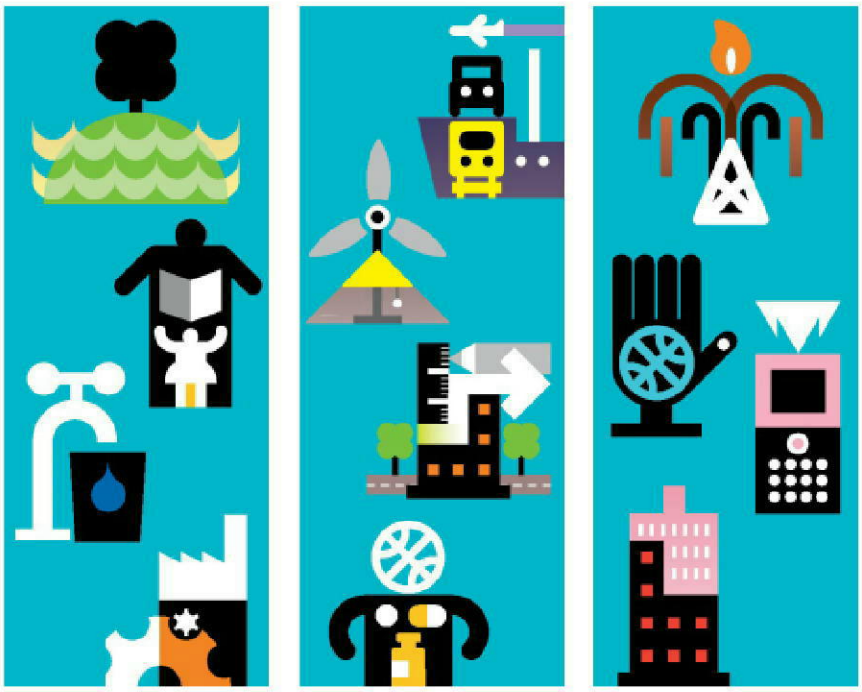

Fernhill Estate, Mulgoa
Eastern Precinct

Traffic Impact Assessment

October 2013

Cubelic Holdings

Mott MacDonald

Fernhill Estate, Mulgoa
Eastern Precinct

Traffic Impact Assessment

October 2013

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Issue and revision record

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Standard

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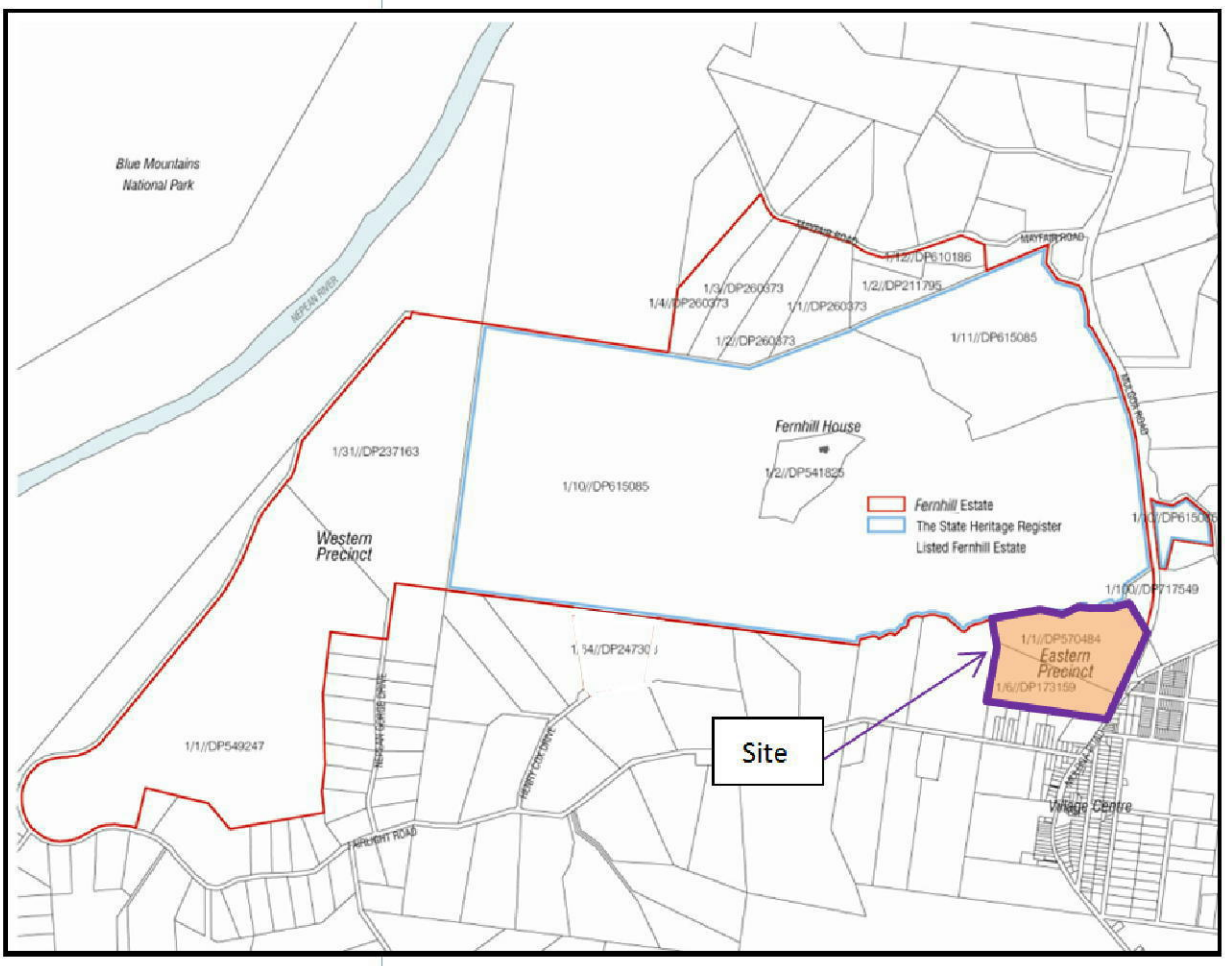
1 Introduction

1.1 Background

Cubelic Holdings Pty Ltd has commissioned Mott MacDonald to undertake a Traffic Impact Assessment for proposed subdivision of the Eastern Precinct of the Fernhill Estate located at 1041 Mulgoa Road, Mulgoa located south west of Penrith (referred to from this point onward as the 'site'). This report will form part of the supporting documentation for the Development Application (DA).

The subject site location is shown in Figure 1-1.

Figure 1.1: Site Location



1.2 Aim

The purpose of this report is to:

- Describe the existing road network and traffic conditions;
- Describe the development proposal; and
- Assess the traffic impact due to the proposed development.

1.3 Scope of Report

This report begins with a summary of the existing development and adjacent road network conditions. The scale of the proposed development, its access arrangements and expected traffic operating characteristics are then described. The section which follows discusses an assessment of likely traffic impacts. The report concludes with a summary of key conclusions and recommendations.

2 Existing Conditions

2.1 Subject Site

The subject site is located at the eastern end of the Fernhill Estate (Refer Figure 1.1) and is approximately 25.9 hectares in area.

The Fernhill Estate is located approximately 10km south-west of Penrith and consists of approximately 700 hectares of woodlands and grazing land. The site has road frontage to Mulgoa Road, connects to Fairlight Road and Nepean Gorge Drive. The central portion of the site consists of nature reserve and conservation areas.

2.2 Adjacent Road Network

The principal roads within close proximity to the site are listed below along with a brief description.

2.2.1 Mulgoa Road

Mulgoa Road is a sub arterial road providing a major link to Penrith and the M4 motorway. In proximity of the site, Mulgoa Road has one traffic lane in each direction with unsealed shoulders. Given the semi-rural location, this is typical of a major rural roadway. The speed limit is typically 80km/h reducing to 60km/h within the Mulgoa Township. Mulgoa Road also provides direct access to fronting properties.

2.2.2 Fairlight Road

Fairlight Road travels west from Mulgoa and provides access to principally large lot rural residential dwellings. It functions as a collector road feeding traffic from the area to Mulgoa Road. It has a variable width, generally having a six metre wide sealed carriageway with one traffic lane in each direction and one to two metre wide unsealed shoulders typical of a rural road. Fairlight Road provides direct access to fronting properties. It is estimated that it carries in the order of 900 vehicles per day.

2.2.3 Nepean Gorge Drive

Nepean Gorge Drive is a local road providing access to rural residential lots. Nepean Gorge Drive provides access to 14 dwellings and has approximately 4.3 metre wide sealed carriageway with 2.0 metre wide shoulders.

2.3 Background Traffic Growth

Traffic volumes are not anticipated to increase dramatically on the surrounding road network. A background traffic growth rate of 1% has been adopted to obtain both 2013 and 2024 peak hour traffic volumes (excluding the proposed development).

2.4 Traffic Volumes

Roads & Maritime Services (RMS) AADT data indicates that Mulgoa Road carried approximately 7,100 vehicles per day in the vicinity of the site in 2005. Conservatively assuming an annual traffic growth rate of 1%, it is estimated the Mulgoa Road currently carries in the order of 7,700 vehicles per day in the vicinity of the site. It is assumed that the peak hour traffic volume is 10% of the daily traffic. On this basis, the two-way traffic during peak periods along Mulgoa Road site frontage was estimated to be approximately 800 vehicles per hour (vph) and is shown in Table 2.1.

A previous traffic report dated March 2003 prepared by Colston Budd Hunt & Kafes Pty Ltd obtained traffic volumes during weekday morning and afternoon peak periods along roads surrounding the site. The morning and afternoon peak hour volumes recorded in 2003 for Mulgoa Road adjacent to the site were 731 and 710 vph respectively.

Applying a 1% traffic growth rate to these 2003 traffic volumes results in 2013 morning and afternoon peak hour traffic volumes of 807vph and 785vph, respectively. This indicates a 1% annual traffic growth rate is appropriate. These traffic volumes were adopted for the traffic impact analysis.

Table 2.1 summarises the estimated 2013 current peak hour traffic volumes for roads adjacent to the development sites.

Table 2.1: 2013 two-way Peak period traffic volumes

Road/Location	Morning Peak	Afternoon Peak
Mulgoa Road	807	785
Fairlight Road	108	130
Henry Cox Drove	38	9
Nepean Gorge Road	5	13

Source: Colston Budd Hunt & Kafes Pty td – Review of existing traffic conditions – potential development of Fern Hill (March 2003)

2.5 Public Transport, Bicycle & Pedestrian Facilities

Bus route 795 runs approximately every hour during the weekday peak periods from Warragamba to Penrith Train Station. Bus route 795 runs through Mulgoa Road. Bus stops are located directly in front of Mulgoa Public School on Mulgoa Road (i.e. at the intersection with Littlefields Road). The bus service operates 3 times per day during weekends and public holidays. It is anticipated that the current bus services will be sufficient to cater for the additional demand generated by the proposed development. The Westbus route map is shown in Appendix A.

The surrounding road network consists of rural environment, such that, there does not appear to be any formalised pedestrian footpaths or sealed shoulders for bicycles on any road within close proximity to the site (including Mulgoa Road).

3 Proposed Development

3.1 Land Use

The site comprising Lot 1 DP 570484 and Lot 6 DP 173159 is a 25.9 ha parcel of land fronting Mulgoa Road. It is proposed to develop this precinct to accommodate total 54 residential lots (includes one existing lot) ranging from approximately 950-1500 square metres. The development will incorporate the existing lake on the site.

Figure 3.1: Site Plan

Source: AE Design partnership Eastern Precinct drawn 16/05/2013

Table 3.1 summarises the proposed scale of development for the site.

Table 3.1: Development Summary

Location	No of Residential Lots (Including 1 Existing)	No of Rural Residential Lots
Site (Eastern Precinct)	54	0

3.2 Road Network

The proposed layout of the road network is indicated in Figure 3.1. The details of the proposed roadways for the development area are summarised below. It should be noted that detailed design of the road layout is anticipated to be undertaken upon receipt of development consent.

- Two roads provided connecting directly to Mulgoa Road;
- There are no significantly long straight roads, thereby minimising speeding;
- Roads to have a minimum of one (1) travel lane in both directions and minimum carriageway of 6 metres;
- The proposed northern access road to be configured into Left In/Left Out only treatment at Mulgoa Road to avoid sight distance issues;
- The proposed southern access road to cater for all turning movements at the intersection with Mulgoa Road;
- Right turn movement into the proposed southern access road to be configured into a T-intersection with indented right turn bay (BAR) on to Mulgoa Road.

3.3 Anticipated Traffic Generation

The anticipated future traffic generation has been estimated based on the RMS Guide to Traffic Generating Developments which provides a peak hour trip generation rate for residential dwellings of 0.85 trips per dwelling. The proposed development's anticipated future trip generation based on the above mentioned trip generation rate is shown below in Table 3.2.

Table 3.2: Development Traffic Generation

Location	No of Residential Lots	No of Rural Residential Lots	Peak Number of Trips (vph)
Site (Eastern Precinct)	54	0	46

The assumed in / out split during each peak period is anticipated to be 10% in / 90% out during the morning peak period and 90% in / 10% out during the evening peak period. The in / out split in vehicles per hour is shown below in Table 3.3. The total number of trips generated by the development is 46 trips in both peak periods.

Table 3.3: Traffic Generation by Direction

Location	Morning Peak		Evening Peak	
	In	Out	In	Out
Site (Eastern Precinct)	5	41	41	5

3.4 Trip Distribution

It is anticipated that vehicles from the development will utilise Mulgoa Road via Fairlight Road.

