.
'D'	Operating near capacity.	Near capacity and accident study required.
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
'F'	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode.

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
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 and requires other control mode.

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout** or **GIVE WAY** or **STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹The values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs.

APPENDIX H – DETAIL SIDRA RESULTS OF DEVELOPMENT TRIP GENERATION

Exit 38 Interchange – western roundabout, without development :

- Year 2020 AM Peak Hour, existing intersection layout;
- Year 2020 PM Peak Hour, existing intersection layout;
- Year 2023 AM Peak Hour, existing intersection layout;
- Year 2023 PM Peak Hour, existing intersection layout;

Exit 38 Interchange – eastern roundabout, without development:

- Year 2020 AM Peak Hour, existing intersection layout;
- Year 2020 PM Peak Hour, existing intersection layout;
- Year 2023 AM Peak Hour, existing intersection layout;
- Year 2023 PM Peak Hour, existing intersection layout;

Western roundabout (upgraded):

- Year 2020 AM Peak Hour, with Stage 1 development;
- Year 2020 PM Peak Hour, with Stage 1 development;
- Year 2020 AM Peak Hour, with Stage 2 development;
- Year 2020 PM Peak Hour, with Stage 2 development;
- Year 2023 AM Peak Hour full development;
- Year 2023 PM Peak Hour full development;

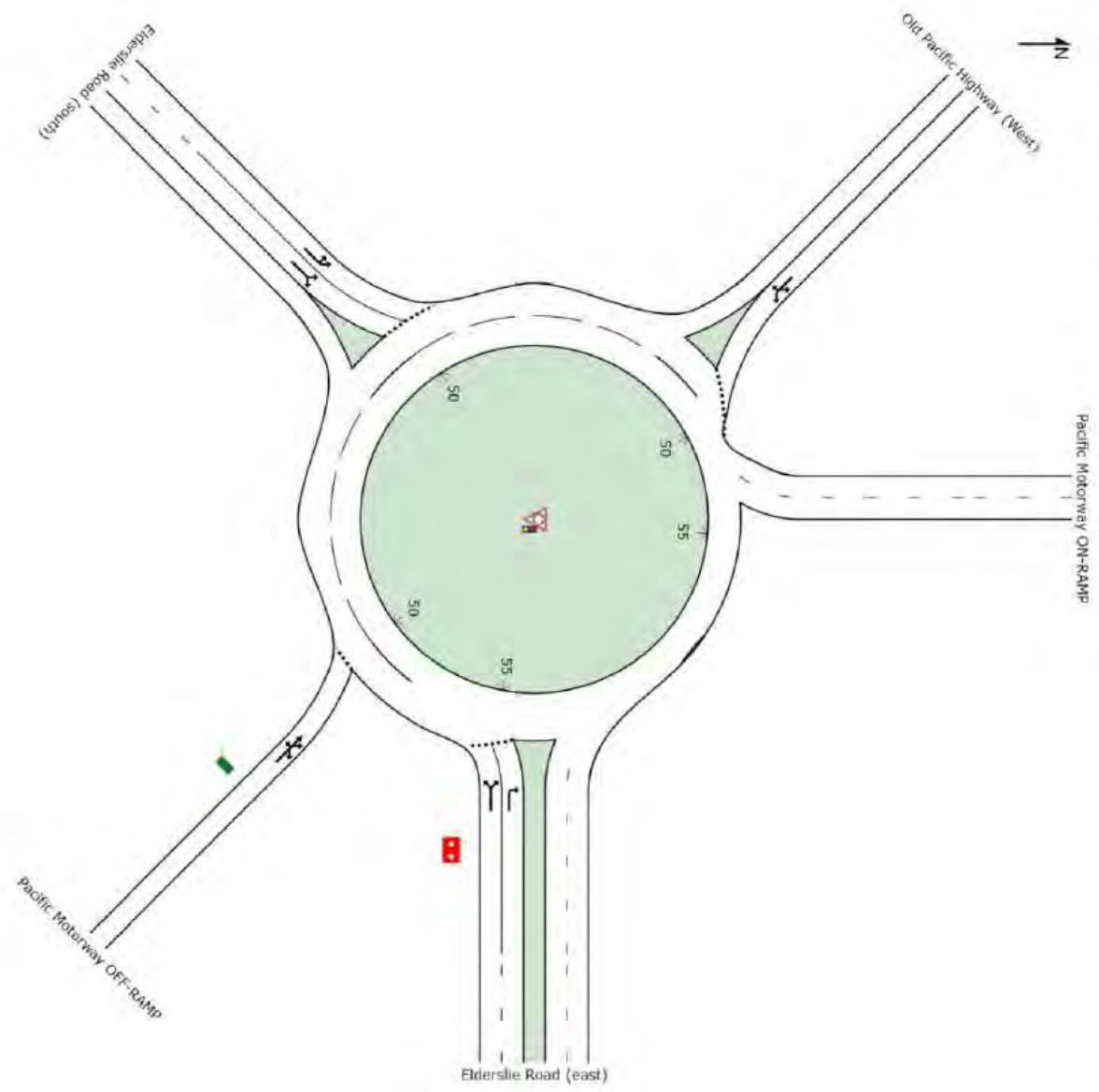
Eastern roundabout (upgraded):

- Year 2020 AM Peak Hour, with Stage 1 development (partial upgrade);
- Year 2020 PM Peak Hour, with Stage 1 development (partial upgrade);
- Year 2020 AM Peak Hour, with Stage 2 development;
- Year 2020 PM Peak Hour, with Stage 2 development;
- Year 2023 AM Peak Hour, with full development (fully upgraded intersection);
- Year 2023 PM Peak Hour, with full development (fully upgraded intersection);

YEAR 2020 WITHOUT DEVELOPMENT

 **Site: Model 1 2020AM west no dev**

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 1 2020AM west no dev

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	346	8.0	0.883	42.2	LOS D	31.5	235.6	1.00	1.56	35.5
22	T1	99	8.0	0.883	41.7	LOS D	31.5	235.6	1.00	1.56	36.5
23a	R1	1	8.0	0.883	47.8	LOS D	31.5	235.6	1.00	1.56	36.5
23b	R3	263	8.0	0.883	50.5	LOS D	31.5	235.6	1.00	1.56	37.5
Approach		709	8.0	0.883	45.2	LOS D	31.5	235.6	1.00	1.56	36.4
East: Elderslie Road (east)											
4a	L1	691	8.0	0.863	22.6	LOS C	39.6	296.1	0.96	0.78	45.2
6a	R1	106	8.0	0.863	29.0	LOS C	39.6	296.1	0.96	0.78	45.8
3	R2	283	8.0	0.396	17.9	LOS B	8.6	64.0	0.71	0.61	50.4
Approach		1080	8.0	0.863	22.0	LOS C	39.6	296.1	0.90	0.74	46.6
NorthWest: Old Pacific Highway (West)											
27b	L3	42	8.0	0.259	6.9	LOS A	1.3	9.7	0.71	0.77	52.6
27a	L1	96	8.0	0.259	5.8	LOS A	1.3	9.7	0.71	0.77	55.0
29	R2	49	8.0	0.259	13.6	LOS B	1.3	9.7	0.71	0.77	57.0
Approach		187	8.0	0.259	8.1	LOS A	1.3	9.7	0.71	0.77	55.0
SouthWest: Elderslie Road (south)											
30	L2	76	8.0	0.351	4.7	LOS A	2.2	16.8	0.67	0.47	55.0
30a	L1	367	8.0	0.351	3.9	LOS A	2.2	16.8	0.67	0.52	56.1
32a	R1	246	8.0	0.351	10.7	LOS B	2.1	15.6	0.68	0.73	54.3
Approach		689	8.0	0.351	6.4	LOS A	2.2	16.8	0.68	0.59	55.3
All Vehicles		2665	8.0	0.883	23.2	LOS C	39.6	296.1	0.85	0.92	45.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

MOVEMENT SUMMARY

 Site: Model 2 2020PM west no dev

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	59	8.0	0.361	6.2	LOS A	2.3	17.5	0.75	0.74	52.1
22	T1	102	8.0	0.361	5.7	LOS A	2.3	17.5	0.75	0.74	54.2
23a	R1	1	8.0	0.361	11.8	LOS B	2.3	17.5	0.75	0.74	54.2
23b	R3	141	8.0	0.361	14.5	LOS B	2.3	17.5	0.75	0.74	56.3
Approach		303	8.0	0.361	9.9	LOS A	2.3	17.5	0.75	0.74	54.7
East: Elderslie Road (east)											
4a	L1	514	8.0	0.660	9.0	LOS A	15.7	117.1	0.81	0.62	53.8
6a	R1	110	8.0	0.660	15.4	LOS B	15.7	117.1	0.81	0.62	54.5
3	R2	580	8.0	0.750	19.6	LOS B	16.9	126.1	0.87	0.82	49.3
Approach		1204	8.0	0.750	14.7	LOS B	16.9	126.1	0.84	0.72	51.5
NorthWest: Old Pacific Highway (West)											
27b	L3	93	8.0	0.649	16.4	LOS B	3.7	27.5	0.90	1.08	47.0
27a	L1	128	8.0	0.649	15.4	LOS B	3.7	27.5	0.90	1.08	48.9
29	R2	43	8.0	0.649	23.1	LOS C	3.7	27.5	0.90	1.08	50.5
Approach		264	8.0	0.649	17.0	LOS B	3.7	27.5	0.90	1.08	48.5
SouthWest: Elderslie Road (south)											
30	L2	24	8.0	0.603	8.5	LOS A	6.3	46.8	0.91	0.89	53.8
30a	L1	596	8.0	0.603	7.7	LOS A	6.3	46.8	0.90	0.90	55.1
32a	R1	409	8.0	0.603	14.1	LOS B	5.1	38.1	0.87	0.98	52.2
Approach		1029	8.0	0.603	10.2	LOS B	6.3	46.8	0.89	0.93	53.9
All Vehicles		2800	8.0	0.750	12.7	LOS B	16.9	126.1	0.85	0.83	52.4

Level of Service (LOS) Method: Delay (HCM 2000).
Roundabout LOS Method: Same as Signalised Intersections.
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 (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Model 5 2023AM west existing without

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast Pacific Motorway OFF-RAMP											
21	L2	377	8.0	0.958	143.2	LOS F	91.6	685.3	1.00	3.18	18.3
22	T1	108	8.0	0.958	149.1	LOS F	91.6	685.3	1.00	3.18	18.6
23a	R1	1	8.0	0.958	138.2	LOS F	91.6	685.3	1.00	3.18	18.6
23b	R3	287	8.0	0.958	151.5	LOS F	91.6	685.3	1.00	3.18	18.9
Approach		773	8.0	0.958	147.1	LOS F	91.6	685.3	1.00	3.18	18.6
East Elderslie Road (east)											
4a	L1	753	8.0	0.965	57.8	LOS E	71.5	535.0	1.00	1.16	31.9
6a	R1	116	8.0	0.965	64.2	LOS E	71.5	535.0	1.00	1.16	32.1
3	R2	308	8.0	0.442	20.4	LOS C	11.8	88.5	0.74	0.58	48.9
Approach		1177	8.0	0.965	48.6	LOS D	71.5	535.0	0.93	1.01	35.2
NorthWest: Old Pacific Highway (West)											
27b	L3	46	8.0	0.302	7.5	LOS A	1.6	11.7	0.76	0.82	52.3
27a	L1	105	8.0	0.302	6.4	LOS A	1.6	11.7	0.76	0.82	54.7
29	R2	53	8.0	0.302	14.2	LOS B	1.6	11.7	0.76	0.82	56.7
Approach		204	8.0	0.302	8.6	LOS A	1.6	11.7	0.76	0.82	54.7
SouthWest: Elderslie Road (south)											
30	L2	83	8.0	0.400	5.0	LOS A	2.7	20.2	0.73	0.50	54.8
30a	L1	400	8.0	0.400	4.2	LOS A	2.7	20.2	0.73	0.55	55.9
32a	R1	268	8.0	0.400	11.1	LOS B	2.5	18.7	0.73	0.77	54.1
Approach		751	8.0	0.400	6.7	LOS A	2.7	20.2	0.73	0.62	55.1
All Vehicles		2905	8.0	0.965	61.2	LOS E	91.6	685.3	0.89	1.47	31.4

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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 (Akceitlik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Model 6 2023PM west existing without

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast Pacific Motorway OFF-RAMP											
21	L2	64	8.0	0.415	7.4	LOS A	3.0	22.2	0.81	0.80	51.5
22	T1	111	8.0	0.415	6.9	LOS A	3.0	22.2	0.81	0.80	53.5
23a	R1	1	8.0	0.415	13.0	LOS B	3.0	22.2	0.81	0.80	53.5
23b	R3	154	8.0	0.415	15.7	LOS B	3.0	22.2	0.81	0.80	55.6
Approach		330	8.0	0.415	11.1	LOS B	3.0	22.2	0.81	0.80	54.1
East Elderslie Road (east)											
4a	L1	560	8.0	0.681	9.0	LOS A	17.9	133.8	0.80	0.60	53.7
6a	R1	120	8.0	0.681	15.5	LOS B	17.9	133.8	0.80	0.60	54.5
3	R2	632	8.0	0.775	20.4	LOS C	19.7	147.2	0.87	0.81	48.8
Approach		1312	8.0	0.775	15.1	LOS B	19.7	147.2	0.83	0.70	51.2
NorthWest Old Pacific Highway (West)											
27b	L3	101	8.0	0.797	26.4	LOS C	5.5	40.8	0.95	1.24	41.8
27a	L1	140	8.0	0.797	25.3	LOS C	5.5	40.8	0.95	1.24	43.3
29	R2	47	8.0	0.797	33.1	LOS C	5.5	40.8	0.95	1.24	44.6
Approach		288	8.0	0.797	26.9	LOS C	5.5	40.8	0.95	1.24	43.0
SouthWest Elderslie Road (south)											
30	L2	26	8.0	0.694	11.8	LOS B	9.0	67.3	0.99	1.04	51.6
30a	L1	650	8.0	0.694	11.0	LOS B	9.0	67.3	0.99	1.04	52.7
32a	R1	446	8.0	0.694	17.7	LOS B	7.2	54.1	0.95	1.10	49.8
Approach		1122	8.0	0.694	13.6	LOS B	9.0	67.3	0.97	1.06	51.5
All Vehicles		3052	8.0	0.797	15.3	LOS B	19.7	147.2	0.89	0.90	50.7

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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.

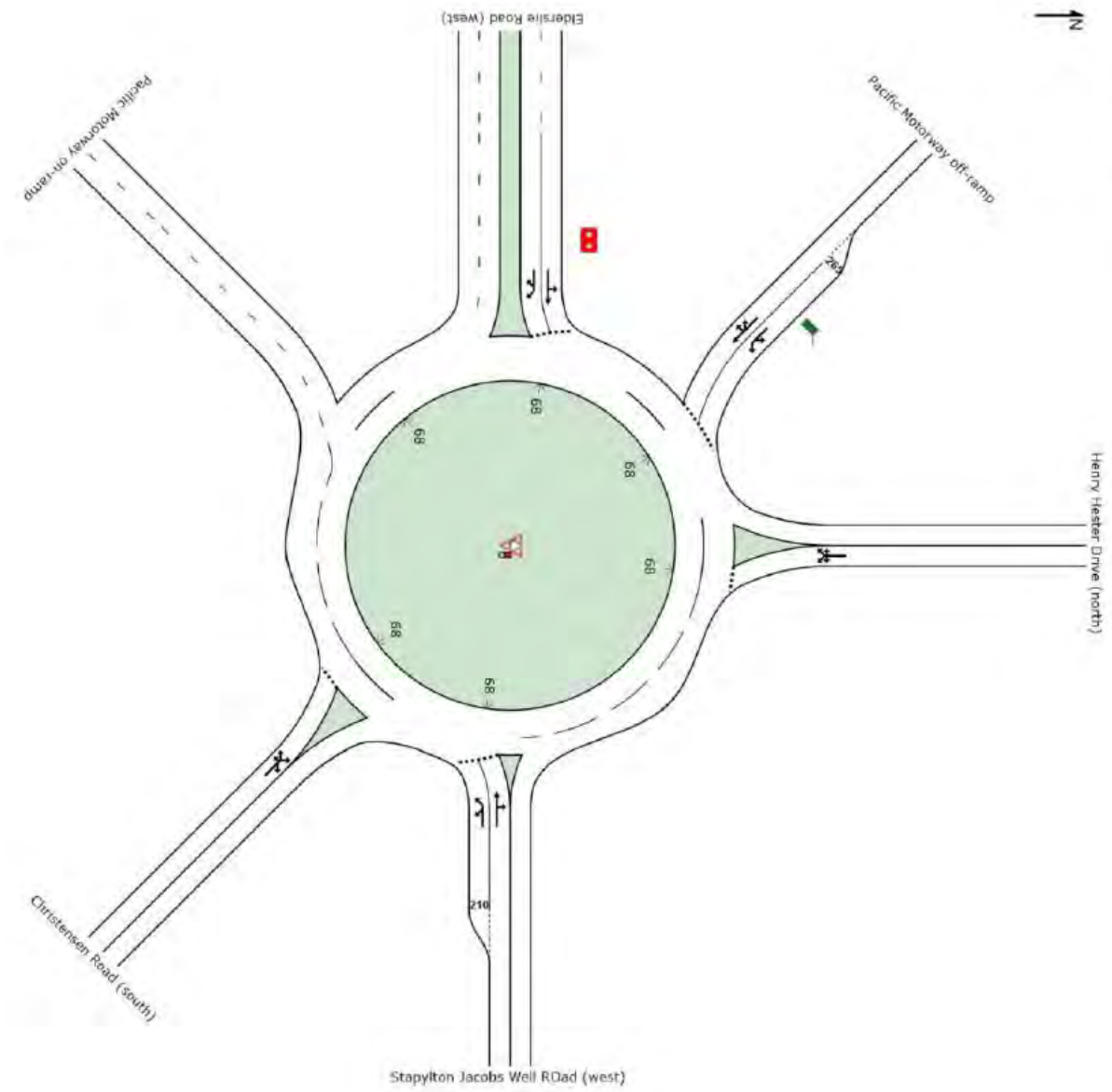
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SITE LAYOUT

 Site: Model 13 2020AM east without

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 13 2020AM east without

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn w/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	25	8.0	0.344	7.0	LOS A	1.6	11.9	0.74	0.81	53.7
21a	L1	148	8.0	0.344	7.1	LOS A	1.6	11.9	0.74	0.81	55.6
23a	R1	38	8.0	0.344	13.2	LOS B	1.6	11.9	0.74	0.81	56.9
23b	R3	15	8.0	0.344	16.1	LOS B	1.6	11.9	0.74	0.81	60.0
Approach		226	8.0	0.344	8.7	LOS A	1.6	11.9	0.74	0.81	55.8
East: Stappilton Jacobs Well Road (west)											
4b	L3	33	8.0	0.261	6.8	LOS A	1.0	7.6	0.80	0.71	53.3
4a	L1	101	8.0	0.261	6.4	LOS A	1.0	7.6	0.80	0.71	56.5
5	T1	289	8.0	0.519	9.0	LOS A	3.2	23.7	0.87	0.98	55.7
6	R2	67	8.0	0.519	16.1	LOS B	3.2	23.7	0.87	0.98	57.2
Approach		490	8.0	0.519	9.3	LOS A	3.2	23.7	0.85	0.90	55.9
North: Henry Hester Drive (north)											
7	L2	64	8.0	0.474	5.8	LOS A	2.1	15.7	0.79	0.88	52.8
7a	L1	40	8.0	0.474	5.9	LOS A	2.1	15.7	0.79	0.88	54.5
9a	R1	103	8.0	0.474	12.0	LOS B	2.1	15.7	0.79	0.88	55.7
9	R2	81	8.0	0.474	13.4	LOS B	2.1	15.7	0.79	0.88	57.2
Approach		288	8.0	0.474	10.1	LOS B	2.1	15.7	0.79	0.88	55.2
NorthWest: Pacific Motorway off-ramp											
27b	L3	109	8.0	0.367	3.5	LOS A	1.5	10.9	0.52	0.36	55.0
27a	L1	248	8.0	0.367	3.0	LOS A	1.5	10.9	0.52	0.36	58.3
28	T1	209	8.0	0.608	3.6	LOS A	3.6	27.2	0.66	0.66	54.6
29	R2	1	8.0	0.608	10.7	LOS B	3.6	27.2	0.66	0.66	56.0
29b	R3	552	8.0	0.608	12.1	LOS B	3.6	27.2	0.66	0.66	57.4
Approach		1119	8.0	0.608	7.7	LOS A	3.6	27.2	0.62	0.57	56.8
West: Elderslie Road (west)											
10	L2	72	8.0	0.589	10.6	LOS B	7.0	52.3	0.91	0.91	52.4
11	T1	260	8.0	0.589	10.9	LOS B	7.0	52.3	0.91	0.91	55.4
12a	R1	187	8.0	0.659	17.7	LOS B	6.6	49.3	0.94	1.05	50.3
12b	R3	105	8.0	0.659	20.5	LOS C	6.6	49.3	0.94	1.05	52.6
Approach		624	8.0	0.659	14.5	LOS B	7.0	52.3	0.92	0.98	52.9
All Vehicles		2747	8.0	0.659	9.9	LOS A	7.0	52.3	0.76	0.77	55.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 (Akpolik M3D).

