Appendix K

Traffic impact assessment

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Dubbo Quarry Continuation Project

Traffic Impact Assessment

Prepared for Holcim (Australia) Pty Ltd
December 2020



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Dubbo Quarry Continuation Project

Traffic Impact Assessment

Report Number

J180313 RP14

Client

Holcim (Australia) Pty Ltd

Date

18 December 2020

Version

Final

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18 December 2020

Approved by

Tim Brooker
Associate Transport Planner
18 December 2020

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1 Introduction

1.1 Project overview

Holcim (Australia) Pty Limited (Holcim) are the owners and operators of Dubbo Quarry (the quarry) located on Sheraton Road, Dubbo (Figure 1.1). The quarry has been operating since 1980 under a development consent granted by the former Talbragar Shire Council, now Dubbo Regional Council. Accessible basalt resources within the existing quarry boundary (Figure 1.2) are close to exhaustion and planning approval is required to allow the quarry to continue operating. Holcim is therefore seeking approval for the Dubbo Quarry Continuation Project (henceforth referred to as 'the Project') which involves continued operation of the quarry through the development of two new resource areas to the south and west of the existing quarry boundary (Figure 1.2).

The project is classified as a State Significant Development (SSD) under Part 4, Division 4.1 of the NSW *Environmental Planning Assessment Act 1979* (EP&A Act). This Traffic Impact Assessment (TIA) has been prepared to support the Environmental Impact Statement (EIS) for submission to Department of Planning, Industry and Environment (DPIE).

1.2 Purpose of this report

This TIA documents the methods used to determine potential traffic and transport impacts of the project and relevant mitigation and management measures to address any residual impacts not able to be avoided.

The specific objectives of this assessment are to:

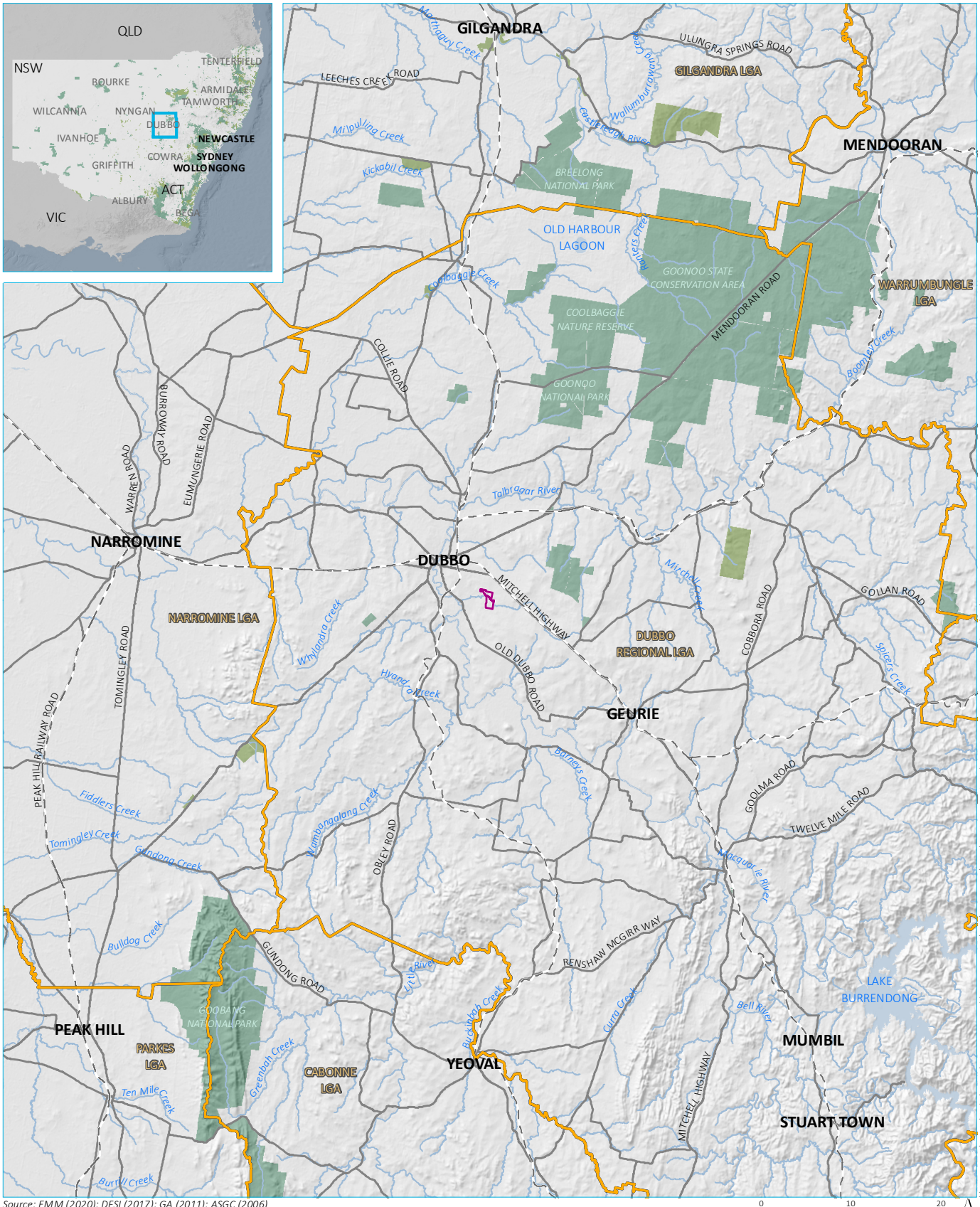
- describe the existing traffic and transport environment including baseline performance of the network;
- describe the approach undertaken for the traffic assessment;
- describe the initiatives built into the project design to avoid and minimise associated traffic and transport impacts;
- describe the proposed construction and operational activities and the forecast performance of the network as a result of the proposed construction and operational activities; and
- identify any mitigation and management measures proposed to address residual impacts not able to be avoided.