Vehicles exiting the proposed development will be able to use two exits; however the choice of exit will depend on the direction of travel along Mulgoa Road.

The northern intersection with Mulgoa Road is proposed to be a Left In/ Left Out only treatment to address sight distance issues at this location. As such, traffic turning right out of the proposed development would need to use the southern intersection with Mulgoa Road.

The traffic has been assumed to be distributed to Mulgoa Road with 85% north of the site and 15% south of the site. Full trip distribution results are contained in Appendix B.

4 Traffic Impact

4.1 Traffic Impact

The likely traffic impact of the proposed development has been assessed. A 10 year design horizon has been adopted from the year of full occupation of the development proposal. Therefore the following development staging was adopted:

- Development Application / Approval: 2013
- Occupation: 2014
- Occupation plus 10 years: 2024

A background traffic growth of 1% per annum has been utilised to forecast future traffic volumes (as discussed in Section 2.4). The anticipated traffic impacts are discussed below.

4.2 Road Network Attributes

The anticipated traffic generation for the development, during 2024 weekday peak periods (both with and without the proposed development) is shown in Appendix C.

The results of the analysis suggest that the proposed development will increase traffic along Mulgoa Road from the development in the future year 2024. Mulgoa Road will carry 925vph and 912vph during the morning and afternoon peak periods, respectively. This equates to an increase in traffic of 3% in the AM peak and 5% in the PM peak period.

Even with these increases, the two-way traffic volumes on Mulgoa Road are anticipated to be well below the notional capacity of 2,000vph for a sub arterial road.

In light of the above, the proposed development is not anticipated to have any significant impact on the surrounding road network in terms of road capacity.

4.3 Intersection Analysis

4.3.1 Mulgoa Road/Fairlight Road Intersection

The impact of the proposed development traffic on the Fairlight Road/Mulgoa Road intersection was assessed using SIDRA 5.1 Intersection modelling software. The results are shown in Table 4.1. The results indicate that under the future scenario incorporating traffic generated by the development, the intersection would operate with an

average delay of approximately 5 seconds in both peak periods, with minimal queue lengths and within acceptable levels of service.

Table 4.1: Fairlight Road Intersection SIDRA Summary

Case	Peak	DoS	Worst LOS	Worst Delay(s)	Average Delay(s)
2024 Without Development	AM	0.332	B	26.1	4.4
2024 With Development	AM	0.332	B	26.3	4.5
2024 Without Development	PM	0.315	B	23.4	4.7
2024 With Development	PM	0.316	B	23.6	4.7

When comparing the anticipated 2024 traffic volumes excluding the development, the proposed traffic generated by the development increases average delay by less than one second in both peak periods. As such, it is evident that the proposed traffic generated by the development is not anticipated to have any significant impact on the surrounding road network.

The results of the analysis suggest that Mulgoa Road / Fairlight Road intersection will operate well within its operational capacity regardless of whether the proposed development proceeds or not.

4.3.1.1 Future Western Precinct Development

It is anticipated that future Western Precinct development comprising of 38 rural residential lots will be developed as part of the Fernhill Estate development in the vicinity of the site. The future Western Precinct will be subject to a separate development approval. Nevertheless, a combined traffic impact for the proposed Eastern Precinct Development as well as future Western Precinct development was undertaken to assess future performance of Mulgoa Road/Fairlight Road intersection. The anticipated trip distribution and trip generation for future Western Precinct as well as combined development is attached in Appendix B and Appendix C respectively.

The results of SIDRA analysis for the combined traffic impact are shown in Table 4.2. The results indicate that under the future scenario incorporating traffic generated by the proposed Eastern Precinct development as well as future Western Precinct development, the intersection would operate with an average delay of approximately 5

seconds in both peak periods, with minimal queue lengths and within acceptable levels of service.

Table 4.2: SIDRA Summary for Combined Development (Proposed Western Precinct Development and Future Western Precinct Development)

Case	Peak	DoS	Worst LOS	Worst Delay(s)	Average Delay(s)
2024 Without Development	AM	0.332	B	26.1	4.4
2024 With Development	AM	0.331	B	27.3	5.0
2024 Without Development	PM	0.315	B	23.4	4.7
2024 With Development	PM	0.340	B	24.4	5.0

The results of the analysis suggest that the combined development including proposed Eastern Precinct development and future Western Precinct development are not anticipated to have any significant impact on Mulgoa Road / Fairlight Road intersection and the intersection will operate well within its operational capacity.

4.3.2 Mulgoa Road / Access Road South Intersection

The impact of the proposed development traffic on the Fairlight Road/Mulgoa Road intersection was assessed using SIDRA 5.1 Intersection modelling software.

Table 4.2 summarises the results of a SIDRA analysis of the intersection layout with Basic right turn (BAR) treatment on Mulgoa Road.

Table 4.2: Access Road South Intersection SIDRA Summary

Case	Peak	DoS	Worst LOS	Worst Delay(s)	Average Delay(s)
2024 With Development	AM	0.370	B	20.2	1.9
2024 With Development	PM	0.333	B	19.2	2.0

The results indicate that the intersection would operate within acceptable levels of service with minimal average delays. It should be noted, the higher delays were for traffic movements out of the side road, reducing the impact on through movements along Mulgoa Road and where vehicle volumes are low.

The right turning movement from Mulgoa Road to the proposed southern access road will have an average delay of 10.9 seconds and a 95% back of queue distance of 22.4m.

It is acknowledged that the proposed intersection would require Channelised (CHR) T-junction treatment in accordance with the AUSTROADS Figure 4.9 for design speed less than 100km/h. It should be noted that the AUSTROADS Figure 4.9 does not consider traffic volumes in each direction of the major road or speed environment less than 60km/h. Mulgoa Road has existing speed limit of 60 km/h in the vicinity of the intersection and it should be noted that the majority of the vehicles will be travelling south on Mulgoa Road in the evening peak period which would have less opposing (northbound) traffic volumes while turning right into the southern access road.

In light of the above, it is considered appropriate to provide Basic right turn (BAR) treatment to the intersection. It should be noted that the BAR treatment has been provided to the existing Mulgoa Road/Fairlight Road intersection, which carries higher right turning volumes than the proposed Mulgoa Road/proposed southern access road intersection.

Nevertheless, a SIDRA intersection analysis has been undertaken to assess performance of the intersection which indicates that the intersection would operate at an acceptable level of service (LOS B) and average delay.

On this basis, it is anticipated the proposed Basic right turn (BAR) treatment would not have any adverse impact on the surrounding road network in terms of traffic efficiency or road safety. The proposed treatment would require widening of the shoulder to accommodate BAR treatment. The proposed Basic right turn (BAR) treatment including swept path analysis at the intersection has been shown in drawing MMD-322876-C-DR-00-EA-0280 and attached in Appendix E.

4.3.3 Mulgoa Road / Access Road North intersection

The proposed northern access road intersection with Mulgoa Road is proposed to be a Left In/Left Out Only treatment. This is to address potential sight distance issues at this location. As such, this intersection is anticipated to operate as a secondary access to the intersection at the proposed northern access road. It is anticipated that the intersection would experience its peak use in the morning, based on the majority of traffic heading north towards Penrith and the M4 motorway.

In terms of traffic efficiency, because all other movements would be banned at this location, the intersection is anticipated to operate under free left turn conditions with minimal delays. The proposed intersection layout has been shown in drawing MMD-322876-C-DR-00-EA-0281.

4.3.4 Mulgoa Road / St Thomas Road Intersection

The additional traffic anticipated to be generated by the proposed development is, for the most part, anticipated to travel straight through the intersection in either a southbound or northbound direction along Mulgoa Road. Based on give way controls between roads of different classifications, the right turning movements both into and out of St Thomas Road are anticipated to be the worst performing movements. As such, it is anticipated that the proposed development will not have any adverse impact on the intersection in terms of traffic efficiency or road safety.

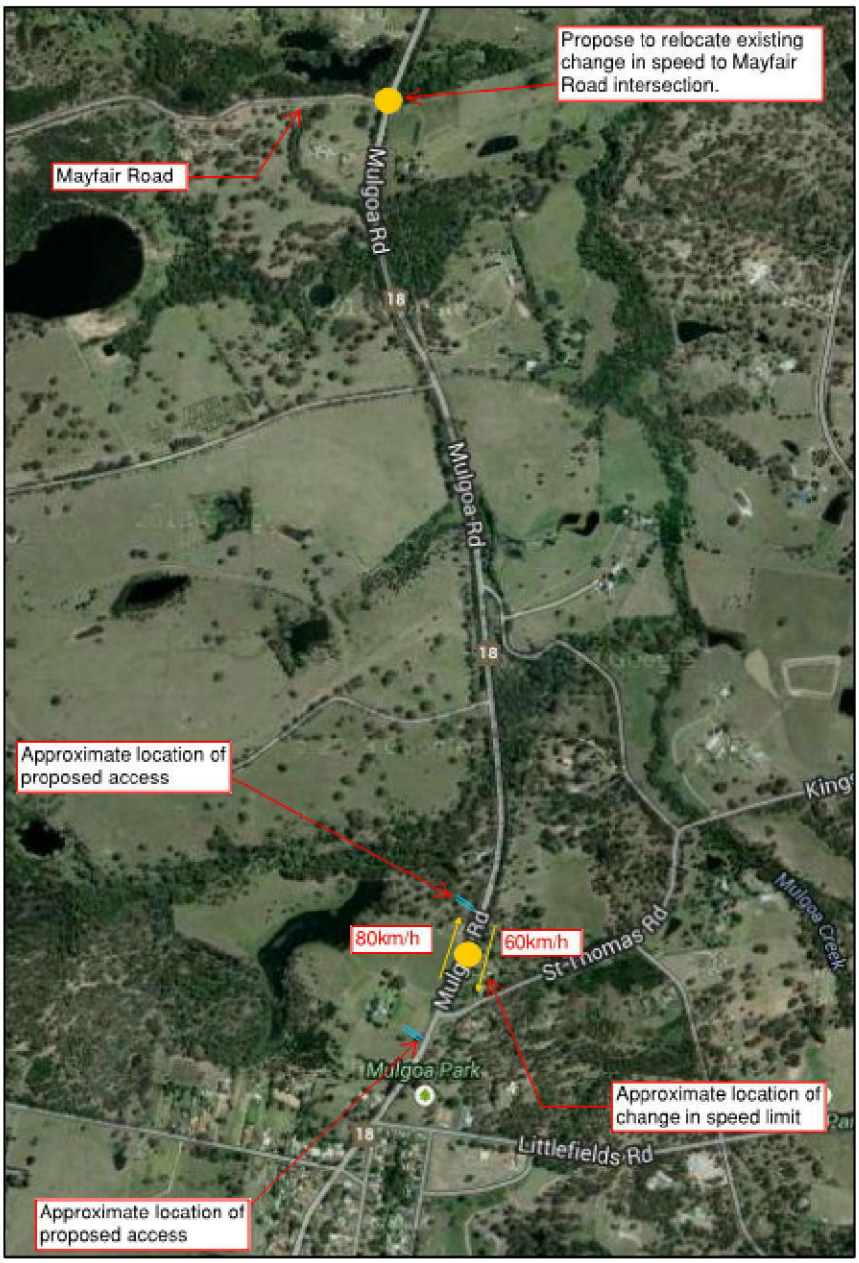
Detailed SIDRA summaries for each intersection investigated are contained in Appendix D.

4.4 Mulgoa Road Speed Limit

Mulgoa Road is a sub arterial road with semi-rural environment in the vicinity of the site. The speed limit for Mulgoa Road is typically 80km/h reducing to 60km/h within the Mulgoa Town ship. The proposed development (Eastern Precinct) as well as the future precinct events on the redefined Fernhill Estate (future Western Precinct as well as Central Precinct - refer to GTA traffic report for details) will increase traffic movements to/from Mulgoa Road during specified events. It is recommended that the existing 60km/h speed limit zone be extended up to Mayfair Road (north) in order to enhance traffic safety on Mulgoa Road in the vicinity of the entire Fernhill Estate Central Precinct development including the secondary access and the proposed alternative access driveway. Relocation of the proposed speed limit zone is intended to enhance pedestrian safety; particularly at the locations of the proposed treatment works at the entrances to the Eastern and Central precincts, and aims to incorporate the Central precinct and Eastern Precinct into the Mulgoa township and not as an isolated separate development.

Figure 4.1 shows existing 60km/h speed limit zone as well as indicative location of the proposed speed change.

Figure 4.1: Recommended Speed Limits



5 Summary and Recommendations

5.1 Summary

The likely traffic impact of the proposed development has been assessed. The main points to note from this assessment are as follows:

- It is proposed to subdivide the subject parcel of land in order to provide 54 residential lots (Eastern Precinct);
- This area includes two roads connecting directly to Mulgoa Road;
- The Mulgoa Road accesses are proposed to comprise of a Left In/Left Out only intersection to the north and a T-intersection at the proposed southern access road;
- The total traffic generation for the development is estimated to be approximately 46 trips during each peak period(AM and PM);
- The traffic impact of the proposed development was assessed using SIDRA Intersection 5.1 software;
- The intersection analysis indicated that under a 2024 future scenario including traffic generated by the development, the Mulgoa Road/Fairlight Road and proposed southern access road /Mulgoa Road intersections would operate well within their operational capacities; and
- The proposed intersection of Mulgoa Road and proposed southern access road to the proposed development is anticipated to operate safely and efficiently based on a Basic right turn (BAR) treatment.