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

MOVEMENT SUMMARY

 Site: Model 14 2020PM east without

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Dep. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christiansen Road (south)											
21	L2	81	8.0	1.101	209.9	LOS F	63.0	471.2	1.00	5.01	14.1
21a	L1	301	8.0	1.101	210.0	LOS F	63.0	471.2	1.00	5.01	14.2
23a	R1	75	8.0	1.101	216.1	LOS F	63.0	471.2	1.00	5.01	14.3
23b	R3	16	8.0	1.101	218.9	LOS F	63.0	471.2	1.00	5.01	14.5
Approach		473	8.0	1.101	211.3	LOS F	63.0	471.2	1.00	5.01	14.2
East: Staphyton Jacobs Well Road (west)											
4b	L3	24	8.0	0.345	7.7	LOS A	1.8	13.4	0.79	0.87	52.8
4a	L1	194	8.0	0.345	8.7	LOS A	1.8	13.4	0.79	0.87	56.0
5	T1	428	8.0	0.616	12.8	LOS B	5.6	42.1	0.92	1.12	53.3
6	R2	94	8.0	0.616	18.3	LOS B	5.6	42.1	0.92	1.12	54.6
Approach		740	8.0	0.616	12.3	LOS B	5.6	42.1	0.88	1.05	54.1
North: Henry Hester Drive (north)											
7	L2	84	8.0	0.508	6.4	LOS A	2.5	18.9	0.76	0.92	52.4
7a	L1	33	8.0	0.508	6.5	LOS A	2.5	18.9	0.76	0.92	54.2
8a	R1	130	8.0	0.508	13.2	LOS B	2.5	18.9	0.76	0.92	55.4
9	R2	77	8.0	0.508	14.0	LOS B	2.5	18.9	0.76	0.92	56.8
Approach		324	8.0	0.508	10.9	LOS B	2.5	18.9	0.76	0.92	54.8
NorthWest: Pacific Motorway off-ramp											
27b	L3	84	8.0	0.339	4.0	LOS A	1.6	12.0	0.62	0.42	54.5
27a	L1	213	8.0	0.339	3.6	LOS A	1.6	12.0	0.62	0.42	57.7
28	T1	61	8.0	0.430	3.9	LOS A	2.6	19.7	0.69	0.72	53.6
29	R2	4	8.0	0.430	11.1	LOS B	2.6	19.7	0.69	0.72	55.0
26b	R3	412	8.0	0.430	12.5	LOS B	2.6	19.7	0.69	0.72	56.3
Approach		774	8.0	0.430	8.5	LOS A	2.6	19.7	0.66	0.60	56.2
West: Elderslie Road (west)											
10	L2	89	8.0	0.472	10.1	LOS B	5.2	39.1	0.85	0.81	52.7
11	T1	153	8.0	0.472	10.4	LOS B	5.2	39.1	0.85	0.81	55.8
12a	R1	72	8.0	0.749	19.1	LOS B	12.6	94.1	0.95	0.97	48.8
12b	R3	417	8.0	0.749	21.9	LOS C	12.6	94.1	0.95	0.97	50.9
Approach		731	8.0	0.749	17.8	LOS B	12.6	94.1	0.91	0.92	51.8
All Vehicles		3042	8.0	1.101	43.4	LOS D	63.0	471.2	0.84	1.51	38.0

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akpetlik, M3D).

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

MOVEMENT SUMMARY

 Site: Model 17 2023AM east without

M1 Northbound, Yataia North - EXT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	85% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	27	8.0	0.401	8.0	LOS A	2.0	15.3	0.78	0.90	53.3
21a	L1	161	8.0	0.401	8.1	LOS A	2.0	15.3	0.78	0.90	55.1
23a	R1	41	8.0	0.401	14.2	LOS B	2.0	15.3	0.78	0.90	56.4
23b	R3	16	8.0	0.401	17.0	LOS B	2.0	15.3	0.78	0.90	56.5
Approach		245	8.0	0.401	9.7	LOS A	2.0	15.3	0.78	0.90	55.4
East: Stapylton Jacobs Well Road (west)											
4b	L3	36	8.0	0.352	8.2	LOS A	1.3	10.0	0.86	0.85	52.8
4a	L1	110	8.0	0.352	7.8	LOS A	1.3	10.0	0.86	0.85	55.9
5	T1	315	8.0	0.688	13.4	LOS B	4.5	33.9	0.93	1.11	52.6
6	R2	73	8.0	0.688	20.5	LOS C	4.5	33.9	0.93	1.11	53.9
Approach		534	8.0	0.688	12.9	LOS B	4.5	33.9	0.91	1.04	53.4
North: Henry Heister Drive (north)											
7	L2	70	8.0	0.581	7.7	LOS A	2.9	21.8	0.85	0.98	51.7
7a	L1	44	8.0	0.581	7.8	LOS A	2.9	21.8	0.85	0.98	53.4
8a	R1	112	8.0	0.581	13.9	LOS B	2.9	21.8	0.85	0.98	54.6
9	R2	89	8.0	0.581	15.3	LOS B	2.9	21.8	0.85	0.98	55.9
Approach		314	8.0	0.581	12.0	LOS B	2.9	21.8	0.85	0.98	54.1
NorthWest: Pacific Motorway off-ramp											
27b	L3	119	8.0	0.417	3.8	LOS A	2.0	14.7	0.60	0.41	54.6
27a	L1	270	8.0	0.417	3.4	LOS A	2.0	14.7	0.60	0.41	57.9
28	T1	228	8.0	0.687	4.4	LOS A	5.4	40.0	0.77	0.75	54.2
29	R2	1	8.0	0.687	11.5	LOS B	5.4	40.0	0.77	0.75	55.6
29b	R3	602	8.0	0.687	13.0	LOS B	5.4	40.0	0.77	0.75	57.0
Approach		1220	8.0	0.687	8.3	LOS A	5.4	40.0	0.72	0.64	56.4
West: Elderslie Road (west)											
10	L2	78	8.0	0.542	9.7	LOS A	7.5	56.4	0.87	0.76	53.0
11	T1	283	8.0	0.542	10.0	LOS A	7.5	56.4	0.87	0.76	55.1
12a	R1	204	8.0	0.609	16.6	LOS B	7.1	53.2	0.89	0.94	50.9
12b	R3	114	8.0	0.609	19.5	LOS B	7.1	53.2	0.89	0.94	53.3
Approach		679	8.0	0.609	13.5	LOS B	7.5	56.4	0.88	0.85	53.6
All Vehicles		2992	8.0	0.688	10.8	LOS B	7.5	56.4	0.81	0.81	54.9

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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 (Angelik MSD).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Model 18 2023PM east without

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
SouthEast: Christensen Road (south)												
21	L2	88	8.0	1.378	686.0	LOS F	182.4	1364.1	1.00		11.03	5.1
21a	L1	328	8.0	1.378	686.1	LOS F	182.4	1364.1	1.00		11.03	5.1
23a	R1	82	8.0	1.378	702.2	LOS F	182.4	1364.1	1.00		11.03	5.1
23b	R3	17	8.0	1.378	706.0	LOS F	182.4	1364.1	1.00		11.03	5.1
Approach												
		515	8.0	1.378	687.4	LOS F	182.4	1364.1	1.00		11.03	5.1
East: Staplyton Jacobs Well Road (west)												
4b	L3	26	8.0	0.414	8.2	LOS A	2.3	17.1	0.82	0.93		51.6
4a	L1	211	8.0	0.414	10.5	LOS B	2.3	17.1	0.82	0.93		54.6
5	T1	467	8.0	0.742	19.4	LOS B	8.5	63.7	0.97	1.31		49.0
6	R2	102	8.0	0.742	24.7	LOS C	8.5	63.7	0.97	1.31		50.1
Approach												
		806	8.0	0.742	17.4	LOS B	8.5	63.7	0.93		1.20	50.5
North: Henry Hester Drive (north)												
7	L2	92	8.0	0.599	8.0	LOS A	3.3	24.4	0.82	1.00		51.2
7a	L1	36	8.0	0.599	8.1	LOS A	3.3	24.4	0.82	1.00		52.9
8a	R1	142	8.0	0.599	15.7	LOS B	3.3	24.4	0.82	1.00		54.0
9	R2	94	8.0	0.599	15.6	LOS B	3.3	24.4	0.82	1.00		55.3
Approach												
		354	8.0	0.599	12.9	LOS B	3.3	24.4	0.82		1.00	53.4
NorthWest: Pacific Motorway off-ramp												
27b	L3	92	8.0	0.396	4.3	LOS A	2.0	14.8	0.67	0.46		54.3
27a	L1	232	8.0	0.396	3.9	LOS A	2.0	14.8	0.67	0.46		57.4
28	T1	67	8.0	0.489	4.4	LOS A	3.3	24.9	0.75	0.75		53.4
29	R2	4	8.0	0.489	11.5	LOS B	3.3	24.9	0.75	0.75		54.7
29b	R3	450	8.0	0.489	12.9	LOS B	3.3	24.9	0.75	0.75		56.0
Approach												
		945	8.0	0.489	8.8	LOS A	3.3	24.9	0.72		0.64	56.0
West: Elderslie Road (west)												
10	L2	97	8.0	0.480	9.9	LOS A	5.8	43.2	0.83	0.77		52.9
11	T1	167	8.0	0.480	10.2	LOS B	5.8	43.2	0.83	0.77		55.9
12a	R1	78	8.0	0.763	19.3	LOS B	14.2	106.1	0.95	0.95		48.7
12b	R3	455	8.0	0.763	22.2	LOS C	14.2	106.1	0.95	0.95		50.8
Approach												
		797	8.0	0.763	17.9	LOS B	14.2	106.1	0.91		0.89	51.7
All Vehicles												
		3317	8.0	1.378	120.4	LOS F	182.4	1364.1	0.87		2.48	21.9

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

MOVEMENT SUMMARY

 Site: Model 3 2020AM west stage 1 - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total HV veh/h %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	346	8.0	0.888	61.6	LOS E	42.8	320.3	1.00	1.85	30.3
22	T1	99	8.0	0.888	56.0	LOS E	42.8	320.3	1.00	1.85	31.0
23a	R1	1	8.0	0.888	62.1	LOS E	42.8	320.3	1.00	1.85	31.0
23b	R3	286	8.0	0.888	69.9	LOS E	42.8	320.3	1.00	1.85	31.7
Approach		732	8.0	0.888	64.1	LOS E	42.8	320.3	1.00	1.85	30.9
East: Elderslie Road (east)											
4a	L1	695	8.0	0.905	30.6	LOS C	46.2	345.6	1.00	0.91	41.3
6a	R1	107	8.0	0.905	37.0	LOS D	46.2	345.6	1.00	0.91	41.7
3	R2	296	8.0	0.430	19.0	LOS B	9.8	73.4	0.74	0.61	49.7
Approach		1098	8.0	0.905	28.1	LOS C	46.2	345.6	0.93	0.83	43.4
NorthWest: Old Pacific Highway (West)											
27b	L3	43	8.0	0.267	7.1	LOS A	1.4	10.2	0.73	0.79	52.5
27a	L1	96	8.0	0.267	6.0	LOS A	1.4	10.2	0.73	0.79	54.9
29	R2	49	8.0	0.267	13.8	LOS B	1.4	10.2	0.73	0.79	56.9
Approach		188	8.0	0.267	8.3	LOS A	1.4	10.2	0.73	0.79	54.8
SouthWest: Elderslie Road (south)											
30	L2	76	8.0	0.365	4.9	LOS A	2.4	18.0	0.70	0.49	54.9
30a	L1	367	8.0	0.365	4.1	LOS A	2.4	18.0	0.70	0.53	56.0
32a	R1	253	8.0	0.365	10.9	LOS B	2.2	16.7	0.71	0.75	54.1
Approach		696	8.0	0.365	6.6	LOS A	2.4	18.0	0.70	0.61	55.2
All Vehicles		2714	8.0	0.905	30.9	LOS C	46.2	345.6	0.88	1.05	41.7

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 includes Geometric Delay.

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

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

MOVEMENT SUMMARY

 Site: Model 4 2020PM west stage 1 - ACTUAL

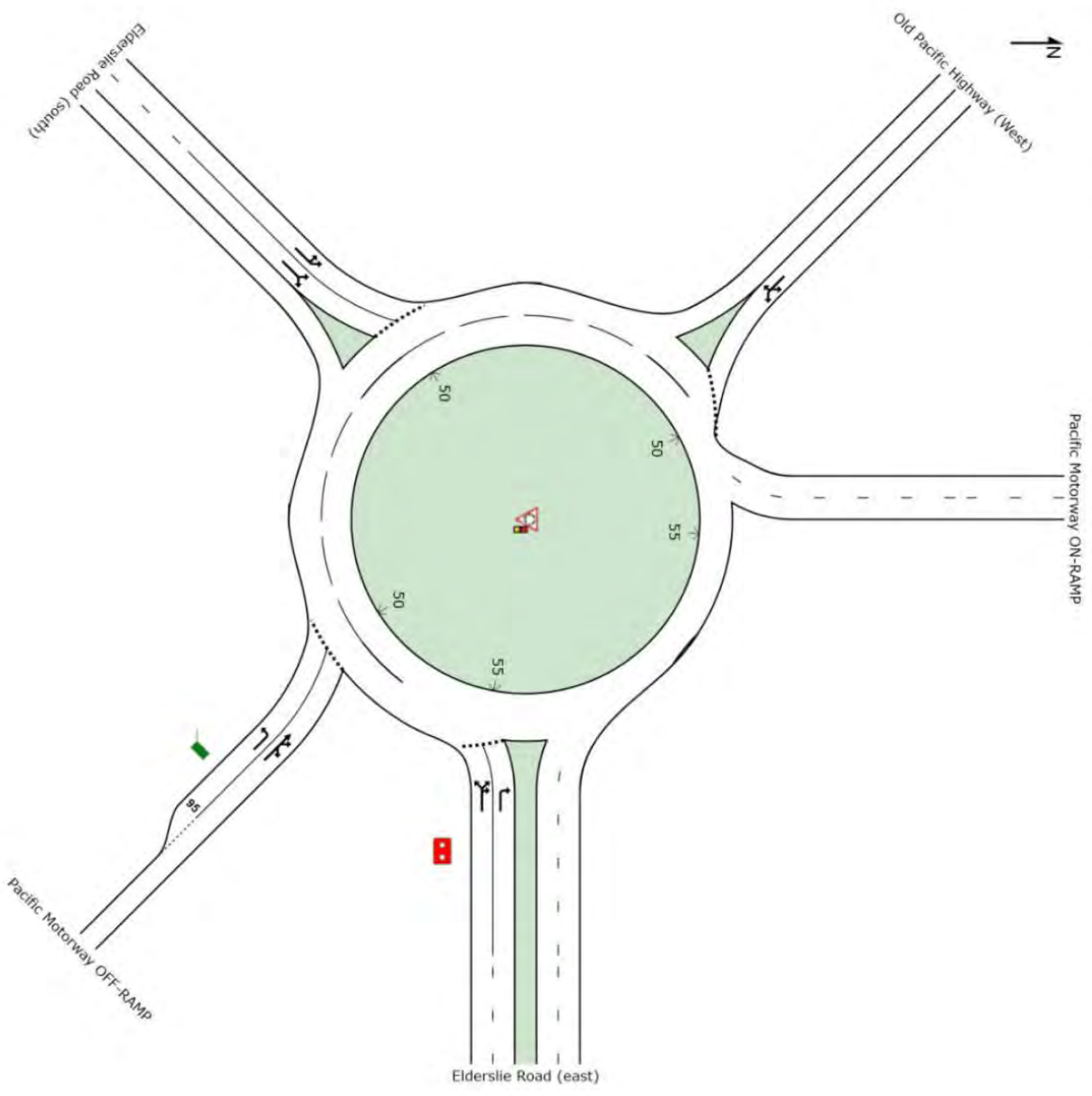
M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	59	8.0	0.374	6.7	LOS A	2.5	18.9	0.77	0.76	51.9
22	T1	102	8.0	0.374	6.2	LOS A	2.5	18.9	0.77	0.76	53.9
23a	R1	1	8.0	0.374	12.3	LOS B	2.5	18.9	0.77	0.76	53.9
23b	R3	148	8.0	0.374	15.0	LOS B	2.5	18.9	0.77	0.76	56.0
Approach		310	8.0	0.374	10.5	LOS B	2.5	18.9	0.77	0.76	54.5
East: Elderslie Road (east)											
4a	L1	523	8.0	0.652	8.6	LOS A	15.9	119.0	0.79	0.59	54.0
6a	R1	112	8.0	0.652	15.1	LOS B	15.9	119.0	0.79	0.59	54.8
3	R2	609	8.0	0.764	20.0	LOS C	18.3	137.1	0.87	0.82	49.1
Approach		1244	8.0	0.764	14.8	LOS B	18.3	137.1	0.83	0.70	51.5
NorthWest: Old Pacific Highway (West)											
27b	L3	93	8.0	0.681	18.7	LOS B	4.0	29.8	0.92	1.11	45.7
27a	L1	128	8.0	0.681	17.7	LOS B	4.0	29.8	0.92	1.11	47.5
29	R2	43	8.0	0.681	25.4	LOS C	4.0	29.8	0.92	1.11	49.0
Approach		264	8.0	0.681	19.3	LOS B	4.0	29.8	0.92	1.11	47.1
SouthWest: Elderslie Road (south)											
30	L2	24	8.0	0.620	9.6	LOS A	6.9	51.5	0.94	0.93	53.2
30a	L1	596	8.0	0.620	8.8	LOS A	6.9	51.5	0.93	0.94	54.4
32a	R1	411	8.0	0.620	15.2	LOS B	5.6	41.6	0.89	1.01	51.4
Approach		1031	8.0	0.620	11.3	LOS B	6.9	51.5	0.92	0.97	53.1
All Vehicles		2849	8.0	0.764	13.5	LOS B	18.3	137.1	0.86	0.84	51.9

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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.