This TIA follows the requirements of the NSW Roads and Traffic Authority's (RTA) (now Transport for NSW (TfNSW)) *Guide to Traffic Generating Developments (2002)* and the following Austroads Guides:

- *Austroads Guide to Road Design Part 3: Geometric Design* (Austroads 2016a);
- *Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development* (Austroads 2016b); and
- *Austroads Guide to Road Design Part 4: Intersections and Crossings: General* (Austroads 2017).

1.3 Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements for the Project were issued by DPIE on 3 April 2020. The traffic related requirements and where they are addressed in this TIA are tabulated below (Table 1.1).



Source: EMM (2020); DFSI (2017); GA (2011); ASGC (2006)

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KEY

- Project area
- Rail line
- Major road
- Named watercourse
- Named waterbody
- Local government area
- NPWS reserve
- State forest

Regional setting

Dubbo Quarry Continuation Project
Traffic impact assessment
Figure 1.1

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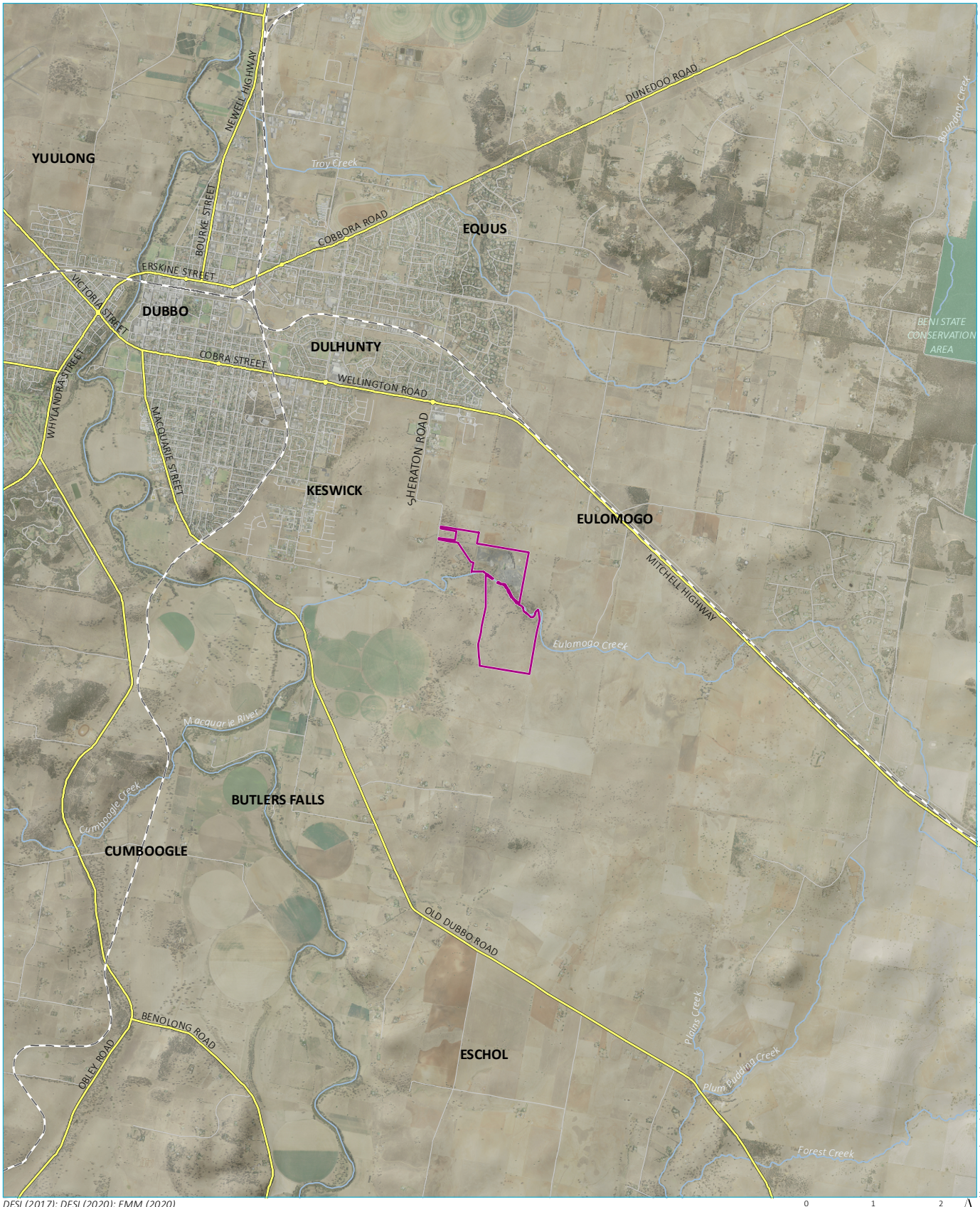

DFSI (2017); DFSI (2020); EMM (2020)

0 1 2 km

GDA 1994 MGA Zone 55

N

KEY

- Project area
- Rail line
- Major road
- Minor road
- Named watercourse
- NPWS reserve

Local setting

Dubbo Quarry Continuation Project
Traffic Impact Assessment
Figure 1.2

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Table 1.1 Traffic related SEARs and EMM responses

Item no.	Authority comments	Where addressed
1	Accurate predictions of the road traffic generated by the construction and operation of the development, and any proposed traffic generating developments in the area, including a description of the types of vehicles likely to be used for the transportation of quarry products;	Refer to sections 3.2 and 3.3.
2	A detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network (as identified above), including undertaking a road safety audit;	The baseline road network conditions are discussed in Chapter 2. Road network traffic impacts have been assessed in Section 4.1 and Section 4.2. A Road Safety Audit for Sheraton Road has been undertaken. It is attached as Appendix B to this TIA.
3	A detailed assessment of potential traffic impacts and interactions with nearby schools, and	Baseline school traffic conditions are identified in Chapter 2. Road safety issues, including those relating to traffic interactions with the nearby schools, are discussed in Section 4.4.
4	A description of the measures that would be implemented to mitigate any impacts.	Mitigation measures have been outlined in Section 4.6.

In addition to the above SEARs, TfNSW, Department of Primary Industries and Dubbo Regional Council in their letters dated 3 February 2020 and 6 February 2020 to DPIE have raised additional comments, as discussed in Table 1.2 below.