5.2 Recommendation

In light of the above, the proposed development is not anticipated to have any adverse impact in terms of traffic efficiency or road safety. It is recommended that the proposed development be approved on traffic grounds. It is also recommended to extend the 60km/h speed limit zone up to Mayfair Road to enhance traffic safety in the vicinity of the entire Fernhill Estate development.

Mott MacDonald
Dipal Prajapati
Civil Engineer

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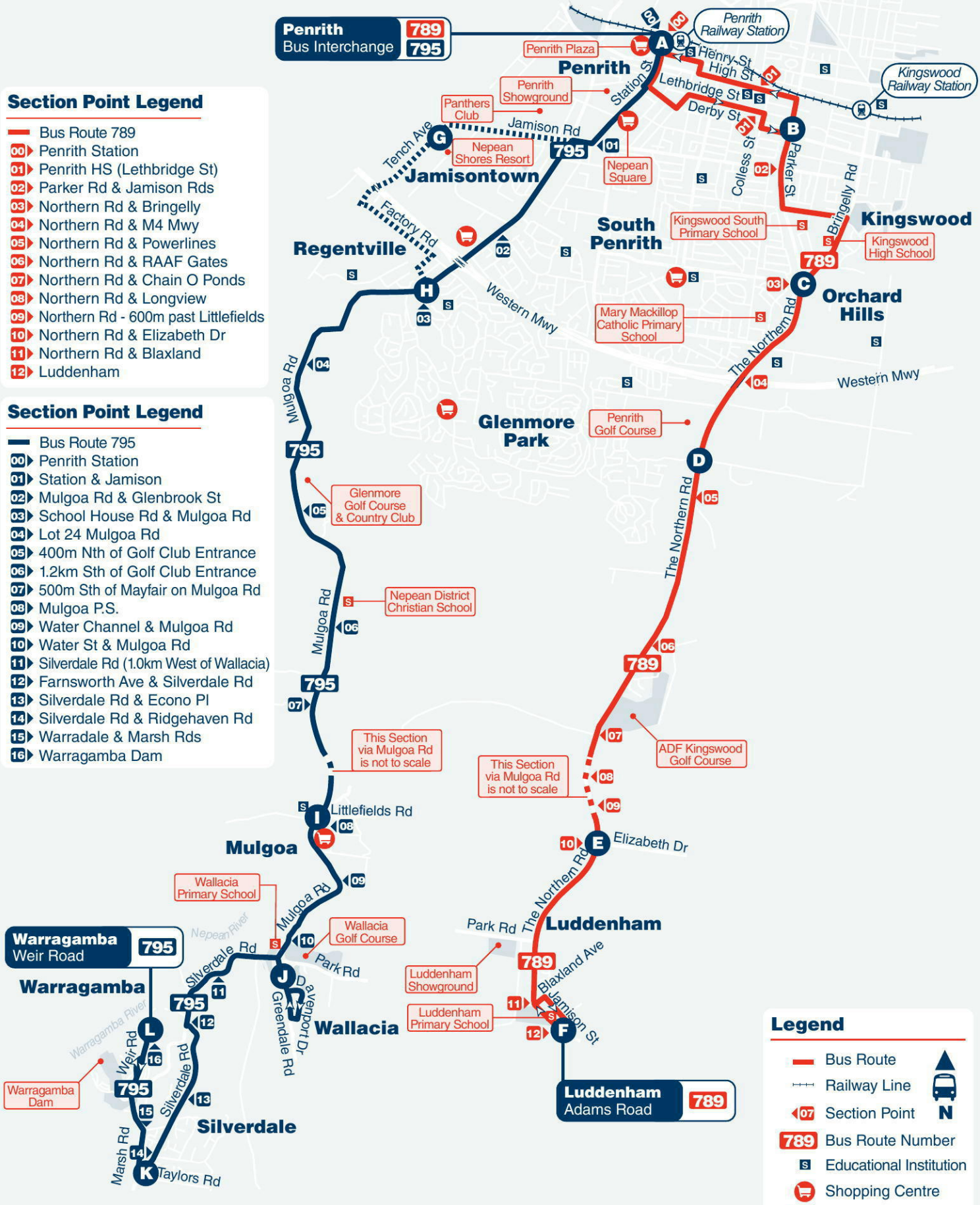
Appendix A. Bus Route Map

Routes 789/795 Bus Route Map

westbus



Section Point Legend

- Bus Route 789
- 00 Penrith Station
- 01 Penrith HS (Lethbridge St)
- 02 Parker Rd & Jamison Rds
- 03 Northern Rd & Bringelly
- 04 Northern Rd & M4 Mwy
- 05 Northern Rd & Powerlines
- 06 Northern Rd & RAAF Gates
- 07 Northern Rd & Chain O Ponds
- 08 Northern Rd & Longview
- 09 Northern Rd - 600m past Littlefields
- 10 Northern Rd & Elizabeth Dr
- 11 Northern Rd & Blaxland
- 12 Luddenham

Section Point Legend

- Bus Route 795
- 00 Penrith Station
- 01 Station & Jamison
- 02 Mulgoa Rd & Glenbrook St
- 03 School House Rd & Mulgoa Rd
- 04 Lot 24 Mulgoa Rd
- 05 400m Nth of Golf Club Entrance
- 06 1.2km Sth of Golf Club Entrance
- 07 500m Sth of Mayfair on Mulgoa Rd
- 08 Mulgoa P.S.
- 09 Water Channel & Mulgoa Rd
- 10 Water St & Mulgoa Rd
- 11 Silverdale Rd (1.0km West of Wallacia)
- 12 Farnsworth Ave & Silverdale Rd
- 13 Silverdale Rd & Econo Pl
- 14 Silverdale Rd & Ridgehaven Rd
- 15 Warradale & Marsh Rds
- 16 Warragamba Dam

Legend

- Bus Route
- Railway Line
- 07 Section Point
- 789 Bus Route Number
- S Educational Institution
- Shopping Centre
- Hospital
- N

Base Map: UBD DG08/01

Route 795 — Warragamba to Penrith
via Silverdale, Wallacia, Mulgoa Rd & Jamisontown

westbus
a member of ComfortDelGro Cabcharge Pty Ltd

Monday to Friday

map ref	Route Number	795	795	795	795	795	795	795	795	795
		am	am	am	am	am	am	pm	pm	pm
L	**Warragamba** (Weir Rd)	5.33	6.42	6.55	8.00	9.23	10.46	1.45	W3.06	4.49
K	Silverdale & Rd Marsh Rd	5.38	6.48	T7.14	8.06	9.29	10.52	1.51	3.15	4.54
J	**Wallacia Hotel** (Mulgoa Rd)	5.56	7.07	7.33	8.25	9.47	11.10	2.09	3.33	5.12
I	**Mulgoa Public School** (Mulgoa Rd)	6.00	7.13	7.39	N8.31	9.53	11.16	2.15	N3.37	5.16
H	Mulgoa Rd & Spencer St	6.10	7.24	7.50	8.43	10.04	11.27	2.26	3.50	5.26
G	**Nepean Shores Resort** (Tench Ave)	....	7.30	....	8.50	10.10	11.33	2.32	....	....
A	**Penrith Interchange**	6.23	7.40	8.05	9.00	10.20	11.43	2.42	4.04	5.40

Explanations

N – Bus diverts via Nepean District Christian School.

T – Bus diverts via Silverdale and Eltons Rds.

W – Bus diverts to Warragamba Public School.

Route 795 — Warragamba to Penrith
via Silverdale, Wallacia, Mulgoa Rd & Jamisontown

westbus
a member of ComfortDelGro Cabcharge Pty Ltd

map ref	Saturday	♿	♿	♿
	Route Number	**795**	**795**	**795**
		am	**am**	**pm**
L	**Warragamba** (Weir Rd)	8.45	10.45	2.45
K	Silverdale & Rd Marsh Rd	8.51	10.51	2.51
J	**Wallacia Hotel** (Mulgoa Rd)	9.09	11.09	3.09
I	**Mulgoa Public School** (Mulgoa Rd)	9.15	11.15	3.15
H	Mulgoa Rd & Spencer St	9.26	11.26	3.26
G	**Nepean Shores Resort** (Tench Ave)	9.32	11.32	3.32
A	**Penrith Interchange**	9.42	11.42	3.42

Explanations

♿ – Wheelchair accessible service.

Route 795 — Warragamba to Penrith
via Silverdale, Wallacia, Mulgoa Rd & Jamisontown

westbus
a member of ComfortDelGro Cabcharge Pty Ltd

map ref	Sundays & Public Holidays	♿	♿	♿
	Route Number	**795**	**795**	**795**
		am	**am**	**pm**
L	**Warragamba** (Weir Rd)	....	10.45	....
K	Silverdale & Rd Marsh Rd	....	10.51	....
J	**Wallacia Hotel** (Mulgoa Rd)	....	11.09	....
I	**Mulgoa Public School** (Mulgoa Rd)	....	11.15	....
H	Mulgoa Rd & Spencer St	**L**9.59	11.26	**L**1.55
G	**Nepean Shores Resort** (Tench Ave)	**L**9.52	11.32	**L**1.48
A	**Penrith Interchange**	10.13	11.42	2.09

Explanations

L – Bus operates from Penrith via Nepean Shores to Mulgoa Rd, then returns to Penrith.

Route 795 — Penrith to Warragamba
via Jamisontown, Mulgoa Rd, Wallacia & Silverdale

westbus — a member of ComfortDelGro Cabcharge Pty Ltd

Monday to Friday

map ref	Route Number	795	795	795	795	795	795	795	795	795
		am	am	am	pm	pm	pm	pm	pm	pm
A	**Penrith Interchange** (Stand 12)	7.07	8.22	9.43	1.58	D3.30	M3.45	4.30	5.43	6.46
G	**Nepean Shores Resort** (Tench Ave)	....	....	9.53	2.08	....	3.55	....	....	....
H	Mulgoa Rd & Spencer St	7.18	N8.31	9.58	2.13	3.42	4.01	4.42	5.55	6.58
I	**Mulgoa Public School** (Mulgoa Rd)	7.32	8.45	10.08	2.23	3.52	4.11	4.52	6.05	7.08
J	**Wallacia Hotel** (Mulgoa Rd)	X7.37	8.50	10.13	2.28	3.57	4.16	4.57	6.11	7.14
K	Silverdale & Rd Marsh Rd	7.47	9.10	10.34	2.29	4.18	4.37	5.18	6.33	7.36
L	**Warragamba** (Weir Rd)	7.55	9.18	10.41	2.56	4.25	4.44	5.25	6.41	7.44

Explanations

D – Bus commences from St Dominics School at 3.15pm

M – Bus commences from McCarthy High School at 3.30pm.

N – Bus diverts via Nepean District Christian School.

X – Bus does not operate via Greendale Rd.

Route 795 — Penrith to Warragamba via Jamisontown, Mulgoa Rd, Wallacia & Silverdale

westbus

Saturday				
map ref	Route Number	795	795	795
		pm	pm	pm
A	**Penrith Interchange** (Stand 12)	12.38	3.38	6.38
G	**Nepean Shores Resort** (Tench Ave)	12.48	3.48	6.48
H	Mulgoa Rd & Spencer St	12.53	3.53	6.53
I	**Mulgoa Public School** (Mulgoa Rd)	1.03	4.03	7.03
J	**Wallacia Hotel** (Mulgoa Rd)	1.08	4.08	7.08
K	Silverdale & Rd Marsh Rd	1.29	4.29	7.29
L	**Warragamba** (Weir Rd)	1.36	4.36	7.36

Explanations

– Wheelchair accessible service.

Route 795 — Penrith to Warragamba
via Jamisontown, Mulgoa Rd, Wallacia & Silverdale

westbus
a member of ComfortDelGro Cabcharge Pty Ltd

map ref	Sundays & Public Holidays	♿	♿	♿
	Route Number	**795**	**795**	**795**
		am	**pm**	**pm**
A	**Penrith Interchange** (Stand 12)	9.42	1.38	3.38
G	**Nepean Shores Resort** (Tench Ave)	9.52	1.48	3.48
H	Mulgoa Rd & Spencer St	9.59	1.55	3.53
I	**Mulgoa Public School** (Mulgoa Rd)	....	....	4.03
J	**Wallacia Hotel** (Mulgoa Rd)	....	....	4.08
K	Silverdale & Rd Marsh Rd	....	....	4.29
L	**Warragamba** (Weir Rd)	....	....	4.36

