

APPENDIX N REVISED TRAFFIC IMPACT ASSESSMENT



Angus Place Mine Extension Project

Traffic impact assessment

Prepared for Centennial Angus Place Pty Ltd
October 2019





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Angus Place Mine Extension Project

Traffic impact assessment

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1 Introduction

1.1 Background

Centennial Angus Place Pty Limited (Centennial Angus Place) operates the Angus Place Colliery (here in referred to as the mine), an existing underground coal mine producing thermal coal for use predominantly at Mount Piper Power Station (MPPS). The mine is located 15 kilometres (km) to the north-west of the regional city of Lithgow and 120 km west-north-west of Sydney in New South Wales (NSW). The mine's location in a regional context is shown in Figure 1.1.

The key components of the mine's existing operations are an underground longwall mine, accessed via the Angus Place pit top, and supporting surface infrastructure within the pit top area and on Newnes Plateau within the Newnes State Forest.

The mine's project approval (PA_06_0021) was granted in September 2006 under the now repealed Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). PA_06_0021 will expire in August 2024 and a new State significant development (SSD) consent is required to ensure the mine will be operational beyond this date.

A new SSD application and supporting Environmental Impact Statement (EIS) was submitted to NSW Department of Planning, Industry and Environment (DPIE) in April 2014 for the Angus Place Mine Extension Project (the Project).

In response to a prolonged downturn in international coal markets, a decision was made by Centennial Angus Place in March 2015 to place the mine into care and maintenance following the completion of secondary extraction within Longwall 900W. At this time, the assessment of the Project was placed on hold.

Since the submission of the EIS, and subsequent response to submissions (RTS) documents, a review of the Project has been completed to take into consideration up to date monitoring information obtained from the adjacent Springvale Mine in relation to observed swamp impacts as well as recent changes in operational requirements. This review has resulted in changes to the Project that was presented in the EIS.

Centennial Angus Place propose to prepare and submit an Amended Project Report to DPIE to highlight the proposed changes to the Project since the submission of the EIS and to enable DPIE to recommence their assessment and determination of the project. This traffic impact assessment (TIA) provides an updated assessment of the key traffic-related impacts of the Project.

1.2 Project overview

The key components of the Project, as amended, are as follows:

- extend the life of the mine to 31 December 2053;
- increase in Project Application Area from 10,460 ha to 10,551 ha;
- increase in full time equivalent (FTE) personnel from 300 to 450;
- increase extraction up to 4.5 million tonnes per annum (Mtpa) of ROM coal from the Lithgow Seam underlying the Project Application Area;

- continued development of new roadways to enable access to the proposed 1,000 panel longwall mining area;
- extraction of existing approved longwall 910;
- development and extraction of 15 longwalls (LW1001-1015) with void widths of 360 m;
- development of underground roadway connections between the Angus Place Colliery underground mine workings and the Springvale Mine underground mine workings;
- transfer up to 4 Mtpa of ROM coal to the Angus Place Colliery pit top for processing and handling before being transported off-site in accordance with the Western Coal Services Project development consent (SSD-5579);
- transfer up to 4.5 Mtpa of ROM coal by underground conveyor to the Springvale Mine pit top via proposed new underground connection roadways for handling and processing in accordance with the Springvale Mine Extension Project development consent (SSD-5594);
- enlargement of the ROM coal stockpile at the Angus Place Colliery pit top from 90,000 t to 110,000 t capacity;
- construction and operation of the approved but not yet constructed 4.5 m shaft at the Angus Place Colliery ventilation facility (APC-VS2) on the Newnes Plateau;
- construction and operation of one additional downcast shaft and mine services boreholes within the proposed Angus Place Colliery Ventilation Facility (APC-VS3) on the Newnes Plateau to support mining in the 1,000 panel area;
- construction and operation of additional dewatering facilities and associated infrastructure on the Newnes Plateau to support mining in the 1,000 panel area to facilitate the transfer of mine water into the Springvale Delta Water Transfer Scheme (SDWTS);
- transfer of mine inflows from the existing and proposed workings at Angus Place Colliery to the Springvale Water Treatment Project (SSD-7972) for treatment and beneficial reuse at MPPS;
- operation of the Angus Place Colliery 930 Bore and associated infrastructure for raw mine water transfer from the SDWTS to the underground mining area; and
- connection to the Lithgow City Council main sewer line prior to the commencement of longwall extraction (subject to a separate development application through Lithgow City Council).

1.3 Assessment guidelines and requirements

This traffic impact assessment (TIA) has been prepared generally in accordance with the requirements of the NSW Roads and Traffic Authority (RTA) (now NSW Roads and Maritime Services (RMS)) (2002) *Guide to Traffic Generating Developments*.

This TIA:

- identifies the future project-generated peak hourly and daily traffic volumes and the respective increases (ie from the existing care and maintenance workforce to the Project workforce of up to 450 FTEs) for the local road network including the mine access off Wolgan Road and other roads in the locality;

- provides a traffic capacity and safety analysis for key intersections, using the SIDRA intersection analysis program;
- assesses the intersection traffic safety sight distances for the approaching traffic in both directions on the Castlereagh Highway at Wolgan Road and Ian Holt Drive;
- reviews the road network and travel conditions within and adjacent to Newnes Plateau and Newnes State Forest as construction-related traffic (for the new ventilation shaft and bore holes) will be using these roads and there is potential for cumulative impacts with other proposed projects within this area; and
- reviews the adequacy of the existing car parking facilities at the mine, including reference to the current AS 2890 car parking standards as applicable to parking for a facility of this type.

The TIA has also considered the following:

- *Austrroads Guide to Road Design Part 3: Geometric Design* (Austrroads 2016a);
- *Austrroads Guide to Road Design Part 4: Intersections and Crossings: General* (Austrroads 2017);
- *Austrroads Guide to Traffic Management Part 12: Traffic Impacts of Development* (Austrroads 2016b); and
- AS 2890 Requirements for Car Parking.

The TIA addresses the requirements of the then Department of Planning and Infrastructure's (now DPIE) Director General's Environmental Assessment Requirements for SSD-5602, issued on 6 November 2012. Supplementary Director General's Environmental Assessment Requirements were issued on 30 August 2013; however, none were of relevance to this assessment.

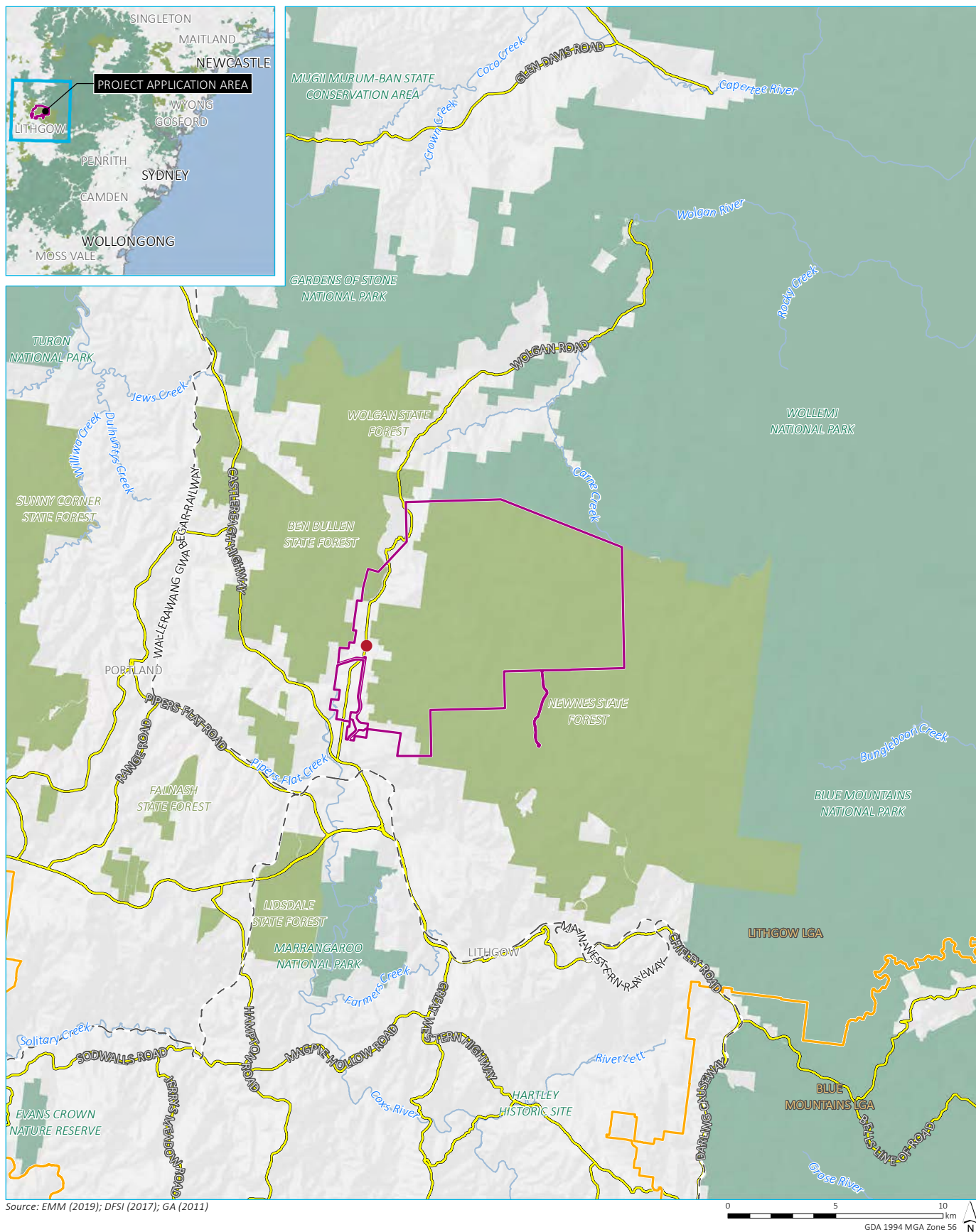
Table 1.1 lists the individual requirements relevant to this TIA and where they are addressed in this report.

Table 1.1 **Transport/traffic related matters raised in Director General's Requirements**

Requirement	Section addressed
An assessment of potential traffic impacts on the capacity, efficiency and safety of the road network; and	Chapter 4
A description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network in the surrounding area over the life of the development.	Section 4.7

A site inspection was performed over 22 and 23 July 2019. As part of the site inspection, photographs were taken of the mine access roads and car parking at the pit top area as well as more generally along the local road network. Photos of access roads within and adjacent to Newnes Plateau and Newnes State Forest were also captured. A selection of the photographs is shown in Appendix A.

Three intersection traffic surveys were undertaken during the morning peak and afternoon peak shift changeover times at the mine on 13 August 2019 to quantify the current baseline peak hourly traffic movements. The traffic survey results are attached in Appendix B.



KEY

- Project application area
- Mine access intersection
- Rail line
- Main road
- Watercourse/drainage line
- NPWS reserve
- State forest
- Local government area

Regional and locality map

Angus Place Mine Extension Project
Traffic impact assessment
Figure 1.1

2 Existing traffic

2.1 Road network

Operations-related traffic will utilise local and regional sealed roads to access the mine's pit top area, via Wolgan Road, north of Lidsdale. Construction-related traffic will utilise local and minor roads (generally unsealed) to access the Newnes Plateau and Newnes State Forest.

The potentially affected roads that have been considered as part of this TIA include:

- Castlereagh Highway, east and west of Lidsdale;
- Wolgan Road (primarily up to 8 km north of Castlereagh Highway);
- Ian Holt Drive (which connects to Wolgan Road approximately 2 km north of Castlereagh Highway);
- Old Bells Line of Road from Chifley Road which connects to the Newnes State Forest;
- State Mine Gully Road from Lithgow which connects to the Newnes State Forest; and
- Glowworm Tunnel Road, Blackfellows Hand Trail and Sunnyside Ridge Road on the Newnes Plateau.

The regional road network showing the locations of all these roads is shown in Figure 2.1. Photographs showing the typical existing widths and surface condition of these roads are included as Appendix A.

During construction, roads within and adjacent to Newnes Plateaus and Newnes State Forest may also be used by construction-related vehicle movements associated with the construction of a new buried pipeline within Newnes State Forest to connect Clarence Colliery's existing water management infrastructure to the Springvale Delta Water Transfer Scheme (SDWTS). Further details relating to potential cumulative impacts during a concurrent construction scenario are provided in Chapter 5.

2.1.1 Castlereagh Highway

The Castlereagh Highway is a major regional highway connecting from the Great Western Highway at Marrangaroo, near Lithgow, via Mudgee and Gulgong, to north-western NSW. West of Marrangaroo, where there is a grade separated interchange, the Castlereagh Highway generally provides two traffic lanes with a high standard 100 km/hr design speed alignment and additional left and right turning lanes at most major intersections.

In the vicinity of Lidsdale village, near the Wolgan Road intersection, the road has a lower design speed and speed limit of 80 km/hr through the intersection. Further to the north-west, the alignment improves and the design speed and speed limit are both 100 km/hr in the vicinity of the intersection with Ian Holt Drive. The general two-way, two-lane road width is approximately 9 m–13 m. The road is an approved B-double route by RMS.

2.1.2 Wolgan Road

Wolgan Road is a two-lane, two-way sealed road with variable road widths and frontage access conditions. It has a mainly urban cross-section with kerbs and parking lanes and a 50 km/hr speed limit for approximately 2–3 km north of the Castlereagh Highway through to the village of Lidsdale. The road then adopts a more rural cross section with an 80 km/hr speed limit and sealed road shoulders giving approximately 8 m sealed width for a further 2–3 km before the sealed width reduces to approximately 6 m on the final 2–3 km approach to the mine

access intersection. Beyond the mine access intersection, the road continues for a further 20 km serving primarily rural properties with generally very low traffic generating characteristics.

2.1.3 Ian Holt Drive

Ian Holt Drive is a two-lane, two-way sealed road with variable road widths and frontage access conditions. It has a 50 km/hr speed limit throughout its length, which is approximately 2–3 km from the Castlereagh Highway to the village of Lidsdale, where it connects with Wolgan Road. The road generally has sealed road shoulders giving approximately 8 m sealed width. The road is currently very lightly trafficked in relation to its design standard and the frontage properties are primarily rural with low traffic generating characteristics.

2.1.4 Chifley Road

Chifley Road is approximately 20 km long and connects Lithgow in the west to Bell in the east. Most sections of Chifley Road are two-way, two-lane sealed roads and some parts have additional overtaking/climbing lanes or increased shoulder widths to improve road safety. The general road width is approximately 9 m–13 m. It is an approved 19 m B-double route by RMS.

2.1.5 Old Bells Line of Road

Old Bells Line of Road is an approximately 8.7 km long unsealed road, which starts from Chifley Road (near the Zig Zag Railway) and ends at the intersection with State Mine Gully Road and Glowworm Tunnel Road. The general road width along Old Bells Line of Road varies between 6 m and 11 m. At the southern end of Old Bells Line of Road, an approximately 2.6 km long unnamed track connects to Clarence Colliery Road, near the Hanson's Clarence Quarry access intersection.

2.1.6 State Mine Gully Road

State Mine Gully Road is a 6.2 km long two-way part sealed and part unsealed road north of Lithgow. It connects Atkinson Street in Lithgow to the south to the intersection of Old Bells Line of Road/Glowworm Tunnel Road in the north. The road alignment is level and relatively straight in the south, becoming steeper and winding in the north, where the road rises to the level of the Newnes Plateau. The road width varies between 5 m and 10 m on both the sealed and the unsealed sections. There is a railway crossing near the southern end of State Mine Gully Road, which is currently inactive but still has level crossing signage.

2.1.7 Glowworm Tunnel Road

Glowworm Tunnel Road is an approximately 27 km long two-way unsealed road in the Newnes State Forest. It links Glow Worm Tunnel Walking Track to the north and Old Bells Line of Road and State Mine Gully Road to the south. The road alignment along this section of Glowworm Tunnel Road is generally straight and level. The unsealed road width is generally between 9 m and 13 m, with most sections of the road being approximately 12 m wide.

2.1.8 Blackfellows Hand Trail

Blackfellows Hand Trail is an approximately 10 km long two-way unsealed fire trail in the Newnes State Forest. It connects Glowworm Tunnel Road in the east to a private road near the mine in the west. The road alignment is generally level with relatively few bends.

2.1.9 Sunnyside Ridge Road

Sunnyside Ridge Road is an approximately 10 km long two-way unsealed fire trail in the Newnes State Forest. It extends in a generally northerly direction from the intersection with Blackfellows Hand Trail and Beecroft Track. There is currently minimal through traffic usage as the access from the northern end is restricted to off road vehicle use only. The road alignment is generally level with some relatively long straight sections. The unsealed road width along the approximately 5 km section likely to be used by project-related vehicles varies between 4 m and 8 m.

2.2 Existing traffic volumes

As noted in Section 1.1, the mine is in care and maintenance. Subsequently, the current workforce is in the order of 20–30 employees, mainly working during day shift hours. This is significantly less than the previously approved workforce of 300 FTEs across three shifts and the proposed workforce of 450 FTEs also working across three shifts.

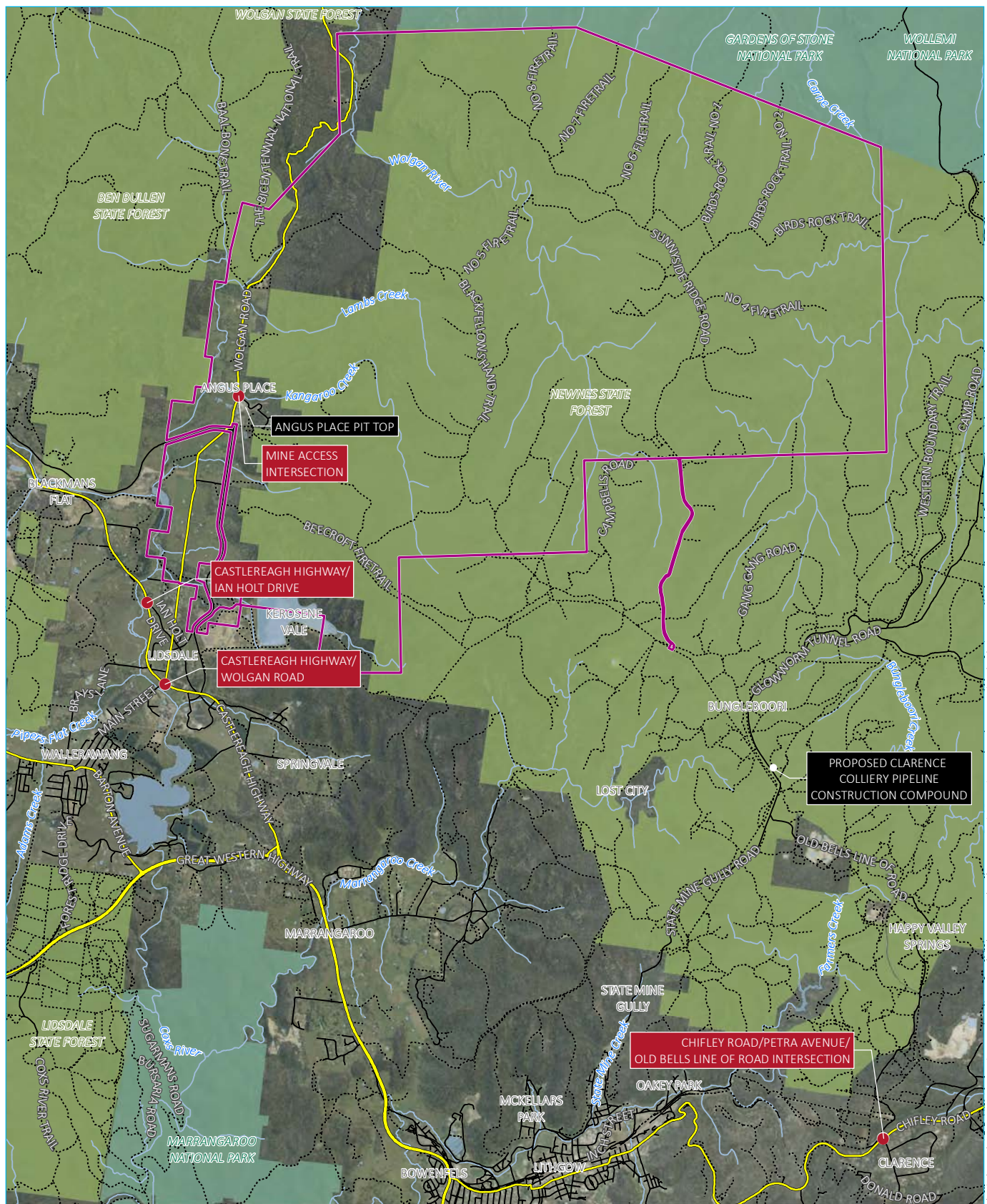
As the mine is currently in care and maintenance, the three baseline intersection traffic surveys that have been performed as part of this TIA show substantially reduced daily and peak hourly traffic volumes using the mine's primary access routes (ie Wolgan Road, Ian Holt Drive and the Castlereagh Highway) when compared with traffic counts captured during previous operations. The current (2019) baseline intersection traffic survey results are attached in Appendix B.

All coal produced at the mine has historically been transported by underground conveyors to the Angus Place pit top and transported off-site along private coal haul roads in accordance with the Western Coal Services Project development consent (SSD-5579). Once longwall mining commences, the amended project proposes to transfer coal to the Springvale Mine pit top via the proposed new underground connection roadways for handling and processing in accordance with the Springvale Mine Extension Project development consent (SSD-5594).

The majority of coal at the Springvale Mine pit top is transported off-site via overland conveyors in accordance with the consent conditions in the Western Coal Services Project development consent (SSD-5579). Up to 50,000 tpa of coal can be transported off-site from the Springvale Mine pit top using the public road network in accordance with the consent conditions in the Springvale Mine Extension Project development consent (SSD-5594).

The project will not result in any change to the approved transportation of coal off-site from either Angus Place or Springvale pit tops. Subsequently, transport of coal off-site via the public road network has not been considered as part of this assessment.

As the mine has, and will continue to have, significantly more employees working on weekdays when compared with weekends, this TIA has focussed on the existing weekday baseline and associated project-related traffic increases and does not specifically consider traffic volumes on weekends.



Source: EMM (2019); DFSI (2017); GA (2011)

KEY

- Project application area
- Assessed intersection
- Main road
- Local road
- Vehicular track
- Watercourse/drainage line
- Waterbody
- NPWS reserve
- State forest

0 1 2
km
GDA 1994 MGA Zone 56
N

Road network

Angus Place Mine Extension Project
Traffic impact assessment
Figure 2.1

2.3 Traffic volumes

2.3.1 Major road network

Baseline daily traffic volumes for the major road network (ie Castlereagh Highway) is available from published RMS daily traffic surveys and the available data is summarised in Table 2.1. To establish baseline 2019 daily traffic volumes from historic data, it is standard practice to adopt the average traffic growth rate from any available data. Where published data is limited, it is standard practice in most rural areas of NSW to add +1% annual (linear) traffic growth to the most recent annual survey.

Table 2.1 Historic and projected daily traffic volumes – Castlereagh Highway

Year	Castlereagh Highway (north of Gemalong Close, Marangaroo)	Castlereagh Highway (north of Ian Holt Drive, Lidsdale)
2008	4,659	3,290
2009	4,842 (9% HV) ¹	3,513 (11% HV) ¹
2010	5,534	-
2011	5,608	-
2012	5,014	-
2019 (estimate)	5,635 ²	3,864 ³

Note:

1. HV stands for 'heavy vehicle' and the percentages represent the proportion of heavy vehicles compared to the total traffic volume.

2. Baseline traffic volume for year 2019 has been estimated by adopting average traffic growth rate between 2008 and 2012.

3. Baseline traffic volume for year 2019 has been estimated by adopting a linear traffic growth of +1% annually from 2009.

Source: Traffic Volume Viewer (RMS 2019).

Daily traffic volume data from RMS's Daily Traffic Volume Viewer is available for Chifley Road for 2006, 2008 and 2009. RMS data (reference 99037) has been captured 190 m north of the Darling Causeway/Chifley Road intersection, which is approximately 6.6 km south-east of the Chifley Road/Clarence Colliery Road intersection. The historical growth trend in the daily traffic movements is shown in Table 2.2.

Table 2.2 Historic and projected daily traffic volumes – Chifley Road

Year	Chifley Road (eastbound)	Chifley Road (westbound)	Chifley Road (total)
2006	1,466 (2.39% HV ¹)	1,238 (1.86% HV ¹)	2,704 (2.14% HV ¹)
2008	1,316	1,401	2,717
2009	1,335	1,724	3,059
2019 (estimate)	1,602 ²	2,069 ²	3,671 ²

Note: 1. HV stands for 'heavy vehicle' and the percentages represent the proportion of heavy vehicles compared to the total traffic volume.

2. +2% annual (linear) traffic growth has been adopted, which gives a growth factor x 1.20 from the 2009 volumes.

Source: RMS Traffic Volume Viewer (RMS 2019).

The long-term traffic growth trend for major roads in rural areas is typically between 1% and 3%. Due to the lack of recent traffic count data in the vicinity, an estimate of +2% linear growth in the annual vehicle volume on Chifley Road has been used. The daily traffic estimate for 2019 has been obtained by scaling up the latest

available RMS survey data from 2009. The RMS data presented in Table 2.2 for 2006 also includes reference to the proportion of heavy vehicle traffic using Chifley Road.

2.3.2 Minor road network

RMS daily traffic volume data is limited for minor rural roads. As part of this assessment, EMM commissioned a subcontractor to conduct morning and afternoon peak hours traffic surveys at three intersections on 13 August 2019, including:

- Castlereagh Highway/Wolgan Road/Main Street;
- Castlereagh Highway/Ian Holt Drive; and
- the mine access intersection.