UPGRADE B - WESTERN ROUNDABOUT LAYOUT

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 37 2020AM west stage 2 UPGRADED - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	346	8.0	0.491	10.9	LOS B	4.1	31.0	0.87	0.90	51.5
22	T1	99	8.0	0.504	10.0	LOS A	5.1	37.9	0.93	0.86	50.3
23a	R1	1	8.0	0.504	16.0	LOS B	5.1	37.9	0.93	0.86	50.2
23b	R3	344	8.0	0.504	18.7	LOS B	5.1	37.9	0.93	0.86	52.0
Approach		790	8.0	0.504	14.2	LOS B	5.1	37.9	0.91	0.88	51.6
East: Elderslie Road (east)											
4a	L1	705	8.0	0.778	11.9	LOS B	25.9	194.1	0.86	0.67	51.8
6a	R1	109	8.0	0.778	18.3	LOS B	25.9	194.1	0.86	0.67	52.5
3	R2	328	8.0	0.401	14.6	LOS B	6.9	51.8	0.65	0.63	52.5
Approach		1142	8.0	0.778	13.3	LOS B	25.9	194.1	0.80	0.66	52.1
NorthWest: Old Pacific Highway (West)											
27b	L3	43	8.0	0.304	8.7	LOS A	1.6	12.1	0.79	0.87	51.6
27a	L1	100	8.0	0.304	7.6	LOS A	1.6	12.1	0.79	0.87	54.0
29	R2	49	8.0	0.304	15.4	LOS B	1.6	12.1	0.79	0.87	55.9
Approach		192	8.0	0.304	9.9	LOS A	1.6	12.1	0.79	0.87	53.9
SouthWest: Elderslie Road (south)											
30	L2	76	8.0	0.393	4.9	LOS A	2.3	17.4	0.71	0.50	54.9
30a	L1	367	8.0	0.393	4.1	LOS A	2.3	17.4	0.71	0.53	56.1
32a	R1	271	8.0	0.393	11.2	LOS B	2.2	16.2	0.71	0.81	53.8
Approach		714	8.0	0.393	6.9	LOS A	2.3	17.4	0.71	0.63	55.1
All Vehicles		2838	8.0	0.778	11.7	LOS B	25.9	194.1	0.81	0.73	52.8

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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: SIDRA Standard.

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

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

MOVEMENT SUMMARY

 Site: Model 38 2020PM west stage 2 UPGRADED - ACTUAL

M1 Northbound Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg: Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles Veh	Distance of Queue m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	59	8.0	0.085	6.8	LOS A	0.5	3.4	0.67	0.64	54.6
22	T1	102	8.0	0.287	6.9	LOS A	2.3	17.0	0.81	0.74	52.8
23a	R1	1	8.0	0.287	12.9	LOS B	2.3	17.0	0.81	0.74	52.7
23b	R3	166	8.0	0.287	15.6	LOS B	2.3	17.0	0.81	0.74	54.7
Approach		328	8.0	0.287	11.3	LOS B	2.3	17.0	0.79	0.72	54.1
East: Elderslie Road (east)											
4a	L1	545	8.0	0.781	12.8	LOS B	21.1	157.8	0.86	0.75	51.0
6a	R1	116	8.0	0.781	19.2	LOS B	21.1	157.8	0.86	0.75	51.7
3	R2	681	8.0	0.680	16.2	LOS B	17.5	131.0	0.77	0.63	51.5
Approach		1342	8.0	0.781	15.1	LOS B	21.1	157.8	0.81	0.69	51.3
NorthWest: Old Pacific Highway (West)											
27b	L3	93	8.0	0.782	29.0	LOS C	5.1	38.3	0.95	1.25	40.5
27a	L1	129	8.0	0.782	28.3	LOS C	5.1	38.3	0.95	1.25	42.0
29	R2	43	8.0	0.782	35.7	LOS D	5.1	38.3	0.95	1.25	43.1
Approach		265	8.0	0.782	29.8	LOS C	5.1	38.3	0.95	1.25	41.6
SouthWest: Elderslie Road (south)											
30	L2	24	8.0	0.657	12.2	LOS B	8.2	61.1	0.98	1.02	51.3
30a	L1	596	8.0	0.657	11.4	LOS B	8.2	61.1	0.98	1.03	52.4
32a	R1	416	8.0	0.657	18.8	LOS B	6.8	50.7	0.94	1.09	49.1
Approach		1036	8.0	0.657	14.4	LOS B	8.2	61.1	0.96	1.05	51.0
All Vehicles		2971	8.0	0.782	15.7	LOS B	21.1	157.8	0.88	0.87	50.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 includes Geometric Delay.

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

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

MOVEMENT SUMMARY

 Site: Model 11 2023AM west full dev UPGRADED - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	377	8.0	0.585	16.0	LOS B	6.2	46.4	0.96	1.05	48.1
22	T1	108	8.0	0.627	17.0	LOS B	9.0	67.2	1.00	1.05	46.1
23a	R1	1	8.0	0.627	23.1	LOS C	9.0	67.2	1.00	1.05	46.1
23b	R3	398	8.0	0.627	25.8	LOS C	9.0	67.2	1.00	1.05	47.6
Approach		884	8.0	0.627	20.6	LOS C	9.0	67.2	0.98	1.05	47.6
East: Elderslie Road (east)											
4a	L1	773	8.0	0.814	13.7	LOS B	31.9	238.7	0.88	0.68	50.5
6a	R1	120	8.0	0.814	20.1	LOS C	31.9	238.7	0.88	0.68	51.2
3	R2	373	8.0	0.434	14.5	LOS B	8.2	61.2	0.64	0.62	52.6
Approach		1266	8.0	0.814	14.5	LOS B	31.9	238.7	0.81	0.66	51.2
NorthWest: Old Pacific Highway (West)											
27b	L3	52	8.0	0.359	10.0	LOS B	2.1	15.5	0.83	0.92	50.7
27a	L1	105	8.0	0.359	8.9	LOS A	2.1	15.5	0.83	0.92	53.0
29	R2	53	8.0	0.359	16.7	LOS B	2.1	15.5	0.83	0.92	54.8
Approach		210	8.0	0.359	11.2	LOS B	2.1	15.5	0.83	0.92	52.8
SouthWest: Elderslie Road (south)											
30	L2	83	8.0	0.453	5.6	LOS A	3.0	22.3	0.76	0.60	54.6
30a	L1	400	8.0	0.453	4.8	LOS A	3.0	22.3	0.76	0.62	55.8
32a	R1	299	8.0	0.453	11.9	LOS B	2.7	20.3	0.76	0.89	53.6
Approach		782	8.0	0.453	7.6	LOS A	3.0	22.3	0.76	0.72	54.8
All Vehicles		3142	8.0	0.814	14.3	LOS B	31.9	238.7	0.85	0.80	51.1

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

MOVEMENT SUMMARY

 Site: Model 12 2023PM west full dev UPGRADED - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	64	8.0	0.107	7.3	LOS A	0.5	4.0	0.68	0.69	54.2
22	T1	111	8.0	0.354	7.5	LOS A	2.8	20.7	0.86	0.80	52.4
23a	R1	1	8.0	0.354	13.6	LOS B	2.8	20.7	0.86	0.80	52.3
23b	R3	185	8.0	0.354	16.3	LOS B	2.8	20.7	0.86	0.80	54.3
Approach		361	8.0	0.354	12.0	LOS B	2.8	20.7	0.83	0.78	53.7
East: Elderslie Road (east)											
4a	L1	593	8.0	0.785	12.2	LOS B	25.2	188.6	0.87	0.71	51.0
6a	R1	127	8.0	0.785	18.6	LOS B	25.2	188.6	0.87	0.71	51.6
3	R2	739	8.0	0.785	20.8	LOS C	25.2	188.6	0.87	0.80	49.0
Approach		1459	8.0	0.785	17.1	LOS B	25.2	188.6	0.87	0.75	50.0
NorthWest: Old Pacific Highway (West)											
27b	L3	103	8.0	0.855	34.9	LOS C	6.6	49.0	0.97	1.36	38.2
27a	L1	140	8.0	0.855	33.8	LOS C	6.6	49.0	0.97	1.36	39.5
29	R2	47	8.0	0.855	41.6	LOS D	6.6	49.0	0.97	1.36	40.5
Approach		290	8.0	0.855	35.5	LOS D	6.6	49.0	0.97	1.36	39.2
SouthWest: Elderslie Road (south)											
30	L2	26	8.0	0.744	14.4	LOS B	10.7	80.3	1.00	1.12	49.8
30a	L1	650	8.0	0.744	13.6	LOS B	10.7	80.3	1.00	1.13	50.9
32a	R1	456	8.0	0.744	20.4	LOS C	8.5	63.3	0.99	1.19	48.1
Approach		1132	8.0	0.744	16.3	LOS B	10.7	80.3	0.99	1.15	49.7
All Vehicles		3242	8.0	0.855	17.9	LOS B	25.2	188.6	0.92	0.95	49.1

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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.

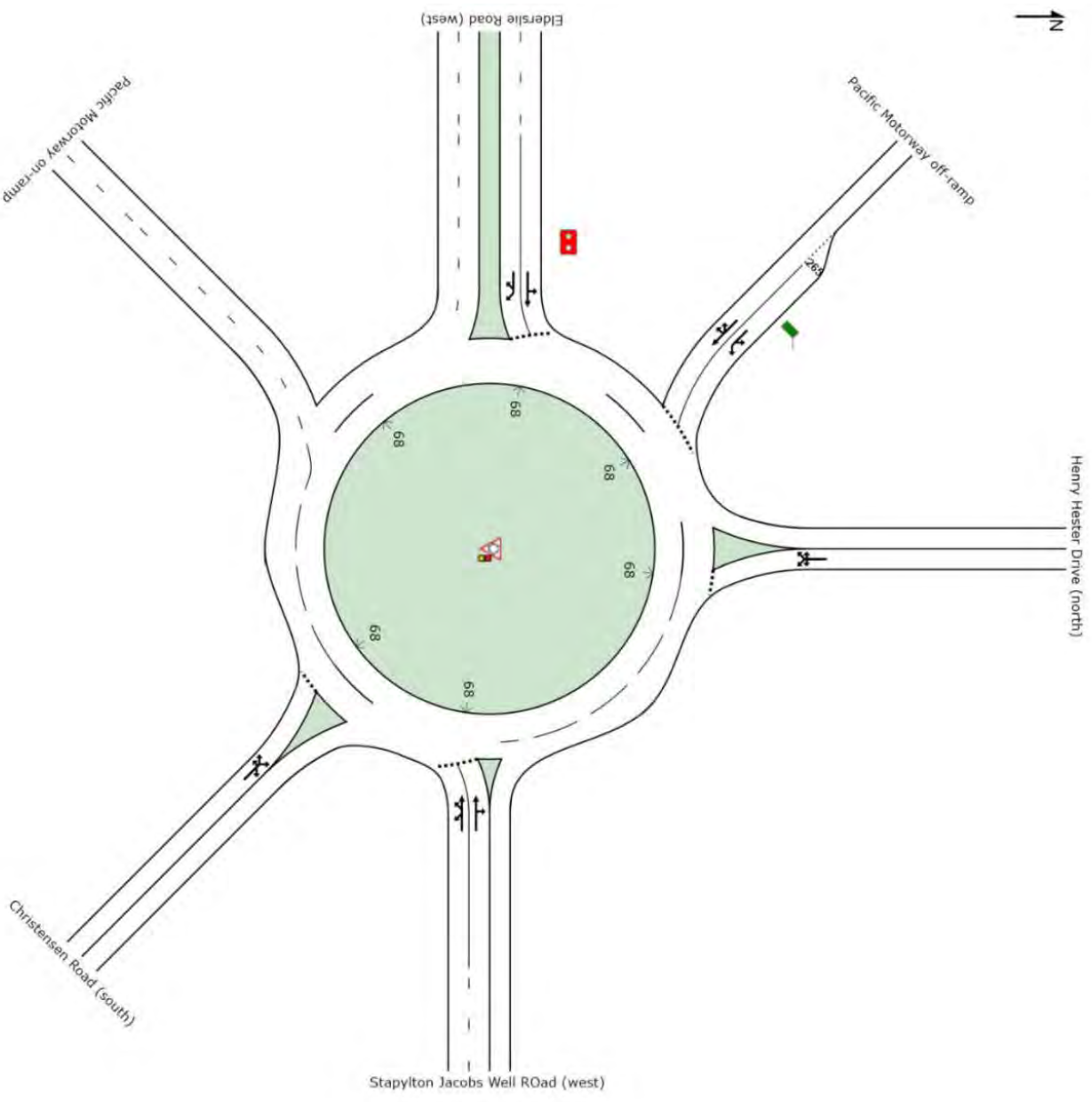
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

UPGRADE A – EASTERN ROUNDABOUT

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 21 2020AM east stage 1 UPGRADE A - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	25	8.0	0.322	5.8	LOS A	1.4	10.6	0.71	0.71	54.0
21a	L1	148	8.0	0.322	5.9	LOS A	1.4	10.6	0.71	0.71	55.9
23a	R1	38	8.0	0.322	12.0	LOS B	1.4	10.6	0.71	0.71	57.2
23b	R3	19	8.0	0.322	14.8	LOS B	1.4	10.6	0.71	0.71	60.4
Approach		230	8.0	0.322	7.6	LOS A	1.4	10.6	0.71	0.71	56.3
East: Stapylton Jacobs Well Road (west)											
4b	L3	37	8.0	0.457	7.6	LOS A	2.3	17.5	0.83	0.80	52.9
4a	L1	115	8.0	0.457	7.2	LOS A	2.3	17.5	0.83	0.80	56.0
5	T1	307	8.0	0.457	7.4	LOS A	2.3	17.5	0.84	0.81	56.4
6	R2	68	8.0	0.457	14.2	LOS B	1.5	11.3	0.85	0.81	56.9
Approach		527	8.0	0.457	8.2	LOS A	2.3	17.5	0.84	0.81	56.1
North: Henry Hester Drive (north)											
7	L2	67	8.0	0.480	5.7	LOS A	2.1	16.0	0.79	0.87	52.8
7a	L1	40	8.0	0.480	5.8	LOS A	2.1	16.0	0.79	0.87	54.5
9a	R1	103	8.0	0.480	11.9	LOS B	2.1	16.0	0.79	0.87	55.7
9	R2	81	8.0	0.480	13.4	LOS B	2.1	16.0	0.79	0.87	57.2
Approach		291	8.0	0.480	10.1	LOS B	2.1	16.0	0.79	0.87	55.2
NorthWest: Pacific Motorway off-ramp											
27b	L3	109	8.0	0.395	3.5	LOS A	1.6	12.1	0.54	0.37	54.9
27a	L1	270	8.0	0.395	3.1	LOS A	1.6	12.1	0.54	0.37	58.2
28	T1	209	8.0	0.621	3.6	LOS A	3.8	28.1	0.68	0.67	54.5
29	R2	1	8.0	0.621	10.8	LOS B	3.8	28.1	0.68	0.67	56.0
29b	R3	552	8.0	0.621	12.2	LOS B	3.8	28.1	0.68	0.67	57.3
Approach		1141	8.0	0.621	7.7	LOS A	3.8	28.1	0.64	0.57	56.7
West: Elderslie Road (west)											
10	L2	72	8.0	0.650	11.2	LOS B	8.0	59.7	0.93	0.96	52.0
11	T1	292	8.0	0.650	11.5	LOS B	8.0	59.7	0.93	0.96	54.9
12a	R1	187	8.0	0.666	17.8	LOS B	6.6	49.6	0.94	1.06	50.2
12b	R3	105	8.0	0.666	20.6	LOS C	6.6	49.6	0.94	1.06	52.5
Approach		656	8.0	0.666	14.7	LOS B	8.0	59.7	0.94	1.01	52.7
All Vehicles		2845	8.0	0.666	9.6	LOS A	8.0	59.7	0.76	0.76	55.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

MOVEMENT SUMMARY

 Site: Model 22 2020PM east stage 1 UPGRADE A - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	81	8.0	1.019	81.6	LOS F	26.1	195.6	1.00	2.75	26.5
21a	L1	301	8.0	1.019	81.7	LOS F	26.1	195.6	1.00	2.75	27.0
23a	R1	75	8.0	1.019	87.8	LOS F	26.1	195.6	1.00	2.75	27.3
23b	R3	25	8.0	1.019	90.7	LOS F	26.1	195.6	1.00	2.75	28.0
Approach		482	8.0	1.019	83.1	LOS F	26.1	195.6	1.00	2.75	27.0
East: Stapylton Jacobs Well Road (west)											
4b	L3	33	8.0	0.593	10.1	LOS B	4.6	34.3	0.82	1.00	50.8
4a	L1	255	8.0	0.593	11.5	LOS B	4.6	34.3	0.82	1.00	53.7
5	T1	468	8.0	0.593	11.9	LOS B	4.6	34.3	0.82	1.00	53.9
6	R2	96	8.0	0.593	19.2	LOS B	3.3	24.7	0.83	1.00	54.5
Approach		852	8.0	0.593	12.5	LOS B	4.6	34.3	0.82	1.00	53.8
North: Henry Hester Drive (north)											
7	L2	85	8.0	0.513	6.4	LOS A	2.5	19.0	0.77	0.92	52.4
7a	L1	33	8.0	0.513	6.5	LOS A	2.5	19.0	0.77	0.92	54.2
9a	R1	130	8.0	0.513	13.2	LOS B	2.5	19.0	0.77	0.92	55.4
9	R2	77	8.0	0.513	14.0	LOS B	2.5	19.0	0.77	0.92	56.8
Approach		325	8.0	0.513	11.0	LOS B	2.5	19.0	0.77	0.92	54.8
NorthWest: Pacific Motorway off-ramp											
27b	L3	84	8.0	0.350	4.1	LOS A	1.7	12.5	0.63	0.42	54.5
27a	L1	220	8.0	0.350	3.6	LOS A	1.7	12.5	0.63	0.42	57.7
28	T1	61	8.0	0.435	4.0	LOS A	2.7	20.1	0.69	0.72	53.6
29	R2	4	8.0	0.435	11.2	LOS B	2.7	20.1	0.69	0.72	54.9
29b	R3	412	8.0	0.435	12.6	LOS B	2.7	20.1	0.69	0.72	56.3
Approach		781	8.0	0.435	8.5	LOS A	2.7	20.1	0.67	0.61	56.2
West: Elderslie Road (west)											
10	L2	89	8.0	0.498	10.2	LOS B	5.5	41.3	0.86	0.82	52.6
11	T1	163	8.0	0.498	10.5	LOS B	5.5	41.3	0.86	0.82	55.7
12a	R1	72	8.0	0.757	19.3	LOS B	12.7	94.9	0.95	0.98	48.7
12b	R3	417	8.0	0.757	22.2	LOS C	12.7	94.9	0.95	0.98	50.8
Approach		741	8.0	0.757	17.9	LOS B	12.7	94.9	0.92	0.93	51.7
All Vehicles		3181	8.0	1.019	23.3	LOS C	26.1	195.6	0.83	1.14	47.0

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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.