Explanations

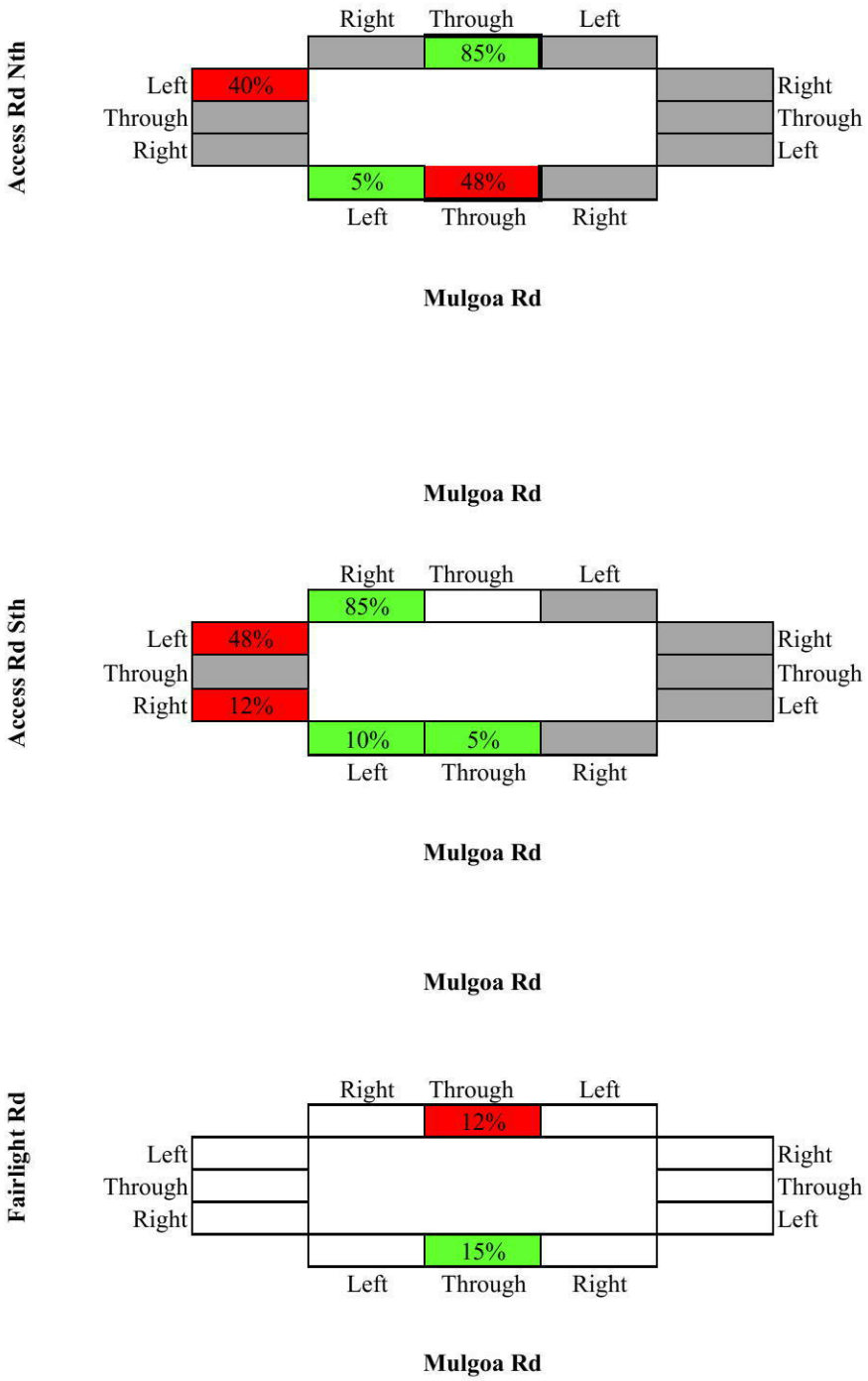
♿ – Wheelchair accessible service.

Appendix B. Traffic Distribution

2024

Morning & Evening Peak Period
Proposed Eastern Precinct

In:	100%
Out:	100%



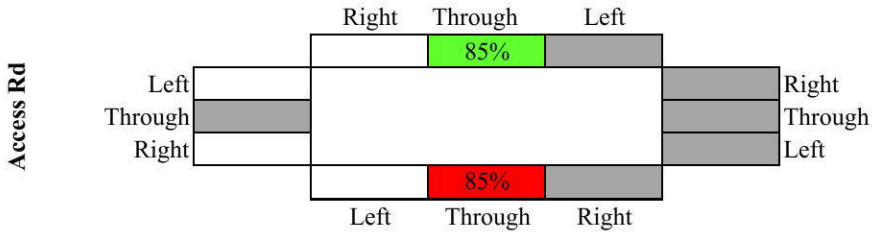
2024

Morning & Evening Peak Period

Future Western Precinct- Under Separate Approval

In:	100%
Out:	100%

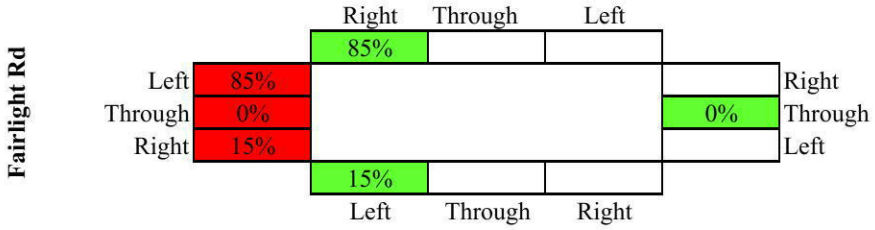
Mulgoa Rd



Access Rd

Mulgoa Rd

Mulgoa Rd



Fairlight Rd

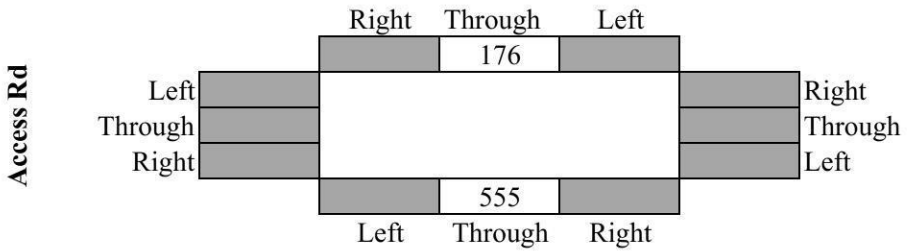
Fairlight Rd

Mulgoa Rd

Appendix C. Traffic Generation and Forecasts

2003 Traffic Volumes **Morning Peak Period**

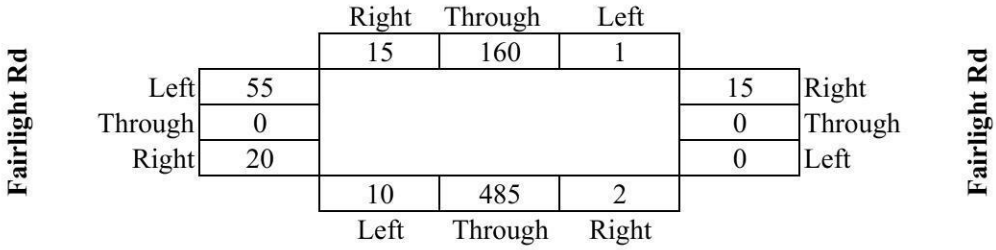
Mulgoa Rd



Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Access Rd	555	176			731
South of Access Rd	555	176			731

Mulgoa Rd

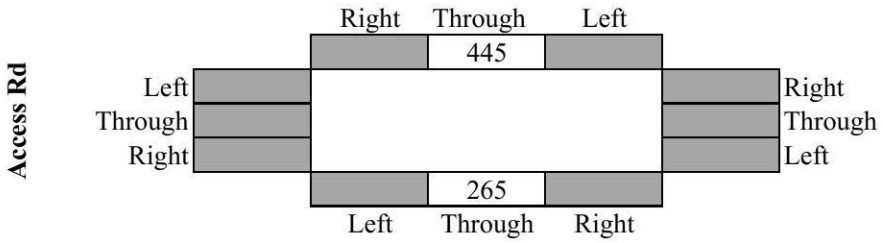


Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Fairlight Rd	555	176			731
South of Fairlight Rd	497	180			677
Fairlight Rd					
East of Mulgoa Rd			3	15	18
West of Mulgoa Rd			75	25	100

2003 Traffic Volumes **Evening Peak Period**

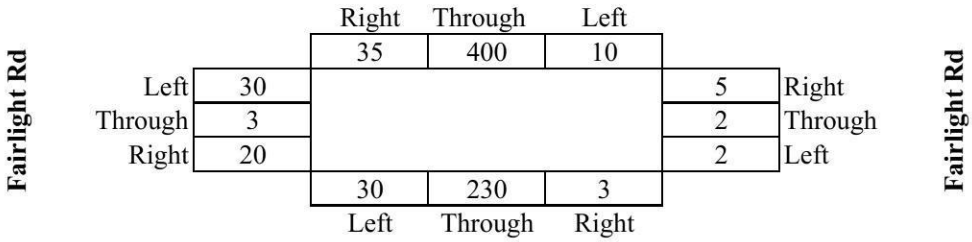
Mulgoa Rd



Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Access Rd	265	445			710
South of Access Rd	265	445			710

Mulgoa Rd

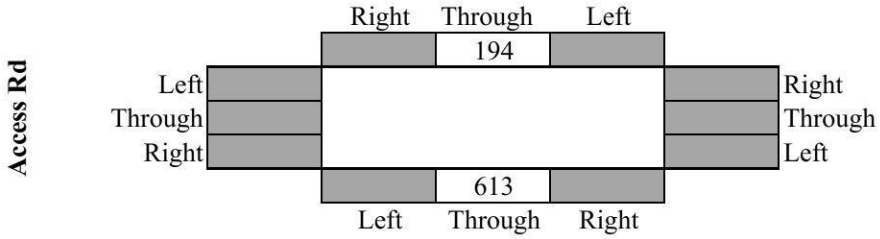


Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Fairlight Rd	265	445			710
South of Fairlight Rd	263	422			685
Fairlight Rd					
East of Mulgoa Rd			16	9	25
West of Mulgoa Rd			53	67	120

2013 Traffic Volumes **Morning Peak Period** Growth Rate: 1%

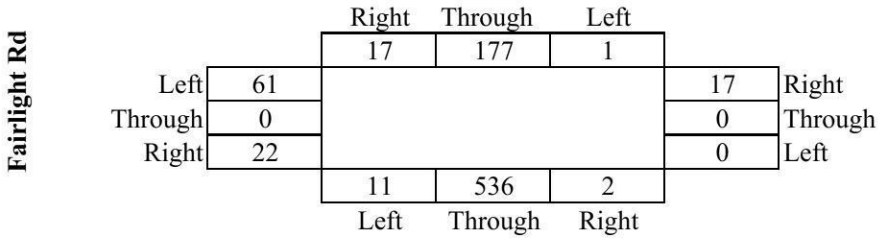
Mulgoa Rd



Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Access Rd	613	194			807
South of Access Rd	613	194			807

Mulgoa Rd

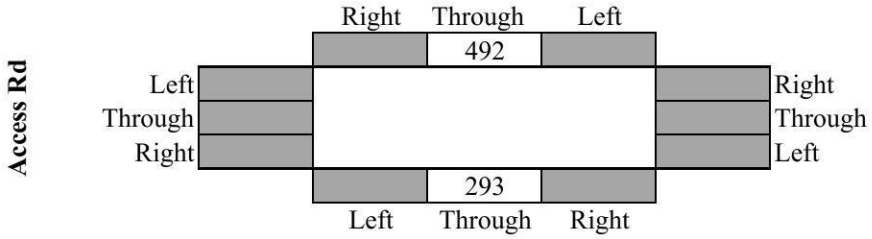


Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Fairlight Rd	613	194			807
South of Fairlight Rd	549	199			748
Fairlight Rd					
East of Mulgoa Rd			3	17	20
West of Mulgoa Rd			83	28	110

2013 Traffic Volumes **Evening Peak Period** Growth Rate: 1%

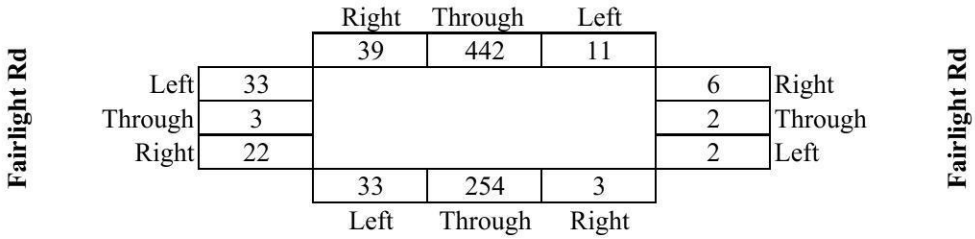
Mulgoa Rd



Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Access Rd	293	492			784
South of Access Rd	293	492			784

Mulgoa Rd



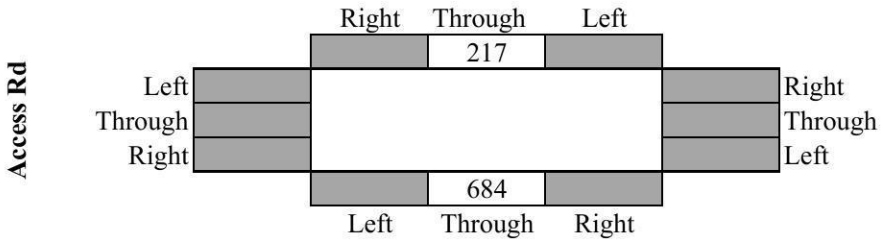
Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Fairlight Rd	293	492			784
South of Fairlight Rd	291	466			757
Fairlight Rd					
East of Mulgoa Rd			18	10	28
West of Mulgoa Rd			59	74	133

2024 Traffic Volumes **Morning Peak Period** Growth Rate: 1%

(Without Development)

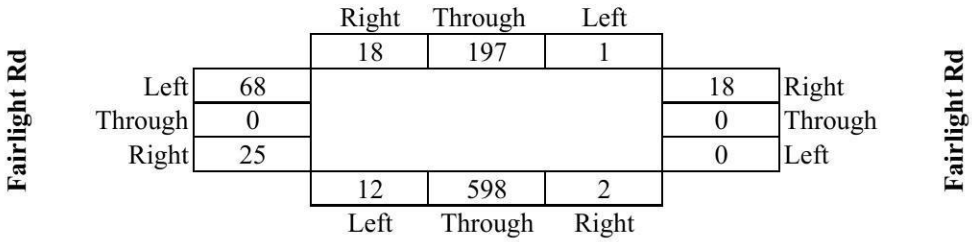
Mulgoa Rd



Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Access Rd	684	217			901
South of Access Rd	684	217			901
Access Rd					
West of Mulgoa Rd			0	0	0