As noted above, the historical RMS traffic data for major roads in NSW over the past 30-40 years shows that the ratio of peak hourly to daily traffic volumes is normally between one tenth (approximately 10%) to one twelfth (approximately 8%). Within the study area considered as part of this TIA, it has been assumed that the peak hour to daily traffic ratio for the road network is at the higher end of this range (ie one tenth of daily traffic) and this ratio has been adopted for all roads where daily volumes have been estimated for this TIA. The predicted daily volumes for the assessed road network, from intersection traffic surveys, are presented in Table 2.3.

In addition, intersection traffic surveys were conducted on 26 June 2019 for the Chifley Road/Petra Avenue/Old Bells Line of Road intersection. These surveys indicated an average of 4 hourly traffic movements on Old Bells Line of Road during the three peak hours considered, which represents approximately 40 daily traffic movements.

Table 2.3 Projected daily traffic volumes – other minor roads

Roads	Average peak hourly traffic volume	Daily traffic volume
Wolgan Road (north of Mine Access)	20	200
Wolgan Road (south of Mine Access)	24	240
Wolgan Road (north of Castlereagh Highway)	123.5	1,235
Ian Holt Drive (east of Castlereagh Highway)	15.5	155
Main Street (south of Castlereagh Highway)	157	1,570
Old Bells Line of Road (north of Chifley Road)	4	40

On minor roads where an existing baseline daily traffic volume estimate is not available, the equivalent daily traffic volumes have been summarised in Table 2.4 from traffic surveys undertaken in 2013 as part of a TIA for works within the Newnes State Forest (ARC 2013). As shown in Table 2.4, the daily traffic volumes on most of these roads are often higher on weekends due to the higher recreational traffic usage of Newnes State Forest and surrounds.

Table 2.4 Minor road daily traffic volumes for roads within Newnes State Forest

Road	Location	Average weekday daily traffic (2013)	Peak daily traffic on weekends (2013)	Forecast daily traffic volume for 2019 ¹
State Mine Gully Road	Within rural area, north of Lithgow.	50	60	53
Glowworm Tunnel Road	North of the picnic area intersection.	60	80	64
Glowworm Tunnel Road	Between Old Bells Line of Road and the picnic area intersection.	90	140	96
Blackfellows Hand Trail	West of the picnic area/Beecroft Track intersection.	40	80	42
Sunnyside Ridge Road	North of Blackfellows Hand Trail/Beecroft Track intersection.	35	70	37

Note:

1. To establish 2019 daily traffic volumes, a +1% annual (linear) traffic growth has been applied to the most recent annual survey.

Source: ARC 2013.

2.4 Road design standard

Road width design standards for low volume (generally rural) roads are defined by the Austroads *Guide to Road Design* (Austroads 2016) and are based on daily traffic volumes. The existing road width measurements and conditions for each road considered as part of this TIA are shown in Table 2.5.

Table 2.5 Daily traffic volumes and corresponding design standards

Road	Daily traffic volume	Relevant Austroads threshold band	Relevant Austroads design standard	Road width	Compliance?
Castlereagh Highway	3,864 – 5,635	> 3,000	Minimum 10 m wide seal	Generally, 10 m wide seal.	Compliant
Wolgan Road (north of mine access intersection)	200	150 – 500	Minimum 7.2 m wide seal	Generally, 6 m wide seal.	Acceptable due to low volumes of traffic.
Wolgan Road (south of mine access intersection)	240	150 – 500	Minimum 7.2 m wide seal	Generally, 6 m – 8 m wide seal.	Generally compliant
Wolgan Road (north of Castlereagh Highway)	1,235	1,000 – 3,000	Minimum 9 m wide seal	7 m – 9 m wide seal.	Generally compliant
Ian Holt Drive	155	150-500	Minimum 7.2 m wide seal	7 m – 9 m wide seal.	Generally compliant
Main Street	1,570	1,000 – 3,000	Minimum 9 m wide seal	7 m – 9 m wide seal.	Generally compliant
Chifley Road	3,671	> 3,000	Minimum 10 m wide seal	Generally, 9 m – 13 m sealed.	Generally compliant

Table 2.5 Daily traffic volumes and corresponding design standards

Road	Daily traffic volume	Relevant Austroads threshold band	Relevant Austroads design standard	Road width	Compliance?
Old Bells Line of Road	40	1 – 150	8.7 m wide total carriageway (if unsealed); or minimum 3.7 m wide seal	Generally, 6 m – 11 m unsealed, with some narrower sections 5 m wide.	Generally compliant
State Mine Gully Road	53	1 – 150	8.7 m wide total carriageway (if unsealed); or minimum 3.7 m wide seal	Generally, 5 m – 10 m, sealed and unsealed.	Acceptable due to low volumes of traffic.
Glowworm Tunnel Road	64 – 96	1 – 150	8.7 m wide total carriageway (if unsealed); or minimum 3.7 m wide seal	Generally, 9 m – 13 m unsealed, with majority 12 m wide.	Compliant
Blackfellows Hand Trail	42	1 – 150	8.7 m wide total carriageway (if unsealed); or minimum 3.7 m wide seal	Generally, 5 m – 12 m unsealed.	Acceptable due to low volumes of traffic.
Sunnyside Ridge Road	37	1 – 150	8.7 m wide total carriageway (if unsealed); or minimum 3.7 m wide seal	Generally, 4 m – 8 m unsealed.	Acceptable due to low volumes of traffic.

The majority of the assessed local road network generally meets the Austroads (2016a) *Road Design Guide* standards to accommodate existing baseline traffic volumes. Where existing road widths do not comply with the relevant Austroads design standards, these roads are still considered acceptable due to the low volumes of traffic movements.

2.5 Intersections

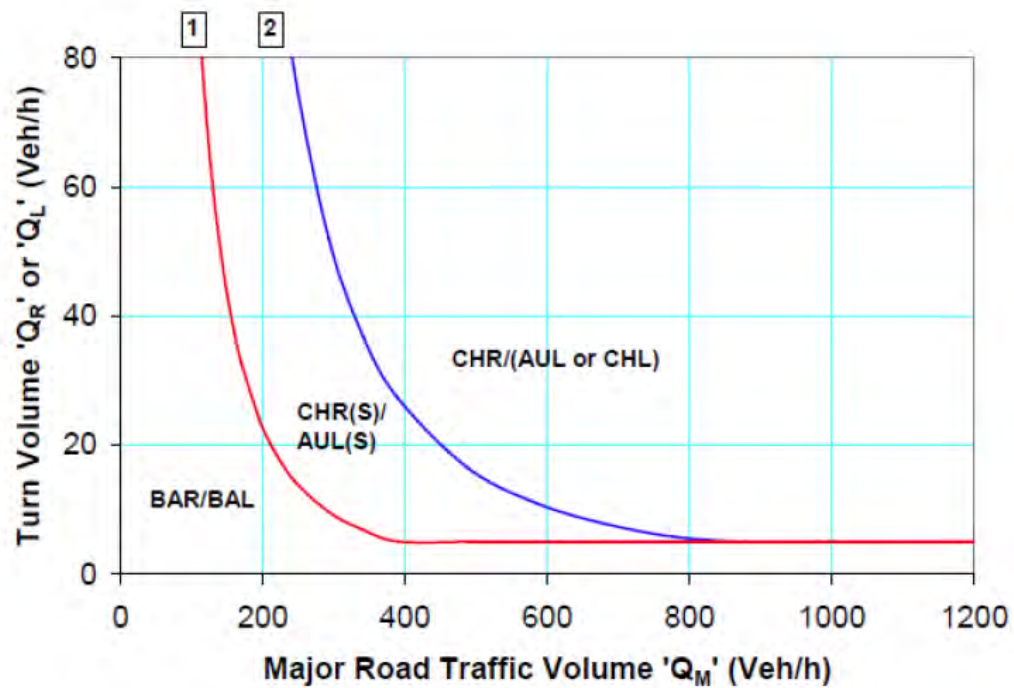
The four key intersections assessed as part of this TIA are:

- Chifley Road/Petra Avenue/Old Bells Line of Road;
- Castlereagh Highway/Wolgan Road/Main Street;
- Castlereagh Highway/Ian Holt Drive; and
- Wolgan Road/Angus Place Mine access road (ie the mine access intersection for the pit top area).

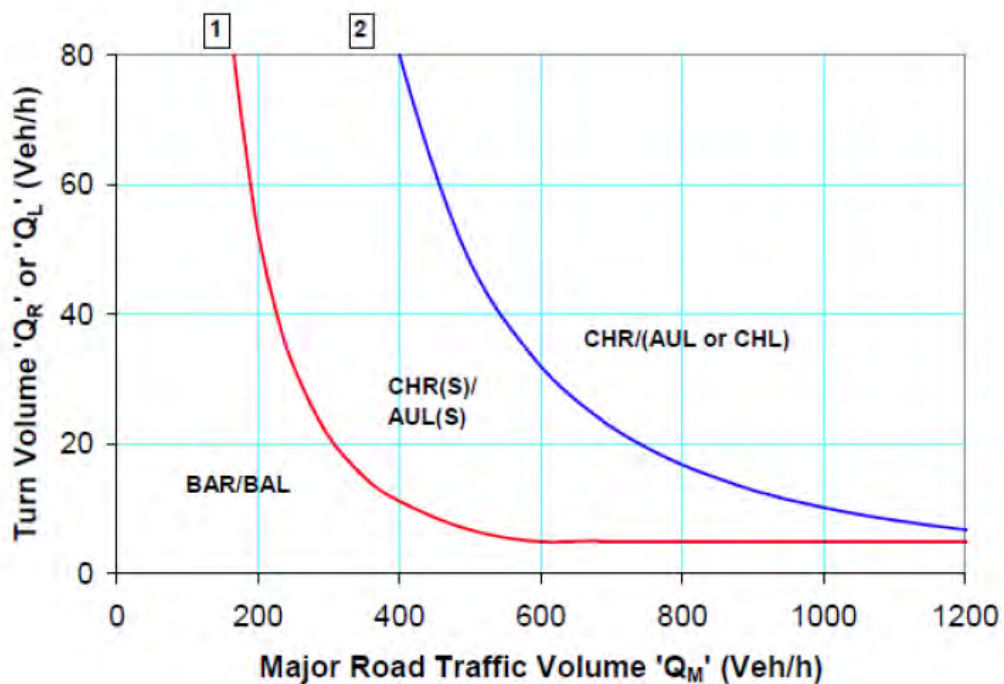
These four intersections are all located in areas where the road does not have a kerb and gutter and are all effectively rural intersections.

Rural intersection design standards for traffic safety are assessed from a combination of the peak hourly through and turning traffic movements that are occurring at each intersection. This determines the need for additional intersection turning lanes in accordance with the current Austroads (2017) *Part 4 Intersection Design Standards*.

There are separate design charts for roads with a design speed of 100 km/h and greater or lower than 100 km/h. The Castlereagh Highway/Ian Holt Drive intersection has a general traffic speed limit on the major road route of 100 km/h. The other two intersections have a major road route traffic speed limit of 80 km/h. The relevant warrant charts for roads with design speeds of greater than and less than 100 km/h are shown in Figure 2.2.



(a) Design speed ≥ 100 km/h



(b) Design speed < 100 km/h

Figure 2.2 Austroads warrant design charts for rural intersection turning lanes with speeds equal to or greater than 100 km/h and lower than 100 km/h

2.5.1 Chifley Road/Petra Avenue/Old Bells Line of Road

The Chifley Road/Petra Avenue/Old Bells Line of Road intersection is a cross-junction. There are 80 km/h speed limit signs approximately 20 m to the west and 160 m to the east of this intersection. The speed limit on Petra Avenue is 60 km/h. No speed limit post is on Old Bells Line of Road; however, the general safe speed limit on gravel roads is normally 40 km/h. There is a CHR and channelised left turn (CHL) treatment on Chifley Road based on Austroads (2017) *Part 4 Intersection Design Standards*.

Additional road width is provided at the intersection to provide better visibility and to reduce the impact and delays of turning vehicles on the major road through traffic flow using Chifley Road. The intersection design currently satisfies the minimum Austroads requirements for a rural intersection with additional CHR and CHL turning lanes. An aerial layout of the intersection is shown in Figure 2.3.



Source: Six Maps

Figure 2.3 Layout of Chifley Road/Petra Avenue/Old Bells Line of Road intersection

An intersection traffic survey was conducted during the morning and afternoon peak hours on 26 June 2019 by ROAR Data Pty Ltd. The current peak hourly traffic volumes on the road network and the proportions of heavy vehicle traffic flow recorded during the intersection traffic surveys are summarised in Table 2.6.

Two peak hours for this intersection have been considered due to the proposed construction shift times.

Table 2.6 **Summary of surveyed peak hour and heavy vehicle volumes – Chifley Road/Petra Avenue/Old Bells Line of Road intersection**

Road	Direction	Early AM peak half hour 6:30 am – 7:00 am typically ¹			PM peak hour 2:45 pm – 3:45 pm typically		
		All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles
Chifley Road (west of Old Bells Line of Road)	Eastbound	69	2	2.90%	112	5	4.46%
	Westbound	34	3	8.82%	147	12	8.16%
Chifley Road (east of Old Bells Line of Road)	Eastbound	70	4	5.71%	106	5	4.72%
	Westbound	28	3	10.71%	151	13	8.61%
Petra Avenue (south of Chifley Road)	Southbound	2	0	0%	12	1	8.33%
	Northbound	8	2	25%	4	0	0%
Old Bells Line of Road (north of Chifley Road)	Southbound	1	0	0%	2	0	0%
	Northbound	0	0	0%	4	0	0%

Note: ¹Traffic volumes for the early AM peak half hour represent a 30-minute survey only.

2.5.2 Castlereagh Highway/Wolgan Road/Main Street

The intersection of Castlereagh Highway/Wolgan Road/Main Street is a multileg intersection. There is a channelised right turn (CHR) treatment and an auxiliary left turn (AUL) treatment on Castlereagh Highway based on Austroads (2017) *Part 4 Intersection Design Standards*. Additional road width is provided at the intersection to provide better visibility and to ensure smoother turns for heavy vehicles. The intersection design currently satisfies the minimum Austroads requirements for a rural intersection with additional CHR and AUL turning lanes. An aerial view of the intersection is shown in Figure 2.4.



Source: Six Maps

Figure 2.4 Aerial view of Castlereagh Highway/Wolgan Road/Main Street intersection

An intersection traffic survey was conducted during the morning and afternoon peak hours on 13 August 2019 by ROAR DATA Pty Ltd. The current peak hourly traffic volumes on the road network and the proportion of heavy vehicle traffic flow recorded during the intersection traffic surveys are summarised in Table 2.7.

As shown in Table 2.7, four peak hours have been considered. Further details regarding project-related shift times during operations are discussed in Section 3.3.

Table 2.7 Summary of surveyed peak hour and heavy vehicle traffic volumes – Castlereagh Highway/Wolgan Road/Main Street intersection

Road	Direction	Early AM peak hour 5:00 am to 6:00 am			AM peak hour 8:00 am to 9:00 am			Early PM peak hour 1:00 pm to 2:00 pm			PM peak hour 4:00 pm to 5:00 pm		
		All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles
Castlereagh Highway (west of Main Street)	Westbound	61	4	6.6%	108	13	12.0%	123	10	8.1%	107	1	0.9%
	Eastbound	31	3	9.7%	131	10	7.6%	131	12	9.2%	168	5	3.0%
Castlereagh Highway (east of Wolgan Road)	Westbound	56	6	10.7%	149	16	10.7%	166	13	7.8%	163	3	1.8%
	Eastbound	61	4	6.6%	148	13	8.8%	168	15	8.9%	229	6	2.6%
Main Street (south of Castlereagh Street)	Northbound	50	1	2.0%	47	4	8.5%	65	1	1.5%	92	2	2.2%
	Southbound	11	1	9.1%	71	4	5.6%	66	2	3.0%	104	1	1.0%
Wolgan Road (north of Castlereagh Street)	Northbound	15	1	6.7%	50	2	4.0%	47	2	4.3%	65	2	3.1%
	Southbound	11	0	0%	50	2	4.0%	42	3	7.1%	82	0	0%

2.5.3 Castlereagh Highway/Ian Holt Drive

The intersection of Castlereagh Highway/Ian Holt Drive is a Y intersection. There is a CHR treatment and an AUL treatment on Castlereagh Highway based on Austroads (2017) *Part 4 Intersection Design Standards*. Additional road width is provided at the intersection to provide better visibility and to ensure smoother turns for heavy vehicles. The intersection design currently satisfies the minimum Austroads requirements for a rural intersection with additional CHR and AUL turning lanes. An aerial view of the intersection is shown in Figure 2.5.



Source: Six Maps

Figure 2.5 Aerial view of Castlereagh Highway/Ian Holt Drive intersection

An intersection traffic survey was conducted during the morning and afternoon peak hours on 13 August 2019 by ROAR DATA Pty Ltd. The current peak hourly traffic volumes on the road network and the proportions of heavy vehicle traffic flow recorded during the intersection traffic surveys are summarised in Table 2.8.

As shown in Table 2.8, four peak hours have been considered. Further details regarding project-related shift times during operations are discussed in Section 3.3.

Table 2.8 **Summary of surveyed peak hour and heavy vehicle volumes – Castlereagh Highway/Ian Holt Drive intersection**

Road	Direction	Early AM peak hour 5:00 am to 6:00 am			AM peak hour 8:00 am to 9:00 am			Early PM peak hour 1:00 pm to 2:00 pm			PM peak hour 4:00 pm to 5:00 pm		
		All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles
Castlereagh Highway (north of Ian Holt Drive)	Northbound	69	5	7.2%	120	14	11.7%	109	14	12.8%	103	3	2.9%
	Southbound	37	3	8.1%	131	13	9.9%	119	15	12.6%	148	6	4.1%
Castlereagh Highway (south of Ian Holt Drive)	Northbound	68	5	7.4%	114	14	12.3%	108	14	13.0%	102	4	3.9%
	Southbound	37	3	4.1%	129	12	9.3%	117	15	12.6%	154	6	3.9%
Ian Holt Drive (east of Castlereagh Highway)	Westbound	2	0	0%	9	0	0%	2	0	0%	5	1	20%
	Eastbound	1	0	0%	5	1	20.0%	3	0	0%	12	0	0%

2.5.4 Mine access intersection

The mine access intersection is a X intersection. The design on Wolgan Road is a basic right turn (BAR) and basic left turn (BAL) based on Austroads (2017) *Part 4 Intersection Design Standards*. The sight distance on Wolgan Road is straight and level, which provides sufficient site distance while turning into the mine access road. The intersection design currently satisfies the minimum Austroads requirements for a rural intersection with basic BAR and BAL turn treatments. An aerial view of the intersection is shown in Figure 2.6.



Source: Six Maps

Figure 2.6 Aerial view of the mine access intersection

An intersection traffic survey was conducted during the morning and afternoon peak hours on 13 August 2019 by ROAR DATA Pty Ltd. The current peak hourly traffic volumes on the road network and the proportions of heavy vehicle traffic flow recorded during the intersection traffic surveys are summarised in Table 2.9.

As shown in Table 2.9, four peak hours have been considered. Further details regarding project-related shift times during operations are discussed in Section 3.3.

Table 2.9 **Summary of surveyed peak hour and heavy vehicle volumes –Mine access intersection**

Road	Direction	Early AM peak hour 5:00 am to 6:00 am			AM peak hour 8:00 am to 9:00 am			Early PM peak hour 1:00 pm to 2:00 pm			PM peak hour 4:00 pm to 5:00 pm		
		All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles	All traffic	Heavy vehicles	% of heavy vehicles
Wolgan Road (north of mine access)	Northbound	0	0	0%	12	0	0%	1	0	0%	8	0	0%
	Southbound	0	0	0%	6	0	0%	1	0	0%	16	0	0%
Wolgan Road (south of mine access)	Northbound	1	0	0%	15	0	0%	2	0	0%	8	0	0%
	Southbound	1	0	0%	9	0	0%	2	0	0%	14	0	0%
Mine access road (east of Wolgan Road)	Westbound	1	0	0%	3	0	0%	1	0	0%	2	0	0%
	Eastbound	1	0	0%	3	0	0%	1	0	0%	0	0	0%
Additional car park (west of Wolgan Road)	Westbound	0	0	0%	0	0	0%	0	0	0%	0	0	0%
	Eastbound	0	0	0%	0	0	0%	0	0	0%	0	0	0%

2.5.5 Baseline intersection performance

The current RMS intersection level of service (LOS) standards for traffic analysis which are undertaken using SIDRA or similar traffic analysis programs for intersections are summarised in Table 2.10.

Table 2.10 Intersection level of service (LOS) standards

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

Source: *Guide to Traffic Generating Developments* (RTA 2002).

The SIDRA analysis results for the baseline performance of the four key intersections are presented in Table 2.11 and Table 2.12. Detailed SIDRA results are provided in Appendix C.

Generally, all intersections are currently operating at LOS A with average delays of between 6 seconds and 11 seconds. These intersections have capacity for future traffic growth.

Table 2.11 Baseline SIDRA intersection analysis results – construction traffic related intersection

Intersection	Early AM peak half hour 6:30 am – 7:00 am typically ¹				PM peak hour 2:45 pm – 3:45 pm typically			
	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL
Chifley Road/Petra Avenue/Old Bells Line of Road	A	0.07	10.8	0.1	A	0.085	8.3	0.0

Note: LOS = level of service; DOS = degree of saturation; DEL = average delay by second; 95th percentile BQL = 95th percentile back of queue length.

¹Traffic volumes for the early AM peak half hour represent a 30-minute survey only.

Table 2.12 Baseline SIDRA intersection analysis results – operations traffic related intersection

Intersection	Early AM peak hour 5:00 am to 6:00 am				AM peak hour 8:00 am to 9:00 am				Early PM peak hour 1:00 pm to 2:00 pm				PM peak hour 4:00 pm to 5:00 pm			
	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL
Castlereagh Highway/Wolgan Road/Main Street	A	0.065	7.4	0.2	A	0.080	7.2	0.3	A	0.111	8.0	0.4	A	0.175	8.7	0.7
Castlereagh Highway/Ian Holt Drive	A	0.032	7.8	0.0	A	0.072	8.4	0.0	A	0.068	7.9	0.0	A	0.081	8.0	0.0
Mine access intersection	A	0.003	6.9	0.0	A	0.008	7.0	0.0	A	0.003	6.9	0.0	A	0.009	7.0	0.0

Note: LOS = level of service; DOS = degree of saturation; DEL = average delay by second; 95th percentile BQL = 95th percentile back of queue length.

2.6 Traffic safety

Only personal injury related accidents are recorded within the Transport for NSW (TfNSW) interactive accident history database. A summary of crash history along the assessed road network for the period 2013-2017 (inclusive) is provided in Table 2.13.

No accidents have been recorded for Ian Holt Drive, Glowworm Tunnel Road, Blackfellows Hand Trail and Sunnyside Ridge Road. Subsequently, these roads have been excluded from Table 2.13.

Current traffic safety conditions along the assessed road network are considered acceptable and safe, with good intersection visibility at all locations. It is noted that many of the reported accidents were human behaviour error such as speeding and fatigue.

Table 2.13 Summary of crash history

Road name	Reported year	Degree of crash	Description	Type of location	Natural light	Speed/fatigue involved crash?
Castlereagh Highway	2013	None reported.				
	2014	Serious injury	Rear end	2-way undivided	Daylight	N/A
		Serious injury	Off left/left bend	Divided road	Darkness	N/A
		Moderate injury	Off road right	2-way undivided	Darkness	N/A
	2015	Moderate injury	Cross traffic	T-junction	Daylight	N/A
	2016	Serious injury	Off right/right bend	T-junction	Darkness	Speeding involved
	2017	None reported.				
Wolgan Road	2013	None reported.				
	2014	Serious injury	Out of control on bend	2-way undivided	Daylight	Speeding involved
	2015	None reported.				
	2016	None reported.				
	2017	None reported.				
Chifley Road	2013	None reported				
	2014	Serious injury	Off left/right bend – object	2-way undivided	Daylight	Speeding and fatigue involved
	2015	Moderate injury	Off left/right bend	2-way undivided	Daylight	Speeding and fatigue involved
	2016	None reported				
	2017	None reported				
Old Bells Line of Road	2013	Moderate injury	Off left/right bend	2-way undivided	Daylight	Speeding involved
		Moderate injury	Off left/right bend – object	2-way undivided	Daylight	Speeding involved

	2014	None reported.				
	2015	None reported.				
	2016	Serious injury	On road – out of control	2-way undivided	Daylight	Fatigue involved
		Serious injury	Head on	2-way undivided	Daylight	N/A
	2017	None reported.				
State Mine Gully Road	2013	Moderate injury	Off left/left bend – object	2-way undivided	Darkness	Speeding involved
	2014	Moderate injury	Off left/right bend – object	2-way undivided	Dusk	Speeding involved
		Serious injury	Off right/left bend – object	2-way undivided	Daylight	Speeding and fatigue involved
	2015	None reported.				
	2016	Moderate injury	Rear end	2-way undivided	Daylight	N/A
	2017	Moderate injury	Rear end	2-way undivided	Daylight	N/A
		Moderate injury	Off left/right bend – object	2-way undivided	Darkness	Speeding involved

Source: Centre for Road Safety (TfNSW 2019)

2.7 Car parking

At present, car parking capacity at the mine's pit top area is 186 spaces. Under approved operations, the largest numbers on-site at the mine's pit top area at any time occurs during the Sunday night and Monday morning shift changeover period.

There are sufficient parking spaces available on-site to accommodate the approved workforce numbers during this shift changeover period if a 10% car-pooling rate is applied.

2.8 Public transport

Regional trains travelling to/from Dubbo-Sydney Central stop at Lithgow and Rydal, which are both within 23 km of the mine. No public bus services travel along the assessed roads. The closest bus stop to the mine is at the Great Western Highway/Barton Avenue intersection.