Table 1.2 Traffic related authority comments to DPIE regarding the SEARs

Item no.	Authority comments	EMM responses
TfNSW		
1	A traffic impact study is to be prepared by a suitably qualified and experienced person in accordance with the methodology set out in the RTA Guide to Traffic Generating Developments 2002 and Austroads Guide to Traffic Management Part 12, Traffic Impacts of Developments, and include the following items:	This report was prepared by Eric Lei and Dr Tim Brooker of EMM Consulting who have four and 30 years experience respectively in preparing TIAs and similar traffic engineering reports. This report was prepared in accordance with the relevant guidelines as listed in Section 1.2.
2	For both the proposed (incremental) increase in the extraction limit and the total (cumulative) quarry operation, provide details of road transport volumes and vehicle types broken down into: • Origin and destination • Haulage routes • Peak hourly movements in each direction • The vehicle size and types undertaking the haulage movements throughout operation • Total daily movements (eg based on the average load mass per truck) and • Temporary and permanent staff numbers (including employees and contractors) during both construction and operation of the quarry.	Details of the proposed additional site generated car and truck movements are described in Chapter 3. The future peak hourly distribution of the additional generated traffic is shown in Table 3.2. A road network traffic impact assessment has been undertaken in Section 4.1 and Section 4.2.

Table 1.2 Traffic related authority comments to DPIE regarding the SEARs

Item no.	Authority comments	EMM responses
3	The study is to provide details of projected transport operations including: • Traffic volumes, both proposed and cumulative, and, both input and output traffic. • Materials to be transported and vehicle types used for transport.	Details of projected transport operations are provided in Chapter 3.
4	Includes an assessment of the cumulative impacts of existing (maximum approved) quarry traffic associated with the subject site and the Dubbo Quarry operated by Holcim. Interactions of quarry traffic with schools located along Sheraton Road (Dubbo Christian School, St Johns Primary School and St Johns College) are to be considered.	Baseline traffic conditions were surveyed in June 2019 and included all the existing approved developments on Sheraton Road for which cumulative traffic impact assessment needs to be undertaken.
5	The TIA is to consider various traffic scenarios including (but not necessarily limited to): • After ramping up (Year 1) to the maximum output of 500,000 tpa, with development traffic using the Mitchell Highway / Sheraton Road roundabout. • The future traffic scenario (Year 10) at the maximum output of 500,000 tpa, with development traffic using the Mitchell Highway / Sheraton Road roundabout.	A future year 2045 traffic impacts scenario has been assessed as requested by Dubbo Regional Council.
6	Analysis of the likely forecast and quarry traffic impacts to network efficiency in both the above scenarios, at the Sheraton Road / Mitchell Highway roundabout	Refer to Section 4.1.
7	Recent traffic count data should be sourced for movements at the Sheraton Road/ Mitchell Highway roundabout. Dubbo Regional Council may be able to assist with traffic count data on the local road and via traffic volume data for State Classified Roads using the TfNSW daily traffic volume viewer website.	Baseline traffic conditions were surveyed in June 2019 which included all the existing traffic movements at the Mitchell Highway and Sheraton Road intersection. The TfNSW daily traffic volume viewer website data has been reviewed to determine future regional traffic growth.
8	Details of any oversize over mass vehicles and loads expected as a result of the increase during ramp up and over the operational life of the proposal.	No oversize or over mass vehicle movements are forecast for the future project traffic operations. If these types of vehicle movements are required at any stage during the project construction work, this will be identified and approval sought through construction traffic management plans.
9	Details of vehicular access locations and treatments need to be identified and in accordance with Austroads Guide to Road Design and relevant TfNSW supplements, including Safe Intersection Sight Distance (SISD).	The future site access intersection design was previously approved as part of a subdivision approval (D2017-640) for the land in August 2018. The design was to accommodate 19 m trucks (with 20 m trucks required for the project). The access will be redesigned to accommodate 20 m trucks and included in a modification application to this consent. The approved intersection design will comply with Austroads Safe Intersection Sight Distance standards and swept path design requirements.