Mulgoa Rd



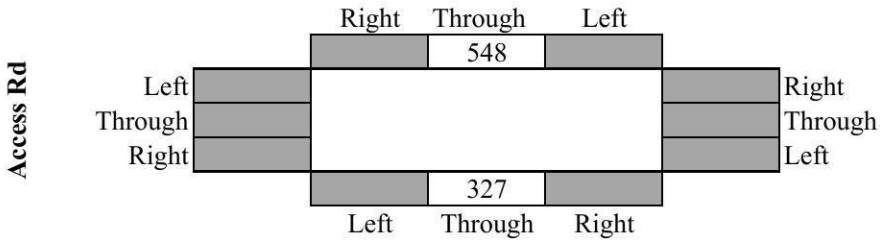
Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Fairlight Rd	684	217			901
South of Fairlight Rd	612	222			834
Fairlight Rd					
East of Mulgoa Rd			4	18	22
West of Mulgoa Rd			92	31	123

2024 Traffic Volumes **Evening Peak Period** Growth Rate: 1%

(Without Development)

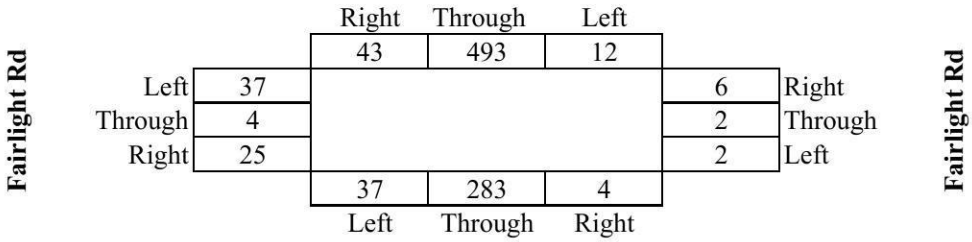
Mulgoa Rd



Mulgoa Rd

Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Access Rd	327	548			875
South of Access Rd	327	548			875
Access Rd					
West of Mulgoa Rd			0	0	0

Mulgoa Rd



Mulgoa Rd

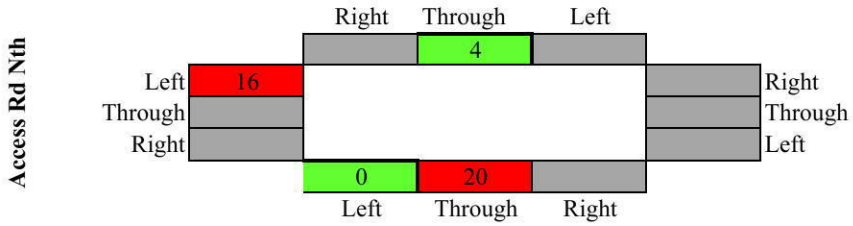
Peak Hour Traffic Volume (vph)					
Road & Section	**NBD**	**SBD**	**EBD**	**WBD**	**Total**
Mulgoa Rd					
North of Fairlight Rd	327	548			875
South of Fairlight Rd	324	520			844
Fairlight Rd					
East of Mulgoa Rd			20	11	31
West of Mulgoa Rd			65	83	148

2024

Morning Peak Period
Proposed Eastern Precinct

In:	5
Out:	41

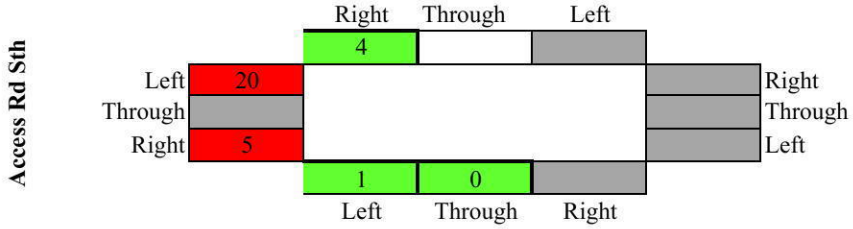
Mulgoa Rd



Access Rd Nth

Mulgoa Rd

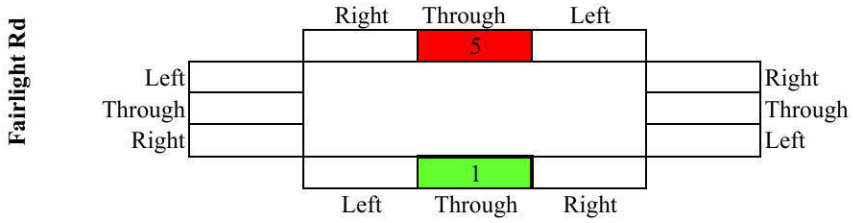
Mulgoa Rd



Access Rd Sth

Mulgoa Rd

Mulgoa Rd



Fairlight Rd

Fairlight Rd

Mulgoa Rd

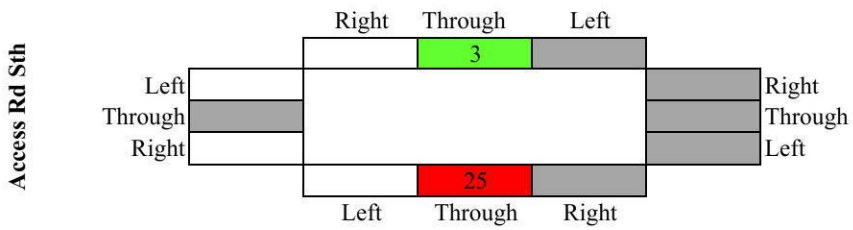
2024

Morning Peak Period

Future Western Precinct- Under Separate Approval

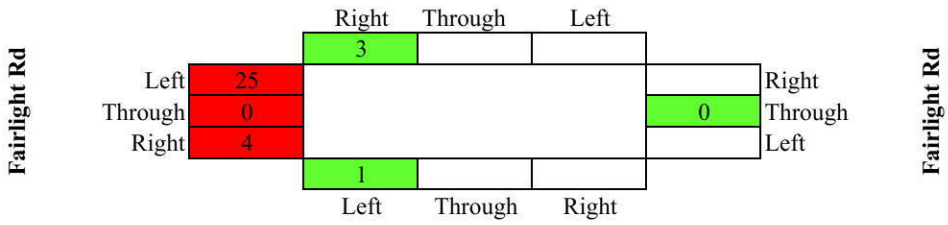
In:	4
Out:	29

Mulgoa Rd



Mulgoa Rd

Mulgoa Rd



Mulgoa Rd

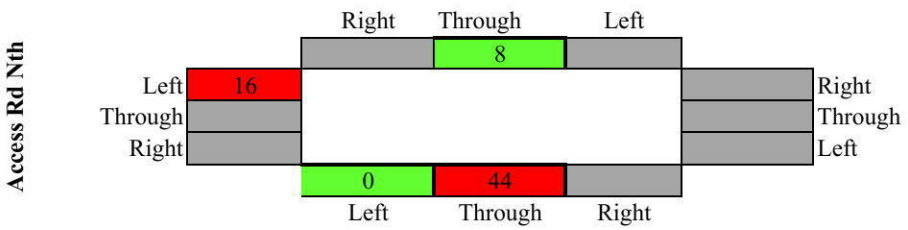
2024

Morning Peak Period

Combined Traffic (Site + Future Western Precinct)