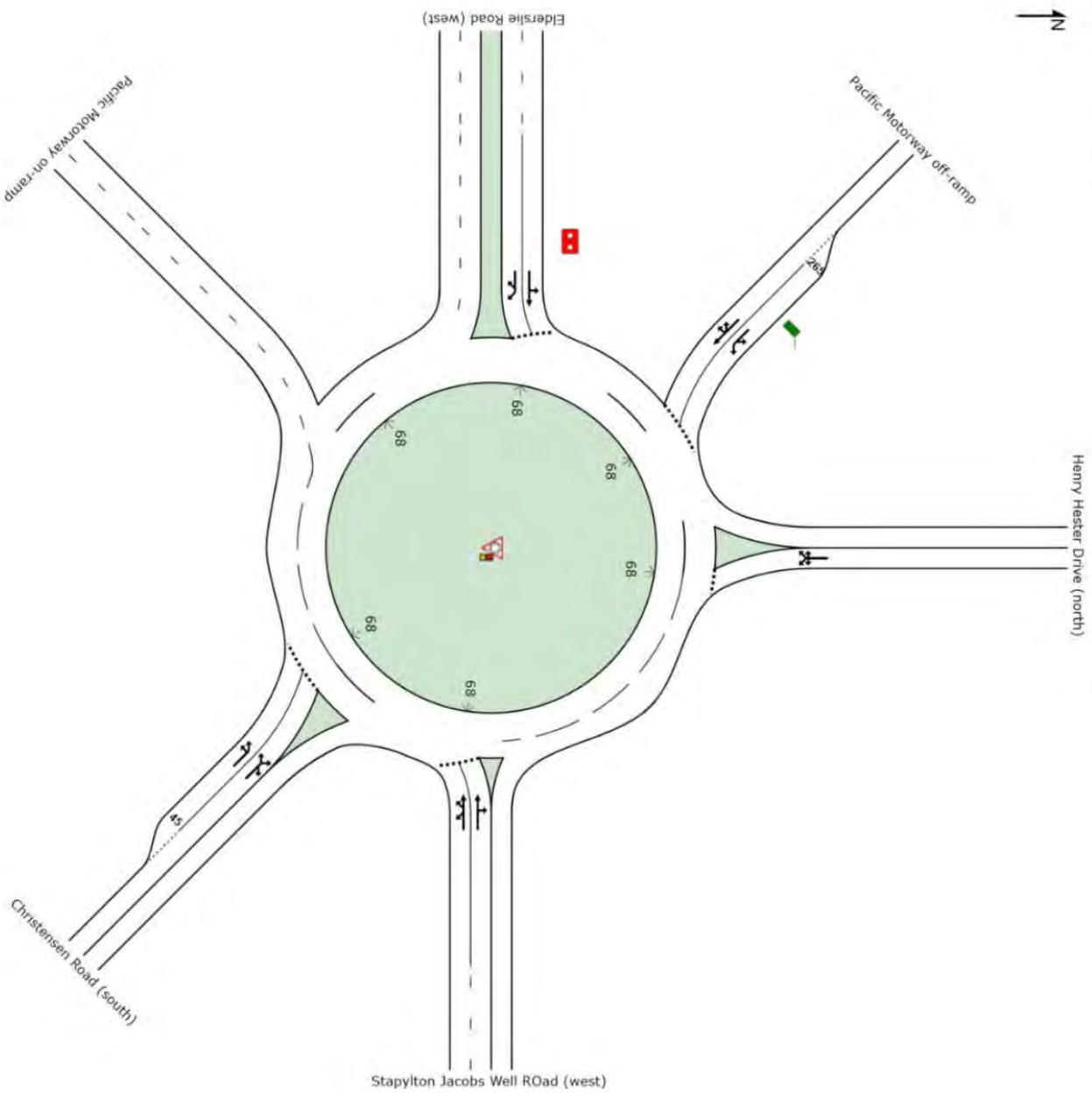
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

UPGRADE B – EASTERN ROUNDABOUT

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 21 2020AM east stage 2 UPGRADE B - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	32	8.0	0.165	5.1	LOS A	0.9	6.5	0.73	0.55	54.9
21a	L1	165	8.0	0.165	5.3	LOS A	0.9	6.5	0.72	0.61	56.2
23a	R1	43	8.0	0.165	12.0	LOS B	0.7	5.2	0.69	0.78	55.8
23b	R3	19	8.0	0.165	14.9	LOS B	0.7	5.2	0.69	0.78	58.7
Approach		259	8.0	0.165	7.1	LOS A	0.9	6.5	0.71	0.64	56.2
East: Stapylton Jacobs Well Road (west)											
4b	L3	37	8.0	0.563	9.1	LOS A	3.1	23.5	0.88	0.97	52.6
4a	L1	139	8.0	0.563	8.7	LOS A	3.1	23.5	0.88	0.97	55.6
5	T1	336	8.0	0.563	8.7	LOS A	3.1	23.5	0.88	0.94	56.0
6	R2	73	8.0	0.563	15.4	LOS B	1.9	14.6	0.89	0.91	56.5
Approach		585	8.0	0.563	9.6	LOS A	3.1	23.5	0.88	0.95	55.7
North: Henry Hester Drive (north)											
7	L2	71	8.0	0.534	6.8	LOS A	2.6	19.6	0.83	0.94	52.3
7a	L1	44	8.0	0.534	6.9	LOS A	2.6	19.6	0.83	0.94	54.0
9a	R1	103	8.0	0.534	13.0	LOS B	2.6	19.6	0.83	0.94	55.2
9	R2	81	8.0	0.534	14.4	LOS B	2.6	19.6	0.83	0.94	56.6
Approach		299	8.0	0.534	11.0	LOS B	2.6	19.6	0.83	0.94	54.7
NorthWest: Pacific Motorway off-ramp											
27b	L3	109	8.0	0.451	4.0	LOS A	2.2	16.7	0.63	0.42	54.4
27a	L1	303	8.0	0.451	3.6	LOS A	2.2	16.7	0.63	0.42	57.6
28	T1	230	8.0	0.670	4.4	LOS A	5.1	38.1	0.78	0.74	54.3
29	R2	1	8.0	0.670	11.6	LOS B	5.1	38.1	0.78	0.74	55.7
29b	R3	552	8.0	0.670	13.0	LOS B	5.1	38.1	0.78	0.74	57.1
Approach		1195	8.0	0.670	8.1	LOS A	5.1	38.1	0.73	0.63	56.4
West: Elderslie Road (west)											
10	L2	72	8.0	0.624	10.5	LOS B	9.1	68.3	0.90	0.84	52.5
11	T1	340	8.0	0.624	10.8	LOS B	9.1	68.3	0.90	0.84	55.5
12a	R1	219	8.0	0.629	16.9	LOS B	7.4	55.2	0.91	0.97	50.8
12b	R3	105	8.0	0.629	19.8	LOS B	7.4	55.2	0.91	0.97	53.1
Approach		736	8.0	0.629	13.8	LOS B	9.1	68.3	0.90	0.89	53.3
All Vehicles		3074	8.0	0.670	10.0	LOS A	9.1	68.3	0.81	0.79	55.3

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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 MSD).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Model 22 2020PM east stage 2 UPGRADE B - ACTUAL

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	96	8.0	0.553	8.8	LOS A	3.2	24.2	0.87	0.98	53.8
21a	L1	340	8.0	0.553	9.1	LOS A	3.2	24.2	0.88	0.99	54.7
23a	R1	86	8.0	0.553	15.9	LOS B	2.3	17.4	0.89	1.00	53.7
23b	R3	25	8.0	0.553	18.8	LOS B	2.3	17.4	0.89	1.00	56.5
Approach		547	8.0	0.553	10.6	LOS B	3.2	24.2	0.88	0.99	54.5
East: Stajylton Jacobs Well Road (west)											
4b	L3	33	8.0	0.714	14.4	LOS B	7.1	52.8	0.87	1.15	48.0
4a	L1	310	8.0	0.714	16.1	LOS B	7.1	52.8	0.87	1.15	50.5
5	T1	533	8.0	0.714	16.0	LOS B	7.1	52.8	0.88	1.13	51.0
6	R2	107	8.0	0.714	23.0	LOS C	4.8	35.6	0.88	1.11	51.9
Approach		983	8.0	0.714	16.7	LOS B	7.1	52.8	0.88	1.13	50.9
North: Henry Hester Drive (north)											
7	L2	86	8.0	0.538	7.1	LOS A	2.8	20.7	0.79	0.95	52.1
7a	L1	34	8.0	0.538	7.2	LOS A	2.8	20.7	0.79	0.95	53.8
9a	R1	130	8.0	0.538	13.6	LOS B	2.8	20.7	0.79	0.95	55.0
9	R2	77	8.0	0.538	14.7	LOS B	2.8	20.7	0.79	0.95	56.4
Approach		327	8.0	0.538	11.4	LOS B	2.8	20.7	0.79	0.95	54.4
NorthWest: Pacific Motorway off-ramp											
27b	L3	84	8.0	0.372	4.3	LOS A	1.9	14.2	0.66	0.45	54.3
27a	L1	230	8.0	0.372	3.9	LOS A	1.9	14.2	0.66	0.45	57.4
28	T1	67	8.0	0.450	4.2	LOS A	3.0	22.3	0.73	0.74	53.5
29	R2	4	8.0	0.450	11.4	LOS B	3.0	22.3	0.73	0.74	54.9
29b	R3	412	8.0	0.450	12.8	LOS B	3.0	22.3	0.73	0.74	56.2
Approach		797	8.0	0.450	8.6	LOS A	3.0	22.3	0.71	0.62	56.1
West: Elderslie Road (west)											
10	L2	89	8.0	0.520	10.2	LOS B	6.0	44.7	0.87	0.82	52.6
11	T1	178	8.0	0.520	10.5	LOS B	6.0	44.7	0.87	0.82	55.7
12a	R1	82	8.0	0.753	19.3	LOS B	13.2	98.8	0.96	0.96	48.7
12b	R3	417	8.0	0.753	22.2	LOS C	13.2	98.8	0.96	0.96	50.8
Approach		766	8.0	0.753	17.8	LOS B	13.2	98.8	0.93	0.91	51.8
All Vehicles		3420	8.0	0.753	13.6	LOS B	13.2	98.8	0.84	0.92	53.1

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 (Akcelik M3D).

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

MOVEMENT SUMMARY

 Site: Model 23 2023AM east full dev UPGRADED V2

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	60	8.0	0.215	6.0	LOS A	1.4	10.1	0.80	0.66	54.6
21a	L1	200	8.0	0.215	6.4	LOS A	1.4	10.1	0.79	0.71	55.7
23a	R1	48	8.0	0.215	13.4	LOS B	1.2	8.6	0.78	0.82	55.3
23b	R3	20	8.0	0.215	16.3	LOS B	1.2	8.6	0.78	0.82	58.2
Approach		328	8.0	0.215	8.0	LOS A	1.4	10.1	0.79	0.72	56.6
East: Stajpylton Jacobs Well Road (west)											
4b	L3	40	8.0	0.764	26.4	LOS C	7.7	57.3	0.95	1.24	42.6
4a	L1	148	8.0	0.764	26.0	LOS C	7.7	57.3	0.95	1.24	44.6
5	T1	361	8.0	0.764	28.9	LOS C	7.7	57.3	0.95	1.23	43.9
6	R2	76	8.0	0.764	36.4	LOS D	5.3	39.4	0.95	1.21	43.2
Approach		625	8.0	0.764	28.9	LOS C	7.7	57.3	0.95	1.23	43.9
North: Henry Hester Drive (north)											
7	L2	76	8.0	0.806	20.3	LOS C	6.2	46.4	0.95	1.20	44.5
7a	L1	50	8.0	0.806	20.4	LOS C	6.2	46.4	0.95	1.20	45.8
9a	R1	112	8.0	0.806	26.5	LOS C	6.2	46.4	0.95	1.20	46.6
9	R2	88	8.0	0.806	27.9	LOS C	6.2	46.4	0.95	1.20	47.6
Approach		326	8.0	0.806	24.5	LOS C	6.2	46.4	0.95	1.20	46.3
NorthWest: Pacific Motorway off-ramp											
27b	L3	119	8.0	0.314	4.8	LOS A	2.4	17.9	0.72	0.54	54.2
27a	L1	325	8.0	0.911	11.6	LOS B	28.5	213.5	0.88	0.84	51.0
28	T1	269	8.0	0.911	17.4	LOS B	28.5	213.5	1.00	1.08	48.1
29	R2	1	8.0	0.911	24.6	LOS C	28.5	213.5	1.00	1.08	49.2
29b	R3	602	8.0	0.911	26.0	LOS C	28.5	213.5	1.00	1.08	50.3
Approach		1316	8.0	0.911	18.8	LOS B	28.5	213.5	0.94	0.97	50.3
West: Elderslie Road (west)											
10	L2	78	8.0	0.718	19.8	LOS B	18.3	136.6	0.96	0.75	46.6
11	T1	341	8.0	0.718	20.1	LOS C	18.3	136.6	0.96	0.75	49.0
12a	R1	283	8.0	0.870	36.0	LOS D	20.9	156.5	1.00	1.07	41.1
12b	R3	114	8.0	0.870	38.8	LOS D	20.9	156.5	1.00	1.07	42.6
Approach		816	8.0	0.870	28.2	LOS C	20.9	156.5	0.98	0.91	44.8
All Vehicles		3411	8.0	0.911	22.4	LOS C	28.5	213.5	0.94	1.00	47.7

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 (Akcelik M3D).

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

MOVEMENT SUMMARY

 Site: Model 24 2023PM east full dev UPGRADED V2

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles Veh	Distance of Queue m	Prop. Queued	Effective Stop Rate per veh	Average Speed Km/h
SouthEast: Christensen Road (south)											
21	L2	111	8.0	0.653	13.5	LOS B	4.8	36.3	0.94	1.11	50.5
21a	L1	374	8.0	0.653	13.1	LOS B	4.8	36.3	0.93	1.09	51.8
23a	R1	94	8.0	0.653	18.4	LOS B	3.1	23.2	0.92	1.05	52.0
23b	R3	26	8.0	0.653	21.3	LOS C	3.1	23.2	0.92	1.05	54.6
Approach		605	8.0	0.653	14.3	LOS B	4.8	36.3	0.93	1.08	51.7
East: Stapylton Jacobs Well Road (west)											
4b	L3	35	8.0	0.934	56.5	LOS E	21.5	161.0	0.98	2.13	31.3
4a	L1	296	8.0	0.934	59.3	LOS E	21.5	161.0	0.98	2.13	32.3
5	T1	572	8.0	0.934	53.5	LOS D	21.5	161.0	0.98	1.93	34.4
6	R2	115	8.0	0.934	55.4	LOS E	11.9	88.8	0.98	1.76	36.5
Approach		1018	8.0	0.934	55.5	LOS E	21.5	161.0	0.98	1.98	33.9
North: Henry Hester Drive (north)											
7	L2	94	8.0	0.717	13.7	LOS B	4.9	36.6	0.90	1.11	48.0
7a	L1	38	8.0	0.717	13.8	LOS B	4.9	36.6	0.90	1.11	49.5
9a	R1	142	8.0	0.717	19.9	LOS B	4.9	36.6	0.90	1.11	50.5
9	R2	84	8.0	0.717	21.4	LOS C	4.9	36.6	0.90	1.11	51.7
Approach		358	8.0	0.717	18.0	LOS B	4.9	36.6	0.90	1.11	50.0
NorthWest: Pacific Motorway off-ramp											
27b	L3	92	8.0	0.232	4.7	LOS A	1.2	9.2	0.68	0.54	54.4
27a	L1	244	8.0	0.671	5.8	LOS A	7.1	53.0	0.83	0.77	54.3
28	T1	79	8.0	0.671	7.1	LOS A	7.1	53.0	0.92	0.90	53.6
29	R2	4	8.0	0.671	14.3	LOS B	7.1	53.0	0.92	0.90	55.0
29b	R3	450	8.0	0.671	15.7	LOS B	7.1	53.0	0.92	0.90	56.4
Approach		869	8.0	0.671	11.0	LOS B	7.1	53.0	0.87	0.82	55.3
West: Elderslie Road (west)											
10	L2	97	8.0	0.456	8.8	LOS A	6.1	45.6	0.81	0.69	53.7
11	T1	191	8.0	0.456	9.1	LOS A	6.1	45.6	0.81	0.69	56.9
12a	R1	96	8.0	0.672	16.5	LOS B	13.6	102.0	0.89	0.77	50.4
12b	R3	455	8.0	0.672	19.3	LOS B	13.6	102.0	0.89	0.77	52.6
Approach		839	8.0	0.672	15.4	LOS B	13.6	102.0	0.87	0.74	53.3
All Vehicles		3689	8.0	0.934	25.5	LOS C	21.5	161.0	0.91	1.19	46.0

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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.

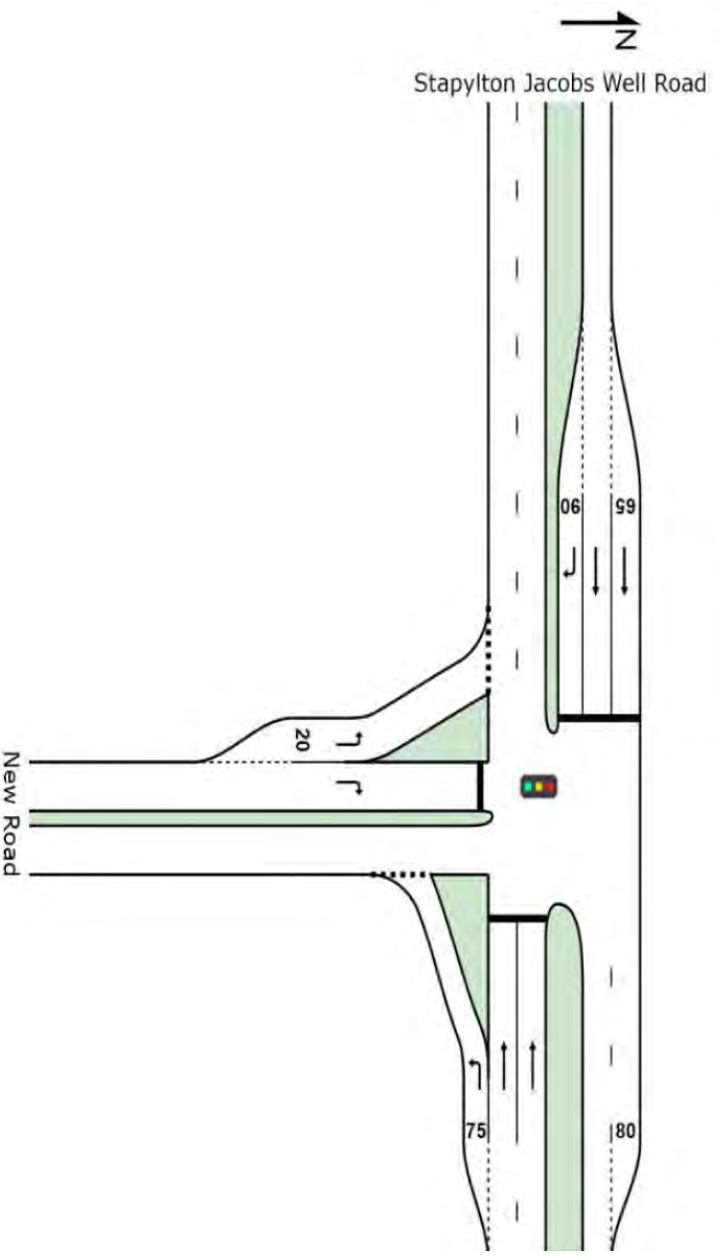
Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

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

SITE ACCESS / STAPYLTON JACOBS WELL ROAD INTERSECTION

2020AM PEAK – STAGE ONE
2020PM PEAK – STAGE ONE
2030AM PEAK – FULL DEVELOPMENT
2030PM PEAK – FULL DEVELOPMENT

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

 **Site: Model 31A 2020 AM Peak (SJW Rd - New Rd Int) - STAGE 1 - ACTUAL**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Distance of Queue m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New Road												
1	L2	32	15.0	0.035	7.7	LOS A	0.2	1.3	0.42	0.63	52.1	
3	R2	8	15.0	0.029	22.2	LOS C	0.1	1.1	0.88	0.65	43.0	
Approach		40	15.0	0.035	10.6	LOS B	0.2	1.3	0.51	0.63	50.0	
East: Stapylton Jacobs Well Road												
4	L2	15	15.0	0.014	6.9	LOS A	0.1	0.4	0.34	0.60	52.5	
5	T1	490	15.0	0.546	14.9	LOS B	4.4	35.0	0.92	0.76	48.2	
Approach		505	15.0	0.546	14.7	LOS B	4.4	35.0	0.90	0.75	48.3	
West: Stapylton Jacobs Well Road												
11	T1	590	15.0	0.408	5.5	LOS A	4.7	36.9	0.59	0.50	55.0	
12	R2	58	15.0	0.234	23.3	LOS C	1.1	8.6	0.92	0.73	42.5	
Approach		648	15.0	0.408	7.1	LOS A	4.7	36.9	0.62	0.52	53.6	
All Vehicles		1193	15.0	0.546	10.4	LOS B	4.7	36.9	0.73	0.62	51.1	

MOVEMENT SUMMARY

 **Site: Model 31B 2020 PM Peak (SJW Rd - New Rd Int) - STAGE 1 - ACTUAL**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Distance of Queue m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New Road												
1	L2	72	15.0	0.086	8.8	LOS A	0.5	3.9	0.52	0.66	51.3	
3	R2	18	15.0	0.066	22.4	LOS C	0.3	2.5	0.89	0.68	42.9	
Approach		90	15.0	0.086	11.5	LOS B	0.5	3.9	0.59	0.67	49.4	
East: Stapylton Jacobs Well Road												
4	L2	5	15.0	0.004	6.8	LOS A	0.0	0.1	0.31	0.58	52.6	
5	T1	740	15.0	0.824	21.0	LOS C	8.5	67.2	1.00	1.04	44.7	
Approach		745	15.0	0.824	20.9	LOS C	8.5	67.2	1.00	1.04	44.7	
West: Stapylton Jacobs Well Road												
11	T1	496	15.0	0.343	5.3	LOS A	3.8	29.6	0.57	0.48	55.2	
12	R2	18	15.0	0.073	22.6	LOS C	0.3	2.6	0.89	0.68	42.9	
Approach		514	15.0	0.343	5.9	LOS A	3.8	29.6	0.58	0.49	54.7	
All Vehicles		1349	15.0	0.824	14.6	LOS B	8.5	67.2	0.81	0.80	48.4	

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik MSD).