Table 1.2 Traffic related authority comments to DPIE regarding the SEARs

Item no.	Authority comments	EMM responses
10	Consideration for the preparation of a Driver Code of Conduct for haulage of materials on public roads, which could include, but not be limited to: • A map of the primary haulage routes highlighting critical locations. • Safety initiatives, including scheduling of haulage through residential areas and/or outside of school zones hours, including local school bus pick up/drop off locations. • An induction process for vehicle operators and regular toolbox meetings. • A complaint resolution and disciplinary procedure. • Any community consultation measures for peak haulage periods. • Scheduling of heavy vehicle movements to minimise length of convoys / platoons. • Scheduling of transport and other mitigation measures for local climate conditions affecting safety or visibility (e.g. fog, wet weather).	A site Driver Code of Conduct and Traffic Management Plan are proposed to be prepared as a condition of development approval for the project (see Section 4.6.1).
Department of Primary Industries		
1	Consideration of the route for movements needs to be taken into account so that impacts on sensitive receptors are minimised (eg noise, dust, volume of traffic). This should include consideration of Travelling Stock Reserves1 (TSR) and the movement of livestock or farm vehicles along / across the affected roads	No active traveling stock route has been identified along the project traffic route.
Dubbo Regional Council		
1	It is noted vehicular access to the development site will be provided via Sheraton Road. Three (3) schools are located along this roadway. Therefore, any traffic analysis submitted shall demonstrate how impacts to these schools shall be minimised. Such measures may include limiting truck movements during peak school drop off and pick up times.	Baseline school traffic conditions are identified in Chapter 2. Road safety issues relating to the school traffic currently using Sheraton Road are discussed in Section 4.4.
2	Noting referral is required to be made to Roads and Maritime Services (RMS) pursuant to Section 16 (2) of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, Council suggests the preparation of any traffic analysis be undertaken in consultation with RMS.	The RMS (now TfNSW) traffic impact assessment requirements for the project have been provided and are addressed as summarised in the foregoing items TfNSW 1 to TfNSW 10 in this table
3	Following on from the above, any traffic analysis shall provide details as to traffic movements and impacts on the local road network. The traffic analysis shall provide details as to: • Vehicle type • Specific gross vehicle mass • Vehicle length • Expected daily volumes travelling to the site • Capacity of Sheraton Road and Wellington Road (Mitchell Highway) to demonstrate ability to accommodate such traffic movements in addition to existing traffic loads • Existing road conditions, and • Safety and efficiency of the existing road network	Refer to all sections of this report

Table 1.2 Traffic related authority comments to DPIE regarding the SEARs

Item no.	Authority comments	EMM responses
4	The analysis shall also consider whether any upgrades to Sheraton Road and access into the site are required to be undertaken. In this regard Council is open to entering into a Planning Agreement (PA) with the applicant for ongoing maintenance of Sheraton Road. This is an acknowledgement that the quarry will increase the amount of heavy traffic on Sheraton Road, which will in turn require an increased maintenance regime. An example of a PA may involve an ongoing monetary contribution to Council based on the tonnage of extraction by the development.	A new site access road and intersection will be constructed as part of the project. The project would not increase the amount of heavy vehicle traffic using Sheraton Road as it does not involve an increase in production above existing approved levels.
5	Reference shall be made to Dubbo City Planning and Transportation Strategy 2036 which identifies lands around the WEA as accommodating the future Southern Ring Road. It is recommended discussions be held with Dubbo Regional Council's Infrastructure Division as to the location and timing of such project to ensure any quarry access and operational requirements do not conflict with future transport links.	Discussions regarding the Southern Ring Road have been held with Dubbo Regional Council's Infrastructure Division as part of the TIA. The project is not considered to pose additional conflicts with the Southern Ring Road in comparison to the current quarry operations. Further, it is noted that the future Southern Ring Road route is conceptual only at this stage and can potentially be diverted around critical areas of the Dubbo Quarry site.

1.4 Methodology

1.4.1 Site visit

A site visit was conducted on 28 April 2020 by EMM Consulting to inspect the relevant road network, key intersections and site accesses connecting to a public road. Photographs were taken during the site visit which are included in Section 2.1.

1.4.2 Traffic counts

Traffic surveys were conducted for the Sheraton Road/Michell Highway intersection on 4 June 2019 from 6 am to 9 am and from 3 pm to 6pm. The traffic count data was used to undertake the SIDRA intersection modelling for this TIA. The full traffic count data results are included as Appendix A. Summary details including the actual peak hourly traffic volumes are included in Section 2.3.

1.4.3 Road safety audit

A Road Safety Audit (RSA) has been conducted by Bitzios Consulting for the existing Sheraton Road and Mitchell Highway locality road conditions with the view of forecasting additional risks associated with the continuation of the Holcim quarry use, which will potentially generate more daily and peak hourly heavy vehicle traffic movements along both Sheraton Road and Mitchell Highway. The RSA has been attached as Appendix B.