In:	9
Out:	70

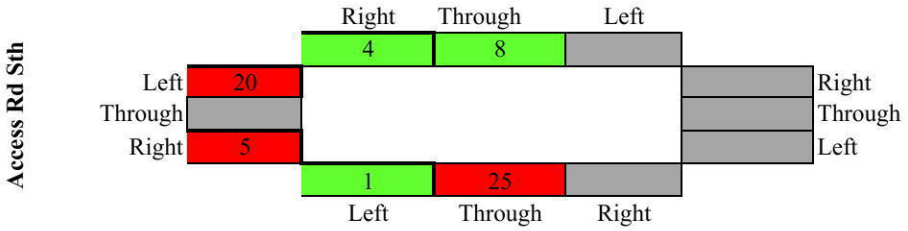
Mulgoa Rd



Access Rd Nth

Mulgoa Rd

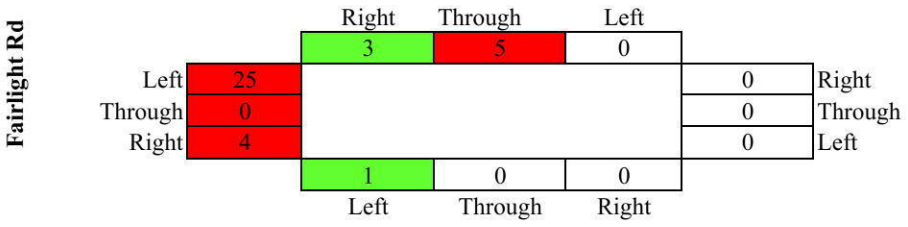
Mulgoa Rd



Access Rd Sth

Mulgoa Rd

Mulgoa Rd



Fairlight Rd

Fairlight Rd

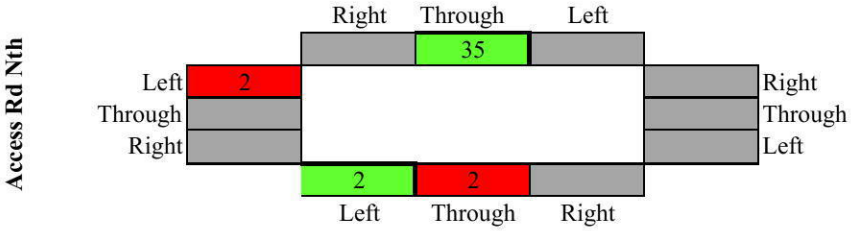
Mulgoa Rd

2024

Evening Peak Period
Proposed Eastern Precinct

In:	41
Out:	5

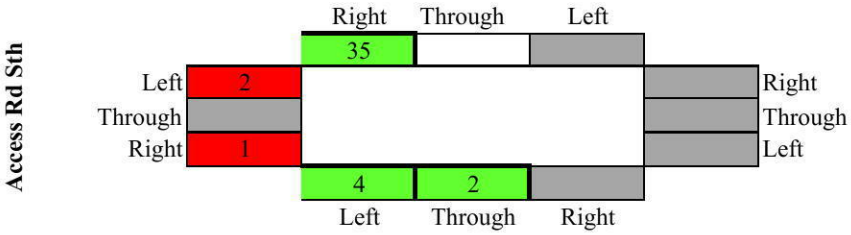
Mulgoa Rd



Access Rd Nth

Mulgoa Rd

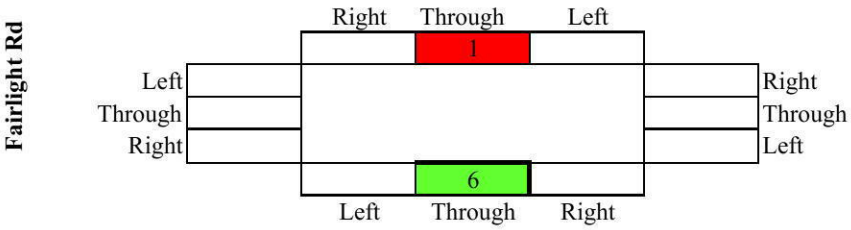
Mulgoa Rd



Access Rd Sth

Mulgoa Rd

Mulgoa Rd



Fairlight Rd

Fairlight Rd

Mulgoa Rd

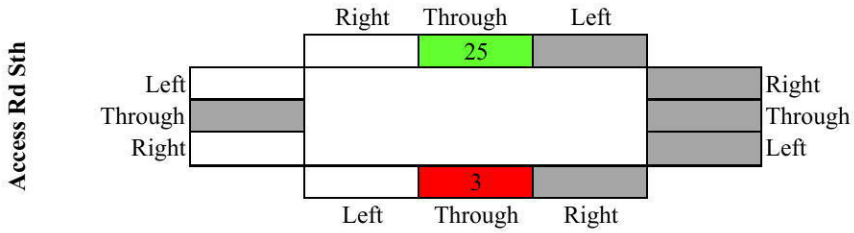
2024

Evening Peak Period

Future Western Precinct- Under Separate Approval

In:	29
Out:	4

Mulgoa Rd



Mulgoa Rd

Mulgoa Rd

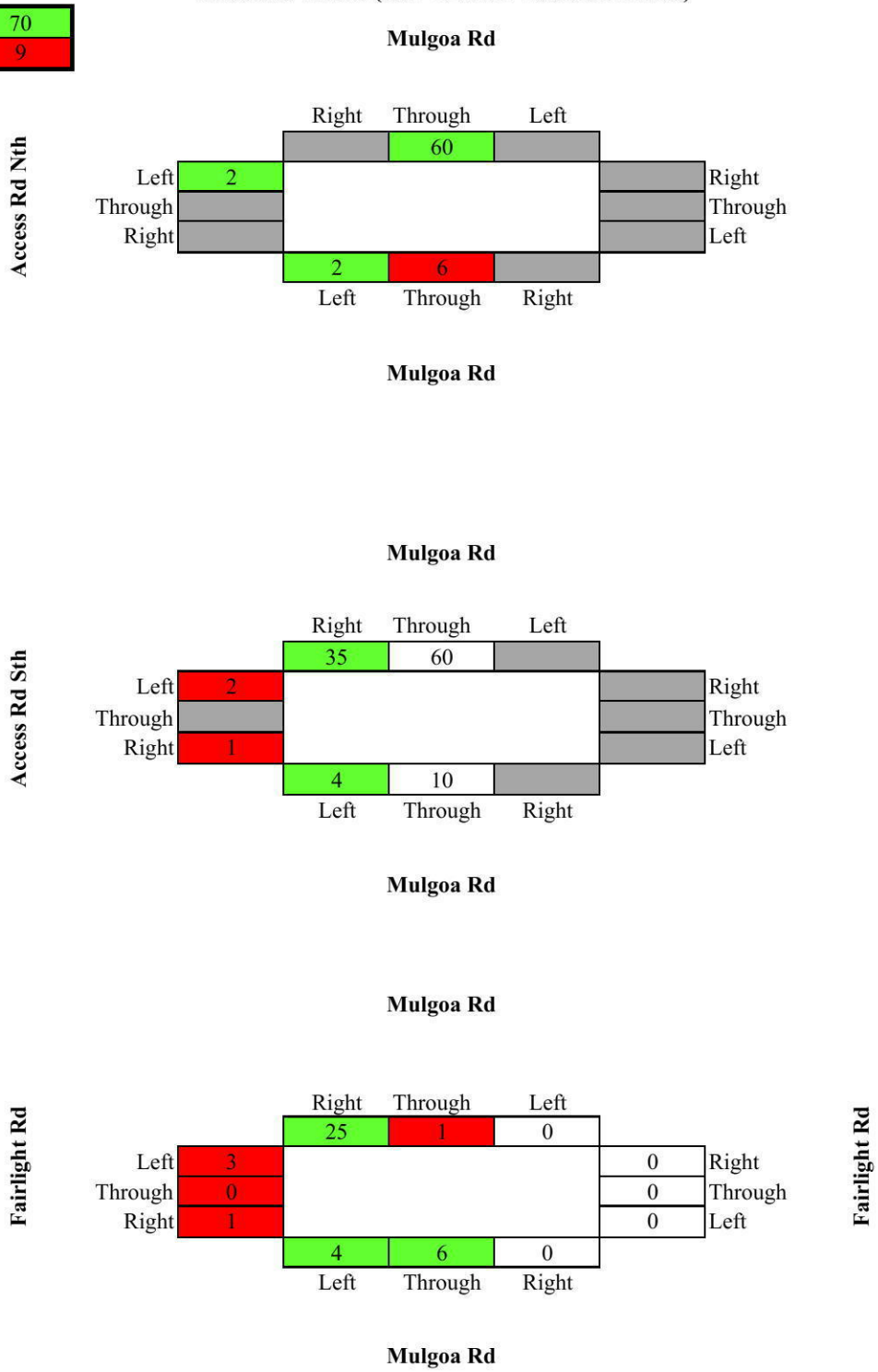
Mulgoa Rd

2024

Evening Peak Period

Combined Traffic (Site + Future Western Precinct)

In:	70
Out:	9

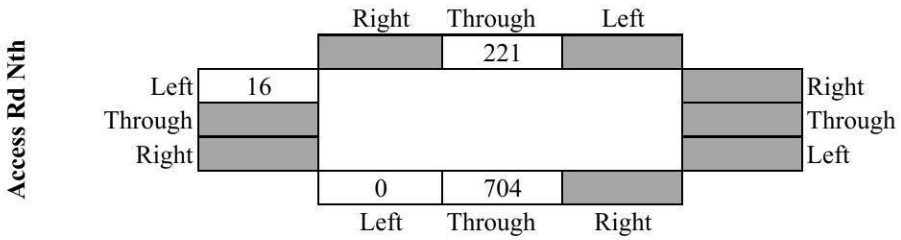


2024

Morning Peak Period

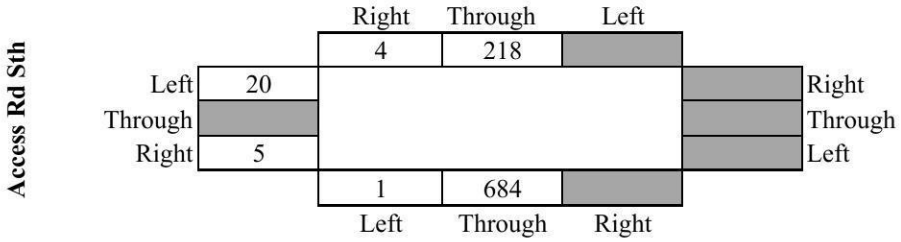
With Eastern Precinct Development traffic

Mulgoa Rd



Mulgoa Rd

Mulgoa Rd



Mulgoa Rd

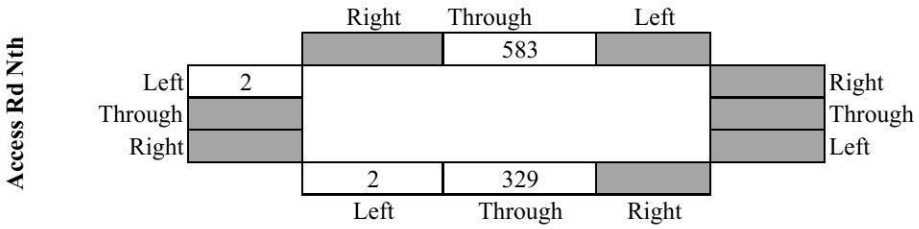
Mulgoa Rd

Mulgoa Rd

2024

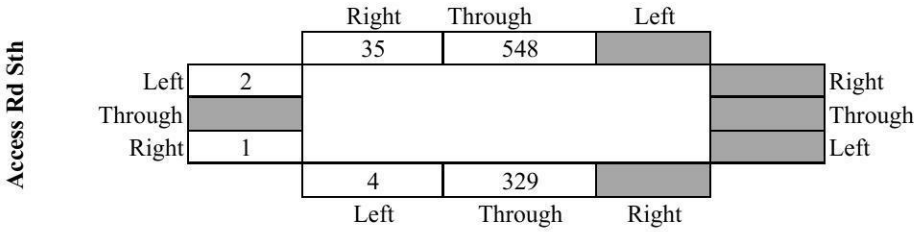
Evening Peak Period
with Eastern Precinct Development Traffic