The walking distance to and from the nearest public transport service to the mine is approximately two hours. Therefore, it is assumed that public transport is not a preferred method of transport for the project's existing workforce.

2.9 Pedestrian and cycling access

No pedestrian walking activity was recorded or observed during the intersection traffic surveys or site inspection.

There are currently no designated cycling trails within proximity of the mine. Cyclists would need to share use of the assessed roads with other vehicles. No cyclist activity was observed along the road network during the site inspection.

Recreational off-road motorcycles were observed on the unsealed roads and trails in the Newnes State Forest during the site inspection.

2.10 Road improvement projects

There were no known RMS road improvement projects within the study area at the time of writing.

3 Project-related traffic

3.1 Overview

During construction, project-related vehicle movements will include heavy vehicles for deliveries of equipment and consumables and light vehicles associated with employee, contractor, service provider and visitor movements to and from the active work areas during bore pump and downcast shaft construction.

Construction-related traffic will primarily be to and from Glowworm Tunnel Road via Old Bells Line of Road and State Mine Gully Road on the Newnes Plateau.

Heavy vehicles will require access to the active work areas during construction of the bore pumps and downcast shaft. All heavy vehicles during construction will access the active work areas via Old Bells Line of Road and Glowworm Tunnel Road to avoid Lithgow township. Heavy vehicle traffic will be temporary in nature and will be spread out over approximately 13 months for bore pump construction and approximately 21 months for downcast shaft construction.

During operations, light vehicles will predominantly require access to the mine's pit top area via Wolgan Road.

3.2 Construction traffic

3.2.1 Traffic generation

i Bore pump construction

Centennial Angus Place anticipate that the construction workforce associated with the additional bore pump construction will be approximately 56 staff. Centennial Angus Place will encourage carpooling wherever practical and, therefore, it is anticipated that approximately 37 light vehicles (ie 74 light vehicle movements) will require access to and from the active work areas during bore pump construction.

Centennial Angus Place do not intend to transport road base to the active work areas unless absolutely necessary and it is considered that material available on Newnes Plateau will be appropriate for any road improvements.

Concrete trucks will require access to the active works areas. It is anticipated that concrete deliveries will result in approximately 15 truck movements per day.

Ballast will also be imported to control the final bore site surface. It is anticipated that ballast deliveries will result in approximately 16 truck movements per day.

Therefore, total daily heavy vehicle movements associated with bore pump construction will be in the order of 31 (ie 15.5 heavy vehicles).

The construction timeframe, including site preparation, drilling and installation is expected to be approximately 13 months.

ii Downcast shaft construction

Centennial Angus Place anticipate that the construction workforce associated with the downcast shaft construction will be approximately 20 staff. For the purposes of this assessment, it is assumed all 20 staff will travel to the active work areas using their own car, representing 20 light vehicles (ie 40 light vehicle movements).

The shaft lining material will be transported to the active work areas and the number of heavy vehicles required will depend on the lining type and the length required. If the lining is 12 m in length, then approximately 33 heavy vehicles will be required and if the lining is 6 m in length, then approximately 66 heavy vehicles will be required.

To assess a worst-case construction scenario, for the purposes of this TIA, total daily heavy vehicle movements associated with downcast shaft construction have been assumed to be in the order of 132 (ie 66 heavy vehicles).

The construction timeframe, including site preparation, drilling and commissioning is expected to be approximately 21 months.

iii Total construction traffic generation

The predicted daily construction traffic generation as a result of the project is summarised in Table 3.1.

Table 3.1 Project-related construction traffic

Construction activity	Light vehicles (LV)	Heavy vehicles (HV)	LV/HV movements
Bore pump construction	37	15.5	74/31
Downcast shaft construction	20	66	40/132
Total	57	81.5	114/163

3.2.2 Traffic distribution

Two routes are proposed for project-related construction traffic, namely:

- Route 1 (ie light vehicles only):
 - 50% of light vehicles via State Mine Gully Road and Glowworm Tunnel Road.
- Route 2 (ie light and heavy vehicles):
 - 50% of light vehicles via Old Bells Line of Road and Glowworm Tunnel Road; and
 - 100% of heavy vehicles via Old Bells Line of Road and Glowworm Tunnel Road.

3.3 Operations traffic

3.3.1 Traffic generation

It is assumed the majority of the operational workforce traffic will continue to use the intersection of Wolgan Road at the Castlereagh Highway, which is effectively an offset four-way cross intersection with Main Street on the opposite side of the Castlereagh Highway at Lidsdale.

As noted in Section 2.2, all coal produced at the mine has historically been transported by underground roads or conveyors or private surface coal haul roads in accordance with the Western Coal Services Project development consent (SSD-5579) and these arrangements will continue as part of the project. Subsequently, there is, and will continue to be, no road transport of coal using the public roads that have been considered as part of this assessment. This TIA has therefore focused on light vehicle movements utilising the local road network during project operations.

The proposed operational workforce is provided in Table 3.2.

Table 3.2 **Proposed employment by shift**

Staff	Weekday shifts (Monday – Thursday)			Weekend shifts (Friday – Sunday)	
	Morning shift	Afternoon shift	Night shift	Morning shift	Night shift
	(6:00 am–4:00 pm)	(2:00 pm–12:00 am)	(10:00 pm–8:00 am)	(6:00 am–6:00 pm)	(6:00 pm–6:00 am)
Surface and underground mine staff (including deputies and trades)	82	70	70	80	80
Contractors	5	8	8	4	3
Apprentices/trainees	2	-	-	-	-
Administration staff	30	2	2	2	2
Total	119	80	80	86	85

As shown in Table 3.2, the mine will continue to have more employees working on weekdays, when compared to weekends. Therefore, this assessment has focussed on the impact on the road network on weekdays only. A 10% carpooling ratio has also been applied to the assessed vehicle movements.

The proposed light vehicle movements under each shift (including a 10% carpooling ratio) is shown in Table 3.3. The total daily light vehicle movements are therefore 502.

Table 3.3 **Predicted daily light vehicle movements (include 10% carpooling)**

Vehicle movements	Weekday shifts (Monday – Thursday)		
	Morning shift	Afternoon shift	Night shift
Light vehicle numbers	119	80	80
Light vehicle numbers (assumes 10% carpooling)	107	72	72
Total light vehicle movements	214	144	144

3.3.2 Traffic distribution

The predicted traffic distribution for project-related light vehicle movements during operations include:

- 20% originating locally near Lidsdale (north of Castlereagh Highway);
- 20% originating locally near Wallerawang (south of Castlereagh Highway);
- 20% originating regionally from the west (travelling to or from the west via Ian Holt Drive and Castlereagh Highway); and
- 40% originating regionally from the east (travelling to or from the Lithgow area).

3.4 Car parking

During construction, the project workforce will park at the active work areas within Newnes State Forest.

During operations, the project workforce will use existing car parking spaces on-site at the mine's pit top area.

4 Impact assessment

4.1 Road network and capacity standards

As noted in Section 2.4, the assessed local roads that will be used by project-related traffic generally meet the Austroads (2016) *Road Design Guide* standards when considering baseline traffic volumes.

4.1.1 Construction

The construction-generated daily light and heavy vehicles will be in the order of 114 daily light vehicle movements and 163 daily heavy vehicle movements following the traffic distribution route described in Section 3.2.2.

Baseline traffic volume, additional construction-generated traffic movements and future daily traffic movements during construction are shown in Table 4.1.

Table 4.1 Project-related daily traffic volumes and corresponding road design standards - Construction

Road	Daily traffic volume	Construction-related daily traffic movements	Future weekday daily traffic movements	Relevant Austroads threshold band	Relevant Austroads design standard	Road width	Compliance?
Chifley Road	3,671	219	3,890	> 3,000	Minimum 10 m wide seal	Generally, 9 m – 13 m sealed.	Generally, compliant
Old Bells Line of Road	40	219	259	150 – 500	Minimum 7.2 m wide seal	Generally, 6 m – 11 m unsealed, with some narrower sections 5 m wide.	Acceptable due to temporary nature of construction activities.
State Mine Gully Road	53	58	111	1 – 150	8.7 m wide total carriageway (if unsealed); or minimum 3.7 m wide seal	Generally, 5 m – 10 m, sealed and unsealed.	Acceptable due to low volumes of traffic.
Glowworm Tunnel Road	64 – 96	277	341 – 373	150 – 500	Minimum 7.2 m wide seal	Generally, 9 m – 13 m unsealed, with majority 12 m wide.	Acceptable due to temporary nature of construction activities.
Blackfellows Hand Trail	42	277	319	150 – 500	Minimum 7.2 m wide seal	Generally, 5 m – 12 m unsealed.	Acceptable due to temporary nature of construction activities.
Sunnyside Ridge Road	37	277	314	150 – 500	Minimum 7.2 m wide seal	Generally, 4 m – 8 m unsealed.	Acceptable due to temporary nature of construction activities.

Project-related vehicle movements during construction will push the following rural, unsealed roads into a higher Austroads threshold band:

- Old Bells Line of Road;
- Glowworm Tunnel Road;
- Blackfellows Hand Trail; and
- Sunnyside Ridge Road.

Due to the temporary nature of project-related construction activities, no long-term significant impacts on the assessed road network during construction are anticipated.

4.1.2 Operations

While the largest numbers on-site at the mine's pit top area at any one time are anticipated to occur during the Sunday night and Monday morning shift changeover period, the actual peak daily traffic volumes will likely occur from Tuesday to Thursday.

The future maximum daily light vehicle movements associated with operations from Tuesday to Thursday are likely to be as follows:

- completion of previous day's afternoon shift (ie 72 outbound light vehicles);
- commencement of morning shift (ie 107 inbound light vehicles);
- completion of night shift (ie 72 outbound light vehicles);
- commencement of afternoon shift (ie 72 inbound light vehicles);
- completion of morning shift (ie 107 outbound light vehicles); and
- commencement of night shift (ie 72 inbound light vehicles).

The maximum daily light vehicles movements during operations will be 502 light vehicle movements. For the purposes of this assessment, it is assumed these vehicles will be distributed across the assessed road network as follows:

- 100 originating locally near Lidsdale (north of Castlereagh Highway);
- 100 originating locally near Wallerawang (south of Castlereagh Highway);
- 100 originating regionally from the west (travelling to or from the west via Ian Holt Drive and Castlereagh Highway); and
- 202 light vehicles originating regionally from the east (travelling to or from the Lithgow area).

Baseline and project-related daily traffic volumes during operations are summarised in Table 4.2.

Table 4.2 Project-related daily traffic volumes and corresponding road design standards - Operations

Road	Daily traffic volume	Project-related maximum daily traffic movements	Future daily traffic movements	Relevant Austroads threshold band	Relevant Austroads design standard	Road width	Compliance?
Castlereagh Highway	3,864 – 5,635	202 (+3.6% - 5.2%)	4,066 – 5,837	> 3,000	Minimum 10 m wide seal	Generally, 10 m wide seal	Compliant
Wolgan Road (north of mine access)	200	0 (+0%)	200	150 – 500	Minimum 7.2 m wide seal	Generally, 6 m wide seal	Acceptable due to low volumes of traffic.
Wolgan Road (south of mine access)	240	502 (+209.2%)	742	500 – 1,000	Minimum 7.2 m – 8 m wide seal	Generally, 6 m – 8 m wide seal	Generally compliant
Wolgan Road (north of Castlereagh Highway)	1,235	302 (+24.5%)	1,537	1,000 – 3,000	Minimum 9 m wide seal	7 m – 9 m wide seal	Generally compliant
Ian Holt Drive	155	100 (+64.5%)	255	150 – 500	Minimum 7.2 m wide seal	7 m – 9 m wide seal	Generally compliant
Main Street	1,570	100 (+6.4%)	1,670	1,000 – 3,000	Minimum 9 m wide seal	7 m – 9 m wide seal	Generally compliant

Additional project-related daily light vehicle movements during operations will contribute to a 209.2% increase in traffic on Wolgan Road (south of the mine access intersection) and push this section of the road into a higher threshold band.

The width and condition of this section of Wolgan Road is still considered to be generally compliant and acceptable as the future daily traffic volume is at the lower range of the revised threshold band.

Threshold bands for all other assessed roads in Table 4.2 will remain unchanged and, therefore, road width assessments remain generally compliant with the relevant Austroads design standard.

4.2 Intersection performance

4.2.1 Construction

During construction, the workforce is expected to arrive at the active work areas between 6:00 am and 7:00 am and depart between 3:00 pm and 4:00 pm. As there will likely be one shift start and finish for all employees during construction, the intersection performance assessment for construction has only considered the early morning (ie 6:00 am – 7:00 am) and afternoon (ie 2:45 pm – 3:45 pm) peak hours.

The forecast additional peak hourly construction-generated traffic movements for the Chifley Road/Petra Avenue/Old Bells Line of Road is summarised in Table 4.3.

Table 4.3 Existing and proposed SIDRA intersection analysis results –construction traffic

Intersection	Early AM peak half hour				PM peak hour			
	6:30 am – 7:00 am typically ¹				2:45 pm – 3:45 pm typically			
	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL
Chifley Road/Petra Avenue/Old Bells Line of Road – existing	A	0.07	10.8	0.1	A	0.085	8.3	0.0
Chifley Road/Petra Avenue/Old Bells Line of Road – proposed	A	0.07	12.4	0.2	A	0.085	9.3	0.3

Note: LOS = level of service; DOS = degree of saturation; DEL = average delay by second; 95th percentile BQL = 95th percentile back of queue length.

¹Traffic volumes for the early AM peak half hour represent a 30-minute survey only.

The SIDRA intersection results show that during the assessed peak hours, there will be only minor changes to the existing intersection operation at the intersection of Chifley Road/Petra Avenue/Old Bells Line of Road.

The average vehicle delays for the early morning and afternoon peak hours will change by 1.6 seconds or less. The intersection will still operate at LOS A during the assessed peak hours.

Overall, project-related vehicle movements during construction will have negligible impacts on this intersection.

4.2.2 Operations

The forecast additional peak hourly project-related vehicle movements at three key intersections during operations are summarised in Table 4.4.

The SIDRA intersection results in Table 4.4 show that during all peak hours, there will be only minor changes to the baseline intersection operations. These intersections will experience average vehicle delays of:

- +0.1 seconds or less during the early morning peak hour;
- +0.5 seconds or less during the morning peak hour;
- +0.5 seconds or less during the early afternoon peak hour; and
- +0.3 seconds or less during the afternoon peak hour.

All delays are considered negligible and are likely to be unnoticeable to the existing road users. All assessed intersections will remain at LOS A during project operations.

Overall, project-related vehicle movements during operations will have negligible impacts on the assessed intersections.

Table 4.4 **Baseline vs future SIDRA intersection analysis results**

Intersection	Early AM peak hour 5:00 am to 6:00 am				AM peak hour 8:00 am to 9:00 am				Early PM peak hour 1:00 pm to 2:00 pm				PM peak hour 4:00 pm to 5:00 pm			
	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL	LOS	DOS	DEL	95 th percentile BQL
Baseline SIDRA intersection analysis results																
Castlereagh Highway/Wolgan Road/Main Street	A	0.065	7.4	0.2	A	0.080	7.2	0.3	A	0.111	8.0	0.4	A	0.175	8.7	0.7
Castlereagh Highway/Ian Holt Drive	A	0.032	7.8	0.0	A	0.072	8.4	0.0	A	0.068	7.9	0.0	A	0.081	8.0	0.0
Mine access intersection	A	0.003	6.9	0.0	A	0.008	7.0	0.0	A	0.003	6.9	0.0	A	0.009	7.0	0.0
Future SIDRA intersection analysis results																
Castlereagh Highway/Wolgan Road/Main Street	A	0.094	7.4	0.3	A	0.080	7.7	0.3	A	0.137	8.5	0.5	A	0.251	9.0	1.0
Castlereagh Highway/Ian Holt Drive	A	0.032	7.8	0.0	A	0.072	8.4	0.1	A	0.068	7.9	0.0	A	0.081	8.0	0.1
Mine access intersection	A	0.063	7.0	0.3	A	0.039	7.0	0.2	A	0.043	7.0	0.2	A	0.058	7.0	0.2

Note: LOS = level of service; DOS = degree of saturation; DEL = average delay by second; 95th percentile BQL = 95th percentile back of queue length

4.3 Impact on road safety

As discussed in Section 2.6, a number of reported crashes on the assessed road network relate to speeding and fatigue, which can potentially be avoided by adopting good driving practice. Nevertheless, it is recommended that the project-related workforce be made aware of a number of traffic-related safety matters prior to commencement of their employment, including:

- varying speed limits along sealed and unsealed roads;
- be aware of driving on unsealed roads in severe weather conditions;
- general road safety rules (eg do not drive under the influence of alcohol and medication); and
- fatigue management measures.

4.4 Impact on public transport

The project workforce is not anticipated to create a high demand for public transport services. As discussed in Section 2.8, the closest public transport services are not within a desirable walking distance, therefore, the project-related workforce is not expected to walk to work.

Existing public transport services are not expected to be impacted by the project.

4.5 Impact on pedestrian and cycling activities

The project-related workforce is not anticipated to create a high demand for pedestrian and cyclist access.

4.6 Availability of sufficient carparks

As discussed in Section 2.7, car parking capacity at the mine's pit top area is currently 186 spaces.

Future maximum demand for car parking will likely be during the Sunday night and Monday morning shift changeover period.

Assuming a 10% carpooling ratio for employees, if all Sunday night shift workers are on-site while the Monday morning shift workers arrive, this will create demand for 184 car parking spaces, which is below the current car parking capacity.

The existing workforce car parking areas at the mine's pit top area are sealed and have generally been designed in accordance with AS 2890 Requirements for Car Parking. These areas are considered to have adequate capacity to accommodate the additional workforce during the peak shift changeover times.

Photographs of the existing car parks are provided in Appendix A.

4.7 Mitigation measures

Due to the temporary nature of construction-related impacts on unsealed roads within Newnes State Forest and surrounds, the assessed rural road network is considered acceptable to carry the additional daily traffic movements. However, it is recommended that a road maintenance program be implemented for the affected unsealed rural roads within Newnes State Forest (namely Old Bells Line of Road, Glowworm Tunnel Road, Blackfellows Hand Trail and Sunnyside Ridge Road). The road maintenance program should include measures such as regrading of the road surface to repair potholes and road corrugations at three monthly intervals during

construction and a commitment by Centennial Angus Place to restore the road surface to its pre-construction condition at the completion of construction. Construction and speed management signage should also be implemented along the affected sections of the unsealed road network.

It is recommended that a construction traffic management plan (CTMP) and Driver Code of Conduct be prepared prior to commencement of construction and incorporate the road maintenance program and other traffic control measures to be implemented throughout the project's construction.

The project-related workforce should also be made aware of a number of traffic-related safety matters prior to commencement of their employment, including:

- varying speed limits on sealed and unsealed roads;
- general road safety rules (eg do not drive under the influence of alcohol and medication);
- be aware of driving on dirt road in severe weather condition; and
- fatigue management measures.

5 Cumulative impact assessment

5.1 Construction of pipeline for Clarence Colliery

During construction, roads within and adjacent to Newnes Plateaus and Newnes State Forest may also be used by construction-related vehicle movements associated with the construction of a new buried pipeline within Newnes State Forest to connect Clarence Colliery's existing water management infrastructure to the SDWTS. Construction of the proposed pipeline is expected to take approximately 18 months and is expected to have a peak construction workforce of approximately 60 people.

Although the Director General's Environmental Assessment Requirements for this project do not specify a requirement for a cumulative impact assessment for other approved and proposed works within the region, this section of the report considers potential cumulative impacts under a concurrent construction scenario for the project and the proposed pipeline.

The cumulative traffic impact assessment has focused on the combined daily traffic impacts from both projects for the network of minor roads which will be used to access the Newnes Plateau, including:

- Old Bells Line of Road (from Chifley Road at Zig Zag);
- State Mine Gully Road (from Lithgow);
- Glowworm Tunnel Road;
- Sunnyside Ridge Road; and
- Blackfellows Hand Trail.

Both the construction compound for the proposed pipeline and the active work areas as part of the project-related construction activities have potential to be accessed via these roads.

It should be noted that this assessment reflects a worst-case concurrent construction scenario and assumes peak construction for the project and proposed pipeline will overlap.

5.2 Cumulative impact on assessed roads

The forecast additional daily construction traffic movements are shown separately for each project in Table 5.1 and then combined to show the cumulative daily traffic increases for each assessed road during a concurrent construction scenario for both projects.

Table 5.1 Minor road daily traffic volumes for assessed roads

Road	Location	Forecast daily traffic volume for 2019 ¹	Daily construction traffic movements for the project	Daily construction traffic movements for the proposed pipeline	Future total daily traffic movements
Sunnyside Ridge Road	North of Blackfellows Hand Trail/Beecroft Track intersection	37	277	0	314
Blackfellows Hand Trail	West of the picnic area intersection to Beecroft Track	42	277	16	335
Glowworm Tunnel Road	North of the construction compound for the proposed pipeline to the picnic area intersection	96	277	16	389
Glowworm Tunnel Road	Between Old Bells Line of Road and the construction compound for the proposed pipeline	96	277	82	455
State Mine Gully Road	Within rural area north of Lithgow	53	58	26	137
Old Bells Line of Road	East of Glowworm Tunnel Road	40	219	56	315
Old Bells Line of Road	North of Chifley Road	40	219	44	303

1. To establish 2019 daily traffic volumes, a +1% annual (linear) traffic growth has been applied to the most recent annual survey.

When compared with the future daily traffic increases for the affected minor roads for the project alone (Section 4.1.1), the results presented in Table 5.1 indicate that part of the assessed route on Newnes Plateau has potential to be significantly affected under a concurrent construction scenario for the project and the proposed pipeline construction (namely Glowworm Tunnel Road and its continuation onto Blackfellows Hand Trail).

Under a concurrent construction scenario, combined total daily traffic movements along Glowworm Tunnel Road will be up to approximately 455 daily vehicle movements, thereby exceeding the recommended threshold of 150 daily vehicle movements for an unsealed minor road. These volumes are only anticipated to occur during a concurrent construction scenario and will therefore not have a significant long-term impact on this access road.

As noted in Section 4.7, it is recommended that a CTMP and Driver Code of Conduct be prepared prior to commencement of construction and incorporate the road maintenance program and other traffic control measures to be implemented throughout the project's construction on the unsealed road network.

5.3 Cumulative impact on key intersection

The intersection of Chifley Road/Petra Avenue/Old Bells Line of Road will be used by both project's under a concurrent construction scenario. Based on a recent assessment of the existing intersection performance at this location as part of the TIA for the pipeline's construction, the LOS was found to be LOS A during the morning and afternoon peak hour periods. As demonstrated in Table 5.1, project-related vehicle movements will be greater than those required for the construction of the proposed pipeline. However, it is anticipated that there will be negligible impacts to the LOS at this intersection as a result of the additional project-related peak hourly vehicle movements during construction. No significant impacts to the performance of this intersection are anticipated under a concurrent construction scenario for the project and the proposed pipeline.

6 Summary and conclusion

This TIA has reviewed and assessed project-related daily traffic volumes along the existing road network to determine whether there is sufficient road network capacity and to ensure the existing road condition will be adequate to accommodate the additional traffic movements generated by the project.

Traffic impacts at four key intersections have been assessed using the SIDRA intersection analysis, including:

- Chifley Road/Petra Avenue/Old Bells Line of Road;
- Castlereagh Highway/Wolgan Road/Main Street;
- Castlereagh Highway/Ian Holt Drive; and
- the mine access intersection.

This assessment concluded that the additional daily traffic movements during construction will push the following minor, unsealed roads/access tracks into a higher threshold band:

- Old Bells Line of Road;
- Glowworm Tunnel Road;
- Blackfellows Hand Trail; and
- Sunnyside Ridge Road.

Due to the temporary nature of project-related construction activities, no long-term significant impacts on the assessed road network during construction are anticipated.

During construction, the average vehicle delays at the Chifley Road/Petra Avenue/Old Bells Line of Road intersection during the early morning and afternoon peak hours will increase by 1.6 seconds or less. This intersection will still operate at LOS A during the assessed peak hours. Both the existing and the future LOS at this intersection is considered to be very good.

Additional project-related daily light vehicle movements during operations will contribute to a 209.2% increase in traffic on Wolgan Road (south of the mine access intersection) and push this section of the road into a higher threshold band. The width and condition of this section of Wolgan Road is still considered to be generally compliant and acceptable as the anticipated daily traffic volumes during operations will be at the lower range of the revised threshold band.

Threshold bands for all other assessed roads will remain unchanged during operations and, therefore, road width assessments remain generally compliant with the relevant Austroads design standard.

During operations, there will be only minor changes to the baseline intersection operations at three assessed intersections (ie Castlereagh Highway/Wolgan Road/Main Street; Castlereagh Highway/Ian Holt Drive and the mine access intersection). These intersections will experience average vehicle delays of:

- +0.1 seconds or less during the early morning peak hour;
- +0.5 seconds or less during the morning peak hour;

- +0.5 seconds or less during the early afternoon peak hour; and
- +0.3 seconds or less during the afternoon peak hour.

All delays are considered negligible and are likely to be unnoticeable to the existing road users. All assessed intersections will remain at LOS A during operations.

The results of the cumulative impact assessment indicate that part of the assessed route on Newnes Plateau has potential to be significantly affected under a concurrent construction scenario for the project and the proposed pipeline construction (namely Old Bells Line of Road, Glowworm Tunnel Road and its continuation onto Blackfellows Hand Trail). A maximum of 455 daily vehicle movements could occur under a concurrent construction scenario, thereby exceeding the recommended threshold of 150 daily vehicle movements for unsealed minor roads. This level of exceedance will only be temporary and will only occur under a concurrent construction scenario.

The intersection of Chifley Road/Petra Avenue/Old Bells Line of Road will be used by both project's under a concurrent construction scenario. No significant impacts to the performance of this intersection are anticipated under a concurrent construction scenario for the project and the proposed pipeline.