1.4.4 Desktop research and analysis

Traffic related information eg Transport for NSW (TfNSW) traffic volume viewer, TfNSW crash and casualty statistics, Google Streetview, and SIX Maps has been reviewed in preparation of this TIA.

1.4.5 Impacts on the road network

A quantitative assessment of the project generated traffic impacts due to the proposed future quarry operational activities has been undertaken. The potential locality road network and intersection capacity impacts have been assessed.

Where potential locality traffic impacts have been identified, which is primarily in relation to the RSA identified road deficiencies, a range of future local agency and stakeholder consultation measures and a future quarry Traffic Management Plan (including a Truck Driver's Code of Conduct) are proposed to address these impacts.

2 Existing traffic conditions

2.1 Road network

Sheraton Road and the Mitchell Highway are the main transport routes that have been assessed for use by the project generated traffic during future quarry operations. These roads and their main connecting intersection, which is a large capacity roundabout, have been assessed to determine the capacity of each road to accommodate both the current baseline traffic and the future project generated traffic. The road network relevant to the project is shown in Figure 1.2 and described in the following sections.

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

- state roads - freeways and primary arterials (TfNSW managed);
- regional roads - secondary or sub arterials (Council managed and part funded by the State); and
- local roads - collector and local access roads (Council managed).

2.1.1 Mitchell Highway

The Mitchell Highway is a state highway connecting the central/south western regions of Queensland and the northern/central western regions of New South Wales. The southern part of the Mitchell Highway forms part of the National Highway A32 corridor, which stretches from Sydney to Adelaide via Dubbo and Broken Hill.

Mitchell Highway in the vicinity of Sheraton Road is a two-way two-lane undivided road with lane widths of 3.5 m and posted speed limit of 70 km/hr. The speed limit on Mitchell Highway changes to 100 km/hr further to the east and to 60 km/hr to the west.

Mitchell Highway east of the intersection with Sheraton Road is also referred to as Wellington Road.

2.1.2 Sheraton Road

The southern section of Sheraton Road is a narrow no-through road running from the Mitchell Highway towards the quarry. The central and northern sections of Sheraton Road are wider and provide access to several schools, including St. Johns Primary School, St. Johns College and the Dubbo Christian School. There are also several business accesses near the schools, including Bunnings, and rural residences. Sheraton Road continues, north of the intersection with the Mitchell Highway, to Myall Street.

Photograph 2.1 and Photograph 2.2 present the general arrangement of Sheraton Road near and south of the schools, respectively. Just south of the Mitchell Highway roundabout, Sheraton Road is a dual carriageway with a posted speed limit of 60 km/hr, traffic lane widths of 3.2 m and parking lanes of 3.0 m wide on either side. It operates as a school zone for approximately 800 m with a reduced speed of 40 km/hr during 8.00 am – 9.30 am and 2.30 pm – 4.00 pm on school days. This section of the road has two level pedestrian crossings which are generally operated by school crossing officials, during the school zone periods.

Further south of the schools, the road is an undivided two-way sealed road with a width of 7.2 m and unsealed shoulders ranging from 0.5 m to 1.5 m wide. The road has a general speed limit of 100 km/hr, with advisory curve warning speed limit signs of 35 km/hr at bends in the road. This section of the road provides access to Holcim's Dubbo Quarry, a small number of rural properties, South Keswick Solar Farm and the South Keswick Quarry.

Photograph 2.1 Sheraton Road near the schools (southbound carriageway)

Photograph 2.2 Sheraton Road south of the schools (northbound)

2.1.3 Boundary Road

Boundary Road is a neighbourhood connector road that runs from Macquarie Street south of and parallel to the Mitchell Highway. The road currently terminates after its connection with Wheelers Lane. Dubbo Regional Council proposes to extend Boundary Road and provide a connection between Sheraton Road and Wheelers Lane and subsequently connecting to Mitchell Highway. The construction of the road extension is expected to be completed this year. The road extension shall include:

- 1.2 km two-lane sealed and fully kerbed extension connecting Boundary Road from Alexandrina Avenue through to Sheraton Road;
- integrated bike lanes;
- installation of street lighting;
- underground electricity, telecommunications, sewer and stormwater infrastructure; and

- footpath on the southern side.