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

MOVEMENT SUMMARY

 **Site: Model 34A 2030 AM Peak (SJW Rd - New Rd Int) - ULTIMATE - ACTUAL**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total Veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles Veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New Road												
1	L2	77	15.0	0.090	8.8	LOS A	0.5	4.2	0.52	0.66	51.3	
3	R2	40	15.0	0.146	22.8	LOS C	0.7	5.8	0.90	0.71	42.7	
Approach		117	15.0	0.146	13.6	LOS B	0.7	5.8	0.65	0.68	48.0	
East: Stapylton Jacobs Well Road												
4	L2	62	15.0	0.060	7.5	LOS A	0.3	2.3	0.41	0.63	52.3	
5	T1	681	15.0	0.759	18.4	LOS B	7.2	56.9	0.98	0.94	46.1	
Approach		743	15.0	0.759	17.5	LOS B	7.2	56.9	0.93	0.92	46.6	
West: Stapylton Jacobs Well Road												
11	T1	815	15.0	0.563	6.1	LOS A	7.3	57.5	0.65	0.57	54.6	
12	R2	141	15.0	0.569	24.8	LOS C	2.9	22.6	0.97	0.82	41.8	
Approach		956	15.0	0.569	8.8	LOS A	7.3	57.5	0.70	0.60	52.2	
All Vehicles			1816	15.0	0.759	12.7	LOS B	7.3	57.5	0.79	0.74	49.5

MOVEMENT SUMMARY

 **Site: Model 34B 2030 PM Peak (SJW Rd - New Rd Int) - ULTIMATE - ACTUAL**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total Veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New Road												
1	L2	175	15.0	0.242	10.5	LOS B	1.9	14.7	0.58	0.71	50.2	
3	R2	65	15.0	0.297	29.1	LOS C	1.6	12.4	0.95	0.74	39.8	
Approach		240	15.0	0.297	15.5	LOS B	1.9	14.7	0.68	0.72	46.9	
East: Stapylton Jacobs Well Road												
4	L2	19	15.0	0.016	6.7	LOS A	0.1	0.5	0.27	0.59	52.7	
5	T1	1026	15.0	0.714	15.3	LOS B	11.4	90.3	0.90	0.83	48.0	
Approach		1045	15.0	0.714	15.1	LOS B	11.4	90.3	0.89	0.83	48.1	
West: Stapylton Jacobs Well Road												
11	T1	644	15.0	0.382	4.4	LOS A	5.2	40.8	0.48	0.42	55.9	
12	R2	44	15.0	0.222	29.0	LOS C	1.1	8.3	0.94	0.73	39.9	
Approach		688	15.0	0.382	6.0	LOS A	5.2	40.8	0.51	0.44	54.5	
All Vehicles		1973	15.0	0.714	12.0	LOS B	11.4	90.3	0.73	0.68	50.0	

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik M3D).

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

APPENDIX I – DETAIL SIDRA RESULTS OF SENSITIVITY ANALYSIS

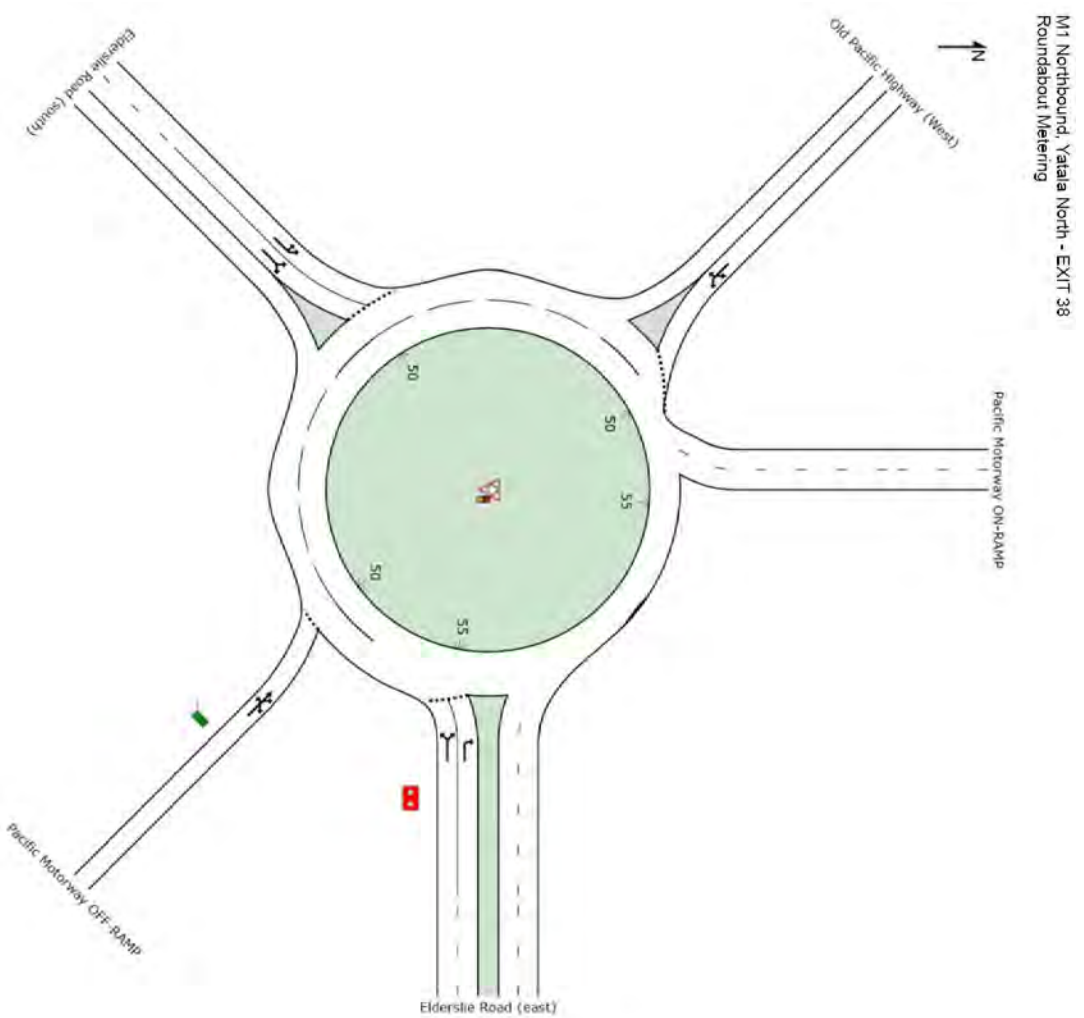
Western roundabout (upgraded):

- Year 2020 AM Peak Hour, with Stage 1 - EXISTING;
- Year 2020 PM Peak Hour, with Stage 1 - EXISTING;
- Year 2023 AM Peak Hour full development – UPGRADE B;
- Year 2023 PM Peak Hour full development – UPGRADE B;

Eastern roundabout:

- Year 2020 AM Peak Hour, with Stage 1 development UPGRADE A;
- Year 2020 PM Peak Hour, with Stage 1 development UPGRADE A;
- Year 2020 AM Peak Hour, with Stage 2 development UPGRADE B;
- Year 2020 PM Peak Hour, with Stage 2 development UPGRADE B;
- Year 2023 AM Peak Hour, with full development UPGRADE B;
- Year 2023 PM Peak Hour, with full development UPGRADE B;

EXISTING – WESTERN ROUNDABOUT



MOVEMENT SUMMARY

 Site: Model 3 2020AM west stage 1

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	346	8.0	0.917	83.3	LOS F	57.3	428.6	1.00	2.21	25.9
22	T1	99	8.0	0.917	75.7	LOS E	57.3	428.6	1.00	2.21	26.5
23a	R1	1	8.0	0.917	81.8	LOS F	57.3	428.6	1.00	2.21	26.4
23b	R3	310	8.0	0.917	91.6	LOS F	57.3	428.6	1.00	2.21	27.0
Approach		756	8.0	0.917	85.7	LOS F	57.3	428.6	1.00	2.21	26.4
East: Elderslie Road (east)											
4a	L1	699	8.0	0.910	32.4	LOS C	48.8	364.7	1.00	0.91	40.5
6a	R1	108	8.0	0.910	38.8	LOS D	48.8	364.7	1.00	0.91	40.9
3	R2	308	8.0	0.446	19.5	LOS B	10.7	79.9	0.74	0.61	49.4
Approach		1115	8.0	0.910	29.4	LOS C	48.8	364.7	0.93	0.83	42.7
NorthWest: Old Pacific Highway (West)											
27b	L3	42	8.0	0.277	7.3	LOS A	1.4	10.6	0.74	0.81	52.4
27a	L1	99	8.0	0.277	6.3	LOS A	1.4	10.6	0.74	0.81	54.8
29	R2	49	8.0	0.277	14.0	LOS B	1.4	10.6	0.74	0.81	56.8
Approach		190	8.0	0.277	8.5	LOS A	1.4	10.6	0.74	0.81	54.8
SouthWest: Elderslie Road (south)											
30	L2	76	8.0	0.377	5.0	LOS A	2.5	18.9	0.72	0.50	54.8
30a	L1	367	8.0	0.377	4.2	LOS A	2.5	18.9	0.72	0.54	55.9
32a	R1	260	8.0	0.377	11.1	LOS B	2.3	17.4	0.73	0.77	54.0
Approach		703	8.0	0.377	6.8	LOS A	2.5	18.9	0.72	0.62	55.1
All Vehicles		2764	8.0	0.917	37.6	LOS D	57.3	428.6	0.88	1.15	38.9

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

MOVEMENT SUMMARY

 Site: Model 4 2020PM west stage 1

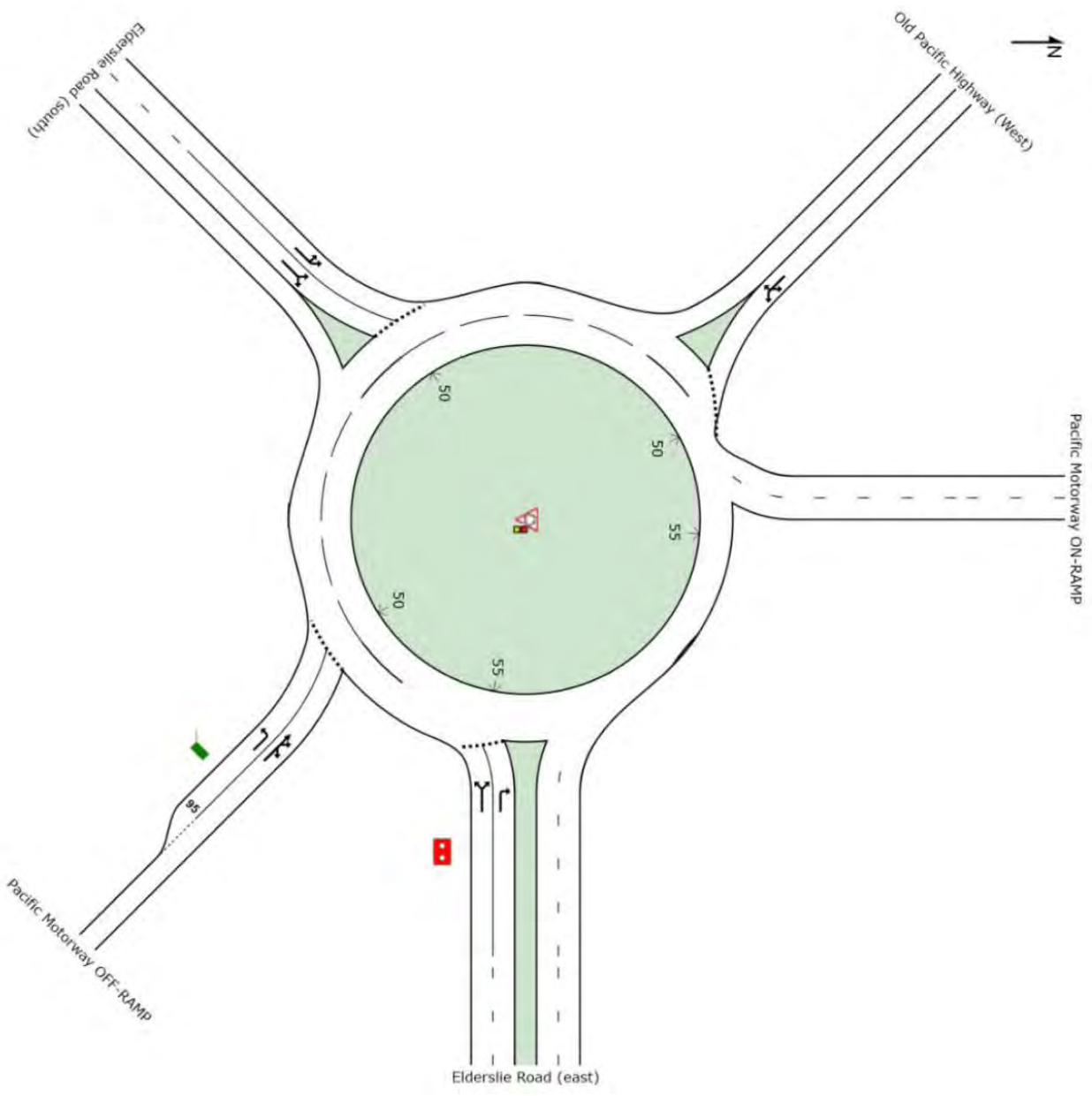
M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles												
Mov ID	OD Mov	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 per veh	Average Speed km/h	
SouthEast: Pacific Motorway OFF-RAMP												
21	L2	59	8.0	0.388	7.2	LOS A	2.7	20.4	0.80	0.78	51.5	
22	T1	102	8.0	0.388	6.7	LOS A	2.7	20.4	0.80	0.78	53.6	
23a	R1	1	8.0	0.388	12.8	LOS B	2.7	20.4	0.80	0.78	53.5	
23b	R3	155	8.0	0.388	15.5	LOS B	2.7	20.4	0.80	0.78	55.7	
Approach		317	8.0	0.388	11.1	LOS B	2.7	20.4	0.80	0.78	54.2	
East: Elderslie Road (east)												
4a	L1	532	8.0	0.645	8.3	LOS A	16.2	121.0	0.78	0.57	54.2	
6a	R1	114	8.0	0.645	14.8	LOS B	16.2	121.0	0.78	0.57	55.0	
3	R2	638	8.0	0.777	20.5	LOS C	19.9	149.2	0.87	0.81	48.8	
Approach		1284	8.0	0.777	15.0	LOS B	19.9	149.2	0.82	0.69	51.4	
NorthWest: Old Pacific Highway (West)												
27b	L3	93	8.0	0.716	21.6	LOS C	4.4	32.7	0.93	1.15	44.2	
27a	L1	129	8.0	0.716	20.5	LOS C	4.4	32.7	0.93	1.15	45.8	
29	R2	43	8.0	0.716	28.3	LOS C	4.4	32.7	0.93	1.15	47.2	
Approach		265	8.0	0.716	22.1	LOS C	4.4	32.7	0.93	1.15	45.5	
SouthWest: Elderslie Road (south)												
30	L2	24	8.0	0.638	10.6	LOS B	7.4	55.7	0.96	0.97	52.5	
30a	L1	596	8.0	0.638	9.7	LOS A	7.4	55.7	0.96	0.97	53.7	
32a	R1	413	8.0	0.638	16.5	LOS B	6.1	45.4	0.92	1.04	50.6	
Approach		1033	8.0	0.638	12.4	LOS B	7.4	55.7	0.94	1.00	52.3	
All Vehicles		2899	8.0	0.777	14.3	LOS B	19.9	149.2	0.87	0.85	51.4	

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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.