It is recommended that a CTMP and Driver Code of Conduct be prepared prior to commencement of construction and incorporate the road maintenance program and other traffic control measures to be implemented throughout the project's construction on the unsealed road network.

The project-related workforce should also be made aware of a number of traffic-related safety matters prior to commencement of their employment, including:

- varying speed limits on sealed and unsealed roads;
- general road safety rules (eg do not drive under the influence of alcohol and medication);
- be aware of driving on dirt road in severe weather condition; and
- fatigue management measures.

The project is not anticipated to create a high demand for public transport services, pedestrian and cycling activities.

The existing car parking at the mine's pit top area is anticipated to be adequate to accommodate the maximum shift changeover period demand for parking during operations.

Abbreviations

CTMP	construction traffic management plan
DEL	average delay by second
DOS	degree of saturation
DPIE	Department of Planning, Industry and Environment
LGA	local government area
LOS	level of service
RMS	Roads and Maritime Services
RTA	Roads and Traffic Authority
TfNSW	Transport for NSW
TIA	traffic impact assessment

References

Austroads 2016a, *Austroads Guide to Road Design Part 3: Geometric Design*.

Austroads 2016b, *Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development*.

Austroads 2017, *Austroads Guide to Road Design Part 4: Intersections and Crossings: General*.

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NSW Roads and Maritime Services (RMS) 2019, NSW Combined Higher Mass Limit (HML) and Restricted Access Vehicle (RAV) Map, viewed on 12 August 2019, <https://www.rms.nsw.gov.au/business-industry/heavy-vehicles/maps/restricted-access-vehicles-map/map/index.html>.

Transport for NSW (TfNSW) 2019, Centre for Road Safety, Crashes Map – Lithgow, viewed on 16 September 2019, https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tblga=4.

Appendix A

Photographs - Construction



Photograph A.1 Chifley Road – approaching Chifley Road/Petra Road/Old Bells Line of Road intersection (westbound) – Petra Road to the left/Old Bells Line of Road to the right



Photograph A.2 Old Bells Line of Road leaving Chifley Road– wide gravel road (flat surface)



Photograph A.3 **Old Bells Line of Road – a deactivated railway line (to the east of the Zig Zag Clarence station, also currently deactivated)**



Photograph A.4 **Old Bells Line of Road – unnamed road to the left following electricity easement, Old Bells Line of Road to the right**



Photograph A.5 **Old Bells Line of Road – approaching narrower section of the road**



Photograph A.6 **Old Bells Line of Road/Glowworm Tunnel Road intersection – looking south**



Photograph A.7 **Glowworm Tunnel Road – travelling north from Old Bells Line of Road**



Photograph A.8 **Glowworm Tunnel Road – approximately 1 km west of Old Bells Line of Road looking north west**



Photograph A.9 **Glowworm Tunnel Road – approximately 2 km west of Old Bells Line of Road looking north west**



Photograph A.10 **Glowworm Tunnel Road – at Bungle Boori picnic area junction with Blackfellows Hands Track, connecting to Beecroft Track and Sunnyside Ridge Road**



Photograph A.11 Sunnyside Ridge Road at junction with Blackfellows Hands Track and Beecroft Track – looking north



Photograph A.12 Sunnyside Ridge Road – northbound approximately 1 km north of Beecroft Track



Photograph A.13 Sunnyside Ridge Road – northbound approximately 3 km north of Beecroft Track



Photograph A.14 Sunnyside Ridge Road – southbound approximately 5 km north of Beecroft Track



Photograph A.15 Sunnyside Ridge Road – southbound approximately 4 km north of Beecroft Track



Photograph A.16 Sunnyside Ridge Road – southbound approximately 2 km north of Beecroft Track



Photograph A.17 **Blackfellows Hands Track – eastbound approximately 2 km west of Glowworm Tunnel Road**



Photograph A.18 **Blackfellows Hands Track – eastbound approximately 200 m west of Glowworm Tunnel Road**



Photograph A.19 **State Mine Gully Road – unsealed section of road – descent to Lithgow (southbound)**



Photograph A.20 **State Mine Gully Road – sealed section of road – approaching a small bridge (southbound)**

Appendix A

Photographs - Operations



Photograph A.1 **Wolgan Road – at mine access intersection looking south**



Photograph A.2 **Wolgan Road – at mine access intersection looking north**



Photograph A.3 **Angus Place pit top carpark – northern end**



Photograph A.4 **Angus Place pit top carpark – southern end**



Photograph A.5 **Overflow carpark – southern end**



Photograph A.6 **Overflow carpark– northern end**



Photograph A.7 **Wolgan Road – heading south directly uphill from the mine access**



Photograph A.8 **Wolgan Road – heading south approximately 1 km south of the mine**



Photograph A.9 **Wolgan Road – heading south approximately 2 km south of the mine**



Photograph A.10 **Wolgan Road – heading south approximately 3 km south of the mine**



Photograph A.11 **Wolgan Road – approximately 4 km south of the mine**



Photograph A.12 **Wolgan Road – approximately 5 km south of the mine**



Photograph A.13 **Wolgan Road – approximately 6 km south of the mine**



Photograph A.14 **Wolgan Road – heading south near Ian Holt Drive junction**



Photograph A.15 Ian Holt Drive at Castlereagh Highway intersection looking south



Photograph A.16 Ian Holt Drive at Castlereagh Highway intersection looking north



Photograph A.17 Ian Holt Drive – 2 km east of Castlereagh Highway heading east



Photograph A.18 Ian Holt Drive – 3 km east of Castlereagh Highway heading east



Photograph A.19 **Castlereagh Highway at Wolgan Road intersection heading west**



Photograph A.20 **Wolgan Road – at Castlereagh Highway intersection looking east**



Photograph A.21 **Wolgan Road – at Castlereagh Highway intersection looking west**



Photograph A.22 **Wolgan Road – at Castlereagh Highway intersection looking north**

Appendix B

Intersection traffic surveys



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR
0745 - 0845



Wolgan Rd

Additional Car Park

	AM	PM
L	0	0
T	0	0
R	0	0

R	T	L	
0	5	0	AM
0	10	0	PM

	R	T	L
0	0	0	0
0	0	0	0
17	4	0	0
PM	AM		

PM	0	16	1
AM	0	15	0
	L	T	R

Angus Colliery

PM PEAK HOUR
1445 - 1545

Weather >>>



Wolgan Rd



Day/Date : Tuesday / 13th August 2019

PEAK HOUR	0	5	0	0	0	0	0	15	5	4	0	0	29
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[illegible]



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

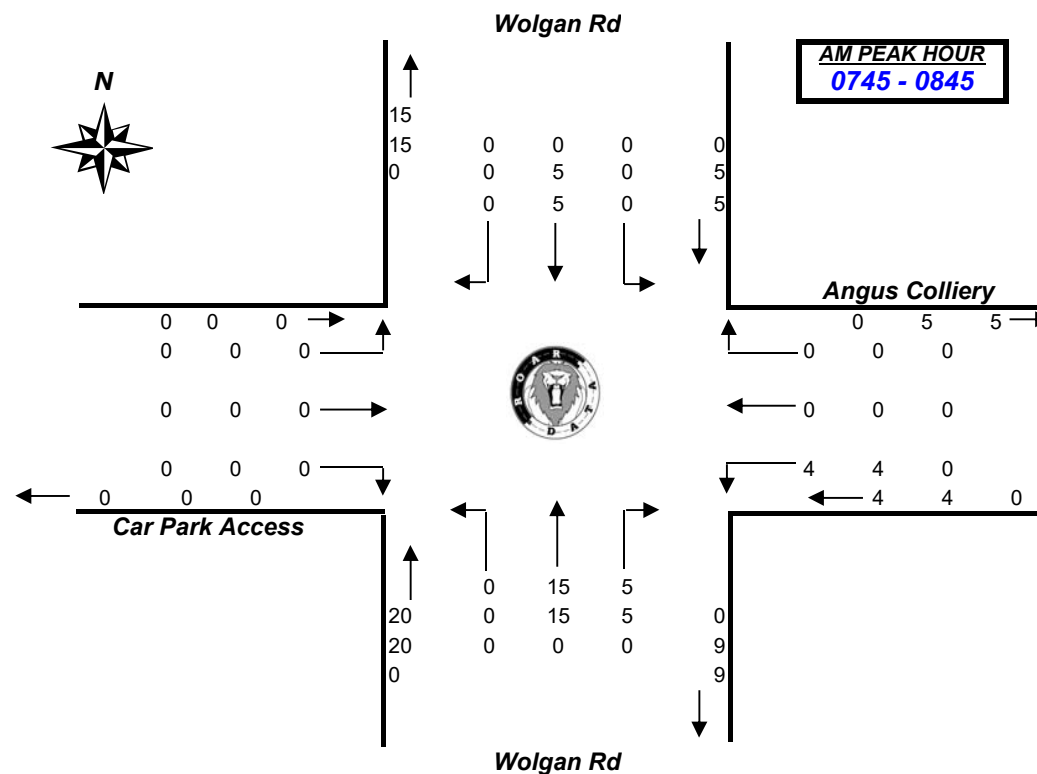
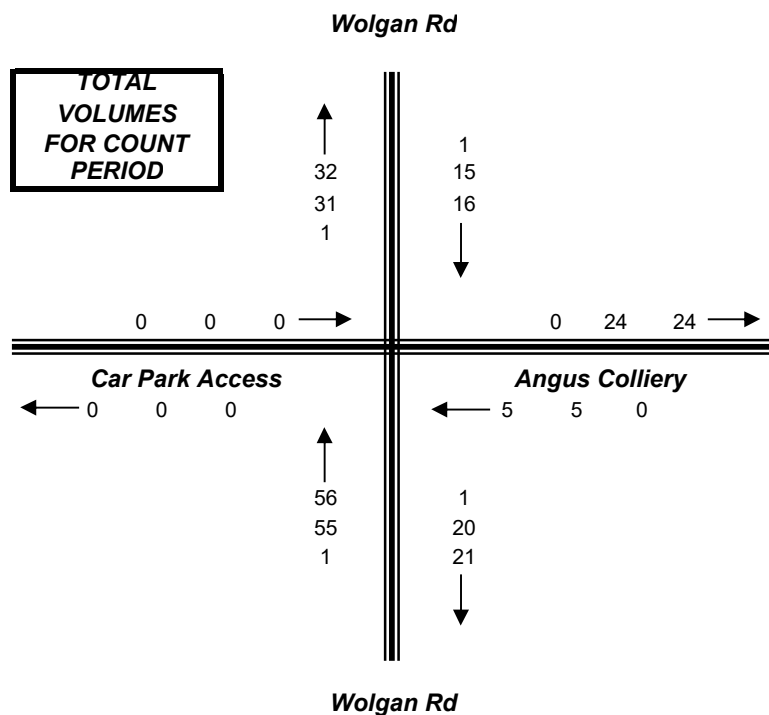
COMBINED

Time Per	NORTH Wolgan Rd			WEST Car Park Access			SOUTH Wolgan Rd			EAST Angus Colliery			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0500 - 0515	0	0	0	0	0	0	0	0	1	1	0	0	2
0515 - 0530	0	0	0	0	0	0	0	0	0	0	0	0	0
0530 - 0545	0	0	0	0	0	0	0	0	0	0	0	0	0
0545 - 0600	0	0	0	0	0	0	0	1	0	0	0	0	1
0600 - 0615	0	1	0	0	0	0	0	1	3	0	0	0	5
0615 - 0630	0	3	0	0	0	0	0	1	2	0	0	0	6
0630 - 0645	0	0	0	0	0	0	0	2	7	0	0	0	9
0645 - 0700	0	1	0	0	0	0	0	0	5	0	0	0	6
0700 - 0715	0	1	0	0	0	0	0	2	0	0	0	0	3
0715 - 0730	0	1	0	0	0	0	0	3	0	0	0	0	4
0730 - 0745	0	2	0	0	0	0	0	3	0	0	0	0	5
0745 - 0800	0	1	0	0	0	0	0	7	3	1	0	0	12
0800 - 0815	0	0	0	0	0	0	0	3	1	0	0	0	4
0815 - 0830	0	1	0	0	0	0	0	0	1	3	0	0	5
0830 - 0845	0	3	0	0	0	0	0	5	0	0	0	0	8
0845 - 0900	0	2	0	0	0	0	0	4	1	0	0	0	7
Period End	0	16	0	0	0	0	0	32	24	5	0	0	77

COMBINED

Peak Per	NORTH Wolgan Rd			WEST Car Park Access			SOUTH Wolgan Rd			EAST Angus Colliery			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0500 - 0600	0	0	0	0	0	0	0	0	1	1	0	0	2
0515 - 0615	0	1	0	0	0	0	0	2	3	0	0	0	6
0530 - 0630	0	4	0	0	0	0	0	3	5	0	0	0	12
0545 - 0645	0	4	0	0	0	0	0	5	12	0	0	0	21
0600 - 0700	0	5	0	0	0	0	0	4	17	0	0	0	26
0615 - 0715	0	5	0	0	0	0	0	5	14	0	0	0	24
0630 - 0730	0	3	0	0	0	0	0	7	12	0	0	0	22
0645 - 0745	0	5	0	0	0	0	0	8	5	0	0	0	18
0700 - 0800	0	5	0	0	0	0	0	15	3	1	0	0	24
0715 - 0815	0	4	0	0	0	0	0	16	4	1	0	0	25
0730 - 0830	0	4	0	0	0	0	0	13	5	4	0	0	26
0745 - 0845	0	5	0	0	0	0	0	15	5	4	0	0	29
0800 - 0900	0	6	0	0	0	0	0	12	3	3	0	0	24

PEAK HOUR	0	5	0	0	0	0	0	15	5	4	0	0	29
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Day/Date : Tuesday / 13th August 2019

PEAK HOUR	0	10	0	0	0	0	0	16	1	17	0	0	44
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[illegible]



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

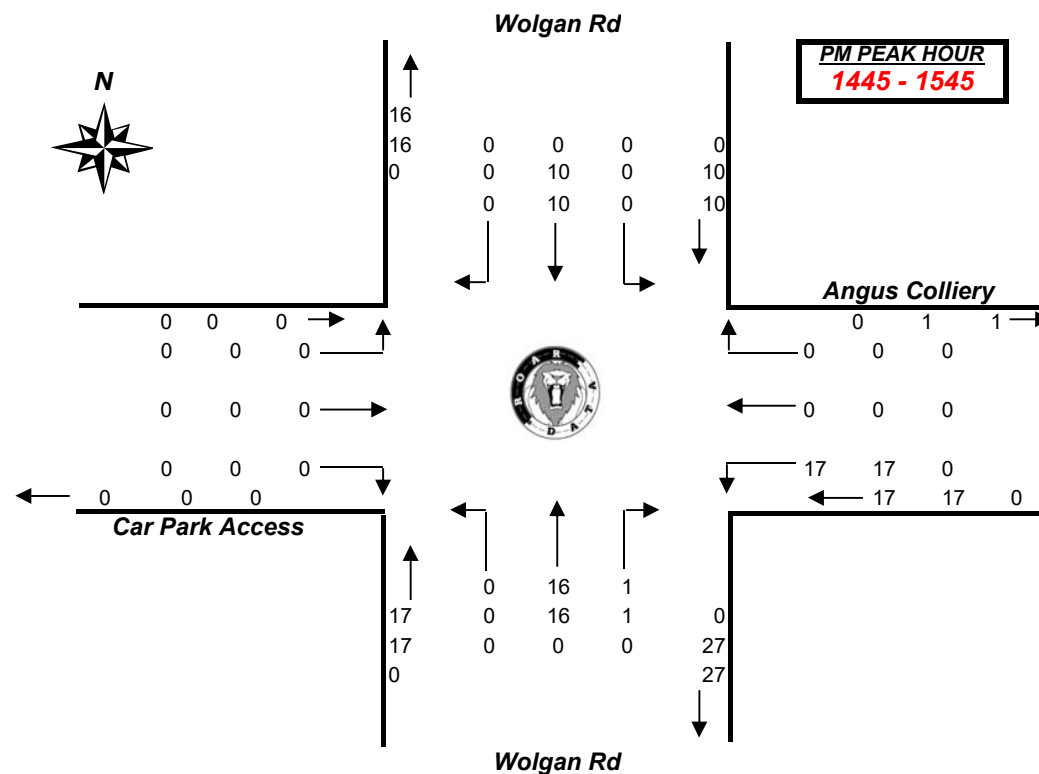
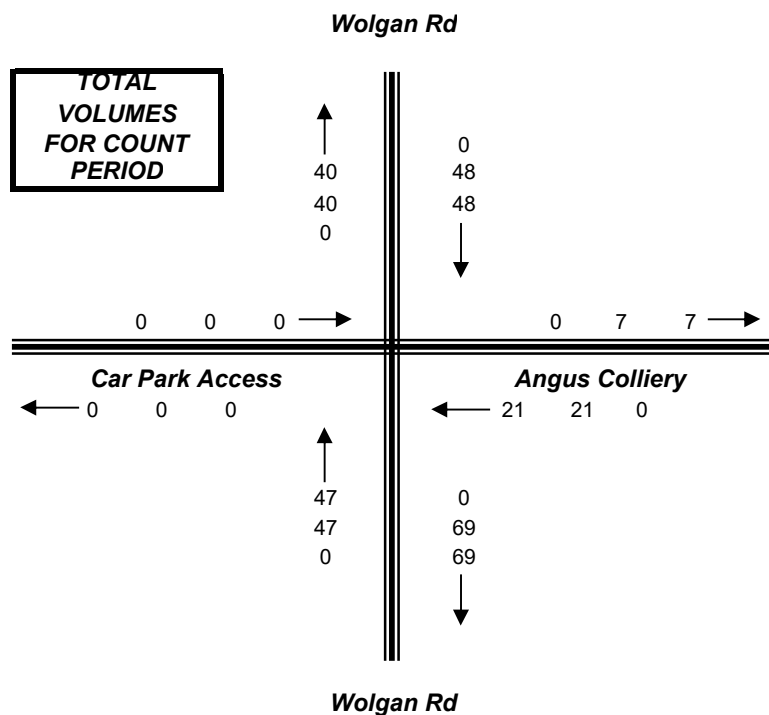
COMBINED

Time Per	NORTH Wolgan Rd			WEST Car Park Access			SOUTH Wolgan Rd			EAST Angus Colliery			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1300 - 1315	0	1	0	0	0	0	0	1	1	1	0	0	4
1315 - 1330	0	3	0	0	0	0	0	0	0	1	0	0	4
1330 - 1345	0	3	0	0	0	0	0	2	0	0	0	0	5
1345 - 1400	0	1	0	0	0	0	0	4	0	0	0	0	5
1400 - 1415	0	6	0	0	0	0	0	5	4	0	0	0	15
1415 - 1430	0	3	0	0	0	0	0	2	0	0	0	0	5
1430 - 1445	0	3	0	0	0	0	0	1	1	0	0	0	5
1445 - 1500	0	0	0	0	0	0	0	4	1	11	0	0	16
1500 - 1515	0	3	0	0	0	0	0	5	0	4	0	0	12
1515 - 1530	0	3	0	0	0	0	0	4	0	1	0	0	8
1530 - 1545	0	4	0	0	0	0	0	3	0	1	0	0	8
1545 - 1600	0	4	0	0	0	0	0	1	0	0	0	0	5
1600 - 1615	0	0	0	0	0	0	0	2	0	2	0	0	4
1615 - 1630	0	6	0	0	0	0	0	1	0	0	0	0	7
1630 - 1645	0	7	0	0	0	0	0	1	0	0	0	0	8
1645 - 1700	0	1	0	0	0	0	0	4	0	0	0	0	5
Period End	0	48	0	0	0	0	0	40	7	21	0	0	116

COMBINED

Peak Per	NORTH Wolgan Rd			WEST Car Park Access			SOUTH Wolgan Rd			EAST Angus Colliery			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1300 - 1400	0	1	0	0	0	0	0	1	1	1	0	0	4
1315 - 1415	0	13	0	0	0	0	0	11	4	1	0	0	29
1330 - 1430	0	13	0	0	0	0	0	13	4	0	0	0	30
1345 - 1445	0	13	0	0	0	0	0	12	5	0	0	0	30
1400 - 1500	0	12	0	0	0	0	0	12	6	11	0	0	41
1415 - 1515	0	9	0	0	0	0	0	12	2	15	0	0	38
1430 - 1530	0	9	0	0	0	0	0	14	2	16	0	0	41
1445 - 1545	0	10	0	0	0	0	0	16	1	17	0	0	44
1500 - 1600	0	14	0	0	0	0	0	13	0	6	0	0	33
1515 - 1615	0	11	0	0	0	0	0	10	0	4	0	0	25
1530 - 1630	0	14	0	0	0	0	0	7	0	3	0	0	24
1545 - 1645	0	17	0	0	0	0	0	5	0	2	0	0	24
1600 - 1700	0	14	0	0	0	0	0	8	0	2	0	0	24

PEAK HOUR	0	10	0	0	0	0	0	16	1	17	0	0	44
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR
0600 - 0700



Castlereagh Hwy

T	L	
83	5	AM
225	12	PM

R	8	13
	PM	AM
L	4	4



Ian Holt Dr

128	0	PM
258	0	AM
T	R	

PM PEAK HOUR
1500 - 1600

Weather >>>



Castlereagh Hwy



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

Lights	NORTH		EAST		SOUTH			Heavies	NORTH		EAST		SOUTH			Combined	NORTH		EAST		SOUTH		
	Castlereagh		Ian Holt Dr		Castlereagh				Castlereagh		Ian Holt Dr		Castlereagh				Castlereagh		Castlereagh		Ian Holt Dr		
Time Per	T	L	R	L	R	T	TOT	Time Per	T	L	R	L	R	T	TOT	Time Per	T	L	R	L	R	T	TOT
0500 - 0515	6	0	0	0	0	5	11	0500 - 0515	2	0	0	0	0	1	3	0500 - 0515	8	0	0	0	0	6	14
0515 - 0530	6	0	0	0	0	10	16	0515 - 0530	1	0	0	0	0	2	3	0515 - 0530	7	0	0	0	0	12	19
0530 - 0545	8	0	0	0	0	18	26	0530 - 0545	0	0	0	0	0	1	1	0530 - 0545	8	0	0	0	0	19	27
0545 - 0600	13	1	1	1	0	30	46	0545 - 0600	0	0	0	0	0	1	1	0545 - 0600	13	1	1	1	0	31	47
0600 - 0615	14	1	0	0	0	52	67	0600 - 0615	1	0	0	0	0	3	4	0600 - 0615	15	1	0	0	0	55	71
0615 - 0630	18	0	5	1	0	54	78	0615 - 0630	0	0	0	0	0	2	2	0615 - 0630	18	0	5	1	0	56	80
0630 - 0645	30	3	5	3	0	100	141	0630 - 0645	3	0	1	0	0	3	7	0630 - 0645	33	3	6	3	0	103	148
0645 - 0700	17	1	2	0	0	42	62	0645 - 0700	0	0	0	0	0	2	2	0645 - 0700	17	1	2	0	0	44	64
0700 - 0715	16	2	1	1	0	25	45	0700 - 0715	1	1	1	1	0	4	8	0700 - 0715	17	3	2	2	0	29	53
0715 - 0730	23	3	1	1	0	24	52	0715 - 0730	1	0	0	0	0	7	8	0715 - 0730	24	3	1	1	0	31	60
0730 - 0745	16	1	0	0	0	33	50	0730 - 0745	2	1	0	0	0	10	13	0730 - 0745	18	2	0	0	0	43	63
0745 - 0800	25	3	0	1	1	22	52	0745 - 0800	2	0	0	0	0	2	4	0745 - 0800	27	3	0	1	1	24	56
0800 - 0815	19	2	1	1	0	33	56	0800 - 0815	5	0	0	0	0	4	9	0800 - 0815	24	2	1	1	0	37	65
0815 - 0830	41	1	2	1	0	38	83	0815 - 0830	3	0	0	0	0	3	6	0815 - 0830	44	1	2	1	0	41	89
0830 - 0845	27	1	3	0	0	11	42	0830 - 0845	2	0	0	0	0	3	5	0830 - 0845	29	1	3	0	0	14	47
0845 - 0900	27	0	0	1	0	18	46	0845 - 0900	2	1	0	0	0	4	7	0845 - 0900	29	1	0	1	0	22	53
Per End	306	19	21	11	1	515	873	Per End	25	3	2	1	0	52	83	Per End	331	22	23	12	1	567	956

Lights		NORTH		EAST		SOUTH		TOT	Heavies		NORTH		EAST		SOUTH		TOT	Combined		NORTH		EAST		SOUTH		TOT
		Castlereagh		Ian Holt Dr		Castlereagh					Castlereagh		Ian Holt Dr		Castlereagh					Castlereagh		Ian Holt Dr		Castlereagh		
Peak Per	T	L	R	L	R	T			Peak Per	T	L	R	L	R	T			Peak Per	T	L	R	L	R	T		
0500 - 0600	33	1	1	1	0	63	99		0500 - 0600	3	0	0	0	0	5	8		0500 - 0600	36	1	1	1	0	68	107	
0515 - 0615	41	2	1	1	0	110	155		0515 - 0615	2	0	0	0	0	7	9		0515 - 0615	43	2	1	1	0	117	164	
0530 - 0630	53	2	6	2	0	154	217		0530 - 0630	1	0	0	0	0	7	8		0530 - 0630	54	2	6	2	0	161	225	
0545 - 0645	75	5	11	5	0	236	332		0545 - 0645	4	0	1	0	0	9	14		0545 - 0645	79	5	12	5	0	245	346	
0600 - 0700	79	5	12	4	0	248	348		0600 - 0700	4	0	1	0	0	10	15		0600 - 0700	83	5	13	4	0	258	363	
0615 - 0715	81	6	13	5	0	221	326		0615 - 0715	4	1	2	1	0	11	19		0615 - 0715	85	7	15	6	0	232	345	
0630 - 0730	86	9	9	5	0	191	300		0630 - 0730	5	1	2	1	0	16	25		0630 - 0730	91	10	11	6	0	207	325	
0645 - 0745	72	7	4	2	0	124	209		0645 - 0745	4	2	1	1	0	23	31		0645 - 0745	76	9	5	3	0	147	240	
0700 - 0800	80	9	2	3	1	104	199		0700 - 0800	6	2	1	1	0	23	33		0700 - 0800	86	11	3	4	1	127	232	
0715 - 0815	83	9	2	3	1	112	210		0715 - 0815	10	1	0	0	0	23	34		0715 - 0815	93	10	2	3	1	135	244	
0730 - 0830	101	7	3	3	1	126	241		0730 - 0830	12	1	0	0	0	19	32		0730 - 0830	113	8	3	3	1	145	273	
0745 - 0845	112	7	6	3	1	104	233		0745 - 0845	12	0	0	0	0	12	24		0745 - 0845	124	7	6	3	1	116	257	
0800 - 0900	114	4	6	3	0	100	227		0800 - 0900	12	1	0	0	0	14	27		0800 - 0900	126	5	6	3	0	114	254	
PEAK HR	79	5	12	4	0	248	348		PEAK HR	4	0	1	0	0	10	15		PEAK HR	83	5	13	4	0	258	363	