Consultation with Dubbo Regional Council indicates that the Boundary Road extension is not proposed to be used for heavy vehicle access due to the residential nature of Wheelers Lane and is expected to remain as a neighbourhood connector road. The Boundary Road extension will also provide an alternative route for the schools access traffic potentially reducing the current traffic usage on Sheraton Road south of the Mitchell Highway.

2.2 Key intersection

The Mitchell Highway/Sheraton Road roundabout, which has two-lanes circulating, has been assessed for the future traffic capacity and project related traffic impacts (as shown in Figure 2.1). The roundabout has an island diameter of approximately 32 m and a circulating width of 10 m.

Source: Nearmap (July 2020)

Figure 2.1 Aerial view of the Mitchell Highway/Sheraton Road intersection

2.3 Existing traffic volumes

The following peak hours were identified for the Sheraton Road/Mitchell Highway intersection from the traffic survey conducted on 4 June 2019:

- 8.00 am to 9.00 am, general and school traffic AM peak hour;
- 3.00 to 4.00 pm, school traffic PM peak hour; and
- 4.30 pm to 5.30 pm, general traffic PM peak hour.

The peak hour traffic volumes are presented in Figure 2.2.

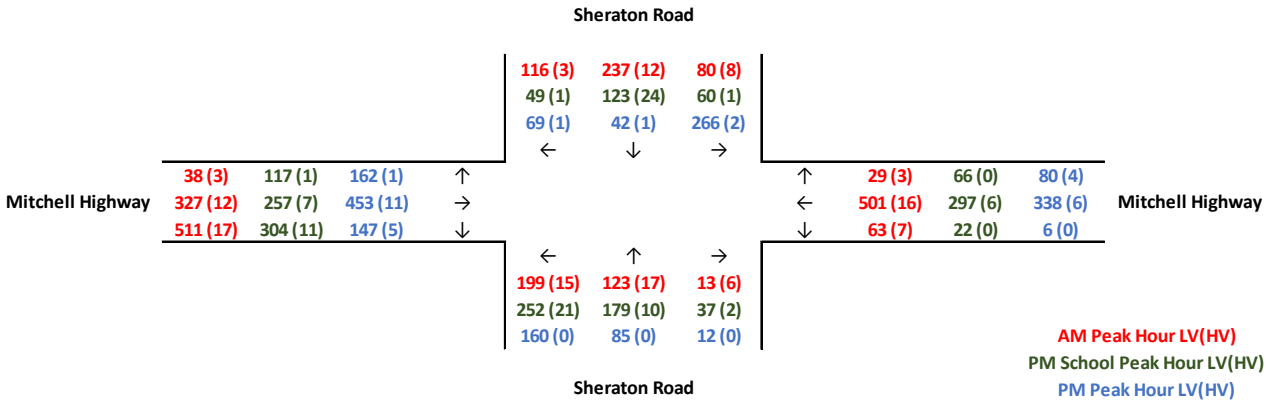


Figure 2.2 Existing traffic volumes

On the day of the intersection traffic survey in June 2019, the quarry was operating with lower than average daily and peak hourly traffic volumes, corresponding to 21 truck loads over the day with 2, 3 and 2 truck loads respectively travelling in and out of the quarry, within the above nominated peak hours.

Existing daily traffic volumes for the major local roads and state roads on the locality road network have been estimated from the peak hourly traffic surveys for the three respective peak hours of the day, as summarised in Figure 2.2. The estimated daily traffic volumes are summarised in Table 2.1.

These existing daily traffic volumes are well within the normal daily traffic capacity limit for these roads which is at least 30,000 daily vehicle movements for urban roads which have a four lane divided carriageway, which is the case for both the Mitchell Highway and Sheraton Road at these locations. The daily traffic capacity of 30,000 vehicle movements is based on the urban road directional capacity per lane, which is 900 vehicles per hour, a 60/40 traffic directional split during the peak hours and approximately 10% of all daily vehicle movements occurring during the peak hours.