UPGRADE B – WESTERN ROUNDABOUT

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 11 2023AM west full dev UPGRADED

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast Pacific Motorway OFF-RAMP											
21	L2	377	8.0	0.617	20.7	LOS C	7.5	55.8	1.00	1.13	45.3
22	T1	108	8.0	0.768	32.9	LOS C	18.3	136.8	1.00	1.37	39.0
23a	R1	1	8.0	0.768	39.0	LOS D	18.3	136.8	1.00	1.37	39.0
23b	R3	492	8.0	0.768	41.7	LOS D	18.3	136.8	1.00	1.37	40.1
Approach		978	8.0	0.768	32.6	LOS C	18.3	136.8	1.00	1.27	41.7
East Elderslie Road (east)											
4a	L1	792	8.0	0.801	12.5	LOS B	32.8	245.5	0.85	0.62	51.4
6a	R1	124	8.0	0.801	18.9	LOS B	32.8	245.5	0.85	0.62	52.1
3	R2	438	8.0	0.485	14.4	LOS B	10.2	76.1	0.65	0.60	52.7
Approach		1354	8.0	0.801	13.7	LOS B	32.8	245.5	0.79	0.62	51.9
NorthWest Old Pacific Highway (West)											
27b	L3	46	8.0	0.415	12.8	LOS B	2.6	19.6	0.88	0.98	49.0
27a	L1	117	8.0	0.415	11.7	LOS B	2.6	19.6	0.88	0.98	51.0
29	R2	53	8.0	0.415	19.5	LOS B	2.6	19.6	0.88	0.98	52.7
Approach		216	8.0	0.415	13.9	LOS B	2.6	19.6	0.88	0.98	51.0
SouthWest Elderslie Road (south)											
30	L2	83	8.0	0.510	6.5	LOS A	3.7	27.4	0.82	0.73	54.3
30a	L1	400	8.0	0.510	5.7	LOS A	3.7	27.4	0.82	0.74	55.7
32a	R1	330	8.0	0.510	13.1	LOS B	3.2	24.2	0.81	0.97	52.7
Approach		813	8.0	0.510	8.8	LOS A	3.7	27.4	0.82	0.83	54.3
All Vehicles		3361	8.0	0.801	18.0	LOS B	32.8	245.5	0.86	0.88	48.8

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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 (Akgelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Model 12 2023PM west full dev UPGRADED

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Pacific Motorway OFF-RAMP											
21	L2	64	8.0	0.118	9.1	LOS A	0.6	4.7	0.73	0.73	52.9
22	T1	111	8.0	0.432	10.0	LOS A	3.7	27.8	0.93	0.85	50.8
23a	R1	1	8.0	0.432	16.0	LOS B	3.7	27.8	0.93	0.85	50.8
23b	R3	219	8.0	0.432	18.7	LOS B	3.7	27.8	0.93	0.85	52.7
Approach		395	8.0	0.432	14.7	LOS B	3.7	27.8	0.90	0.83	52.2
East: Elderslie Road (east)											
4a	L1	625	8.0	0.813	13.5	LOS B	30.6	228.9	0.87	0.70	49.9
6a	R1	133	8.0	0.813	19.9	LOS B	30.6	228.9	0.87	0.70	50.6
3	R2	848	8.0	0.813	22.3	LOS C	30.6	228.9	0.87	0.78	48.2
Approach		1606	8.0	0.813	18.7	LOS B	30.6	228.9	0.87	0.74	49.0
NorthWest: Old Pacific Highway (West)											
27b	L3	101	8.0	0.920	58.5	LOS E	9.6	72.2	0.98	1.65	30.8
27a	L1	144	8.0	0.920	57.5	LOS E	9.6	72.2	0.98	1.65	31.6
29	R2	47	8.0	0.920	65.2	LOS E	9.6	72.2	0.98	1.65	32.3
Approach		292	8.0	0.920	59.1	LOS E	9.6	72.2	0.98	1.65	31.5
SouthWest: Elderslie Road (south)											
30	L2	26	8.0	0.817	21.6	LOS C	14.7	110.1	1.00	1.30	45.5
30a	L1	650	8.0	0.817	20.8	LOS C	14.7	110.1	1.00	1.30	46.5
32a	R1	466	8.0	0.817	29.3	LOS C	11.9	88.7	1.00	1.35	43.3
Approach		1142	8.0	0.817	24.3	LOS C	14.7	110.1	1.00	1.32	45.1
All Vehicles		3435	8.0	0.920	23.5	LOS C	30.6	228.9	0.93	1.02	45.9

Level of Service (LOS) Method: Delay (HCM 2000).
 Roundabout LOS Method: Same as Signalised Intersections.
 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 includes Geometric Delay.
 Gap-Acceptance Capacity: SIDRA Standard (Alceik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

 Site: Model 21 2020AM east stage 1 UPGRADE A - SENSITIVITY

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	25	8.0	0.340	6.1	LOS A	1.6	11.9	0.74	0.75	53.8
21a	L1	148	8.0	0.340	6.2	LOS A	1.6	11.9	0.74	0.75	55.6
23a	R1	38	8.0	0.340	12.3	LOS B	1.6	11.9	0.74	0.75	56.9
23b	R3	23	8.0	0.340	15.2	LOS B	1.6	11.9	0.74	0.75	60.1
Approach		234	8.0	0.340	8.1	LOS A	1.6	11.9	0.74	0.75	56.0
East: Stapylton Jacobs Well Road (west)											
4b	L3	41	8.0	0.495	7.5	LOS A	2.7	20.2	0.84	0.80	52.9
4a	L1	128	8.0	0.495	7.1	LOS A	2.7	20.2	0.84	0.80	56.0
5	T1	324	8.0	0.495	7.4	LOS A	2.7	20.2	0.85	0.81	56.3
6	R2	78	8.0	0.495	14.5	LOS B	1.7	13.0	0.86	0.83	56.7
Approach		571	8.0	0.495	8.3	LOS A	2.7	20.2	0.85	0.81	56.0
North: Henry Hester Drive (north)											
7	L2	70	8.0	0.495	6.1	LOS A	2.3	17.3	0.80	0.90	52.7
7a	L1	40	8.0	0.495	6.2	LOS A	2.3	17.3	0.80	0.90	54.4
9a	R1	103	8.0	0.495	12.3	LOS B	2.3	17.3	0.80	0.90	55.6
9	R2	81	8.0	0.495	13.7	LOS B	2.3	17.3	0.80	0.90	57.0
Approach		294	8.0	0.495	10.4	LOS B	2.3	17.3	0.80	0.90	55.1
NorthWest: Pacific Motorway off-ramp											
27b	L3	109	8.0	0.433	3.8	LOS A	2.0	14.8	0.60	0.40	54.6
27a	L1	292	8.0	0.433	3.4	LOS A	2.0	14.8	0.60	0.40	57.8
28	T1	209	8.0	0.645	4.0	LOS A	4.4	32.7	0.74	0.70	54.3
29	R2	1	8.0	0.645	11.2	LOS B	4.4	32.7	0.74	0.70	55.7
29b	R3	552	8.0	0.645	12.6	LOS B	4.4	32.7	0.74	0.70	57.1
Approach		1163	8.0	0.645	7.9	LOS A	4.4	32.7	0.69	0.60	56.5
West: Elderslie Road (west)											
10	L2	72	8.0	0.658	11.1	LOS B	8.9	66.4	0.93	0.92	52.0
11	T1	324	8.0	0.658	11.4	LOS B	8.9	66.4	0.93	0.92	54.9
12a	R1	187	8.0	0.625	17.2	LOS B	6.6	49.1	0.92	1.02	50.6
12b	R3	105	8.0	0.625	20.0	LOS B	6.6	49.1	0.92	1.02	52.9
Approach		688	8.0	0.658	14.3	LOS B	8.9	66.4	0.93	0.97	53.0
All Vehicles		2950	8.0	0.658	9.7	LOS A	8.9	66.4	0.79	0.77	55.4

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

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

MOVEMENT SUMMARY

 Site: Model 22 2020PM east stage 1 UPGRADE A - SENSITIVITY

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	81	8.0	1.065	146.9	LOS F	47.3	353.5	1.00	4.05	18.4
21a	L1	301	8.0	1.065	147.0	LOS F	47.3	353.5	1.00	4.05	18.6
23a	R1	75	8.0	1.065	153.1	LOS F	47.3	353.5	1.00	4.05	18.7
23b	R3	34	8.0	1.065	155.9	LOS F	47.3	353.5	1.00	4.05	19.0
Approach		491	8.0	1.065	148.5	LOS F	47.3	353.5	1.00	4.05	18.6
East: Stapylton Jacobs Well Road (west)											
4b	L3	42	8.0	0.628	10.8	LOS B	5.1	38.5	0.83	1.03	50.4
4a	L1	255	8.0	0.628	12.2	LOS B	5.1	38.5	0.83	1.03	53.2
5	T1	507	8.0	0.628	12.6	LOS B	5.1	38.5	0.84	1.03	53.4
6	R2	98	8.0	0.628	19.8	LOS B	3.6	27.3	0.84	1.03	54.1
Approach		902	8.0	0.628	13.2	LOS B	5.1	38.5	0.83	1.03	53.3
North: Henry Hester Drive (north)											
7	L2	86	8.0	0.519	6.5	LOS A	2.6	19.1	0.77	0.93	52.4
7a	L1	33	8.0	0.519	6.6	LOS A	2.6	19.1	0.77	0.93	54.1
9a	R1	130	8.0	0.519	13.3	LOS B	2.6	19.1	0.77	0.93	55.3
9	R2	77	8.0	0.519	14.1	LOS B	2.6	19.1	0.77	0.93	56.7
Approach		326	8.0	0.519	11.0	LOS B	2.6	19.1	0.77	0.93	54.7
NorthWest: Pacific Motorway off-ramp											
27b	L3	84	8.0	0.361	4.1	LOS A	1.8	13.1	0.64	0.43	54.4
27a	L1	227	8.0	0.361	3.7	LOS A	1.8	13.1	0.64	0.43	57.6
28	T1	61	8.0	0.439	4.0	LOS A	2.7	20.4	0.70	0.73	53.5
29	R2	4	8.0	0.439	11.2	LOS B	2.7	20.4	0.70	0.73	54.9
29b	R3	412	8.0	0.439	12.6	LOS B	2.7	20.4	0.70	0.73	56.2
Approach		788	8.0	0.439	8.5	LOS A	2.7	20.4	0.68	0.61	56.2
West: Elderslie Road (west)											
10	L2	89	8.0	0.518	10.3	LOS B	5.8	43.3	0.87	0.83	52.6
11	T1	173	8.0	0.518	10.6	LOS B	5.8	43.3	0.87	0.83	55.6
12a	R1	72	8.0	0.758	19.4	LOS B	12.7	95.1	0.96	0.99	48.7
12b	R3	417	8.0	0.758	22.2	LOS C	12.7	95.1	0.96	0.99	50.8
Approach		751	8.0	0.758	17.8	LOS B	12.7	95.1	0.92	0.93	51.7
All Vehicles		3258	8.0	1.065	33.3	LOS C	47.3	353.5	0.84	1.35	42.1

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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.

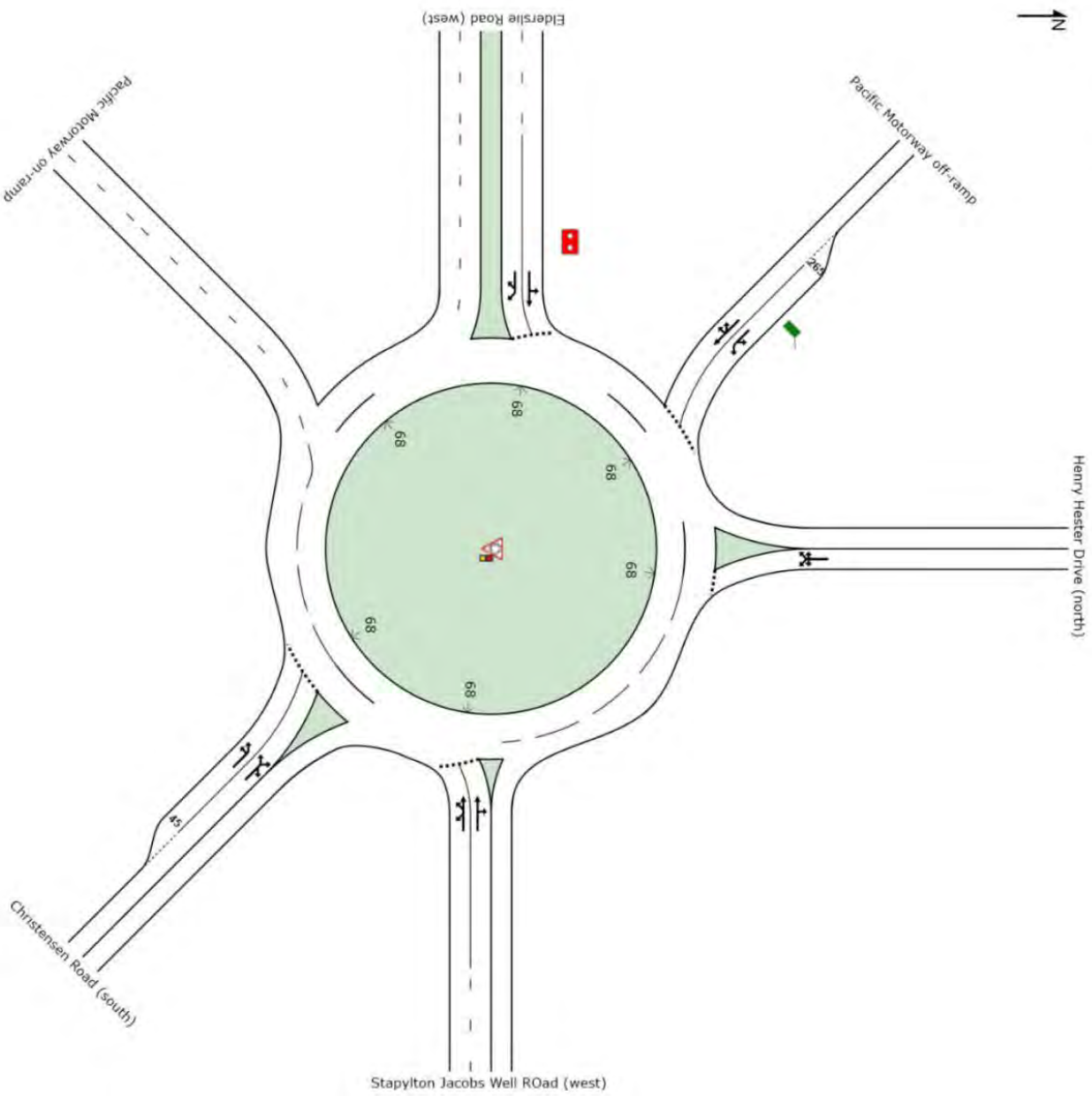
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

UPGRADE B – EASTERN ROUNDABOUT

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering



MOVEMENT SUMMARY

 Site: Model 35 2020AM east Stage 2 UPGRADE B - SENSITIVITY

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	38	8.0	0.193	5.5	LOS A	1.1	8.1	0.76	0.59	54.7
21a	L1	182	8.0	0.193	5.7	LOS A	1.1	8.1	0.75	0.64	56.0
23a	R1	48	8.0	0.193	12.4	LOS B	0.9	6.4	0.72	0.80	55.4
23b	R3	23	8.0	0.193	15.3	LOS B	0.9	6.4	0.72	0.80	58.3
Approach		291	8.0	0.193	7.5	LOS A	1.1	8.1	0.75	0.67	55.9
East: Stapylton Jacobs Well Road (west)											
4b	L3	41	8.0	0.751	15.9	LOS B	4.8	36.1	0.94	1.15	47.9
4a	L1	176	8.0	0.751	16.0	LOS B	4.8	36.1	0.94	1.15	50.5
5	T1	382	8.0	0.751	15.6	LOS B	4.8	36.1	0.94	1.12	51.2
6	R2	88	8.0	0.751	22.1	LOS C	3.0	22.2	0.94	1.09	52.3
Approach		687	8.0	0.751	16.5	LOS B	4.8	36.1	0.94	1.13	51.0
North: Henry Hester Drive (north)											
7	L2	77	8.0	0.628	9.0	LOS A	3.2	23.6	0.88	1.02	51.1
7a	L1	47	8.0	0.628	9.1	LOS A	3.2	23.6	0.88	1.02	52.8
9a	R1	103	8.0	0.628	15.2	LOS B	3.2	23.6	0.88	1.02	53.9
9	R2	81	8.0	0.628	16.6	LOS B	3.2	23.6	0.88	1.02	55.2
Approach		308	8.0	0.628	13.0	LOS B	3.2	23.6	0.88	1.02	53.3
NorthWest: Pacific Motorway off-ramp											
27b	L3	109	8.0	0.550	4.4	LOS A	3.2	24.1	0.70	0.47	54.0
27a	L1	395	8.0	0.550	4.0	LOS A	3.2	24.1	0.70	0.47	57.2
28	T1	251	8.0	0.684	4.8	LOS A	5.8	43.3	0.81	0.77	54.3
29	R2	1	8.0	0.684	12.0	LOS B	5.8	43.3	0.81	0.77	55.7
29b	R3	552	8.0	0.684	13.4	LOS B	5.8	43.3	0.81	0.77	57.1
Approach		1308	8.0	0.684	8.2	LOS A	5.8	43.3	0.77	0.65	56.3
West: Elderslie Road (west)											
10	L2	72	8.0	0.647	10.9	LOS B	8.3	62.2	0.90	0.90	52.1
11	T1	283	8.0	0.647	11.2	LOS B	8.3	62.2	0.90	0.90	55.1
12a	R1	251	8.0	0.507	15.4	LOS B	7.4	55.2	0.85	0.77	51.8
12b	R3	105	8.0	0.507	18.2	LOS B	7.4	55.2	0.85	0.77	54.3
Approach		711	8.0	0.647	13.7	LOS B	8.3	62.2	0.87	0.84	53.4
All Vehicles		3305	8.0	0.751	11.5	LOS B	8.3	62.2	0.84	0.83	54.2

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 (Akgelik M3D).

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

MOVEMENT SUMMARY

 Site: Model 36 2020PM east Stage 2 UPGRADE B - SENSITIVITY

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	111	8.0	0.707	13.3	LOS B	4.7	35.4	0.93	1.10	50.6
21a	L1	379	8.0	0.707	12.8	LOS B	4.7	35.4	0.93	1.09	52.0
23a	R1	97	8.0	0.707	17.6	LOS B	2.9	21.7	0.94	1.06	52.4
23b	R3	34	8.0	0.707	20.4	LOS C	2.9	21.7	0.94	1.06	55.0
Approach		621	8.0	0.707	14.0	LOS B	4.7	35.4	0.93	1.09	52.0
East: Stapylton Jacobs Well Road (west)											
4b	L3	42	8.0	0.898	33.6	LOS C	16.7	124.9	0.95	1.74	38.6
4a	L1	364	8.0	0.898	35.7	LOS D	16.7	124.9	0.95	1.74	40.2
5	T1	638	8.0	0.898	32.6	LOS C	16.7	124.9	0.96	1.60	42.0
6	R2	120	8.0	0.898	37.3	LOS D	9.6	71.9	0.96	1.49	43.8
Approach		1164	8.0	0.898	34.1	LOS C	16.7	124.9	0.96	1.64	41.5
North: Henry Hester Drive (north)											
7	L2	88	8.0	0.577	8.2	LOS A	3.1	22.9	0.82	0.98	51.5
7a	L1	35	8.0	0.577	8.3	LOS A	3.1	22.9	0.82	0.98	53.2
9a	R1	130	8.0	0.577	14.4	LOS B	3.1	22.9	0.82	0.98	54.3
9	R2	77	8.0	0.577	15.8	LOS B	3.1	22.9	0.82	0.98	55.7
Approach		330	8.0	0.577	12.4	LOS B	3.1	22.9	0.82	0.98	53.7
NorthWest: Pacific Motorway off-ramp											
27b	L3	84	8.0	0.411	4.6	LOS A	2.2	16.5	0.70	0.49	54.0
27a	L1	248	8.0	0.411	4.2	LOS A	2.2	16.5	0.70	0.49	57.2
28	T1	74	8.0	0.471	4.6	LOS A	3.3	24.5	0.77	0.77	53.4
29	R2	4	8.0	0.471	11.7	LOS B	3.3	24.5	0.77	0.77	54.8
29b	R3	412	8.0	0.471	13.2	LOS B	3.3	24.5	0.77	0.77	56.1
Approach		822	8.0	0.471	8.8	LOS A	3.3	24.5	0.74	0.66	55.9
West: Elderslie Road (west)											
10	L2	89	8.0	0.526	9.5	LOS A	6.3	47.0	0.86	0.79	53.1
11	T1	202	8.0	0.526	9.8	LOS A	6.3	47.0	0.86	0.79	56.2
12a	R1	92	8.0	0.710	17.7	LOS B	12.6	94.0	0.93	0.88	49.7
12b	R3	417	8.0	0.710	20.5	LOS C	12.6	94.0	0.93	0.88	51.9
Approach		800	8.0	0.710	16.3	LOS B	12.6	94.0	0.91	0.85	52.7
All Vehicles		3737	8.0	0.898	19.5	LOS B	16.7	124.9	0.88	1.10	49.2

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 (Akcelik M3D).