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM

Job No/Name : LITGOW Angus Place Colliery

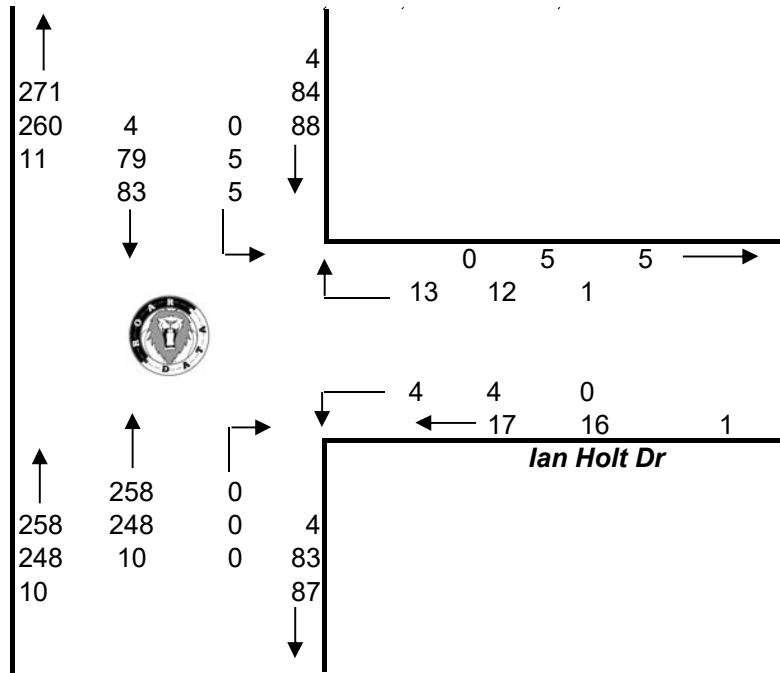
Day/Date : Tuesday / 13th August 2019

AM PEAK HOUR
0600 - 0700

TOTAL VOLUMES
FOR COUNT
PERIOD

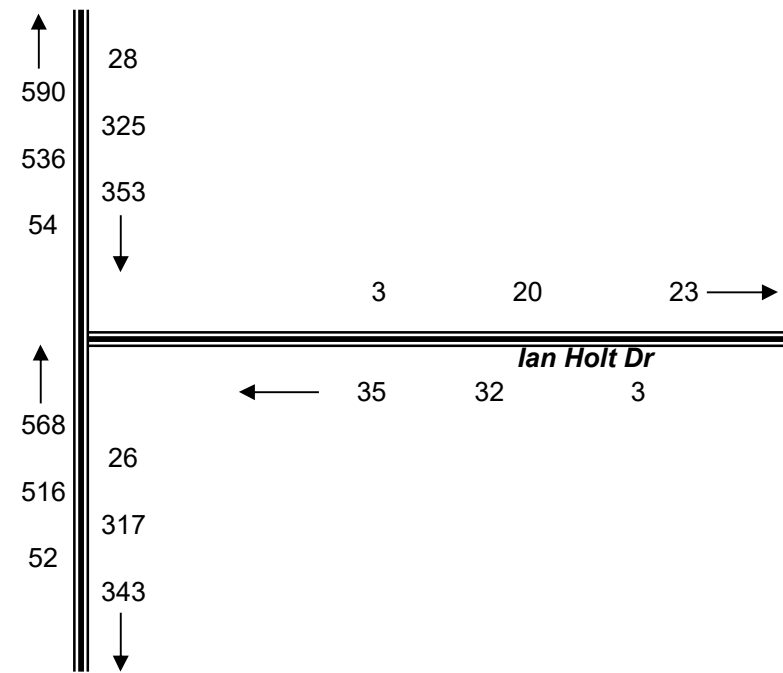


Castlereagh Hwy



Castlereagh Hwy

Castlereagh Hwy



Castlereagh Hwy



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

Lights		NORTH		EAST		SOUTH			Heavies		NORTH		EAST		SOUTH			Combined		NORTH		EAST		SOUTH		
		Castlereagh		Ian Holt Dr		Castlereagh					Castlereagh		Ian Holt Dr		Castlereagh					Castlereagh		Ian Holt Dr		Castlereagh		
Time Per		T	L	R	L	R	T	TOT	Time Per		T	L	R	L	R	T	TOT	Time Per		T	L	R	L	R	T	TOT
1300 - 1315		33	0	0	0	1	30	64	1300 - 1315		3	0	0	0	0	3	6	1300 - 1315		36	0	0	0	1	33	70
1315 - 1330		16	1	1	0	0	19	37	1315 - 1330		2	0	0	0	0	5	7	1315 - 1330		18	1	1	0	0	24	44
1330 - 1345		19	0	1	0	0	21	41	1330 - 1345		5	0	0	0	0	6	11	1330 - 1345		24	0	1	0	0	27	52
1345 - 1400		34	1	0	0	0	23	58	1345 - 1400		5	0	0	0	0	0	5	1345 - 1400		39	1	0	0	0	23	63
1400 - 1415		22	5	1	0	0	36	64	1400 - 1415		5	0	0	0	0	1	6	1400 - 1415		27	5	1	0	0	37	70
1415 - 1430		28	0	2	0	0	27	57	1415 - 1430		4	1	0	0	0	2	7	1415 - 1430		32	1	2	0	0	29	64
1430 - 1445		29	0	1	1	0	28	59	1430 - 1445		1	0	0	0	0	4	5	1430 - 1445		30	0	1	1	0	32	64
1445 - 1500		14	2	2	1	1	29	49	1445 - 1500		1	0	0	0	0	1	2	1445 - 1500		15	2	2	1	1	30	51
1500 - 1515		48	2	1	2	0	37	90	1500 - 1515		5	0	0	0	0	3	8	1500 - 1515		53	2	1	2	0	40	98
1515 - 1530		62	5	3	0	0	19	89	1515 - 1530		8	0	1	0	0	3	12	1515 - 1530		70	5	4	0	0	22	101
1530 - 1545		50	2	3	0	0	30	85	1530 - 1545		1	0	0	0	0	2	3	1530 - 1545		51	2	3	0	0	32	88
1545 - 1600		48	3	0	1	0	31	83	1545 - 1600		3	0	0	1	0	3	7	1545 - 1600		51	3	0	2	0	34	90
1600 - 1615		35	1	0	0	2	29	67	1600 - 1615		1	0	1	0	0	0	2	1600 - 1615		36	1	1	0	2	29	69
1615 - 1630		24	1	2	1	0	22	50	1615 - 1630		1	0	0	0	0	1	2	1615 - 1630		25	1	2	1	0	23	52
1630 - 1645		49	3	0	0	0	23	75	1630 - 1645		2	0	0	0	0	1	3	1630 - 1645		51	3	0	0	0	24	78
1645 - 1700		33	2	1	0	3	21	60	1645 - 1700		2	0	0	0	0	1	3	1645 - 1700		35	2	1	0	3	22	63
Per End		544	28	18	6	7	425	1028	Per End		49	1	2	1	0	36	89	Per End		593	29	20	7	7	461	1117

Lights		NORTH		EAST		SOUTH			Heavies		NORTH		EAST		SOUTH			Combined		NORTH		EAST		SOUTH		
		Castlereagh		Ian Holt Dr		Castlereagh					Castlereagh		Ian Holt Dr		Castlereagh					Castlereagh		Castlereagh		Ian Holt Dr		
Peak Per		T	L	R	L	R	T	TOT	Peak Per		T	L	R	L	R	T	TOT	Peak Per		T	L	R	L	R	T	TOT
1300 - 1400		102	2	2	0	1	93	200	1300 - 1400		15	0	0	0	0	14	29	1300 - 1400		117	2	2	0	1	107	229
1315 - 1415		91	7	3	0	0	99	200	1315 - 1415		17	0	0	0	0	12	29	1315 - 1415		108	7	3	0	0	111	229
1330 - 1430		103	6	4	0	0	107	220	1330 - 1430		19	1	0	0	0	9	29	1330 - 1430		122	7	4	0	0	116	249
1345 - 1445		113	6	4	1	0	114	238	1345 - 1445		15	1	0	0	0	7	23	1345 - 1445		128	7	4	1	0	121	261
1400 - 1500		93	7	6	2	1	120	229	1400 - 1500		11	1	0	0	0	8	20	1400 - 1500		104	8	6	2	1	128	249
1415 - 1515		119	4	6	4	1	121	255	1415 - 1515		11	1	0	0	0	10	22	1415 - 1515		130	5	6	4	1	131	277
1430 - 1530		153	9	7	4	1	113	287	1430 - 1530		15	0	1	0	0	11	27	1430 - 1530		168	9	8	4	1	124	314
1445 - 1545		174	11	9	3	1	115	313	1445 - 1545		15	0	1	0	0	9	25	1445 - 1545		189	11	10	3	1	124	338
1500 - 1600		208	12	7	3	0	117	347	1500 - 1600		17	0	1	1	0	11	30	1500 - 1600		225	12	8	4	0	128	377
1515 - 1615		195	11	6	1	2	109	324	1515 - 1615		13	0	2	1	0	8	24	1515 - 1615		208	11	8	2	2	117	348
1530 - 1630		157	7	5	2	2	112	285	1530 - 1630		6	0	1	1	0	6	14	1530 - 1630		163	7	6	3	2	118	299
1545 - 1645		156	8	2	2	2	105	275	1545 - 1645		7	0	1	1	0	5	14	1545 - 1645		163	8	3	3	2	110	289
1600 - 1700		141	7	3	1	5	95	252	1600 - 1700		6	0	1	0	0	3	10	1600 - 1700		147	7	4	1	5	98	262
PEAK HR		208	12	7	3	0	117	347	PEAK HR		17	0	1	1	0	11	30	PEAK HR		225	12	8	4	0	128	377



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

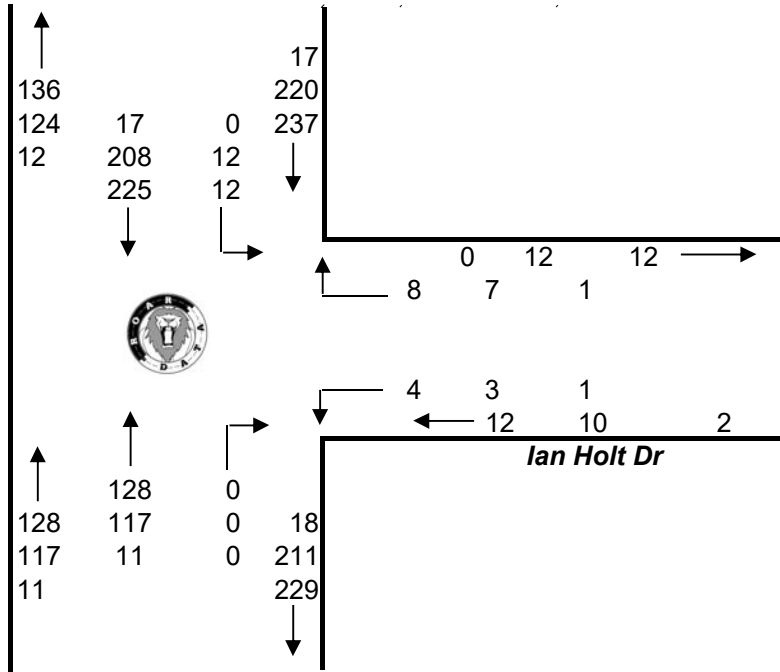
Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

PM PEAK HOUR
1500 - 1600

TOTAL VOLUMES
FOR COUNT
PERIOD

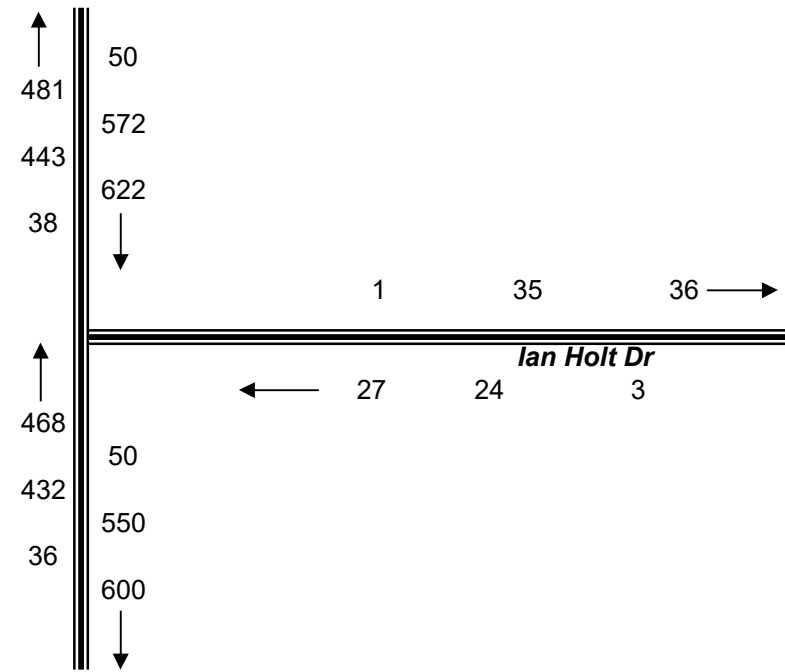


Castlereagh Hwy



Castlereagh Hwy

Castlereagh Hwy



Castlereagh Hwy



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

Intersection Details

Obtained via satellite

May be incorrect

AM PEAK HOUR

0600 - 0700



Wolgan Rd

Castlereagh Hwy

R	T	L	
5	11	24	AM
9	29	44	PM

AM	PM	
7	3	L
67	142	T
8	29	R

34	35	R
103	189	T
39	24	L
		PM
		AM

14	22	53	PM
65	25	15	AM
			L
			T
			R

Castlereagh Hwy

PM PEAK HOUR

1545 - 1645

Weather >>>



Main St



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

Lights

Lights	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0500 - 0515	0	0	0	0	3	0	0	2	3	1	7	0	16
0515 - 0530	2	2	0	0	7	0	1	0	4	0	7	2	25
0530 - 0545	1	1	0	0	4	1	7	2	11	0	10	1	38
0545 - 0600	4	1	0	0	11	2	9	3	7	2	16	4	59
0600 - 0615	1	2	0	0	6	4	8	7	2	3	26	3	62
0615 - 0630	7	4	2	1	14	2	18	6	4	4	48	12	122
0630 - 0645	3	1	1	5	21	1	14	6	4	11	45	10	122
0645 - 0700	10	4	2	1	22	1	25	4	5	6	60	9	149
0700 - 0715	4	2	0	0	14	1	2	0	4	1	23	4	55
0715 - 0730	12	5	2	0	23	3	2	3	5	3	24	6	88
0730 - 0745	2	6	1	0	17	2	7	7	5	4	25	5	81
0745 - 0800	10	8	2	1	18	3	14	11	14	5	21	4	111
0800 - 0815	2	1	1	2	11	4	5	1	1	6	18	7	59
0815 - 0830	7	4	2	2	39	3	5	4	9	15	21	6	117
0830 - 0845	11	7	0	3	28	3	2	3	6	3	23	9	98
0845 - 0900	4	7	2	2	15	9	0	5	2	5	16	4	71
Period End	80	55	15	17	253	39	119	64	86	69	390	86	1273

Heavies

Heavies	NORTH			WEST			SOUTH			EAST			TOT
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	
0500 - 0515	0	0	0	0	1	0	0	0	0	0	1	0	2
0515 - 0530	0	0	0	0	2	0	0	0	1	0	2	0	5
0530 - 0545	0	0	0	0	0	0	0	0	0	0	1	1	2
0545 - 0600	0	0	0	0	0	0	0	0	0	1	0	0	1
0600 - 0615	0	0	0	0	0	0	0	0	0	0	4	0	4
0615 - 0630	1	0	0	0	1	0	0	0	0	0	2	1	5
0630 - 0645	1	0	0	0	1	0	0	2	0	0	2	0	6
0645 - 0700	1	0	0	0	2	0	0	0	0	0	2	0	5
0700 - 0715	0	0	0	1	1	0	0	0	1	2	3	0	8
0715 - 0730	1	1	0	0	1	0	0	0	0	0	9	1	13
0730 - 0745	1	1	0	0	0	0	2	0	1	1	1	3	10
0745 - 0800	1	1	0	0	3	0	0	0	1	0	1	1	8
0800 - 0815	2	0	0	0	3	0	0	0	0	1	2	0	8
0815 - 0830	0	0	0	0	1	0	2	0	0	0	2	0	5
0830 - 0845	0	0	0	0	4	0	0	0	1	1	4	0	10
0845 - 0900	0	0	0	0	2	0	0	1	0	2	3	1	9
Period End	8	3	0	1	22	0	4	3	5	8	39	8	101

Lights

Lights	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
0500 - 0600	7	4	0	0	25	3	17	7	25	3	40	7	138
0515 - 0615	8	6	0	0	28	7	25	12	24	5	59	10	184
0530 - 0630	13	8	2	1	35	9	42	18	24	9	100	20	281
0545 - 0645	15	8	3	6	52	9	49	22	17	20	135	29	365
0600 - 0700	21	11	5	7	63	8	65	23	15	24	179	34	455
0615 - 0715	24	11	5	7	71	5	59	16	17	22	176	35	448
0630 - 0730	29	12	5	6	80	6	43	13	18	21	152	29	414
0645 - 0745	28	17	5	1	76	7	36	14	19	14	132	24	373
0700 - 0800	28	21	5	1	72	9	25	21	28	13	93	19	335
0715 - 0815	26	20	6	3	69	12	28	22	25	18	88	22	339
0730 - 0830	21	19	6	5	85	12	31	23	29	30	85	22	368
0745 - 0845	30	20	5	8	96	13	26	19	30	29	83	26	385
0800 - 0900	24	19	5	9	93	19	12	13	18	29	78	26	345

PEAK HOUR	21	11	5	7	63	8	65	23	15	24	179	34	455
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Heavies

Heavies	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Peak Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
0500 - 0600	0	0	0	0	3	0	0	0	1	1	4	1	10
0515 - 0615	0	0	0	0	2	0	0	0	1	1	7	1	12
0530 - 0630	1	0	0	0	1	0	0	0	0	1	7	2	12
0545 - 0645	2	0	0	0	2	0	0	2	0	1	8	1	16
0600 - 0700	3	0	0	0	4	0	0	2	0	0	10	1	20
0615 - 0715	3	0	0	1	5	0	0	2	1	2	9	1	24
0630 - 0730	3	1	0	1	5	0	0	2	1	2	16	1	32
0645 - 0745	3	2	0	1	4	0	2	0	2	3	15	4	36
0700 - 0800	3	3	0	1	5	0	2	0	3	3	14	5	39
0715 - 0815	5	3	0	0	7	0	2	0	2	2	13	5	39
0730 - 0830	4	2	0	0	7	0	4	0	2	2	6	4	31
0745 - 0845	3	1	0	0	11	0	2	0	2	2	9	1	31
0800 - 0900	2	0	0	0	10	0	2	1	1	4	11	1	32

PEAK HOUR	3	0	0	0	4	0	0	2	0	0	10	1	20
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R.O.A.R. DATA

Reliable, Original & Authentic Results

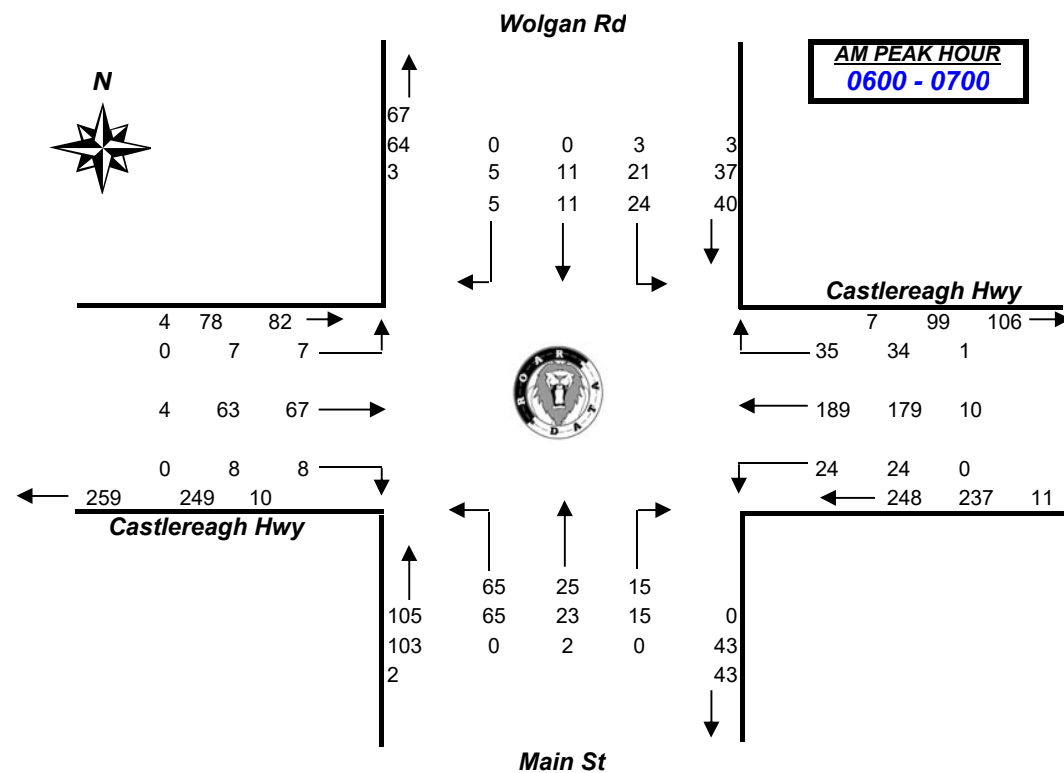
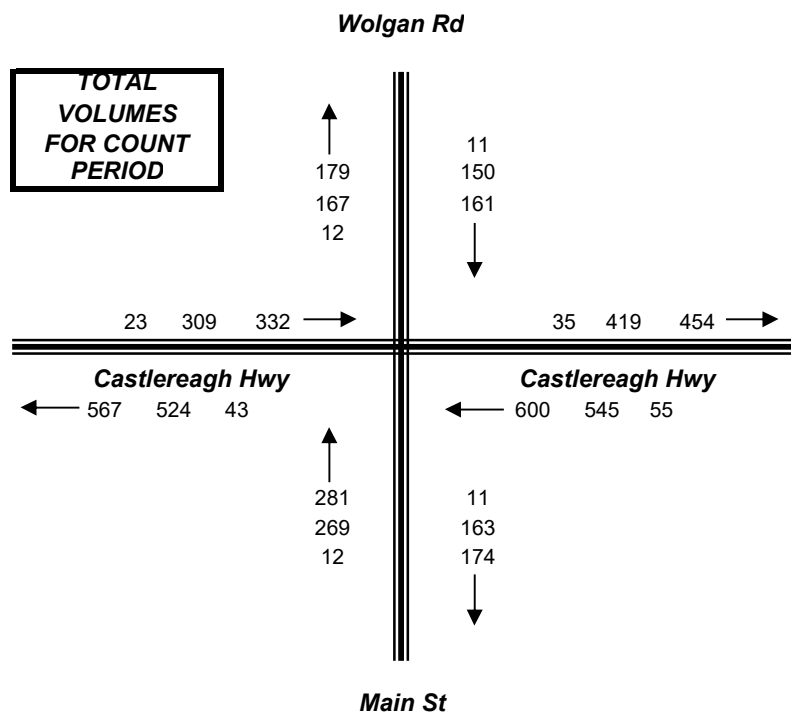
Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

COMBINED	NORTH			WEST			SOUTH			EAST			TOT
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	
0500 - 0515	0	0	0	0	4	0	0	2	3	1	8	0	18
0515 - 0530	2	2	0	0	9	0	1	0	5	0	9	2	30
0530 - 0545	1	1	0	0	4	1	7	2	11	0	11	2	40
0545 - 0600	4	1	0	0	11	2	9	3	7	3	16	4	60
0600 - 0615	1	2	0	0	6	4	8	7	2	3	30	3	66
0615 - 0630	8	4	2	1	15	2	18	6	4	4	50	13	127
0630 - 0645	4	1	1	5	22	1	14	8	4	11	47	10	128
0645 - 0700	11	4	2	1	24	1	25	4	5	6	62	9	154
0700 - 0715	4	2	0	1	15	1	2	0	5	3	26	4	63
0715 - 0730	13	6	2	0	24	3	2	3	5	3	33	7	101
0730 - 0745	3	7	1	0	17	2	9	7	6	5	26	8	91
0745 - 0800	11	9	2	1	21	3	14	11	15	5	22	5	119
0800 - 0815	4	1	1	2	14	4	5	1	1	7	20	7	67
0815 - 0830	7	4	2	2	40	3	7	4	9	15	23	6	122
0830 - 0845	11	7	0	3	32	3	2	3	7	4	27	9	108
0845 - 0900	4	7	2	2	17	9	0	6	2	7	19	5	80
Period End	88	58	15	18	275	39	123	67	91	77	429	94	1374