Mulgoa Rd



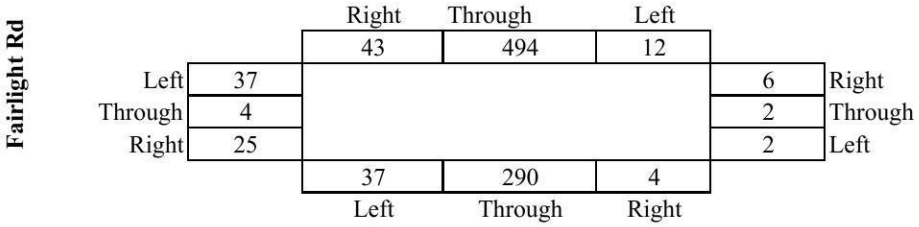
Mulgoa Rd

Mulgoa Rd



Mulgoa Rd

Mulgoa Rd



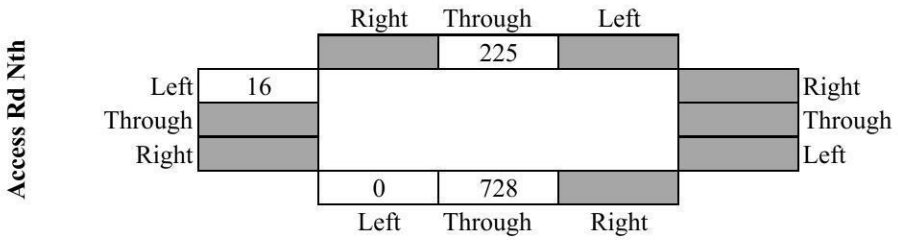
Fairlight Rd

Mulgoa Rd

2024

Morning Peak Period
With Combined Development traffic

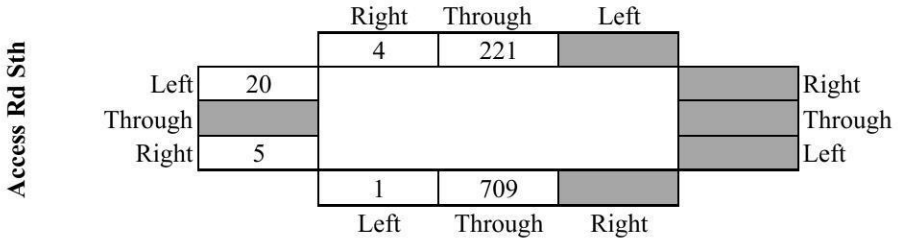
Mulgoa Rd



Access Rd Nth

Mulgoa Rd

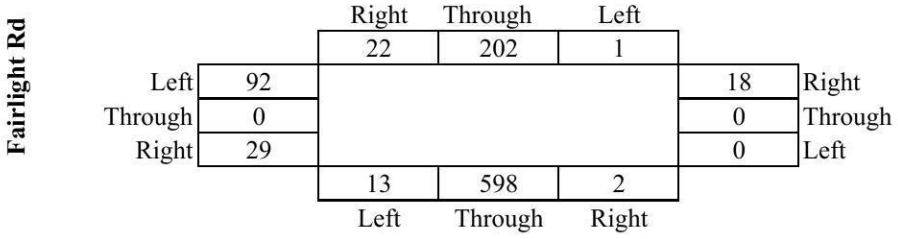
Mulgoa Rd



Access Rd Sth

Mulgoa Rd

Mulgoa Rd



Fairlight Rd

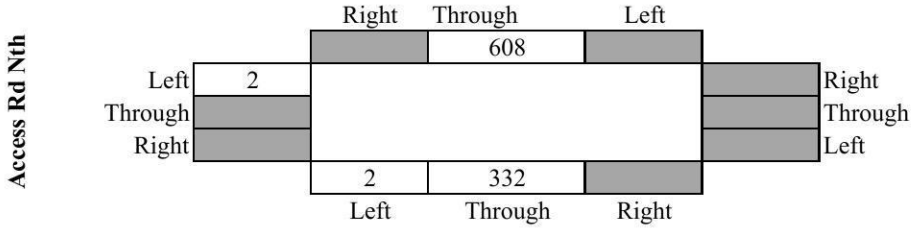
Fairlight Rd

Mulgoa Rd

2024

Evening Peak Period
with Combined Development Traffic

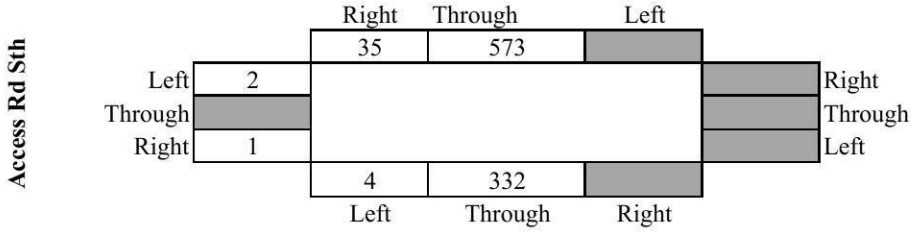
Mulgoa Rd



Access Rd Nth

Mulgoa Rd

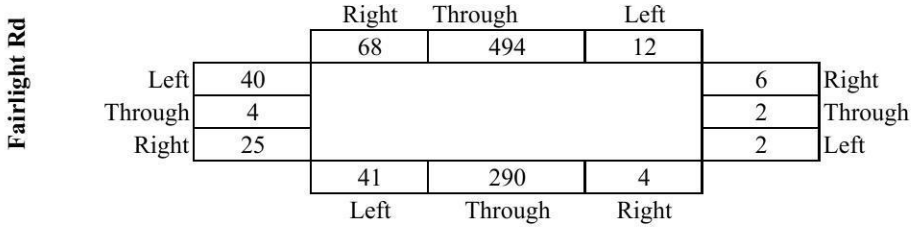
Mulgoa Rd



Access Rd Sth

Mulgoa Rd

Mulgoa Rd

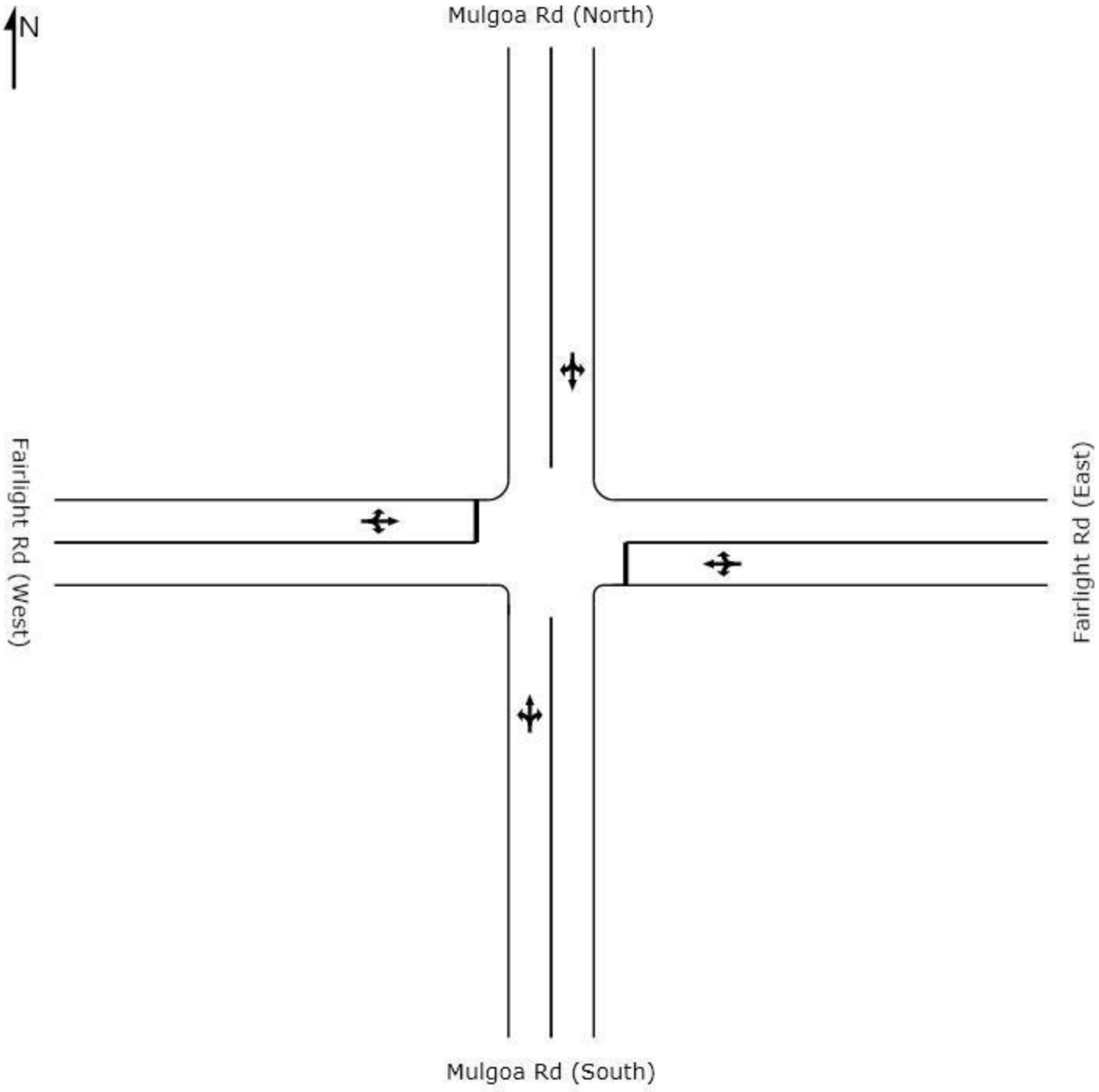


Fairlight Rd

Fairlight Rd

Mulgoa Rd

Appendix D. SIDRA Output Summary


N
Mulgoa Rd (North)
Fairlight Rd (West)
Fairlight Rd (East)
Mulgoa Rd (South)

MOVEMENT SUMMARY

Site: Mulgoa Rd & Fairlight Rd
2024 (AM without development)

Mulgoa Rd / Fairlight Rd Intersection 2024 Morning Peak (Without Development)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Rd (South)											
1	L	12	0.0	0.332	9.4	LOS A	2.7	19.1	0.44	0.60	49.2
2	T	598	0.0	0.332	1.2	LOS A	2.7	19.1	0.44	0.00	52.2
3	R	2	0.0	0.332	9.4	LOS A	2.7	19.1	0.44	0.90	49.2
Approach		612	0.0	0.332	1.4	NA	2.7	19.1	0.44	0.01	52.1
East: Fairlight Rd (East)											
4	L	1	0.0	0.092	26.1	LOS B	0.3	2.2	0.76	0.72	35.8
5	T	1	0.0	0.092	25.9	LOS B	0.3	2.2	0.76	1.00	35.9
6	R	18	0.0	0.092	26.1	LOS B	0.3	2.2	0.76	1.00	35.8
Approach		20	0.0	0.092	26.1	LOS B	0.3	2.2	0.76	0.99	35.8
North: Mulgoa Rd (North)											
7	L	1	0.0	0.133	12.3	LOS A	1.2	8.6	0.63	0.38	47.3
8	T	197	0.0	0.133	4.1	LOS A	1.2	8.6	0.63	0.00	49.2
9	R	18	0.0	0.133	12.3	LOS A	1.2	8.6	0.63	0.99	47.3
Approach		216	0.0	0.133	4.8	NA	1.2	8.6	0.63	0.08	49.1
West: Fairlight Rd (West)											
10	L	68	0.0	0.235	18.9	LOS B	0.9	6.1	0.68	1.02	40.5
11	T	1	0.0	0.235	18.6	LOS B	0.9	6.1	0.68	1.02	40.6
12	R	25	0.0	0.235	18.9	LOS B	0.9	6.1	0.68	1.01	40.5
Approach		94	0.0	0.235	18.9	LOS B	0.9	6.1	0.68	1.02	40.5
All Vehicles		942	0.0	0.332	4.4	NA	2.7	19.1	0.52	0.15	49.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mulgoa Rd & Fairlight Rd
2024 (PM without Development)

Mulgoa Rd / Fairlight Rd Intersection 2024 Evening Peak (Without Development)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Rd (South)											
1	L	37	0.0	0.179	11.4	LOS A	1.7	11.8	0.66	0.34	48.2
2	T	283	0.0	0.179	3.2	LOS A	1.7	11.8	0.66	0.00	48.8
3	R	4	0.0	0.179	11.4	LOS A	1.7	11.8	0.66	0.95	48.2
Approach		324	0.0	0.179	4.3	NA	1.7	11.8	0.66	0.05	48.7
East: Fairlight Rd (East)											
4	L	2	0.0	0.040	23.4	LOS B	0.1	0.9	0.74	0.88	37.5
5	T	2	0.0	0.040	23.1	LOS B	0.1	0.9	0.74	1.00	37.6
6	R	6	0.0	0.040	23.4	LOS B	0.1	0.9	0.74	1.00	37.5
Approach		10	0.0	0.040	23.3	LOS B	0.1	0.9	0.74	0.98	37.5
North: Mulgoa Rd (North)											
7	L	12	0.0	0.315	10.3	LOS A	2.7	19.0	0.56	0.44	49.1
8	T	493	0.0	0.315	2.1	LOS A	2.7	19.0	0.56	0.00	50.2
9	R	43	0.0	0.315	10.3	LOS A	2.7	19.0	0.56	0.90	49.1
Approach		548	0.0	0.315	2.9	NA	2.7	19.0	0.56	0.08	50.1
West: Fairlight Rd (West)											
10	L	37	0.0	0.172	18.6	LOS B	0.6	4.2	0.59	0.88	40.5
11	T	4	0.0	0.172	18.3	LOS B	0.6	4.2	0.59	1.00	40.7
12	R	25	0.0	0.172	18.6	LOS B	0.6	4.2	0.59	1.00	40.5
Approach		66	0.0	0.172	18.6	LOS B	0.6	4.2	0.59	0.93	40.6
All Vehicles		948	0.0	0.315	4.7	NA	2.7	19.0	0.60	0.14	48.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mulgoa Rd & Fairlight Rd
2024 (AM with Development)

Mulgoa Rd / Fairlight Rd Intersection 2024 Morning Peak (With Development)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Rd (South)											
1	L	12	0.0	0.332	9.4	LOS A	2.7	19.2	0.45	0.59	49.2
2	T	598	0.0	0.332	1.2	LOS A	2.7	19.2	0.45	0.00	52.1
3	R	2	0.0	0.332	9.4	LOS A	2.7	19.2	0.45	0.90	49.2
Approach		612	0.0	0.332	1.4	NA	2.7	19.2	0.45	0.01	52.0
East: Fairlight Rd (East)											
4	L	1	0.0	0.093	26.3	LOS B	0.3	2.2	0.76	0.72	35.7
5	T	1	0.0	0.093	26.1	LOS B	0.3	2.2	0.76	1.00	35.8
6	R	18	0.0	0.093	26.3	LOS B	0.3	2.2	0.76	1.00	35.7
Approach		20	0.0	0.093	26.3	LOS B	0.3	2.2	0.76	0.99	35.7
North: Mulgoa Rd (North)											
7	L	1	0.0	0.135	12.3	LOS A	1.3	8.8	0.64	0.38	47.3
8	T	202	0.0	0.135	4.1	LOS A	1.3	8.8	0.64	0.00	49.2
9	R	18	0.0	0.135	12.3	LOS A	1.3	8.8	0.64	0.99	47.3
Approach		221	0.0	0.135	4.8	NA	1.3	8.8	0.64	0.08	49.0
West: Fairlight Rd (West)											
10	L	68	0.0	0.237	19.0	LOS B	0.9	6.2	0.68	1.02	40.4
11	T	1	0.0	0.237	18.7	LOS B	0.9	6.2	0.68	1.02	40.6
12	R	25	0.0	0.237	19.0	LOS B	0.9	6.2	0.68	1.01	40.4
Approach		94	0.0	0.237	18.9	LOS B	0.9	6.2	0.68	1.02	40.4
All Vehicles		947	0.0	0.332	4.5	NA	2.7	19.2	0.52	0.15	49.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mulgoa Rd & Fairlight Rd
2024 (PM with Development)

Mulgoa Rd / Fairlight Rd Intersection 2024 Evening Peak
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Rd (South)											
1	L	37	0.0	0.183	11.4	LOS A	1.7	12.1	0.66	0.34	48.1
2	T	290	0.0	0.183	3.2	LOS A	1.7	12.1	0.66	0.00	48.7
3	R	4	0.0	0.183	11.4	LOS A	1.7	12.1	0.66	0.95	48.1
Approach		331	0.0	0.183	4.3	NA	1.7	12.1	0.66	0.05	48.7
East: Fairlight Rd (East)											
4	L	2	0.0	0.040	23.6	LOS B	0.1	0.9	0.74	0.88	37.3
5	T	2	0.0	0.040	23.3	LOS B	0.1	0.9	0.74	1.00	37.4
6	R	6	0.0	0.040	23.6	LOS B	0.1	0.9	0.74	1.00	37.3
Approach		10	0.0	0.040	23.5	LOS B	0.1	0.9	0.74	0.98	37.3
North: Mulgoa Rd (North)											
7	L	12	0.0	0.316	10.4	LOS A	2.7	19.2	0.57	0.44	49.0
8	T	494	0.0	0.316	2.2	LOS A	2.7	19.2	0.57	0.00	50.1
9	R	43	0.0	0.316	10.4	LOS A	2.7	19.2	0.57	0.91	49.0
Approach		549	0.0	0.316	3.0	NA	2.7	19.2	0.57	0.08	50.0
West: Fairlight Rd (West)											
10	L	37	0.0	0.174	18.8	LOS B	0.6	4.3	0.59	0.88	40.4
11	T	4	0.0	0.174	18.5	LOS B	0.6	4.3	0.59	1.00	40.6
12	R	25	0.0	0.174	18.8	LOS B	0.6	4.3	0.59	1.00	40.4
Approach		66	0.0	0.174	18.8	LOS B	0.6	4.3	0.59	0.93	40.4
All Vehicles		956	0.0	0.316	4.7	NA	2.7	19.2	0.61	0.14	48.6

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mulgoa Rd & Fairlight Rd
2024 (AM combined)

Mulgoa Rd / Fairlight Rd Intersection 2024 Morning Peak
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Rd (South)											
1	L	13	0.0	0.331	9.4	LOS A	2.7	19.2	0.45	0.59	49.2
2	T	598	0.0	0.331	1.2	LOS A	2.7	19.2	0.45	0.00	52.1
3	R	1	0.0	0.331	9.4	LOS A	2.7	19.2	0.45	0.90	49.2
Approach		612	0.0	0.331	1.4	NA	2.7	19.2	0.45	0.01	52.0
East: Fairlight Rd (East)											
4	L	1	0.0	0.098	27.3	LOS B	0.3	2.3	0.78	0.72	35.1
5	T	1	0.0	0.098	27.0	LOS B	0.3	2.3	0.78	1.00	35.2
6	R	18	0.0	0.098	27.3	LOS B	0.3	2.3	0.78	1.00	35.1
Approach		20	0.0	0.098	27.3	LOS B	0.3	2.3	0.78	0.99	35.1
North: Mulgoa Rd (North)											
7	L	1	0.0	0.141	12.4	LOS A	1.3	9.0	0.63	0.37	47.2
8	T	202	0.0	0.141	4.2	LOS A	1.3	9.0	0.63	0.00	49.2
9	R	22	0.0	0.141	12.4	LOS A	1.3	9.0	0.63	0.99	47.2
Approach		225	0.0	0.141	5.0	NA	1.3	9.0	0.63	0.10	49.0
West: Fairlight Rd (West)											
10	L	92	0.0	0.299	19.4	LOS B	1.2	8.5	0.69	1.04	40.1
11	T	1	0.0	0.299	19.1	LOS B	1.2	8.5	0.69	1.04	40.3
12	R	29	0.0	0.299	19.4	LOS B	1.2	8.5	0.69	1.04	40.1
Approach		122	0.0	0.299	19.4	LOS B	1.2	8.5	0.69	1.04	40.1
All Vehicles		979	0.0	0.331	5.0	NA	2.7	19.2	0.53	0.18	49.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: Mulgoa Rd & Fairlight Rd
2024 (PM combined)