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

MOVEMENT SUMMARY

 Site: Model 23 2023AM east full dev UPGRADED V2 - SENS

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles												
Mov ID	OD Mov	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 per veh	Average Speed km/h	
SouthEast: Christensen Road (south)												
21	L2	92	8.0	0.282	6.3	LOS A	1.8	13.7	0.83	0.70	54.5	
21a	L1	239	8.0	0.282	6.8	LOS A	1.8	13.7	0.82	0.76	55.5	
23a	R1	59	8.0	0.282	13.9	LOS B	1.6	11.7	0.80	0.86	54.9	
23b	R3	31	8.0	0.282	16.7	LOS B	1.6	11.7	0.80	0.86	57.7	
Approach		421	8.0	0.282	8.4	LOS A	1.8	13.7	0.82	0.77	55.4	
East: Stapylton Jacobs Well Road (west)												
4b	L3	44	8.0	0.915	63.9	LOS E	17.2	128.4	0.98	1.75	30.2	
4a	L1	184	8.0	0.915	63.4	LOS E	17.2	128.4	0.98	1.75	31.2	
5	T1	407	8.0	0.915	65.0	LOS E	17.2	128.4	0.98	1.67	31.2	
6	R2	84	8.0	0.915	72.3	LOS E	10.7	80.3	0.98	1.58	31.4	
Approach		719	8.0	0.915	65.4	LOS E	17.2	128.4	0.98	1.68	31.2	
North: Henry Hester Drive (north)												
7	L2	83	8.0	0.977	96.6	LOS F	19.1	142.9	0.99	2.20	24.0	
7a	L1	56	8.0	0.977	95.7	LOS F	19.1	142.9	0.99	2.20	24.3	
9a	R1	112	8.0	0.977	102.7	LOS F	19.1	142.9	0.99	2.20	24.6	
9	R2	88	8.0	0.977	104.2	LOS F	19.1	142.9	0.99	2.20	24.8	
Approach		339	8.0	0.977	100.5	LOS F	19.1	142.9	0.99	2.20	24.5	
NorthWest: Pacific Motorway off-ramp												
27b	L3	119	8.0	0.347	11.1	LOS B	2.7	20.4	0.75	0.64	51.5	
27a	L1	381	8.0	1.005	74.4	LOS E	118.2	884.3	0.90	2.25	28.4	
28	T1	310	8.0	1.005	118.6	LOS F	118.2	884.3	1.00	3.35	22.0	
29	R2	1	8.0	1.005	118.3	LOS F	118.2	884.3	1.00	3.35	22.2	
29b	R3	602	8.0	1.005	127.2	LOS F	118.2	884.3	1.00	3.35	22.4	
Approach		1413	8.0	1.005	101.3	LOS F	118.2	884.3	0.95	2.82	24.8	
West: Elderslie Road (west)												
10	L2	78	8.0	1.040	211.0	LOS F	144.3	1079.6	0.98	4.14	14.2	
11	T1	477	8.0	1.040	211.3	LOS F	144.3	1079.6	0.98	4.14	14.4	
12a	R1	290	8.0	0.976	81.5	LOS F	36.9	276.1	1.00	1.42	28.2	
12b	R3	114	8.0	0.976	84.3	LOS F	36.9	276.1	1.00	1.42	28.9	
Approach		959	8.0	1.040	156.9	LOS F	144.3	1079.6	0.99	2.99	18.3	
All Vehicles		3851	8.0	1.040	98.2	LOS F	144.3	1079.6	0.96	2.37	25.0	

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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 (Akcelik M3D).

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

MOVEMENT SUMMARY

 Site: Model 24 2023PM east full dev UPGRADED V2 - SENS

M1 Northbound, Yatala North - EXIT 38
Roundabout Metering

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Christensen Road (south)											
21	L2	136	8.0	0.823	25.6	LOS C	8.3	62.0	0.99	1.35	43.5
21a	L1	421	8.0	0.823	24.5	LOS C	8.3	62.0	0.98	1.30	44.9
23a	R1	106	8.0	0.823	28.4	LOS C	5.0	37.5	0.96	1.21	46.0
23b	R3	35	8.0	0.823	31.2	LOS C	5.0	37.5	0.96	1.21	47.9
Approach		698	8.0	0.823	25.6	LOS C	8.3	62.0	0.98	1.29	44.9
East: Stapylion Jacobs Well Road (west)											
4b	L3	44	8.0	1.127	271.6	LOS F	121.6	909.5	1.00	6.33	11.5
4a	L1	381	8.0	1.127	273.2	LOS F	121.6	909.5	1.00	6.33	11.6
5	T1	677	8.0	1.127	273.6	LOS F	121.6	909.5	1.00	5.82	11.8
6	R2	127	8.0	1.127	280.8	LOS F	84.1	628.8	1.00	5.41	11.9
Approach		1229	8.0	1.127	274.1	LOS F	121.6	909.5	1.00	5.95	11.7
North: Henry Hester Drive (north)											
7	L2	133	8.0	0.839	20.5	LOS C	7.2	53.7	0.94	1.26	44.5
7a	L1	40	8.0	0.839	20.6	LOS C	7.2	53.7	0.94	1.26	45.8
9a	R1	142	8.0	0.839	26.7	LOS C	7.2	53.7	0.94	1.26	46.6
9	R2	84	8.0	0.839	28.1	LOS C	7.2	53.7	0.94	1.26	47.7
Approach		399	8.0	0.839	24.3	LOS C	7.2	53.7	0.94	1.26	46.0
NorthWest: Pacific Motorway off-ramp											
27b	L3	92	8.0	0.255	5.1	LOS A	1.5	11.5	0.74	0.60	54.1
27a	L1	282	8.0	0.738	7.6	LOS A	10.0	75.0	0.91	0.86	53.4
28	T1	93	8.0	0.738	9.6	LOS A	10.0	75.0	1.00	1.00	52.6
29	R2	4	8.0	0.738	16.7	LOS B	10.0	75.0	1.00	1.00	53.9
29b	R3	450	8.0	0.738	18.1	LOS B	10.0	75.0	1.00	1.00	55.2
Approach		921	8.0	0.738	12.8	LOS B	10.0	75.0	0.95	0.92	54.3
West: Elderslie Road (west)											
10	L2	97	8.0	0.555	10.8	LOS B	8.5	63.7	0.87	0.72	52.2
11	T1	228	8.0	0.555	11.1	LOS B	8.5	63.7	0.87	0.72	55.2
12a	R1	105	8.0	0.733	19.6	LOS B	17.1	127.6	0.94	0.80	48.6
12b	R3	455	8.0	0.733	22.4	LOS C	17.1	127.6	0.94	0.80	50.7
Approach		885	8.0	0.733	17.9	LOS B	17.1	127.6	0.92	0.77	51.6
All Vehicles		4132	8.0	1.127	94.9	LOS F	121.6	909.5	0.96	2.48	25.5

Level of Service (LOS) Method: Delay (HCM 2000).

Roundabout LOS Method: Same as Signalised Intersections.

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.

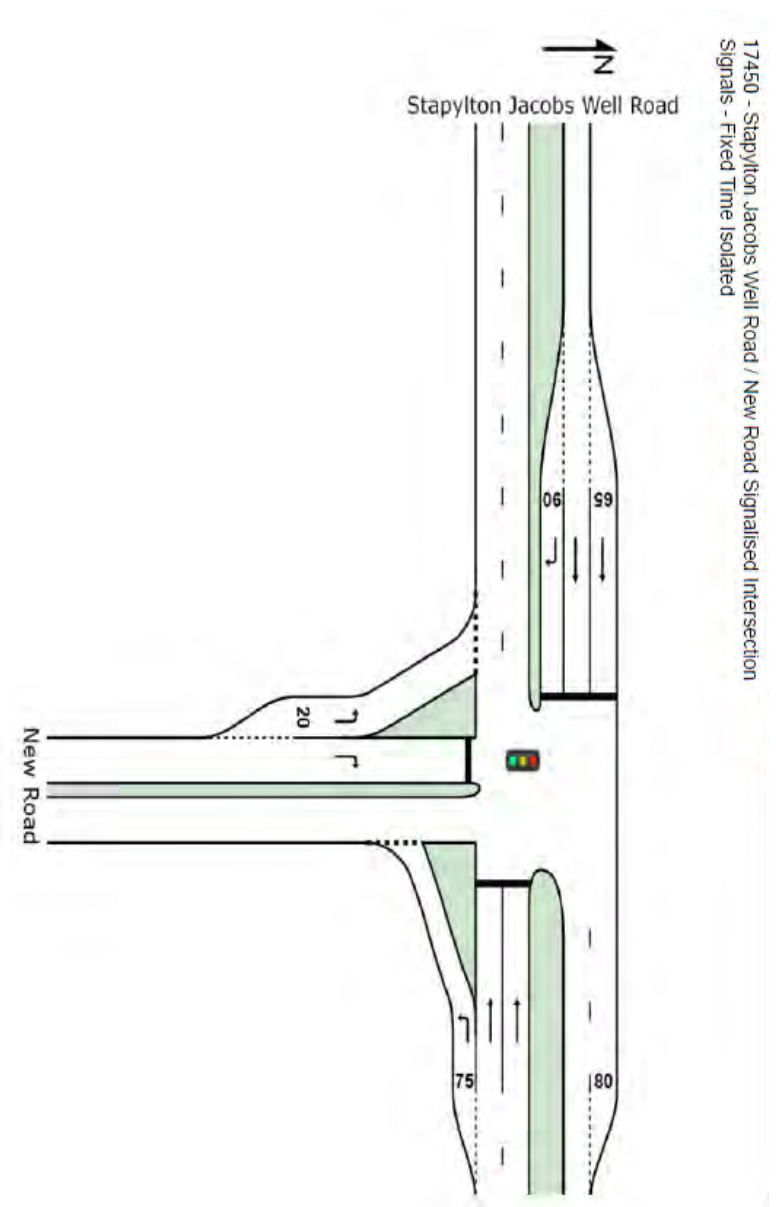
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

SITE ACCESS / STAPYLTON JACOBS WELL ROAD INTERSECTION

2020AM PEAK – STAGE ONE
2020PM PEAK – STAGE ONE
2023 AM PEAK – FULL DEVELOPMENT
2023 PM PEAK – FULL DEVELOPMENT
2033AM PEAK – FULL DEVELOPMENT
2033PM PEAK – FULL DEVELOPMENT



MOVEMENT SUMMARY

 **Site: Model 31A 2020 AM Peak (SJW Rd - New Rd Int) - STAGE 1**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: New Road											
1	L2	61	15.0	0.066	7.8	LOS A	0.3	2.5	0.43	0.64	52.0
3	R2	15	15.0	0.055	22.4	LOS C	0.3	2.1	0.88	0.67	42.9
Approach		76	15.0	0.066	10.6	LOS B	0.3	2.5	0.52	0.65	50.0
East: Stapylton Jacobs Well Road											
4	L2	28	15.0	0.027	7.2	LOS A	0.1	0.9	0.37	0.61	52.4
5	T1	490	15.0	0.546	14.9	LOS B	4.4	35.0	0.92	0.76	48.2
Approach		518	15.0	0.546	14.5	LOS B	4.4	35.0	0.89	0.75	48.4
West: Stapylton Jacobs Well Road											
11	T1	590	15.0	0.408	5.5	LOS A	4.7	36.9	0.59	0.50	55.0
12	R2	114	15.0	0.460	24.1	LOS C	2.2	17.7	0.95	0.77	42.1
Approach		704	15.0	0.460	8.5	LOS A	4.7	36.9	0.65	0.55	52.4
All Vehicles		1298	15.0	0.546	11.0	LOS B	4.7	36.9	0.74	0.63	50.6

Level of Service (LOS) Method: Delay (HCM 2000).

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.

PHASING SUMMARY

 **Site: Model 31A 2020 AM Peak (SJW Rd - New Rd Int) - STAGE 1**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
 Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Variable Phasing

Movement Class: All Movement Classes

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Reference Phase	No	Yes	No
Phase Change Time (sec)	24	0	12
Green Time (sec)	10	6	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	16	12	12
Phase Split	40 %	30 %	30 %



MOVEMENT SUMMARY

 **Site: Model 31B 2020 PM Peak (S,J,W Rd - New Rd Int) - STAGE 1**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
 Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New Road											
1	L2	140	15.0	0.167	9.0	LOS A	1.0	8.1	0.55	0.69	51.2
3	R2	35	15.0	0.128	22.7	LOS C	0.6	5.0	0.90	0.71	42.7
Approach		175	15.0	0.167	11.7	LOS B	1.0	8.1	0.62	0.69	49.2
East: Stapylton Jacobs Well Road											
4	L2	9	15.0	0.008	6.8	LOS A	0.0	0.2	0.31	0.59	52.6
5	T1	740	15.0	0.824	21.0	LOS C	8.5	67.2	1.00	1.04	44.7
Approach		749	15.0	0.824	20.8	LOS C	8.5	67.2	0.99	1.04	44.7
West: Stapylton Jacobs Well Road											
11	T1	496	15.0	0.343	5.3	LOS A	3.8	29.6	0.57	0.48	55.2
12	R2	35	15.0	0.141	22.9	LOS C	0.6	5.1	0.90	0.71	42.7
Approach		531	15.0	0.343	6.5	LOS A	3.8	29.6	0.59	0.49	54.2
All Vehicles		1455	15.0	0.824	14.5	LOS B	8.5	67.2	0.80	0.80	48.3

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik M3D).

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

PHASING SUMMARY

 **Site: Model 31B 2020 PM Peak (SJW Rd - New Rd Int) - STAGE 1**

17450 - Staplyton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Variable Phasing

Movement Class: All Movement Classes

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Reference Phase	No	Yes	No
Phase Change Time (sec)	24	0	12
Green Time (sec)	10	6	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	16	12	12
Phase Split	40 %	30 %	30 %



MOVEMENT SUMMARY

 **Site: Model 32A 2023 AM Peak (S-JW Rd - New Rd Int) - ULTIMATE**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
 Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: New Road											
1	L2	153	15.0	0.164	8.2	LOS A	0.9	7.5	0.49	0.67	51.7
3	R2	79	15.0	0.288	23.4	LOS C	1.5	11.7	0.93	0.75	42.4
Approach		232	15.0	0.288	13.4	LOS B	1.5	11.7	0.64	0.70	48.1
East: Stapylton Jacobs Well Road											
4	L2	124	15.0	0.140	8.5	LOS A	0.8	6.5	0.51	0.67	51.5
5	T1	512	15.0	0.815	22.4	LOS C	5.9	46.5	1.00	1.01	43.9
Approach		636	15.0	0.815	19.7	LOS B	5.9	46.5	0.90	0.95	45.2
West: Stapylton Jacobs Well Road											
11	T1	657	15.0	0.454	5.7	LOS A	5.4	42.6	0.61	0.52	54.9
12	R2	284	15.0	0.764	25.3	LOS C	6.2	48.6	0.99	0.96	41.6
Approach		941	15.0	0.764	11.6	LOS B	6.2	48.6	0.72	0.65	50.1
All Vehicles		1809	15.0	0.815	14.7	LOS B	6.2	48.6	0.78	0.76	48.0

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik M3D).

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

PHASING SUMMARY

 **Site: Model 32A 2023 AM Peak (SJW Rd - New Rd Int) - ULTIMATE**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Variable Phasing

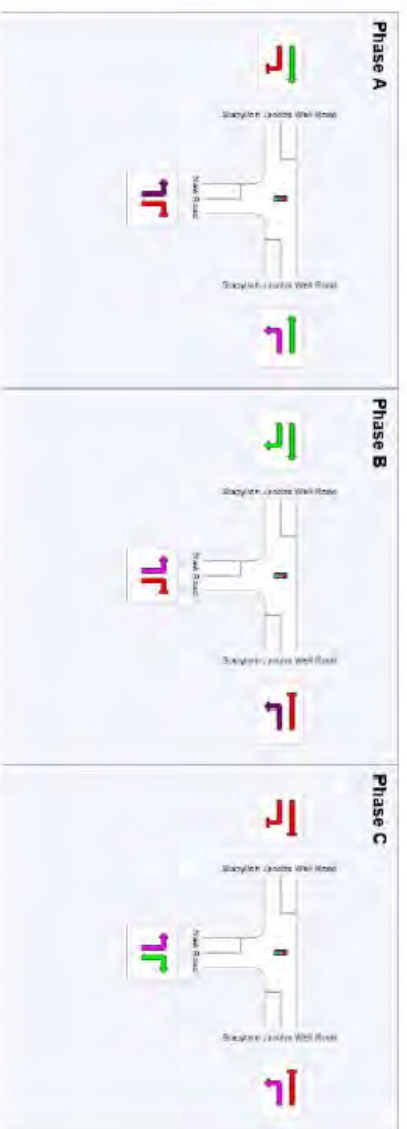
Movement Class: All Movement Classes

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Reference Phase	No	Yes	No
Phase Change Time (sec)	27	0	15
Green Time (sec)	7	9	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	13	15	12
Phase Split	33 %	38 %	30 %



MOVEMENT SUMMARY

 **Site: Model 32B 2023 PM Peak (SJV Rd - New Rd Int) - ULTIMATE**

17450 - Stapytton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: New Road											
1	L2	349	15.0	0.448	9.8	LOS A	3.7	29.5	0.60	0.74	50.6
3	R2	131	15.0	0.598	30.6	LOS C	3.4	26.5	0.99	0.82	39.1
Approach		480	15.0	0.598	15.5	LOS B	3.7	29.5	0.71	0.76	46.8
East: Stapytton Jacobs Well Road											
4	L2	39	15.0	0.033	6.9	LOS A	0.2	1.3	0.30	0.60	52.7
5	T1	830	15.0	0.578	13.0	LOS B	8.1	64.3	0.83	0.72	49.5
Approach		869	15.0	0.578	12.7	LOS B	8.1	64.3	0.81	0.71	49.6
West: Stapytton Jacobs Well Road											
11	T1	525	15.0	0.312	4.2	LOS A	4.0	31.3	0.46	0.39	56.1
12	R2	87	15.0	0.439	29.9	LOS C	2.2	17.1	0.97	0.76	39.5
Approach		612	15.0	0.439	7.9	LOS A	4.0	31.3	0.53	0.45	53.0
All Vehicles		1961	15.0	0.598	11.9	LOS B	8.1	64.3	0.70	0.64	49.9

Level of Service (LOS) Method: Delay (HCM 2000).
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 (Akcelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

 **Site: Model 32B 2023 PM Peak (SJW Rd - New Rd Int) - ULTIMATE**

17450 - Staplyton Jacobs Well Road / New Road Signalised Intersection
 Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Variable Phasing

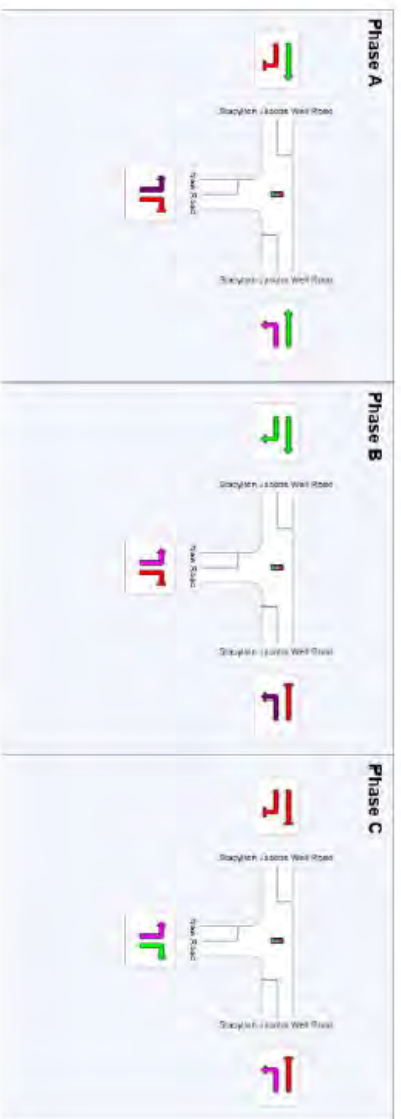
Movement Class: All Movement Classes

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Reference Phase	No	Yes	No
Phase Change Time (sec)	24	0	12
Green Time (sec)	20	6	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	26	12	12
Phase Split	52 %	24 %	24 %



MOVEMENT SUMMARY

 **Site: Model 33A 2033 AM Peak (S/JW Rd - New Rd Int) - ULTIMATE**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
 Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance of Queue m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New Road											
1	L2	153	15.0	0.170	8.7	LOS A	1.2	9.5	0.47	0.67	51.4
3	R2	79	15.0	0.361	29.4	LOS C	1.9	15.2	0.96	0.75	39.7
Approach		232	15.0	0.361	15.7	LOS B	1.9	15.2	0.64	0.70	46.7
East: Stapylton Jacobs Well Road											
4	L2	124	15.0	0.128	8.3	LOS A	0.9	7.0	0.43	0.66	51.7
5	T1	665	15.0	0.712	20.5	LOS C	8.2	64.5	0.96	0.88	44.9
Approach		789	15.0	0.712	18.6	LOS B	8.2	64.5	0.88	0.85	45.9
West: Stapylton Jacobs Well Road											
11	T1	854	15.0	0.507	4.9	LOS A	7.7	60.6	0.53	0.47	55.6
12	R2	284	15.0	0.661	25.4	LOS C	6.7	53.3	0.95	0.86	41.5
Approach		1138	15.0	0.661	10.0	LOS A	7.7	60.6	0.64	0.57	51.2
All Vehicles		2159	15.0	0.712	13.7	LOS B	8.2	64.5	0.73	0.68	48.7

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Algeik M3D).