COMBINED	NORTH			WEST			SOUTH			EAST			TOT
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	
0500 - 0600	7	4	0	0	28	3	17	7	26	4	44	8	148
0515 - 0615	8	6	0	0	30	7	25	12	25	6	66	11	196
0530 - 0630	14	8	2	1	36	9	42	18	24	10	107	22	293
0545 - 0645	17	8	3	6	54	9	49	24	17	21	143	30	381
0600 - 0700	24	11	5	7	67	8	65	25	15	24	189	35	475
0615 - 0715	27	11	5	8	76	5	59	18	18	24	185	36	472
0630 - 0730	32	13	5	7	85	6	43	15	19	23	168	30	446
0645 - 0745	31	19	5	2	80	7	38	14	21	17	147	28	409
0700 - 0800	31	24	5	2	77	9	27	21	31	16	107	24	374
0715 - 0815	31	23	6	3	76	12	30	22	27	20	101	27	378
0730 - 0830	25	21	6	5	92	12	35	23	31	32	91	26	399
0745 - 0845	33	21	5	8	107	13	28	19	32	31	92	27	416
0800 - 0900	26	19	5	9	103	19	14	14	19	33	89	27	377

PEAK HOUR	24	11	5	7	67	8	65	25	15	24	189	35	475
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM

Job No/Name : LITGOW Angus Place Colliery

Day/Date : Tuesday / 13th August 2019

Lights

Lights	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1300 - 1315	2	1	3	1	25	5	2	3	7	6	29	5	89
1315 - 1330	6	4	1	2	24	4	6	3	5	12	18	5	90
1330 - 1345	6	2	0	3	17	3	6	2	8	9	20	12	88
1345 - 1400	6	7	1	0	32	3	4	3	15	8	23	6	108
1400 - 1415	4	5	5	3	28	6	7	4	6	15	27	11	121
1415 - 1430	6	4	2	2	14	1	3	4	7	6	21	9	79
1430 - 1445	9	9	2	2	31	4	4	7	8	13	28	8	125
1445 - 1500	5	3	2	1	12	4	3	5	11	10	16	9	81
1500 - 1515	8	10	1	2	35	11	4	6	12	15	38	8	150
1515 - 1530	8	8	0	1	50	7	2	6	4	14	17	2	119
1530 - 1545	6	8	0	2	39	5	2	4	3	9	24	8	110
1545 - 1600	3	3	2	0	35	4	2	2	6	7	29	10	103
1600 - 1615	13	6	3	0	40	6	3	5	12	10	23	7	128
1615 - 1630	17	9	4	2	24	7	8	11	24	15	21	8	150
1630 - 1645	11	11	0	1	37	11	1	4	9	6	26	8	125
1645 - 1700	6	1	1	5	25	5	1	7	5	16	15	5	92
Period End	116	91	27	27	468	86	58	76	142	171	375	121	1758

Heavies

Heavies	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Time Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
1300 - 1315	0	0	0	0	4	0	0	0	0	1	2	0	7
1315 - 1330	2	0	0	0	2	0	0	0	0	0	2	0	6
1330 - 1345	1	0	0	0	1	0	1	0	0	0	2	2	7
1345 - 1400	0	0	0	0	5	0	0	0	0	1	3	0	9
1400 - 1415	1	0	0	0	5	0	0	0	0	0	1	0	7
1415 - 1430	0	0	0	0	6	0	0	0	1	1	1	0	9
1430 - 1445	0	0	0	0	2	0	0	0	0	0	5	2	9
1445 - 1500	0	0	0	0	1	0	0	0	0	0	1	0	2
1500 - 1515	0	0	1	0	2	0	0	0	0	0	1	0	4
1515 - 1530	0	0	0	1	3	0	0	1	0	1	0	0	6
1530 - 1545	0	0	0	0	0	0	0	0	0	1	2	0	3
1545 - 1600	0	0	0	0	3	0	0	0	0	1	3	0	7
1600 - 1615	0	0	0	0	1	1	0	0	0	0	0	1	3
1615 - 1630	0	0	0	0	1	0	0	0	1	0	1	0	3
1630 - 1645	0	0	0	0	1	0	0	0	1	0	0	0	2
1645 - 1700	0	0	0	0	1	0	0	0	0	0	0	1	2
Period End	4	0	1	1	38	1	1	1	3	6	24	6	86

Lights

Lights	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Peak Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1300 - 1400	20	14	5	6	98	15	18	11	35	35	90	28	375
1315 - 1415	22	18	7	8	101	16	23	12	34	44	88	34	407
1330 - 1430	22	18	8	8	91	13	20	13	36	38	91	38	396
1345 - 1445	25	25	10	7	105	14	18	18	36	42	99	34	433
1400 - 1500	24	21	11	8	85	15	17	20	32	44	92	37	406
1415 - 1515	28	26	7	7	92	20	14	22	38	44	103	34	435
1430 - 1530	30	30	5	6	128	26	13	24	35	52	99	27	475
1445 - 1545	27	29	3	6	136	27	11	21	30	48	95	27	460
1500 - 1600	25	29	3	5	159	27	10	18	25	45	108	28	482
1515 - 1615	30	25	5	3	164	22	9	17	25	40	93	27	460
1530 - 1630	39	26	9	4	138	22	15	22	45	41	97	33	491
1545 - 1645	44	29	9	3	136	28	14	22	51	38	99	33	506
1600 - 1700	47	27	8	8	126	29	13	27	50	47	85	28	495

PEAK HOUR	44	29	9	3	136	28	14	22	51	38	99	33	506
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Heavies

Heavies	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Peak Per	L	I	R	L	I	R	L	I	R	L	I	R	TOT
1300 - 1400	3	0	0	0	12	0	1	0	0	2	9	2	29
1315 - 1415	4	0	0	0	13	0	1	0	0	1	8	2	29
1330 - 1430	2	0	0	0	17	0	1	0	1	2	7	2	32
1345 - 1445	1	0	0	0	18	0	0	0	1	2	10	2	34
1400 - 1500	1	0	0	0	14	0	0	0	1	1	8	2	27
1415 - 1515	0	0	1	0	11	0	0	0	1	1	8	2	24
1430 - 1530	0	0	1	1	8	0	0	1	0	1	7	2	21
1445 - 1545	0	0	1	1	6	0	0	1	0	2	4	0	15
1500 - 1600	0	0	1	1	8	0	0	1	0	3	6	0	20
1515 - 1615	0	0	0	1	7	1	0	1	0	3	5	1	19
1530 - 1630	0	0	0	0	5	1	0	0	1	2	6	1	16
1545 - 1645	0	0	0	0	6	1	0	0	2	1	4	1	15
1600 - 1700	0	0	0	0	4	1	0	0	2	0	1	2	10

PEAK HOUR	0	0	0	0	6	1	0	0	2	1	4	1	15
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R.O.A.R. DATA

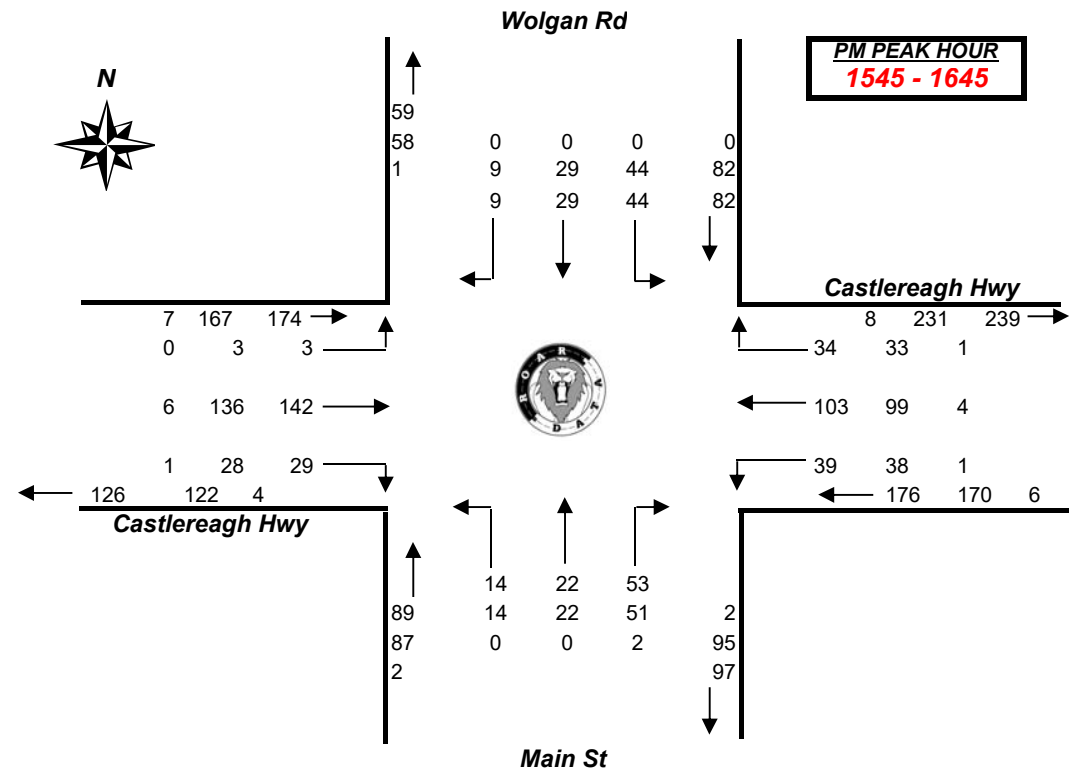
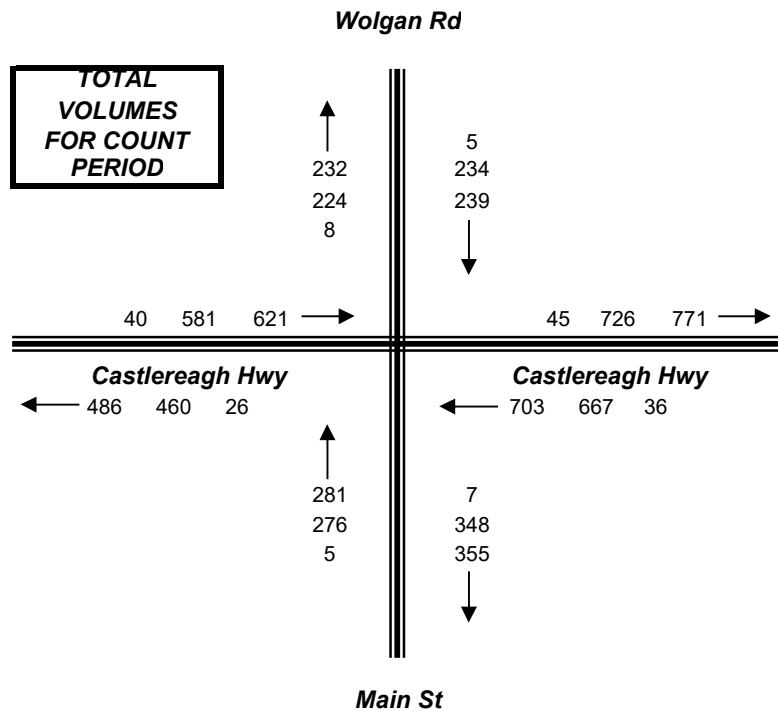
Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : LITGOW Angus Place Colliery
Day/Date : Tuesday / 13th August 2019

COMBINED	NORTH			WEST			SOUTH			EAST			
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Time Per	L	T	R	L	T	R	L	T	R	L	T	R	TOT
1300 - 1315	2	1	3	1	29	5	2	3	7	7	31	5	96
1315 - 1330	8	4	1	2	26	4	6	3	5	12	20	5	96
1330 - 1345	7	2	0	3	18	3	7	2	8	9	22	14	95
1345 - 1400	6	7	1	0	37	3	4	3	15	9	26	6	117
1400 - 1415	5	5	5	3	33	6	7	4	6	15	28	11	128
1415 - 1430	6	4	2	2	20	1	3	4	8	7	22	9	88
1430 - 1445	9	9	2	2	33	4	4	7	8	13	33	10	134
1445 - 1500	5	3	2	1	13	4	3	5	11	10	17	9	83
1500 - 1515	8	10	2	2	37	11	4	6	12	15	39	8	154
1515 - 1530	8	8	0	2	53	7	2	7	4	15	17	2	125
1530 - 1545	6	8	0	2	39	5	2	4	3	10	26	8	113
1545 - 1600	3	3	2	0	38	4	2	2	6	8	32	10	110
1600 - 1615	13	6	3	0	41	7	3	5	12	10	23	8	131
1615 - 1630	17	9	4	2	25	7	8	11	25	15	22	8	153
1630 - 1645	11	11	0	1	38	11	1	4	10	6	26	8	127
1645 - 1700	6	1	1	5	26	5	1	7	5	16	15	6	94
Period End	120	91	28	28	506	87	59	77	145	177	399	127	1844

COMBINED	NORTH			WEST			SOUTH			EAST			TOT
	Wolgan Rd			Castlereagh Hwy			Main St			Castlereagh Hwy			
Peak Per	<u>L</u>	<u>T</u>	<u>R</u>	<u>L</u>	<u>T</u>	<u>R</u>	<u>L</u>	<u>T</u>	<u>R</u>	<u>L</u>	<u>T</u>	<u>R</u>	
1300 - 1400	23	14	5	6	110	15	19	11	35	37	99	30	404
1315 - 1415	26	18	7	8	114	16	24	12	34	45	96	36	436
1330 - 1430	24	18	8	8	108	13	21	13	37	40	98	40	428
1345 - 1445	26	25	10	7	123	14	18	18	37	44	109	36	467
1400 - 1500	25	21	11	8	99	15	17	20	33	45	100	39	433
1415 - 1515	28	26	8	7	103	20	14	22	39	45	111	36	459
1430 - 1530	30	30	6	7	136	26	13	25	35	53	106	29	496
1445 - 1545	27	29	4	7	142	27	11	22	30	50	99	27	475
1500 - 1600	25	29	4	6	167	27	10	19	25	48	114	28	502
1515 - 1615	30	25	5	4	171	23	9	18	25	43	98	28	479
1530 - 1630	39	26	9	4	143	23	15	22	46	43	103	34	507
1545 - 1645	44	29	9	3	142	29	14	22	53	39	103	34	521
1600 - 1700	47	27	8	8	130	30	13	27	52	47	86	30	505
PEAK HOUR	44	29	9	3	142	29	14	22	53	39	103	34	521



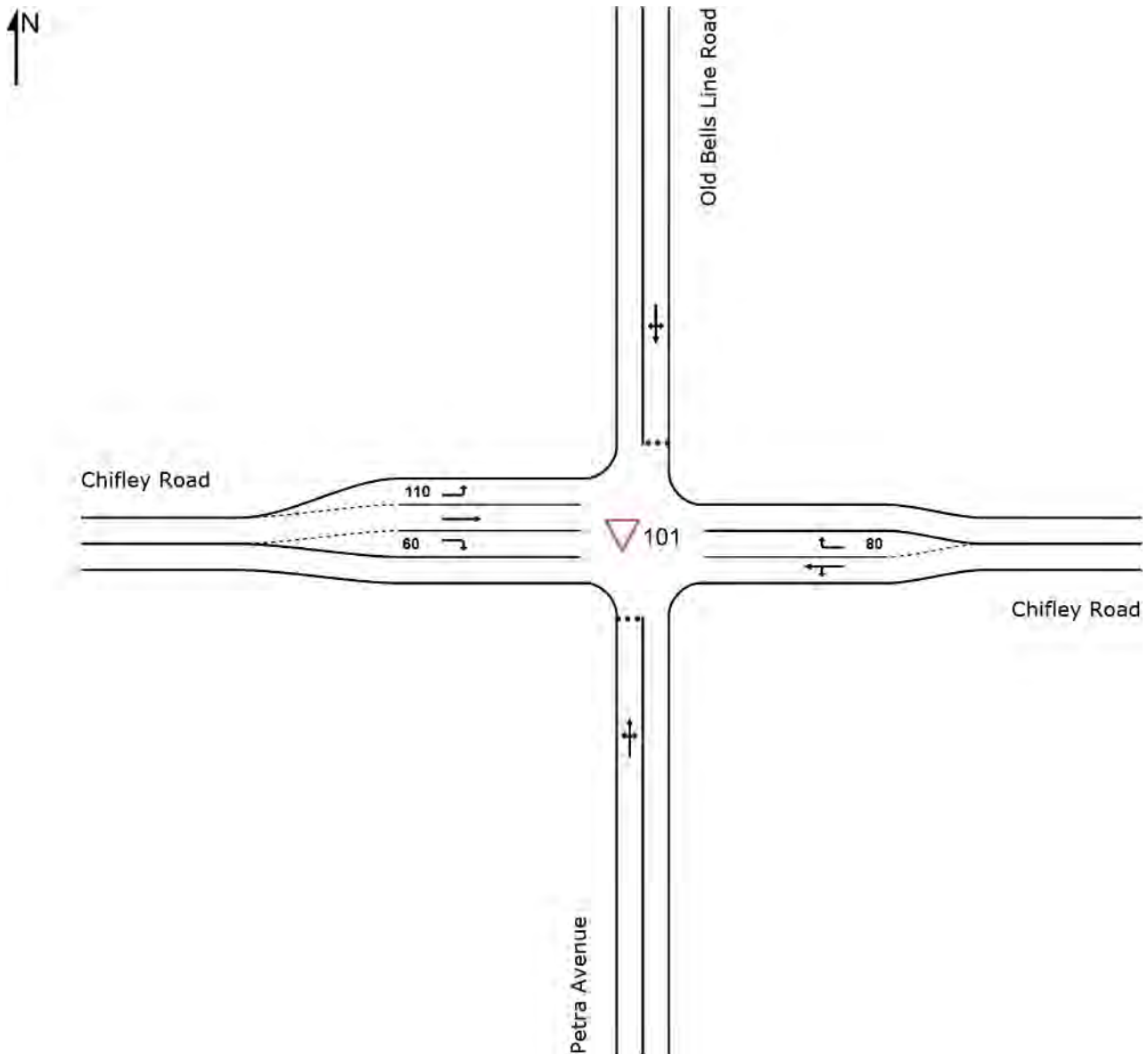
Appendix C

Baseline SIDRA results

SITE LAYOUT

▽ Site: 101 [Old Bells Line Road Intersection Early AM peak]

Project Traffic Assessment
Site Category: (None)
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 101 [Old Bells Line Road Intersection Early AM peak]

Future Baseline Assessment

Site Category: (None)

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Petra Avenue												
1	L2	12	0.0	0.023	5.7	LOS A	0.1	0.7	0.18	0.55	0.18	57.6
2	T1	2	0.0	0.023	6.3	LOS A	0.1	0.7	0.18	0.55	0.18	49.5
3	R2	4	100.0	0.023	10.8	LOS A	0.1	0.7	0.18	0.55	0.18	46.5
Approach		18	22.2	0.023	7.0	LOS A	0.1	0.7	0.18	0.55	0.18	53.7
East: Chifley Road												
4	L2	2	0.0	0.032	6.9	LOS A	0.0	0.0	0.00	0.02	0.00	74.2
5	T1	56	10.7	0.032	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.5
6	R2	2	0.0	0.002	7.1	LOS A	0.0	0.0	0.24	0.57	0.24	53.6
Approach		60	10.0	0.032	0.5	NA	0.0	0.0	0.01	0.04	0.01	78.1
North: Old Bells Line Road												
7	L2	2	0.0	0.008	5.0	LOS A	0.0	0.2	0.31	0.50	0.31	53.4
8	T1	2	0.0	0.008	5.2	LOS A	0.0	0.2	0.31	0.50	0.31	49.5
9	R2	2	0.0	0.008	6.5	LOS A	0.0	0.2	0.31	0.50	0.31	53.4
Approach		6	0.0	0.008	5.6	LOS A	0.0	0.2	0.31	0.50	0.31	52.0
West: Chifley Road												
10	L2	2	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	134	3.0	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	4	0.0	0.002	6.8	LOS A	0.0	0.1	0.15	0.59	0.15	58.2
Approach		140	2.9	0.070	0.3	NA	0.0	0.1	0.00	0.03	0.00	78.9
All Vehicles		224	6.3	0.070	1.0	NA	0.1	0.7	0.03	0.08	0.03	74.8

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Old Bells Line Road Intersection PM peak]

Future Baseline Assessment
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Petra Avenue												
1	L2	3	0.0	0.006	6.1	LOS A	0.0	0.2	0.31	0.54	0.31	57.7
2	T1	1	0.0	0.006	7.0	LOS A	0.0	0.2	0.31	0.54	0.31	49.5
3	R2	1	0.0	0.006	8.3	LOS A	0.0	0.2	0.31	0.54	0.31	57.5
Approach		5	0.0	0.006	6.7	LOS A	0.0	0.2	0.31	0.54	0.31	55.8
East: Chifley Road												
4	L2	5	20.0	0.085	7.3	LOS A	0.0	0.0	0.00	0.02	0.00	66.3
5	T1	152	8.3	0.085	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.6
6	R2	2	0.0	0.002	7.0	LOS A	0.0	0.0	0.21	0.58	0.21	53.7
Approach		159	8.6	0.085	0.3	NA	0.0	0.0	0.00	0.03	0.00	78.6
North: Old Bells Line Road												
7	L2	2	0.0	0.005	4.9	LOS A	0.0	0.1	0.27	0.50	0.27	53.2
8	T1	1	0.0	0.005	6.0	LOS A	0.0	0.1	0.27	0.50	0.27	49.4
9	R2	1	0.0	0.005	7.3	LOS A	0.0	0.1	0.27	0.50	0.27	53.3
Approach		4	0.0	0.005	5.8	LOS A	0.0	0.1	0.27	0.50	0.27	52.2
West: Chifley Road												
10	L2	2	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	108	4.9	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	7	0.0	0.005	7.1	LOS A	0.0	0.1	0.26	0.58	0.26	57.8
Approach		118	4.5	0.057	0.6	NA	0.0	0.1	0.02	0.05	0.02	77.8
All Vehicles		286	6.6	0.085	0.6	NA	0.0	0.2	0.02	0.05	0.02	77.1

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

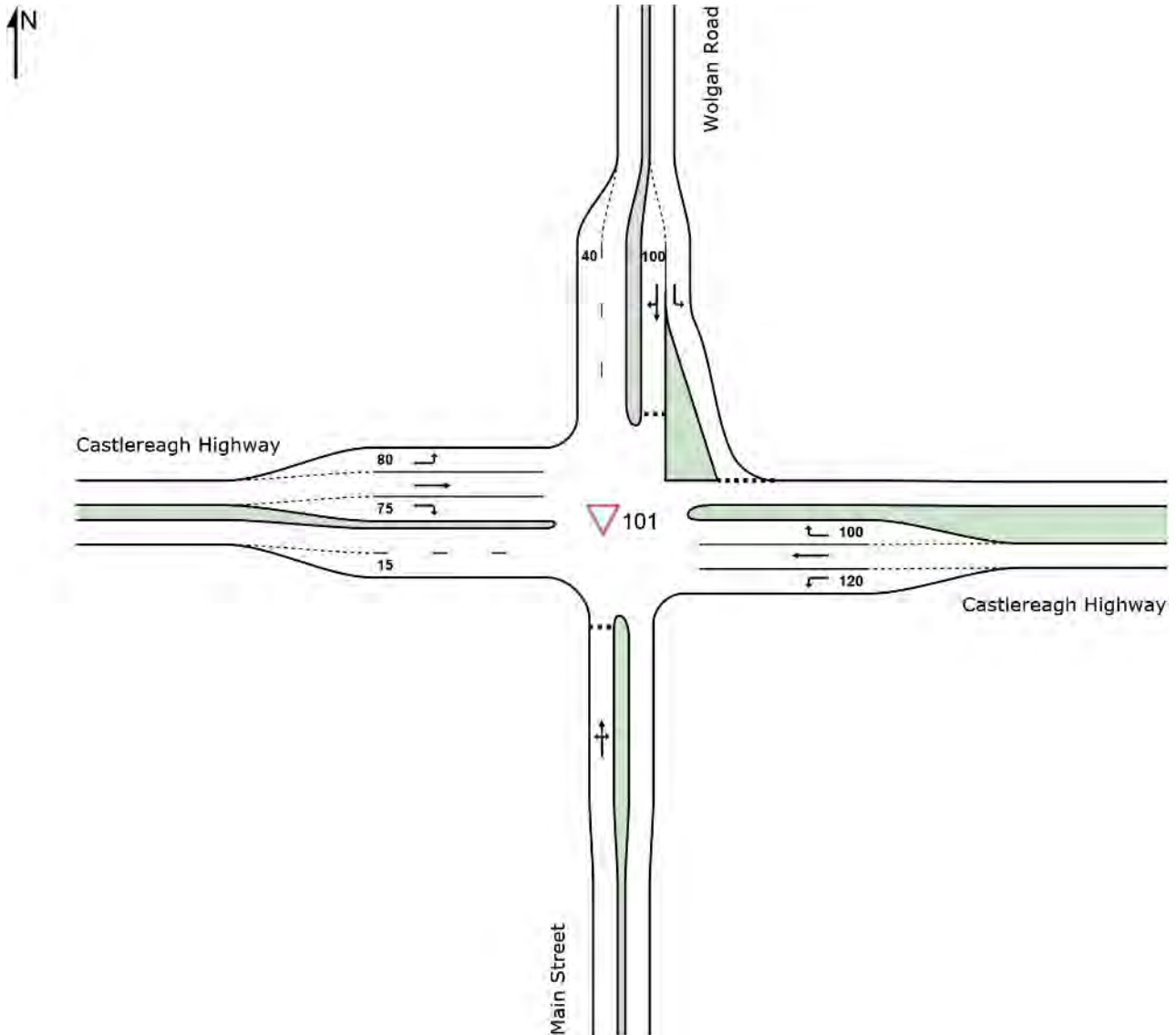
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SITE LAYOUT