Mulgoa Rd / Fairlight Rd Intersection 2024 Evening Peak
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Rd (South)											
1	L	41	0.0	0.184	11.4	LOS A	1.7	12.2	0.67	0.33	48.1
2	T	289	0.0	0.184	3.3	LOS A	1.7	12.2	0.67	0.00	48.6
3	R	4	0.0	0.184	11.4	LOS A	1.7	12.2	0.67	0.95	48.1
Approach		334	0.0	0.184	4.4	NA	1.7	12.2	0.67	0.05	48.6
East: Fairlight Rd (East)											
4	L	2	0.0	0.043	24.4	LOS B	0.1	1.0	0.75	0.88	36.8
5	T	2	0.0	0.043	24.2	LOS B	0.1	1.0	0.75	1.00	36.9
6	R	6	0.0	0.043	24.4	LOS B	0.1	1.0	0.75	1.00	36.8
Approach		10	0.0	0.043	24.4	LOS B	0.1	1.0	0.75	0.98	36.8
North: Mulgoa Rd (North)											
7	L	12	0.0	0.340	10.5	LOS A	3.0	20.9	0.59	0.41	48.8
8	T	494	0.0	0.340	2.3	LOS A	3.0	20.9	0.59	0.00	49.7
9	R	68	0.0	0.340	10.5	LOS A	3.0	20.9	0.59	0.90	48.8
Approach		574	0.0	0.340	3.4	NA	3.0	20.9	0.59	0.11	49.6
West: Fairlight Rd (West)											
10	L	40	0.0	0.185	19.0	LOS B	0.6	4.5	0.59	0.89	40.3
11	T	4	0.0	0.185	18.7	LOS B	0.6	4.5	0.59	1.00	40.4
12	R	25	0.0	0.185	19.0	LOS B	0.6	4.5	0.59	1.00	40.3
Approach		69	0.0	0.185	19.0	LOS B	0.6	4.5	0.59	0.93	40.3
All Vehicles		987	0.0	0.340	5.0	NA	3.0	20.9	0.62	0.16	48.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

South Access Road & Mulgoa Road 2024 AM
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Road											
1	L	1	0.0	0.370	8.2	LOS A	0.0	0.0	0.00	1.09	49.0
2	T	720	0.0	0.370	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		721	0.0	0.370	0.0	NA	0.0	0.0	0.00	0.00	60.0
North: Mulgoa Road											
8	T	229	0.0	0.125	5.5	LOS A	1.5	10.7	0.72	0.00	48.4
9	R	4	0.0	0.125	14.0	LOS A	1.5	10.7	0.72	1.05	46.4
Approach		234	0.0	0.125	5.7	NA	1.5	10.7	0.72	0.02	48.3
West: Acess Road South											
10	L	21	0.0	0.082	20.2	LOS B	0.3	1.8	0.72	1.00	39.5
12	R	5	0.0	0.082	20.0	LOS B	0.3	1.8	0.72	1.01	39.7
Approach		26	0.0	0.082	20.2	LOS B	0.3	1.8	0.72	1.00	39.6
All Vehicles		981	0.0	0.370	1.9	NA	1.5	10.7	0.19	0.03	56.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

South Access Road & Mulgoa Road 2024 PM
Stop (Two-Way)

Movement Performance - Vehicles

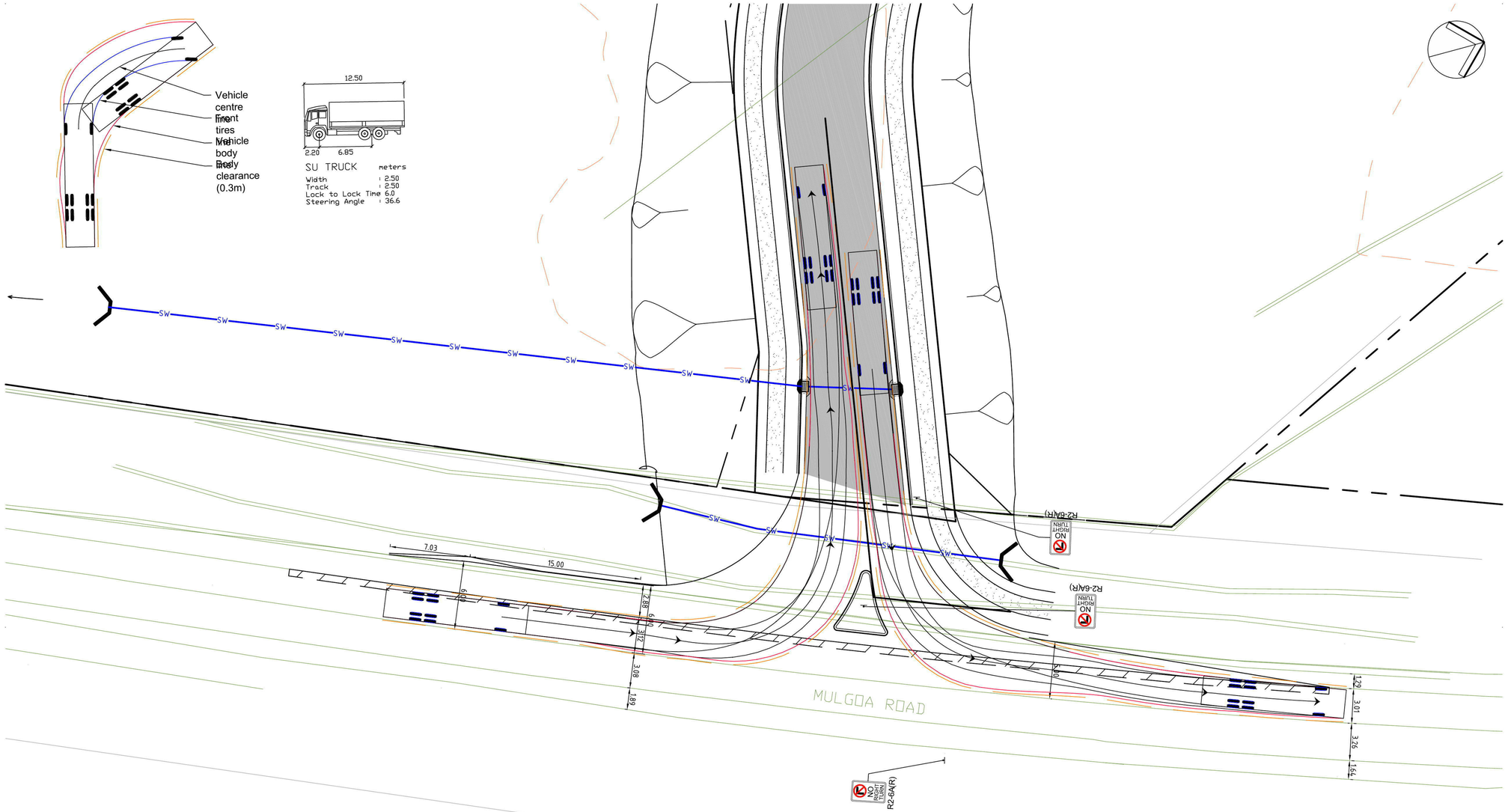
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Mulgoa Road											
1	L	4	0.0	0.180	8.2	LOS A	0.0	0.0	0.00	1.08	49.0
2	T	346	0.0	0.180	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		350	0.0	0.180	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: Mulgoa Road											
8	T	577	0.0	0.333	2.4	LOS A	3.2	22.4	0.61	0.00	49.6
9	R	37	0.0	0.333	10.9	LOS A	3.2	22.4	0.61	0.97	49.0
Approach		614	0.0	0.333	2.9	NA	3.2	22.4	0.61	0.06	49.6
West: Acess Road South											
10	L	2	0.0	0.010	19.2	LOS B	0.0	0.2	0.59	0.77	40.1
12	R	1	0.0	0.010	18.9	LOS B	0.0	0.2	0.59	0.98	40.2
Approach		3	0.0	0.010	19.1	LOS B	0.0	0.2	0.59	0.84	40.1
All Vehicles		967	0.0	0.333	2.0	NA	3.2	22.4	0.39	0.04	52.8

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model used.

Appendix E. Proposed Intersection Treatments

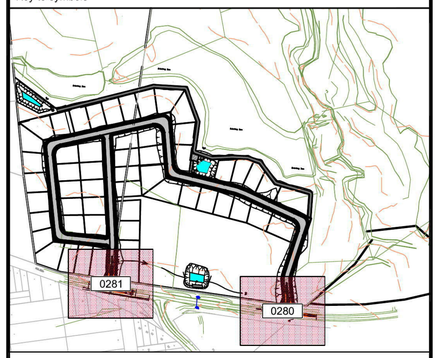
SU TRUCK meters

Width	: 2.50
Track	: 2.50
Lock to Lock Time	6.0
Steering Angle	: 36.6



Notes

Key to symbols



Key Plan
1:NTS

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	27.06.13	AMP	Issued for DA Approval	GL	DB

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Client
Cubelic Holdings Pty Ltd

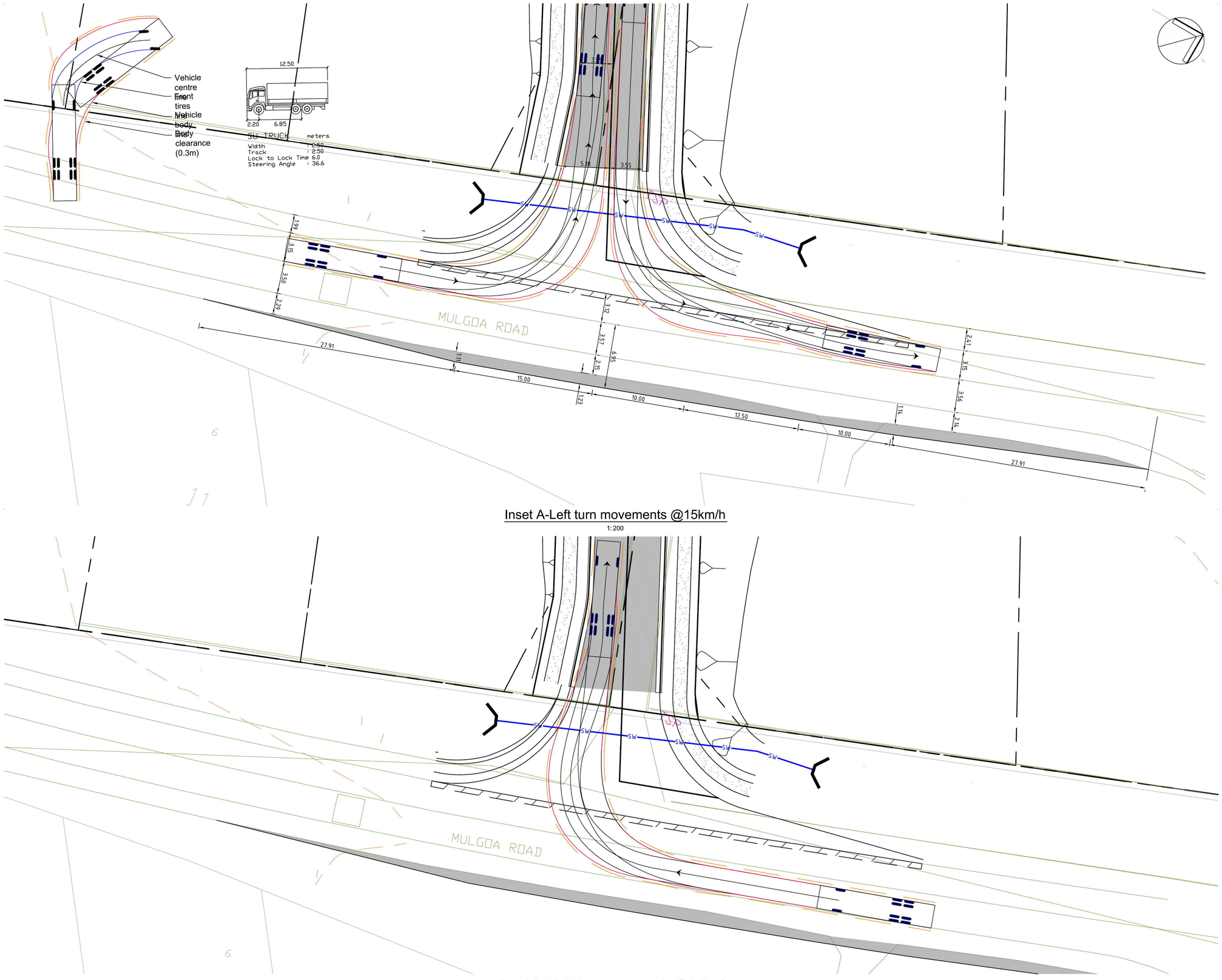
Title
Fernhill Estate
Intersection Plan
Sheet 1
Rural basic left-turn (BAL)

Designed	GL	.	Eng check	GL	.
Drawn	DW	.	Coordination	CJA	.
Dwg check	GC	.	Approved	DB	.
Scale at A1	1:200	Status	PRE	Rev	----

Drawing Number
MMD-322876-C-DR-00-EA-0280

5 4 3 2 1 0 5 10
PLAN SCALE 1:200 @ A1

Not For Construction



Inset A-Left turn movements @15km/h

1:200

Inset A-Right turn movements @15km/h

1:200

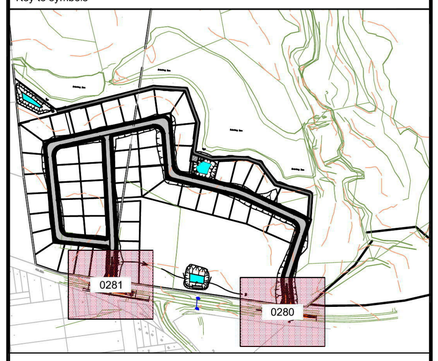
5 4 3 2 1 0 5 10

PLAN SCALE 1:200 @A1

Not For Construction

Notes

Key to symbols



Key Plan

1:NTS

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	27.06.13	AMP	Issued for DA Approval	GL	DB

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Client: Cubelic Holdings Pty Ltd

Title:
Fernhill Estate
Intersection Plan
Sheet 2
Basic right turn (BAR)

Designed	GL	.	Eng check	GL	.
Drawn	DW	.	Coordination	CJA	.
Dwg check	GC	.	Approved	DB	.

Scale at A1	Status	Rev
1:200	PRE	----

Drawing Number: MMD-322876-C-DR-00-EA-0281