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

PHASING SUMMARY

 **Site: Model 33A 2033 AM Peak (SJW Rd - New Rd Int) - ULTIMATE**

17450 - Staplyton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Variable Phasing

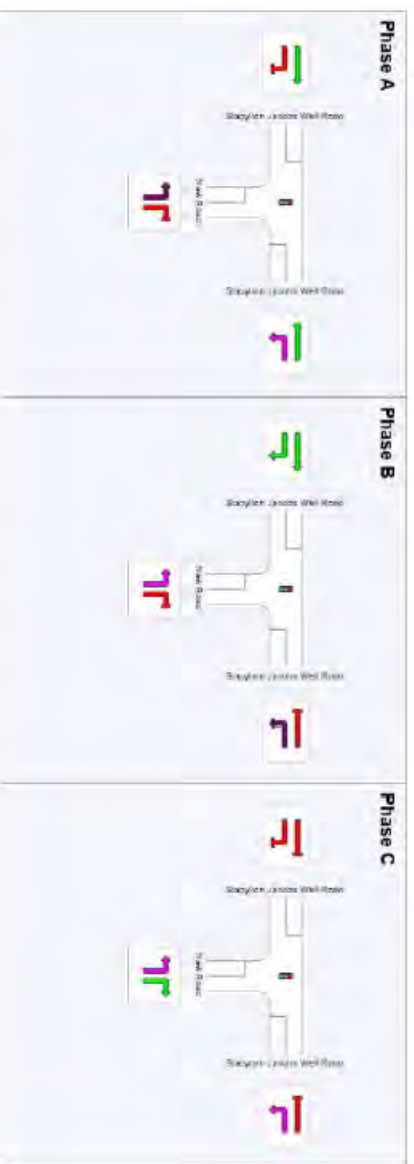
Movement Class: All Movement Classes

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Reference Phase	No	Yes	No
Phase Change Time (sec)	31	0	19
Green Time (sec)	13	13	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	19	19	12
Phase Split	38 %	38 %	24 %



MOVEMENT SUMMARY

 **Site: Model 33B 2033 PM Peak (S-JW Rd - New Rd Int) - ULTIMATE**

17450 - Stapylton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance Queued m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New Road											
1	L2	349	15.0	0.491	11.4	LOS B	4.5	35.5	0.69	0.76	49.5
3	R2	131	15.0	0.598	30.6	LOS C	3.4	26.5	0.99	0.82	39.1
Approach		480	15.0	0.598	16.7	LOS B	4.5	35.5	0.77	0.78	46.2
East: Stapylton Jacobs Well Road											
4	L2	39	15.0	0.033	6.9	LOS A	0.2	1.3	0.30	0.60	52.7
5	T1	1079	15.0	0.751	16.5	LOS B	12.7	100.1	0.92	0.88	47.2
Approach		1118	15.0	0.751	16.2	LOS B	12.7	100.1	0.90	0.87	47.4
West: Stapylton Jacobs Well Road											
11	T1	683	15.0	0.406	4.5	LOS A	5.6	44.1	0.49	0.43	55.9
12	R2	87	15.0	0.439	29.9	LOS C	2.2	17.1	0.97	0.76	39.5
Approach		770	15.0	0.439	7.4	LOS A	5.6	44.1	0.55	0.47	53.4
All Vehicles		2368	15.0	0.751	13.4	LOS B	12.7	100.1	0.76	0.72	48.9

Level of Service (LOS) Method: Delay (HCM 2000).

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 (Akcelik M3D).

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

PHASING SUMMARY

 **Site: Model 33B 2033 PM Peak (S,W Rd - New Rd Int) - ULTIMATE**

17450 - Staplyton Jacobs Well Road / New Road Signalised Intersection
Signals - Fixed Time Isolated Cycle Time = 50 seconds (Practical Cycle Time)

Phase times determined by the program

Sequence: Variable Phasing

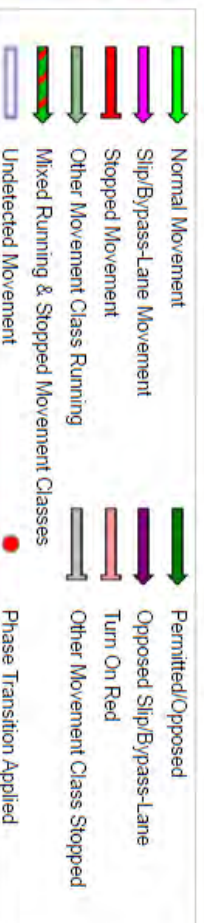
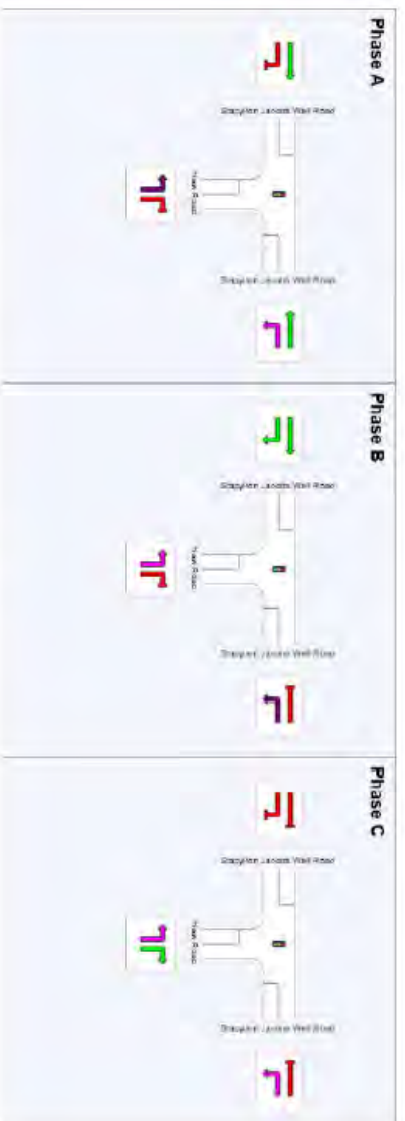
Movement Class: All Movement Classes

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Reference Phase	No	Yes	No
Phase Change Time (sec)	24	0	12
Green Time (sec)	20	6	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	26	12	12
Phase Split	52 %	24 %	24 %



Department of State Development, Manufacturing, Infrastructure and Planning

Statement of reasons for application 1803-4418 SRA

(Given under section 56 of the *Planning Act 2016*)

Departmental role: Referral agency

Applicant details

Applicant name: KS8 Pty Ltd

Applicant contact details: C/- Gassman Development Perspectives
PO Box 392
BEENLEIGH QLD 4207
admin@gassman.com.au

Location details

Street address: 60 Stapylton Jacobs Well Road, 31 Yellowwood Road and 82 Christensen Road, Stapylton QLD 4208

Real property description: Lot 1 on RP6882, Lot 240 on W31320 and Lot 4 on RP6843

Local government area: The City of Gold Coast

Development details

Development permit Reconfiguring a lot for 38 industrial lots, stormwater detention lot, new road and a balance lot

Operational works for 38 industrial lots, stormwater detention lot, new road and a balance lot

Operational works for vegetation clearing

Assessment matters

Aspect of development requiring code assessment	Applicable codes
1. Reconfiguring a lot	State Development and Assessment Provision (SDAP) version 2.1, effective 11 August 2017 State code 1: Development in a state-controlled road environment State code 6: Protection of state transport networks
2. Operational works	State Development and Assessment Provision (SDAP) version 2.1, effective 11 August 2017; State code 18: Constructing or raising waterway barrier works in fish habitats

Reasons for the Department of State Development, Manufacturing, Infrastructure and Planning's response:

The reasons for the response are:

- The development complies with the relevant performance-based planning outcomes of State Code 1, 6 and 18 of SDAP, version 2.1, effective 11 August 2017.
- The proposed traffic impacts of the development have been adequately mitigated through the conditioning of road works in accordance with the applicable standards.
- The existing waterway has been segmented due to development upstream and downstream and as such it is unlikely to provide fish passage.

Response:

Nature of Approval	Nature of Response	Date of Response
Development Permit	Concurrence agency response— with conditions	11 October 2018

Relevant material:

- Development application material
- State Development Assessment Provisions published by the Department of Infrastructure, Local Government and Planning
- *Planning Act 2016*
- *Planning Regulation 2017*

Our reference: 1803-4418 SRA
Your reference: ROL201800079

11 October 2018

The Chief Executive Officer
The City of Gold Coast
PO Box 5042
GCMC QLD 9729
mail@goldcoast.qld.gov.au

Attention: Ms Thalia Allsop

Dear Ms Allsop

Referral agency response—with conditions

(Given under section 56 of the *Planning Act 2016*)

The development application described below was properly referred to the Department of State Development, Manufacturing, Infrastructure and Planning on 15 March 2018.

Applicant details

Applicant name:	KS8 Pty Ltd
Applicant contact details:	C/- Gassman Development Perspectives PO Box 392 BEENLEIGH QLD 4207 admin@gassman.com.au

Location details

Street address:	60 Stapylton Jacobs Well Road, 31 Yellowwood Road and 82 Christensen Road, Stapylton QLD 4208
Real property description:	Lot 1 on RP6882, Lot 240 on W31320 and Lot 4 on RP6843
Local government area:	The City of Gold Coast

Application details

Development permit	Reconfiguring a lot for 38 industrial lots, stormwater detention lot, new road and a balance lot Operational works for 38 industrial lots, stormwater detention lot, new road and a balance lot Operational works for vegetation clearing
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Referral triggers

The development application was referred to the department under the following provisions of the Planning Regulation 2017:

- Schedule 10, Part 6, Division 4, Subdivision 3, Table 1, Item 1 Fisheries - waterway barrier works
- Schedule 10, Part 9, Division 4, Subdivision 1, Table 1, Item 1 Infrastructure - state transport infrastructure
- Schedule 10, Part 9, Division 4, Subdivision 2, Table 2, Item 1 State transport corridors and future State transport corridors

Conditions

Under section 56(1)(b)(i) of the *Planning Act 2016* (the Act), the conditions set out in Attachment 1 must be attached to any development approval.

Reasons for imposing conditions

The department must provide reasons for imposing conditions. These reasons are set out in Attachment 2.

Advice to the applicant

The department offers advice about the application to the applicant—see Attachment 3.

Approved plans and specifications

The department requires that the plans and specifications set out below and enclosed must be attached to any development approval.

Drawing/report title	Prepared by	Date	Reference no.	Version/issue
Aspect of development: Reconfiguring a Lot				
Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 1 of 2	Gassman Development Perspectives	24/7/2018	5738 ENG BE1 SK-004	B
Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 2 of 2	Gassman Development Perspectives	24/7/2018	5738 ENG BE1 SK-005	B
Typical Cross Sections of Stapylton Jacobs Well Road	Gassman Development Perspectives	24/7/2018	5738 ENG BE1 SK-006	B
Stapylton Jacobs Well Road – Extension of Second Approach Lane Between Eastern Roundabout and Site Access	Rytenskild Traffic Engineering	18/7/2018	17450-01C.3	-
Traffic Impact Assessment	Rytenskild Traffic Engineering	13/4/2018	17450	3
Aspect of development: Operational works				

Existing Features Survey Plan	Gassman Development Perspectives	11/05/2018	5738 ENG BE1 010	B
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A copy of this response has been sent to the applicant for their information.

For further information please contact Hugh Campbell, Senior Planning Officer, on 3452 7695 or via email BrisbaneSARA@dsdmip.qld.gov.au who will be pleased to assist.

Yours sincerely



Tamara Cavallaro
A/Planning Manager – SARA Brisbane Region

cc KS8 Pty Ltd, admin@gassman.com.au

enc Attachment 1—Conditions to be imposed
Attachment 2—Reasons for imposing conditions
Attachment 3—Advice to the applicant
Approved plans and specifications

Attachment 1—Conditions to be imposed

No.	Conditions	Condition timing
Reconfiguring a lot		
State-controlled road—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of The Department of Transport and Main Roads to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following conditions:		
1.	(a) Any excavation, filling/backfilling/compaction, retaining structures and other works involving ground disturbance must not encroach or de-stabilise the state-controlled road or land supporting this infrastructure, or cause similar adverse impacts. (b) RPEQ certification with supporting documentation must be provided to Land Management Team of South Coast Region within the Department of Transport and Main Roads' at southcoast@tmr.qld.gov.au within the Department of Transport and Main Roads', confirming that the development has been constructed in accordance with part (a) of this condition.	(a) At all times (b) Prior to submitting the Plan of Survey to the local government for approval
2.	(a) Road works comprising of a signalised intersection at the site entrance and a second lane on Stapylton Jacobs Well westbound, between the site access and the eastern roundabout on interchange 38, must be provided generally in accordance with the following plans: - Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 1 of 2 prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-004 and revision B; - Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 2 of 2 prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-005 and revision B; - Typical Cross Sections of Stapylton Jacobs Well Road prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-006 and revision B; - Stapylton Jacobs Well Road – Extension of Second Approach Lane Between Eastern Roundabout and Site Access, prepared by Rytenskild Traffic Engineering, dated 18 July 2018, reference 17450-01C.3; - Figure 5.2 Proposed Intersection Arrangements of the Traffic Impact Assessment, prepared by Rytenskild Traffic Engineering, dated 13/04/2018, reference 17450 and revision 3. (b) The road works must be designed and constructed in accordance with Road Planning and Design Manual (2nd edition), prepared by Department of Transport and Main Roads, 2016.	Prior to submitting the Plan of Survey to the local government for approval
3.	(a) The development must be provided generally in accordance with the following plans: - Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 1 of 2 prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-004 and revision B; - Functional Road Layout Plan and Stormwater Drainage	(a) Prior to submitting the Plan of Survey to the local government for approval (b) Prior to submitting the Plan of Survey

	Layout Plan – Sheet 2 of 2 prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-005 and revision B Typical Cross Sections of Stapylton Jacobs Well Road prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-006 and revision B (b) RPEQ certification with supporting documentation must be provided to Land Management Team of South Coast Region within the Department of Transport and Main Roads' at southcoast@tmr.qld.gov.au, confirming that the development has been constructed in accordance with part (a) of this condition.	to the local government for approval
4.	(a) The road access location is to be located generally in accordance with the Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 1 of 2 prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-004 and revision B; (b) Road access works comprising construction of a signalised intersection on Stapylton Jacobs Well Road must be provided generally in accordance with the Functional Road Layout Plan and Stormwater Drainage Layout Plan – Sheet 2 of 2 prepared by Gassman Development Perspectives dated 24 July 2018, reference 5738 ENG BE1 SK-005 and revision B; (c) The road access works must be designed and constructed in accordance with Road Planning and Design Manual (2nd edition), prepared by Department of Transport and Main Roads, 2016.	Prior to submitting the Plan of Survey to the local government for approval
5.	(a) The existing vehicular property access located between Lot 1 on RP 6882 and Stapylton Jacobs Well Road must be permanently closed and removed. (b) The kerb and channelling between the pavement edge and the property boundary must be reinstated in accordance with Road Planning and Design Manual at no cost to the Department of Transport and Main Roads	Prior to submitting the Plan of Survey to the local government for approval
Operational works		
Waterway barrier works—The chief executive administering the <i>Planning Act 2016</i> nominates the Director-General of The Department of Agriculture and Fisheries to be the enforcement authority for the development to which this development approval relates for the administration and enforcement of any matter relating to the following conditions:		
6.	The operational works to raise or construct a waterway barrier works that is the filling of a waterway mapped green on the spatial data layer <i>Queensland waterways for waterway barrier works</i> within Lots 240/W31320 and 1/RP6882 and represented by a blue dashed line in drawing Existing Features Survey Plan, prepared by Gassman development perspectives, dated 11/05/18, reference 5738 ENG BE1 010 and revision B.	At all times
7.	Provide written notice to notifications@daf.qld.gov.au, when the development authorised under this approval: (a) Will start, and (b) When it has been completed. These notices must state this permit number 1803-4418 SRA	At least 5 business days but no greater than 20 business days
8.	Any fish found to be present within waterways are to be salvaged immediately in accordance with the Department of Agriculture Fisheries fish salvage guidelines.	For the duration of works

Attachment 2—Reasons for imposing conditions

The reasons for imposing conditions are:

- To ensure the road works on, or associated with, the state-controlled road network are undertaken in accordance with applicable standards.
- To ensure the development is carried out in the location and to the extent specified on the approved plans of development.
- To ensure the disturbance of acid sulfate soil is managed to prevent impacts on fisheries resources and fish habitats.
- To facilitate the monitoring of the development works for compliance purposes.
- To maintain the safety and efficiency of the state-controlled road by reducing the number of road access.

Attachment 3—Advice to the applicant

General advice	
1.	Public Utility Plant Pursuant to section 80 of the <i>Transport Infrastructure Act 1994</i>, the construction, augmentation, alteration or maintenance of public utility plant in a State-controlled road corridor must be undertaken in accordance with the Department of Transport and Main Roads' (TMR) requirements and at the expense of the owner of the plant. The owner of the plant must also obtain approval from TMR prior to commencement of any works. Applications for approval should be made to southcoast@tmr.qld.gov.au. Additional information regarding the installation of public utility plant can be obtained from TMR's Technical Note 163: Third Party Utility Infrastructure Installation in State Controlled Roads Technical Guidelines (available at http://www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Technical-Notes/Road-design).
2.	Works in State Controlled Road Reserve (WSCRR) Under section 33 of the <i>Transport Infrastructure Act 1994</i>, written approval is required from the Department of Transport and Main Roads to carry out road works, including road access works, on a State-controlled road or interfere with a State-controlled road or its operation. This may include access to a Council road that is within the State-controlled road reserve, or where road access works to a Council road interferes with a State-controlled road or its operations. No works are to commence within the State-controlled road reserve until approval of the plan/s showing the proposed works is issued by the Department of Transport and Main Roads accordingly with Section 33 of the <i>Transport Infrastructure Act 1994</i>. The approval process may require the approval of engineering designs of the proposed works, certified by a Registered Professional Engineer of Queensland (RPEQ). This approval may be subject to conditions related to the works construction process. Please contact the department (South Coast Region) on (07) 5563 6600 or at southcoast@tmr.qld.gov.au to make an application for works in the State-controlled road reserve (WSCRR).