▽ Site: 101 [Castlereagh Highway Wolgan Road Early AM Peak]

Four way offset intersection
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 101 [Castlereagh Highway Wolgan Road Early AM Peak]

Four way offset intersection
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	18	0.0	0.065	4.7	LOS A	0.2	1.6	0.18	0.50	0.18	53.7
2	T1	7	0.0	0.065	4.7	LOS A	0.2	1.6	0.18	0.50	0.18	46.7
3	R2	27	3.8	0.065	5.5	LOS A	0.2	1.6	0.18	0.50	0.18	52.8
Approach		53	2.0	0.065	5.1	LOS A	0.2	1.6	0.18	0.50	0.18	52.2
East: Castlereagh Highway												
4	L2	4	25.0	0.003	7.4	LOS A	0.0	0.0	0.00	0.63	0.00	57.8
5	T1	46	9.1	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	8	12.5	0.005	7.2	LOS A	0.0	0.2	0.15	0.58	0.15	53.8
Approach		59	10.7	0.025	1.6	NA	0.0	0.2	0.02	0.13	0.02	72.9
North: Wolgan Road												
7	L2	7	0.0	0.006	4.7	LOS A	0.0	0.1	0.13	0.47	0.13	54.2
8	T1	4	0.0	0.007	4.9	LOS A	0.0	0.2	0.26	0.46	0.26	46.7
9	R2	1	0.0	0.007	5.5	LOS A	0.0	0.2	0.26	0.46	0.26	53.8
Approach		13	0.0	0.007	4.8	LOS A	0.0	0.2	0.19	0.46	0.19	51.4
West: Castlereagh Highway												
10	L2	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	29	10.7	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	3	0.0	0.002	6.9	LOS A	0.0	0.1	0.13	0.58	0.13	54.1
Approach		34	9.4	0.016	0.9	NA	0.0	0.1	0.01	0.07	0.01	76.1
All Vehicles		158	6.7	0.065	2.9	NA	0.2	1.6	0.09	0.27	0.09	63.0

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Castlereagh Highway Wolgan Road AM Peak]

Four way offset intersection
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	15	14.3	0.080	5.1	LOS A	0.3	2.1	0.33	0.57	0.33	49.5
2	T1	15	7.1	0.080	7.0	LOS A	0.3	2.1	0.33	0.57	0.33	45.8
3	R2	20	5.3	0.080	7.9	LOS A	0.3	2.1	0.33	0.57	0.33	51.4
Approach		49	8.5	0.080	6.8	LOS A	0.3	2.1	0.33	0.57	0.33	49.0
East: Castlereagh Highway												
4	L2	35	12.1	0.020	7.2	LOS A	0.0	0.0	0.00	0.63	0.00	61.5
5	T1	94	12.4	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	28	3.7	0.018	7.3	LOS A	0.1	0.6	0.24	0.58	0.24	53.7
Approach		157	10.7	0.052	2.9	NA	0.1	0.6	0.04	0.24	0.04	69.2
North: Wolgan Road												
7	L2	27	7.7	0.024	5.1	LOS A	0.1	0.6	0.23	0.48	0.23	52.2
8	T1	20	0.0	0.047	7.1	LOS A	0.2	1.1	0.44	0.59	0.44	45.6
9	R2	5	0.0	0.047	7.6	LOS A	0.2	1.1	0.44	0.59	0.44	52.3
Approach		53	4.0	0.047	6.1	LOS A	0.2	1.1	0.33	0.54	0.33	49.5
West: Castlereagh Highway												
10	L2	9	0.0	0.005	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	108	9.7	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	20	0.0	0.012	7.1	LOS A	0.1	0.4	0.20	0.58	0.20	53.9
Approach		138	7.6	0.059	1.5	NA	0.1	0.4	0.03	0.13	0.03	73.7
All Vehicles		397	8.5	0.080	3.3	NA	0.3	2.1	0.11	0.28	0.11	63.9

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Castlereagh Highway Wolgan Road Early PM Peak]

Four way offset intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	20	5.3	0.111	5.1	LOS A	0.4	2.8	0.35	0.59	0.35	51.2
2	T1	12	0.0	0.111	7.0	LOS A	0.4	2.8	0.35	0.59	0.35	45.7
3	R2	37	0.0	0.111	8.0	LOS A	0.4	2.8	0.35	0.59	0.35	52.4
Approach		68	1.5	0.111	7.0	LOS A	0.4	2.8	0.35	0.59	0.35	50.8
East: Castlereagh Highway												
4	L2	39	5.4	0.022	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	63.6
5	T1	104	9.1	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	32	6.7	0.021	7.4	LOS A	0.1	0.7	0.27	0.58	0.27	53.5
Approach		175	7.8	0.057	2.9	NA	0.1	0.7	0.05	0.25	0.05	69.8
North: Wolgan Road												
7	L2	24	13.0	0.023	5.3	LOS A	0.1	0.6	0.26	0.49	0.26	51.0
8	T1	15	0.0	0.039	7.6	LOS A	0.1	1.0	0.46	0.61	0.46	45.3
9	R2	5	0.0	0.039	7.8	LOS A	0.1	1.0	0.46	0.61	0.46	52.0
Approach		44	7.1	0.039	6.3	LOS A	0.1	1.0	0.35	0.54	0.35	49.1
West: Castlereagh Highway												
10	L2	6	0.0	0.003	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	116	10.9	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	16	0.0	0.010	7.1	LOS A	0.0	0.3	0.21	0.57	0.21	53.8
Approach		138	9.2	0.064	1.1	NA	0.0	0.3	0.02	0.09	0.02	75.0
All Vehicles		425	7.2	0.111	3.3	NA	0.4	2.8	0.12	0.28	0.12	64.5

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Castlereagh Highway Wolgan Road PM Peak]

Four way offset intersection
 Site Category: (None)
 Giveway / Yield (Two-Way)

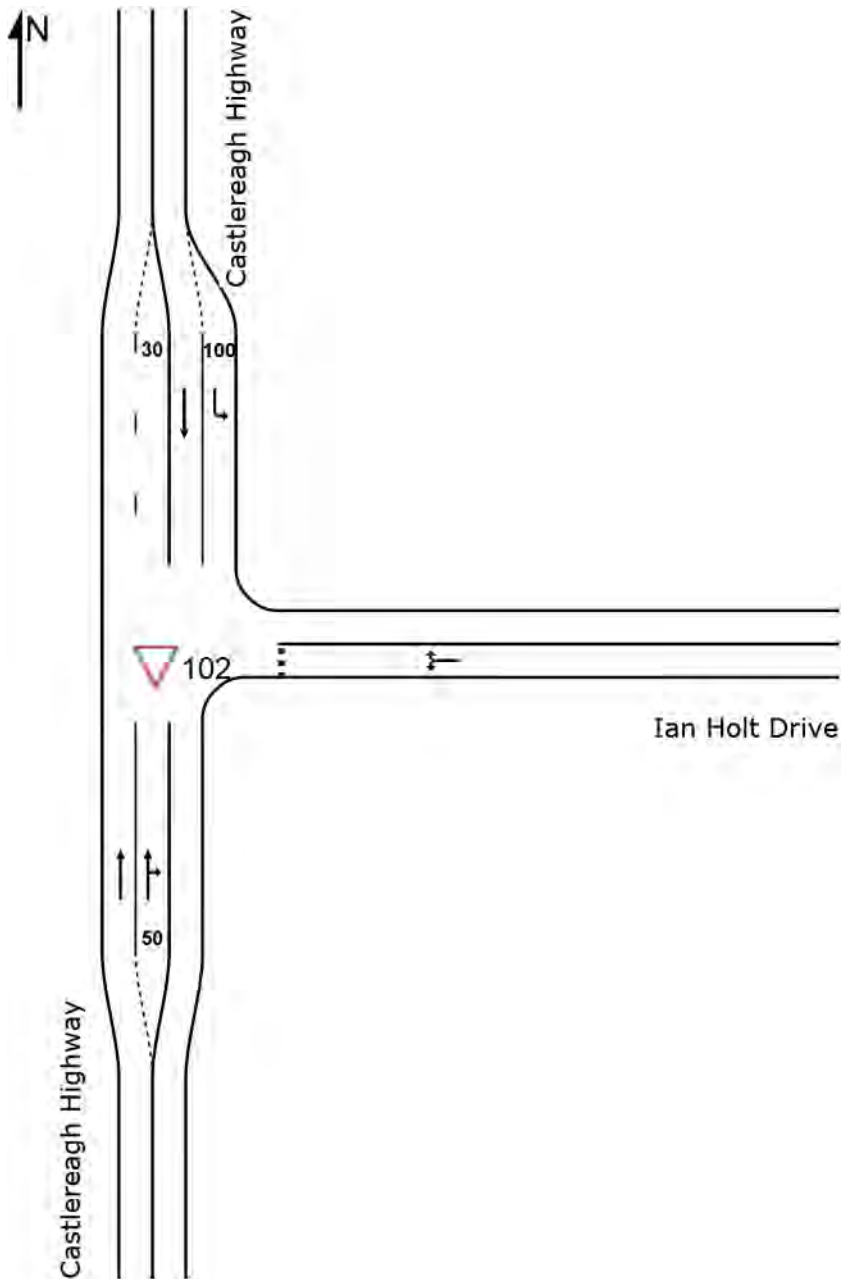
Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	16	13.3	0.175	5.1	LOS A	0.7	4.7	0.40	0.63	0.40	49.1
2	T1	28	0.0	0.175	7.5	LOS A	0.7	4.7	0.40	0.63	0.40	45.3
3	R2	53	0.0	0.175	8.7	LOS A	0.7	4.7	0.40	0.63	0.40	51.8
Approach		97	2.2	0.175	7.7	LOS A	0.7	4.7	0.40	0.63	0.40	49.3
East: Castlereagh Highway												
4	L2	49	0.0	0.027	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	91	1.2	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	32	6.7	0.022	7.5	LOS A	0.1	0.7	0.29	0.59	0.29	53.4
Approach		172	1.8	0.047	3.4	NA	0.1	0.7	0.05	0.29	0.05	69.2
North: Wolgan Road												
7	L2	49	0.0	0.044	5.2	LOS A	0.2	1.1	0.28	0.51	0.28	53.6
8	T1	28	0.0	0.075	8.1	LOS A	0.3	1.9	0.48	0.65	0.48	45.1
9	R2	8	0.0	0.075	8.2	LOS A	0.3	1.9	0.48	0.65	0.48	51.6
Approach		86	0.0	0.075	6.5	LOS A	0.3	1.9	0.37	0.57	0.37	50.3
West: Castlereagh Highway												
10	L2	8	0.0	0.005	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	137	3.1	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	32	3.3	0.019	7.1	LOS A	0.1	0.6	0.20	0.58	0.20	53.8
Approach		177	3.0	0.072	1.6	NA	0.1	0.6	0.04	0.13	0.04	72.9
All Vehicles		532	2.0	0.175	4.1	NA	0.7	4.7	0.16	0.35	0.16	61.9

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

SITE LAYOUT

▽ Site: 102 [Castlereagh Highway Ian Holt Dr Early AM Peak]

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



MOVEMENT SUMMARY

▽ Site: 102 [Castlereagh Highway Ian Holt Dr Early AM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	72	7.4	0.032	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.6
3	R2	1	0.0	0.007	7.5	LOS A	0.0	0.1	0.02	0.05	0.02	70.6
Approach		73	7.2	0.032	0.1	NA	0.0	0.1	0.00	0.01	0.00	99.1
East: Ian Holt Drive												
4	L2	1	0.0	0.002	5.7	LOS A	0.0	0.0	0.14	0.54	0.14	61.8
6	R2	1	0.0	0.002	6.1	LOS A	0.0	0.0	0.14	0.54	0.14	61.7
Approach		2	0.0	0.002	5.9	LOS A	0.0	0.0	0.14	0.54	0.14	61.7
North: Castlereagh Highway												
7	L2	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	38	8.3	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		39	8.1	0.020	0.2	NA	0.0	0.0	0.00	0.02	0.00	99.1
All Vehicles		114	7.4	0.032	0.3	NA	0.0	0.1	0.00	0.02	0.00	98.0

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 102 [Castlereagh Highway Ian Holt Dr AM Peak]

Three way intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	120	12.3	0.055	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.7
3	R2	1	0.0	0.012	7.9	LOS A	0.0	0.1	0.03	0.03	0.03	70.9
Approach		121	12.2	0.055	0.1	NA	0.0	0.1	0.01	0.01	0.01	99.4
East: Ian Holt Drive												
4	L2	3	0.0	0.011	6.0	LOS A	0.0	0.3	0.32	0.57	0.32	61.0
6	R2	6	0.0	0.011	7.2	LOS A	0.0	0.3	0.32	0.57	0.32	60.9
Approach		9	0.0	0.011	6.8	LOS A	0.0	0.3	0.32	0.57	0.32	60.9
North: Castlereagh Highway												
7	L2	5	20.0	0.003	8.4	LOS A	0.0	0.0	0.00	0.66	0.00	67.6
8	T1	133	9.5	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		138	9.9	0.072	0.3	NA	0.0	0.0	0.00	0.03	0.00	98.2
All Vehicles		268	10.6	0.072	0.4	NA	0.0	0.3	0.01	0.04	0.01	96.6

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

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 102 [Castlereagh Highway Ian Holt Dr Early PM Peak]

Three way intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	113	13.1	0.052	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.7
3	R2	1	0.0	0.012	7.9	LOS A	0.0	0.1	0.03	0.03	0.03	70.9
Approach		114	13.0	0.052	0.1	NA	0.0	0.1	0.01	0.01	0.01	99.3
East: Ian Holt Drive												
4	L2	1	0.0	0.004	6.0	LOS A	0.0	0.1	0.30	0.55	0.30	61.1
6	R2	2	0.0	0.004	7.1	LOS A	0.0	0.1	0.30	0.55	0.30	61.0
Approach		3	0.0	0.004	6.7	LOS A	0.0	0.1	0.30	0.55	0.30	61.0
North: Castlereagh Highway												
7	L2	2	0.0	0.001	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	123	12.8	0.068	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		125	12.6	0.068	0.1	NA	0.0	0.0	0.00	0.01	0.00	99.4
All Vehicles		242	12.6	0.068	0.2	NA	0.0	0.1	0.01	0.02	0.01	98.6

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: 102 [Castlereagh Highway Ian Holt Dr PM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	103	3.1	0.047	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	99.0
3	R2	5	0.0	0.011	8.0	LOS A	0.0	0.2	0.17	0.19	0.17	67.6
Approach		108	2.9	0.047	0.4	NA	0.0	0.2	0.03	0.03	0.03	96.8
East: Ian Holt Drive												
4	L2	1	0.0	0.007	6.1	LOS A	0.0	0.2	0.37	0.57	0.37	59.9
6	R2	4	25.0	0.007	8.0	LOS A	0.0	0.2	0.37	0.57	0.37	54.1
Approach		5	20.0	0.007	7.7	LOS A	0.0	0.2	0.37	0.57	0.37	55.2
North: Castlereagh Highway												
7	L2	7	0.0	0.004	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	155	4.1	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		162	3.9	0.081	0.4	NA	0.0	0.0	0.00	0.03	0.00	98.5
All Vehicles		276	3.8	0.081	0.5	NA	0.0	0.2	0.02	0.04	0.02	96.4

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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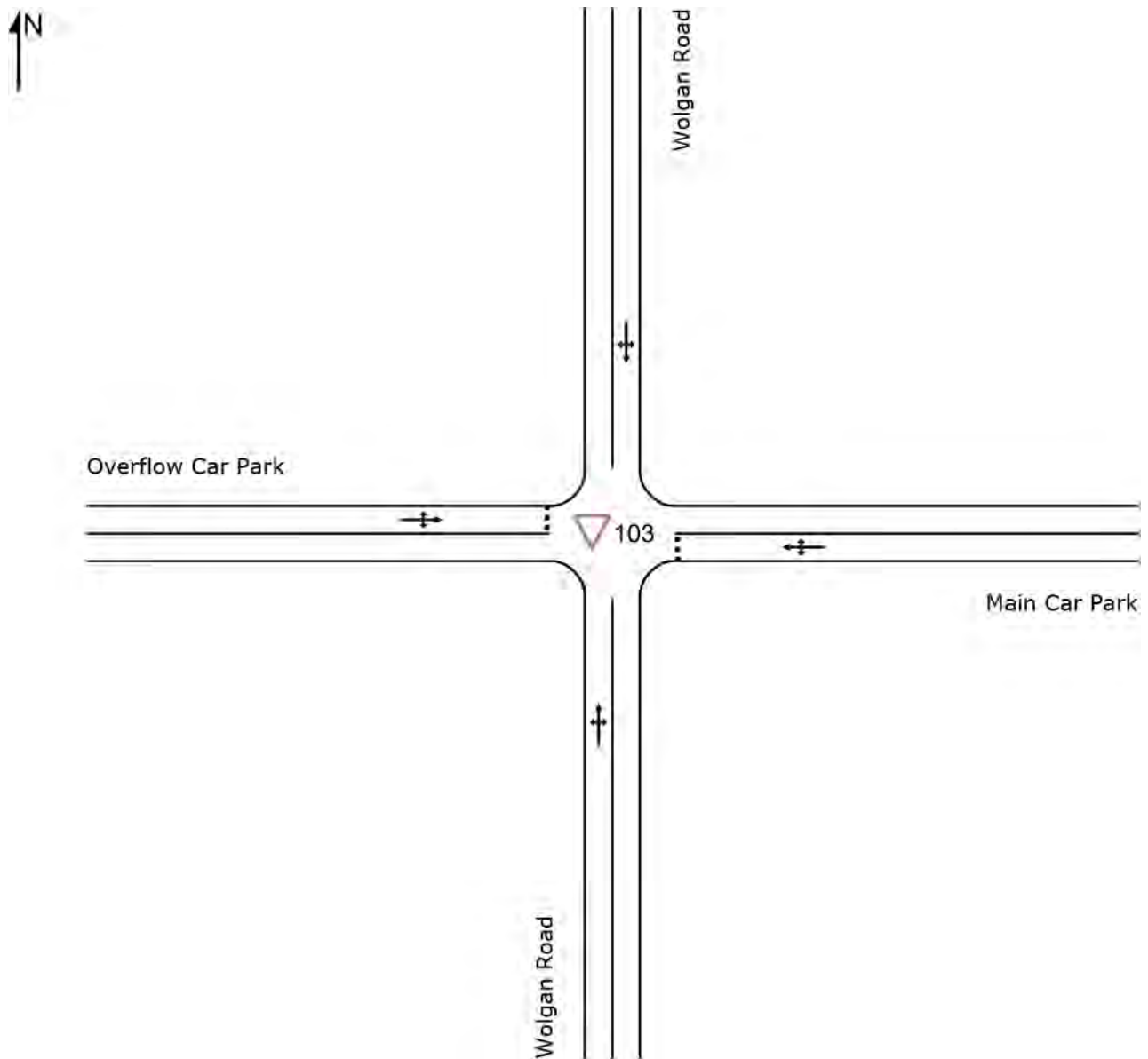
Organisation: EMM CONSULTING | Processed: Tuesday, 10 September 2019 4:26:13 PM

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SITE LAYOUT

▽ Site: 103 [Wolgan Road Site Access Early AM Peak]

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



MOVEMENT SUMMARY

▽ Site: 103 [Wolgan Road Site Access Early AM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	1	0.0	0.002	6.9	LOS A	0.0	0.1	0.02	0.48	0.02	50.0
2	T1	1	0.0	0.002	0.0	LOS A	0.0	0.1	0.02	0.48	0.02	71.9
3	R2	2	0.0	0.002	6.6	LOS A	0.0	0.1	0.02	0.48	0.02	49.5
Approach		4	0.0	0.002	5.0	NA	0.0	0.1	0.02	0.48	0.02	53.8
East: Main Car Park												
4	L2	2	0.0	0.003	3.4	LOS A	0.0	0.1	0.01	0.44	0.01	48.6
5	T1	1	0.0	0.003	2.1	LOS A	0.0	0.1	0.01	0.44	0.01	38.8
6	R2	1	0.0	0.003	3.6	LOS A	0.0	0.1	0.01	0.44	0.01	48.3
Approach		4	0.0	0.003	3.1	LOS A	0.0	0.1	0.01	0.44	0.01	45.6
North: Wolgan Road												
7	L2	1	0.0	0.002	6.9	LOS A	0.0	0.0	0.01	0.43	0.01	50.4
8	T1	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.01	0.43	0.01	72.7
9	R2	1	0.0	0.002	6.6	LOS A	0.0	0.0	0.01	0.43	0.01	49.9
Approach		3	0.0	0.002	4.5	NA	0.0	0.0	0.01	0.43	0.01	55.9
West: Overflow Car Park												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.01	0.43	0.01	48.6
11	T1	1	0.0	0.002	2.1	LOS A	0.0	0.1	0.01	0.43	0.01	38.8
12	R2	1	0.0	0.002	3.6	LOS A	0.0	0.1	0.01	0.43	0.01	48.4
Approach		3	0.0	0.002	3.0	LOS A	0.0	0.1	0.01	0.43	0.01	44.8
All Vehicles		15	0.0	0.003	3.9	NA	0.0	0.1	0.01	0.45	0.01	49.5

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 103 [Wolgan Road Site Access AM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	1	0.0	0.008	7.0	LOS A	0.0	0.1	0.01	0.13	0.01	52.7
2	T1	13	0.0	0.008	0.0	LOS A	0.0	0.1	0.01	0.13	0.01	77.6
3	R2	2	0.0	0.008	6.6	LOS A	0.0	0.1	0.01	0.13	0.01	52.1
Approach		16	0.0	0.008	1.4	NA	0.0	0.1	0.01	0.13	0.01	70.7
East: Main Car Park												
4	L2	2	0.0	0.003	3.4	LOS A	0.0	0.1	0.04	0.43	0.04	48.5
5	T1	1	0.0	0.003	2.1	LOS A	0.0	0.1	0.04	0.43	0.04	38.7
6	R2	1	0.0	0.003	3.6	LOS A	0.0	0.1	0.04	0.43	0.04	48.2
Approach		4	0.0	0.003	3.2	LOS A	0.0	0.1	0.04	0.43	0.04	45.6
North: Wolgan Road												
7	L2	1	0.0	0.004	7.0	LOS A	0.0	0.0	0.02	0.16	0.02	52.4
8	T1	6	0.0	0.004	0.0	LOS A	0.0	0.0	0.02	0.16	0.02	77.0
9	R2	1	0.0	0.004	6.6	LOS A	0.0	0.0	0.02	0.16	0.02	51.8
Approach		8	0.0	0.004	1.7	NA	0.0	0.0	0.02	0.16	0.02	68.8
West: Overflow Car Park												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.06	0.42	0.06	48.5
11	T1	1	0.0	0.002	2.1	LOS A	0.0	0.1	0.06	0.42	0.06	38.7
12	R2	1	0.0	0.002	3.6	LOS A	0.0	0.1	0.06	0.42	0.06	48.3
Approach		3	0.0	0.002	3.1	LOS A	0.0	0.1	0.06	0.42	0.06	44.7
All Vehicles		32	0.0	0.008	1.9	NA	0.0	0.1	0.02	0.21	0.02	62.1

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 103 [Wolgan Road Site Access Early PM Peak]

Four way intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	1	0.0	0.002	6.9	LOS A	0.0	0.1	0.02	0.48	0.02	50.0
2	T1	1	0.0	0.002	0.0	LOS A	0.0	0.1	0.02	0.48	0.02	71.9
3	R2	2	0.0	0.002	6.6	LOS A	0.0	0.1	0.02	0.48	0.02	49.5
Approach		4	0.0	0.002	5.0	NA	0.0	0.1	0.02	0.48	0.02	53.8
East: Main Car Park												
4	L2	2	0.0	0.003	3.4	LOS A	0.0	0.1	0.01	0.44	0.01	48.6
5	T1	1	0.0	0.003	2.1	LOS A	0.0	0.1	0.01	0.44	0.01	38.8
6	R2	1	0.0	0.003	3.6	LOS A	0.0	0.1	0.01	0.44	0.01	48.3
Approach		4	0.0	0.003	3.1	LOS A	0.0	0.1	0.01	0.44	0.01	45.6
North: Wolgan Road												
7	L2	1	0.0	0.002	6.9	LOS A	0.0	0.0	0.01	0.43	0.01	50.4
8	T1	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.01	0.43	0.01	72.7
9	R2	1	0.0	0.002	6.6	LOS A	0.0	0.0	0.01	0.43	0.01	49.9
Approach		3	0.0	0.002	4.5	NA	0.0	0.0	0.01	0.43	0.01	55.9
West: Overflow Car Park												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.01	0.43	0.01	48.6
11	T1	1	0.0	0.002	2.1	LOS A	0.0	0.1	0.01	0.43	0.01	38.8
12	R2	1	0.0	0.002	3.6	LOS A	0.0	0.1	0.01	0.43	0.01	48.4
Approach		3	0.0	0.002	3.0	LOS A	0.0	0.1	0.01	0.43	0.01	44.8
All Vehicles		15	0.0	0.003	3.9	NA	0.0	0.1	0.01	0.45	0.01	49.5

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 103 [Wolgan Road Site Access PM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	1	0.0	0.006	7.0	LOS A	0.0	0.1	0.03	0.18	0.03	52.3
2	T1	8	0.0	0.006	0.0	LOS A	0.0	0.1	0.03	0.18	0.03	76.7
3	R2	2	0.0	0.006	6.6	LOS A	0.0	0.1	0.03	0.18	0.03	51.7
Approach		12	0.0	0.006	1.9	NA	0.0	0.1	0.03	0.18	0.03	67.8
East: Main Car Park												
4	L2	2	0.0	0.003	3.4	LOS A	0.0	0.1	0.07	0.43	0.07	48.4
5	T1	1	0.0	0.003	2.2	LOS A	0.0	0.1	0.07	0.43	0.07	38.7
6	R2	1	0.0	0.003	3.6	LOS A	0.0	0.1	0.07	0.43	0.07	48.2
Approach		4	0.0	0.003	3.2	LOS A	0.0	0.1	0.07	0.43	0.07	45.5
North: Wolgan Road												
7	L2	1	0.0	0.009	7.0	LOS A	0.0	0.1	0.01	0.08	0.01	53.1
8	T1	15	0.0	0.009	0.0	LOS A	0.0	0.1	0.01	0.08	0.01	78.5
9	R2	1	0.0	0.009	6.6	LOS A	0.0	0.1	0.01	0.08	0.01	52.5
Approach		17	0.0	0.009	0.9	NA	0.0	0.1	0.01	0.08	0.01	74.0
West: Overflow Car Park												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.05	0.42	0.05	48.5
11	T1	1	0.0	0.002	2.2	LOS A	0.0	0.1	0.05	0.42	0.05	38.7
12	R2	1	0.0	0.002	3.7	LOS A	0.0	0.1	0.05	0.42	0.05	48.3
Approach		3	0.0	0.002	3.1	LOS A	0.0	0.1	0.05	0.42	0.05	44.7
All Vehicles		36	0.0	0.009	1.6	NA	0.0	0.1	0.03	0.18	0.03	63.7

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

Appendix D

Proposed SIDRA results

MOVEMENT SUMMARY

▽ Site: 101 [Old Bells Line Road Intersection Early AM peak with project]

Future Baseline Assessment

Site Category: (None)

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Petra Avenue												
1	L2	12	0.0	0.025	5.7	LOS A	0.1	0.7	0.19	0.55	0.19	57.2
2	T1	2	0.0	0.025	7.4	LOS A	0.1	0.7	0.19	0.55	0.19	49.2
3	R2	4	100.0	0.025	12.4	LOS A	0.1	0.7	0.19	0.55	0.19	46.2
Approach		18	22.2	0.025	7.5	LOS A	0.1	0.7	0.19	0.55	0.19	53.4
East: Chifley Road												
4	L2	2	0.0	0.032	6.9	LOS A	0.0	0.0	0.00	0.02	0.00	74.2
5	T1	56	10.7	0.032	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.5
6	R2	46	34.8	0.046	8.3	LOS A	0.2	1.7	0.32	0.63	0.32	52.6
Approach		104	21.2	0.046	3.8	NA	0.2	1.7	0.14	0.29	0.14	64.8
North: Old Bells Line Road												
7	L2	2	0.0	0.008	5.0	LOS A	0.0	0.2	0.34	0.52	0.34	53.0
8	T1	2	0.0	0.008	6.0	LOS A	0.0	0.2	0.34	0.52	0.34	49.2
9	R2	2	0.0	0.008	7.4	LOS A	0.0	0.2	0.34	0.52	0.34	53.0
Approach		6	0.0	0.008	6.1	LOS A	0.0	0.2	0.34	0.52	0.34	51.6
West: Chifley Road												
10	L2	46	34.8	0.031	7.6	LOS A	0.0	0.0	0.00	0.63	0.00	55.3
11	T1	134	3.0	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	4	0.0	0.002	6.8	LOS A	0.0	0.1	0.15	0.59	0.15	58.2
Approach		184	10.9	0.070	2.0	NA	0.0	0.1	0.00	0.17	0.00	71.4
All Vehicles		312	14.7	0.070	3.0	NA	0.2	1.7	0.07	0.24	0.07	67.3

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Old Bells Line Road Intersection PM peak with project]

Future Baseline Assessment
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Petra Avenue												
1	L2	3	0.0	0.006	6.1	LOS A	0.0	0.2	0.31	0.54	0.31	57.6
2	T1	1	0.0	0.006	7.0	LOS A	0.0	0.2	0.31	0.54	0.31	49.5
3	R2	1	0.0	0.006	8.6	LOS A	0.0	0.2	0.31	0.54	0.31	57.4
Approach		5	0.0	0.006	6.8	LOS A	0.0	0.2	0.31	0.54	0.31	55.7
East: Chifley Road												
4	L2	5	20.0	0.085	7.3	LOS A	0.0	0.0	0.00	0.02	0.00	66.3
5	T1	152	8.3	0.085	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	79.6
6	R2	2	0.0	0.002	7.0	LOS A	0.0	0.0	0.21	0.58	0.21	53.7
Approach		159	8.6	0.085	0.3	NA	0.0	0.0	0.00	0.03	0.00	78.6
North: Old Bells Line Road												
7	L2	25	33.3	0.081	5.4	LOS A	0.3	2.6	0.32	0.57	0.32	45.9
8	T1	1	0.0	0.081	6.3	LOS A	0.3	2.6	0.32	0.57	0.32	48.6
9	R2	24	34.8	0.081	9.3	LOS A	0.3	2.6	0.32	0.57	0.32	45.7
Approach		51	33.3	0.081	7.3	LOS A	0.3	2.6	0.32	0.57	0.32	45.8
West: Chifley Road												
10	L2	2	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	108	4.9	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	7	0.0	0.005	7.1	LOS A	0.0	0.1	0.26	0.58	0.26	57.8
Approach		118	4.5	0.057	0.6	NA	0.0	0.1	0.02	0.05	0.02	77.8
All Vehicles		333	10.8	0.085	1.6	NA	0.3	2.6	0.06	0.13	0.06	70.2

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Project Castlereagh Highway Wolgan Road Early AM Peak]

Four way offset intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	18	0.0	0.094	4.7	LOS A	0.3	2.5	0.20	0.49	0.20	53.7
2	T1	29	0.0	0.094	4.7	LOS A	0.3	2.5	0.20	0.49	0.20	46.8
3	R2	27	3.8	0.094	5.6	LOS A	0.3	2.5	0.20	0.49	0.20	52.9
Approach		75	1.4	0.094	5.0	LOS A	0.3	2.5	0.20	0.49	0.20	50.5
East: Castlereagh Highway												
4	L2	4	25.0	0.003	7.4	LOS A	0.0	0.0	0.00	0.63	0.00	57.8
5	T1	46	9.1	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	53	2.0	0.031	7.0	LOS A	0.1	1.0	0.15	0.59	0.15	54.0
Approach		103	6.1	0.031	3.9	NA	0.1	1.0	0.08	0.33	0.08	63.4
North: Wolgan Road												
7	L2	7	0.0	0.006	4.7	LOS A	0.0	0.1	0.13	0.47	0.13	54.2
8	T1	4	0.0	0.008	5.3	LOS A	0.0	0.2	0.31	0.48	0.31	46.6
9	R2	1	0.0	0.008	6.2	LOS A	0.0	0.2	0.31	0.48	0.31	53.6
Approach		13	0.0	0.008	5.0	LOS A	0.0	0.2	0.21	0.47	0.21	51.3
West: Castlereagh Highway												
10	L2	1	0.0	0.001	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	29	10.7	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	3	0.0	0.002	6.9	LOS A	0.0	0.1	0.13	0.58	0.13	54.1
Approach		34	9.4	0.016	0.9	NA	0.0	0.1	0.01	0.07	0.01	76.1
All Vehicles		224	4.7	0.094	3.9	NA	0.3	2.5	0.11	0.35	0.11	59.1

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Project Castlereagh Highway Wolgan Road AM Peak]

Four way offset intersection
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	15	14.3	0.080	5.1	LOS A	0.3	2.1	0.33	0.57	0.33	49.5
2	T1	15	7.1	0.080	7.0	LOS A	0.3	2.1	0.33	0.57	0.33	45.8
3	R2	20	5.3	0.080	7.9	LOS A	0.3	2.1	0.33	0.57	0.33	51.4
Approach		49	8.5	0.080	6.8	LOS A	0.3	2.1	0.33	0.57	0.33	49.0
East: Castlereagh Highway												
4	L2	35	12.1	0.020	7.2	LOS A	0.0	0.0	0.00	0.63	0.00	61.5
5	T1	94	12.4	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	28	3.7	0.018	7.3	LOS A	0.1	0.6	0.24	0.58	0.24	53.7
Approach		157	10.7	0.052	2.9	NA	0.1	0.6	0.04	0.24	0.04	69.2
North: Wolgan Road												
7	L2	57	3.7	0.049	5.1	LOS A	0.2	1.3	0.23	0.49	0.23	53.0
8	T1	35	0.0	0.074	7.2	LOS A	0.3	1.8	0.45	0.61	0.45	45.6
9	R2	5	0.0	0.074	7.7	LOS A	0.3	1.8	0.45	0.61	0.45	52.3
Approach		97	2.2	0.074	6.0	LOS A	0.3	1.8	0.32	0.54	0.32	50.0
West: Castlereagh Highway												
10	L2	9	0.0	0.005	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	108	9.7	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	20	0.0	0.012	7.1	LOS A	0.1	0.4	0.20	0.58	0.20	53.9
Approach		138	7.6	0.059	1.5	NA	0.1	0.4	0.03	0.13	0.03	73.7
All Vehicles		441	7.6	0.080	3.6	NA	0.3	2.1	0.13	0.31	0.13	62.3

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Project Castlereagh Highway Wolgan Road Early PM Peak]

Four way offset intersection
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	20	5.3	0.137	5.1	LOS A	0.5	3.6	0.37	0.60	0.37	51.2
2	T1	26	0.0	0.137	7.0	LOS A	0.5	3.6	0.37	0.60	0.37	45.7
3	R2	37	0.0	0.137	8.1	LOS A	0.5	3.6	0.37	0.60	0.37	52.3
Approach		83	1.3	0.137	7.1	LOS A	0.5	3.6	0.37	0.60	0.37	49.8
East: Castlereagh Highway												
4	L2	39	5.4	0.022	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	63.6
5	T1	104	9.1	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	61	3.4	0.040	7.3	LOS A	0.2	1.3	0.27	0.59	0.27	53.6
Approach		204	6.7	0.057	3.5	NA	0.2	1.3	0.08	0.30	0.08	66.9
North: Wolgan Road												
7	L2	24	13.0	0.023	5.3	LOS A	0.1	0.6	0.26	0.49	0.26	51.0
8	T1	15	0.0	0.041	8.0	LOS A	0.1	1.0	0.48	0.63	0.48	45.1
9	R2	5	0.0	0.041	8.5	LOS A	0.1	1.0	0.48	0.63	0.48	51.6
Approach		44	7.1	0.041	6.6	LOS A	0.1	1.0	0.36	0.55	0.36	48.9
West: Castlereagh Highway												
10	L2	6	0.0	0.003	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	116	10.9	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	16	0.0	0.010	7.1	LOS A	0.0	0.3	0.21	0.57	0.21	53.8
Approach		138	9.2	0.064	1.1	NA	0.0	0.3	0.02	0.09	0.02	75.0
All Vehicles		469	6.5	0.137	3.7	NA	0.5	3.6	0.14	0.31	0.14	62.9

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

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 101 [Project Castlereagh Highway Wolgan Road PM Peak]

Four way offset intersection
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Main Street												
1	L2	60	3.5	0.251	5.0	LOS A	1.0	7.1	0.34	0.59	0.34	51.4
2	T1	51	0.0	0.251	7.8	LOS A	1.0	7.1	0.34	0.59	0.34	45.6
3	R2	53	0.0	0.251	9.0	LOS A	1.0	7.1	0.34	0.59	0.34	52.2
Approach		163	1.3	0.251	7.2	LOS A	1.0	7.1	0.34	0.59	0.34	49.7
East: Castlereagh Highway												
4	L2	49	0.0	0.027	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
5	T1	91	1.2	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	32	6.7	0.022	7.5	LOS A	0.1	0.7	0.29	0.59	0.29	53.4
Approach		172	1.8	0.047	3.4	NA	0.1	0.7	0.05	0.29	0.05	69.2
North: Wolgan Road												
7	L2	49	0.0	0.044	5.2	LOS A	0.2	1.1	0.28	0.51	0.28	53.6
8	T1	28	0.0	0.076	8.1	LOS A	0.3	1.9	0.49	0.65	0.49	45.0
9	R2	8	0.0	0.076	8.6	LOS A	0.3	1.9	0.49	0.65	0.49	51.6
Approach		86	0.0	0.076	6.5	LOS A	0.3	1.9	0.37	0.57	0.37	50.3
West: Castlereagh Highway												
10	L2	8	0.0	0.005	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
11	T1	137	3.1	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
12	R2	32	3.3	0.019	7.1	LOS A	0.1	0.6	0.20	0.58	0.20	53.8
Approach		177	3.0	0.072	1.6	NA	0.1	0.6	0.04	0.13	0.04	72.9
All Vehicles		598	1.8	0.251	4.3	NA	1.0	7.1	0.17	0.37	0.17	60.4

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 102 [Project Castlereagh Highway Ian Holt Dr Early AM Peak]

Three way intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	72	7.4	0.032	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.6
3	R2	1	0.0	0.007	7.6	LOS A	0.0	0.1	0.03	0.05	0.03	70.6
Approach		73	7.2	0.032	0.1	NA	0.0	0.1	0.00	0.01	0.00	99.0
East: Ian Holt Drive												
4	L2	1	0.0	0.002	5.7	LOS A	0.0	0.0	0.14	0.54	0.14	61.8
6	R2	1	0.0	0.002	6.2	LOS A	0.0	0.0	0.14	0.54	0.14	61.7
Approach		2	0.0	0.002	5.9	LOS A	0.0	0.0	0.14	0.54	0.14	61.7
North: Castlereagh Highway												
7	L2	23	0.0	0.012	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	38	8.3	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		61	5.2	0.020	3.0	NA	0.0	0.0	0.00	0.25	0.00	88.9
All Vehicles		136	6.2	0.032	1.5	NA	0.0	0.1	0.00	0.13	0.00	93.4

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: 102 [Project Castlereagh Highway Ian Holt Dr AM Peak]

Three way intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	120	12.3	0.055	0.0	LOS A	0.0	0.1	0.00	0.01	0.00	99.7
3	R2	1	0.0	0.012	7.9	LOS A	0.0	0.1	0.03	0.03	0.03	70.9
Approach		121	12.2	0.055	0.1	NA	0.0	0.1	0.01	0.01	0.01	99.4
East: Ian Holt Drive												
4	L2	3	0.0	0.030	6.0	LOS A	0.1	0.8	0.36	0.60	0.36	60.7
6	R2	21	0.0	0.030	7.3	LOS A	0.1	0.8	0.36	0.60	0.36	60.6
Approach		24	0.0	0.030	7.1	LOS A	0.1	0.8	0.36	0.60	0.36	60.6
North: Castlereagh Highway												
7	L2	5	20.0	0.003	8.4	LOS A	0.0	0.0	0.00	0.66	0.00	67.6
8	T1	133	9.5	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		138	9.9	0.072	0.3	NA	0.0	0.0	0.00	0.03	0.00	98.2
All Vehicles		283	10.0	0.072	0.8	NA	0.1	0.8	0.03	0.07	0.03	93.7

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: 102 [Project Castlereagh Highway Ian Holt Dr Early PM Peak]

Three way intersection
Site Category: (None)
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	113	13.1	0.052	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	99.7
3	R2	1	0.0	0.012	7.9	LOS A	0.0	0.1	0.03	0.03	0.03	70.8
Approach		114	13.0	0.052	0.1	NA	0.0	0.1	0.01	0.01	0.01	99.3
East: Ian Holt Drive												
4	L2	1	0.0	0.004	6.0	LOS A	0.0	0.1	0.31	0.55	0.31	61.1
6	R2	2	0.0	0.004	7.1	LOS A	0.0	0.1	0.31	0.55	0.31	60.9
Approach		3	0.0	0.004	6.7	LOS A	0.0	0.1	0.31	0.55	0.31	61.0
North: Castlereagh Highway												
7	L2	17	0.0	0.009	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	123	12.8	0.068	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		140	11.3	0.068	0.9	NA	0.0	0.0	0.00	0.08	0.00	96.2
All Vehicles		257	11.9	0.068	0.6	NA	0.0	0.1	0.01	0.05	0.01	96.8

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: 102 [Project Castlereagh Highway Ian Holt Dr PM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Castlereagh Highway												
2	T1	103	3.1	0.047	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	99.0
3	R2	5	0.0	0.011	8.0	LOS A	0.0	0.2	0.17	0.19	0.17	67.6
Approach		108	2.9	0.047	0.4	NA	0.0	0.2	0.03	0.03	0.03	96.8
East: Ian Holt Drive												
4	L2	1	0.0	0.036	6.1	LOS A	0.1	1.0	0.39	0.61	0.39	60.0
6	R2	26	4.0	0.036	7.5	LOS A	0.1	1.0	0.39	0.61	0.39	58.9
Approach		27	3.8	0.036	7.4	LOS A	0.1	1.0	0.39	0.61	0.39	58.9
North: Castlereagh Highway												
7	L2	7	0.0	0.004	7.8	LOS A	0.0	0.0	0.00	0.66	0.00	75.3
8	T1	155	4.1	0.081	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	100.0
Approach		162	3.9	0.081	0.4	NA	0.0	0.0	0.00	0.03	0.00	98.5
All Vehicles		298	3.5	0.081	1.0	NA	0.1	1.0	0.05	0.08	0.05	92.2

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: 103 [Project Wolgan Road Site Access Early AM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	23	0.0	0.063	7.0	LOS A	0.3	2.1	0.02	0.63	0.02	49.0
2	T1	1	0.0	0.063	0.0	LOS A	0.3	2.1	0.02	0.63	0.02	69.7
3	R2	91	0.0	0.063	6.6	LOS A	0.3	2.1	0.02	0.63	0.02	48.4
Approach		115	0.0	0.063	6.6	NA	0.3	2.1	0.02	0.63	0.02	48.7
East: Main Car Park												
4	L2	2	0.0	0.003	3.4	LOS A	0.0	0.1	0.00	0.44	0.00	48.5
5	T1	1	0.0	0.003	2.5	LOS A	0.0	0.1	0.00	0.44	0.00	38.7
6	R2	1	0.0	0.003	3.9	LOS A	0.0	0.1	0.00	0.44	0.00	48.2
Approach		4	0.0	0.003	3.3	LOS A	0.0	0.1	0.00	0.44	0.00	45.5
North: Wolgan Road												
7	L2	1	0.0	0.002	7.0	LOS A	0.0	0.0	0.06	0.41	0.06	50.3
8	T1	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.06	0.41	0.06	72.4
9	R2	1	0.0	0.002	6.7	LOS A	0.0	0.0	0.06	0.41	0.06	49.7
Approach		3	0.0	0.002	4.6	NA	0.0	0.0	0.06	0.41	0.06	55.7
West: Overflow Car Park												
10	L2	1	0.0	0.003	3.4	LOS A	0.0	0.1	0.01	0.44	0.01	48.5
11	T1	1	0.0	0.003	2.4	LOS A	0.0	0.1	0.01	0.44	0.01	38.7
12	R2	1	0.0	0.003	4.0	LOS A	0.0	0.1	0.01	0.44	0.01	48.2
Approach		3	0.0	0.003	3.3	LOS A	0.0	0.1	0.01	0.44	0.01	44.7
All Vehicles		125	0.0	0.063	6.4	NA	0.3	2.1	0.02	0.61	0.02	48.6

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 103 [Project Wolgan Road Site Access AM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	1	0.0	0.008	7.0	LOS A	0.0	0.1	0.01	0.13	0.01	52.7
2	T1	13	0.0	0.008	0.0	LOS A	0.0	0.1	0.01	0.13	0.01	77.6
3	R2	2	0.0	0.008	6.6	LOS A	0.0	0.1	0.01	0.13	0.01	52.1
Approach		16	0.0	0.008	1.4	NA	0.0	0.1	0.01	0.13	0.01	70.7
East: Main Car Park												
4	L2	61	0.0	0.039	3.4	LOS A	0.2	1.1	0.04	0.44	0.04	48.3
5	T1	1	0.0	0.039	2.2	LOS A	0.2	1.1	0.04	0.44	0.04	38.6
6	R2	1	0.0	0.039	3.6	LOS A	0.2	1.1	0.04	0.44	0.04	48.0
Approach		63	0.0	0.039	3.4	LOS A	0.2	1.1	0.04	0.44	0.04	48.1
North: Wolgan Road												
7	L2	1	0.0	0.004	7.0	LOS A	0.0	0.0	0.02	0.16	0.02	52.4
8	T1	6	0.0	0.004	0.0	LOS A	0.0	0.0	0.02	0.16	0.02	77.0
9	R2	1	0.0	0.004	6.6	LOS A	0.0	0.0	0.02	0.16	0.02	51.8
Approach		8	0.0	0.004	1.7	NA	0.0	0.0	0.02	0.16	0.02	68.8
West: Overflow Car Park												
10	L2	1	0.0	0.017	3.4	LOS A	0.1	0.4	0.12	0.47	0.12	48.1
11	T1	1	0.0	0.017	2.1	LOS A	0.1	0.4	0.12	0.47	0.12	38.5
12	R2	16	0.0	0.017	3.9	LOS A	0.1	0.4	0.12	0.47	0.12	47.9
Approach		18	0.0	0.017	3.8	LOS A	0.1	0.4	0.12	0.47	0.12	47.2
All Vehicles		105	0.0	0.039	3.0	NA	0.2	1.1	0.05	0.38	0.05	51.6

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 103 [Project Wolgan Road Site Access Early PM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	16	0.0	0.043	7.0	LOS A	0.2	1.4	0.02	0.62	0.02	49.0
2	T1	1	0.0	0.043	0.0	LOS A	0.2	1.4	0.02	0.62	0.02	69.8
3	R2	61	0.0	0.043	6.6	LOS A	0.2	1.4	0.02	0.62	0.02	48.5
Approach		78	0.0	0.043	6.6	NA	0.2	1.4	0.02	0.62	0.02	48.8
East: Main Car Park												
4	L2	2	0.0	0.003	3.4	LOS A	0.0	0.1	0.01	0.44	0.01	48.5
5	T1	1	0.0	0.003	2.3	LOS A	0.0	0.1	0.01	0.44	0.01	38.7
6	R2	1	0.0	0.003	3.8	LOS A	0.0	0.1	0.01	0.44	0.01	48.2
Approach		4	0.0	0.003	3.2	LOS A	0.0	0.1	0.01	0.44	0.01	45.6
North: Wolgan Road												
7	L2	1	0.0	0.002	7.0	LOS A	0.0	0.0	0.05	0.41	0.05	50.3
8	T1	1	0.0	0.002	0.0	LOS A	0.0	0.0	0.05	0.41	0.05	72.5
9	R2	1	0.0	0.002	6.7	LOS A	0.0	0.0	0.05	0.41	0.05	49.8
Approach		3	0.0	0.002	4.5	NA	0.0	0.0	0.05	0.41	0.05	55.8
West: Overflow Car Park												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.01	0.44	0.01	48.6
11	T1	1	0.0	0.002	2.3	LOS A	0.0	0.1	0.01	0.44	0.01	38.8
12	R2	1	0.0	0.002	3.8	LOS A	0.0	0.1	0.01	0.44	0.01	48.3
Approach		3	0.0	0.002	3.2	LOS A	0.0	0.1	0.01	0.44	0.01	44.7
All Vehicles		88	0.0	0.043	6.2	NA	0.2	1.4	0.02	0.60	0.02	48.7

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

MOVEMENT SUMMARY

▽ Site: 103 [Project Wolgan Road Site Access PM Peak]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Wolgan Road												
1	L2	1	0.0	0.006	7.0	LOS A	0.0	0.1	0.03	0.18	0.03	52.3
2	T1	8	0.0	0.006	0.0	LOS A	0.0	0.1	0.03	0.18	0.03	76.7
3	R2	2	0.0	0.006	6.6	LOS A	0.0	0.1	0.03	0.18	0.03	51.7
Approach		12	0.0	0.006	1.9	NA	0.0	0.1	0.03	0.18	0.03	67.8
East: Main Car Park												
4	L2	91	0.0	0.058	3.4	LOS A	0.2	1.7	0.06	0.44	0.06	48.2
5	T1	1	0.0	0.058	2.2	LOS A	0.2	1.7	0.06	0.44	0.06	38.6
6	R2	1	0.0	0.058	3.7	LOS A	0.2	1.7	0.06	0.44	0.06	48.0
Approach		93	0.0	0.058	3.4	LOS A	0.2	1.7	0.06	0.44	0.06	48.1
North: Wolgan Road												
7	L2	1	0.0	0.009	7.0	LOS A	0.0	0.1	0.01	0.08	0.01	53.1
8	T1	15	0.0	0.009	0.0	LOS A	0.0	0.1	0.01	0.08	0.01	78.5
9	R2	1	0.0	0.009	6.6	LOS A	0.0	0.1	0.01	0.08	0.01	52.5
Approach		17	0.0	0.009	0.9	NA	0.0	0.1	0.01	0.08	0.01	74.0
West: Overflow Car Park												
10	L2	1	0.0	0.025	3.4	LOS A	0.1	0.6	0.13	0.48	0.13	48.1
11	T1	1	0.0	0.025	2.2	LOS A	0.1	0.6	0.13	0.48	0.13	38.4
12	R2	23	0.0	0.025	4.1	LOS A	0.1	0.6	0.13	0.48	0.13	47.8
Approach		25	0.0	0.025	3.9	LOS A	0.1	0.6	0.13	0.48	0.13	47.3
All Vehicles		146	0.0	0.058	3.1	NA	0.2	1.7	0.07	0.38	0.07	51.2

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

Vehicle movement LOS values are based on average delay per movement.

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

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

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

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

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