Table 2.1 Existing state and local road peak hour and daily traffic volumes

Road and location	AM peak hourly volume	School PM peak hourly volume	PM peak hourly volume	Approximate daily traffic volume*
Mitchell Highway west of Sheraton Road	1,759	1,323	1,353	15,000
Mitchell Highway east of Sheraton Road	1,062	755	1,178	10,000
Sheraton Road north of Mitchell Highway	670	631	713	7,000
Sheraton Road south of Mitchell Highway	1,217	985	458	9,000

Note: *The approximate daily traffic volume is estimated based on ten times the average of the surveyed peak hourly volumes

2.4 Crash analysis

TfNSW Centre for Road Safety currently publishes crash history data for the five-year period from 2014 to 2018. Figure 2.3 presents the location of all recorded crashes in relation to Sheraton Road and the Dubbo Quarry site.

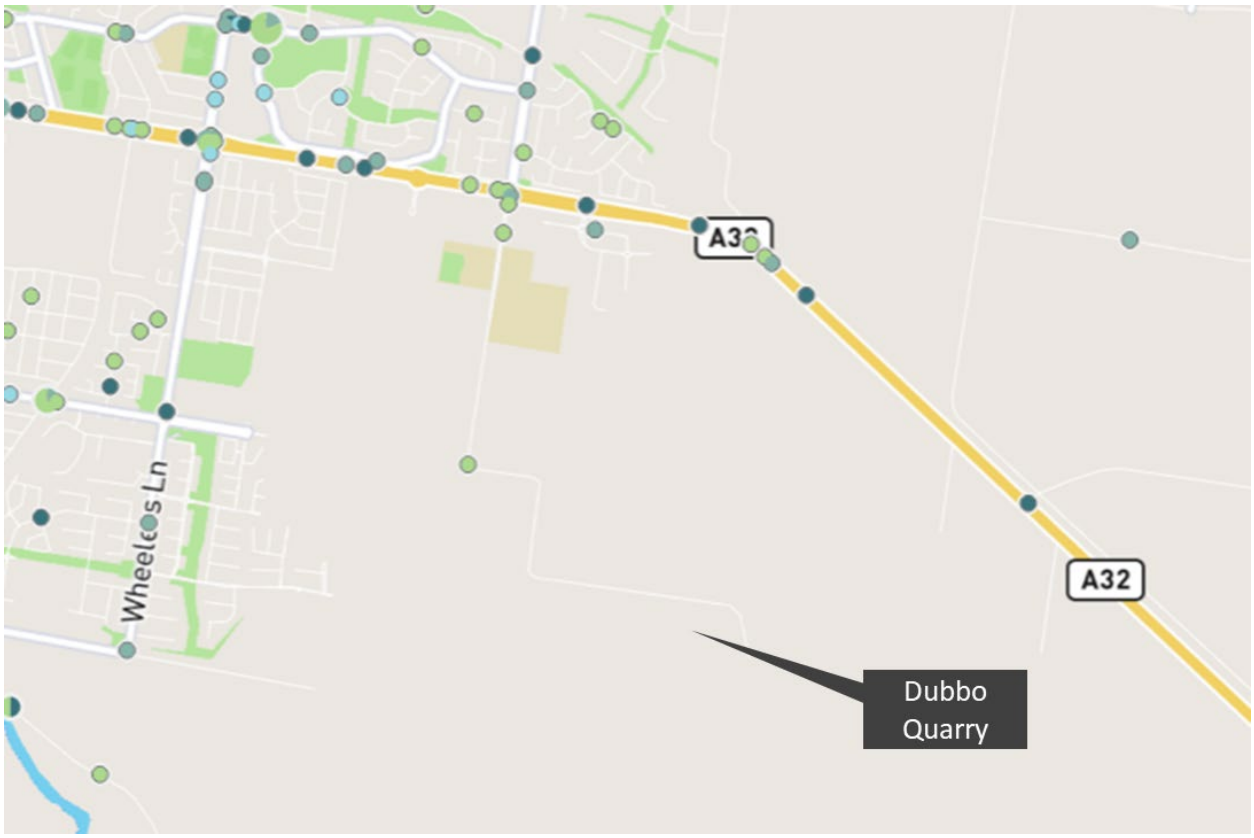


Figure 2.3 TfNSW five year crash locations map in the vicinity of the site

It was noted that there were far more crashes concentrated in the north-west areas of the map towards the Dubbo town centre and the Charles Sturt University campus, compared to the rest of the mapping area. This is understandable given there are higher traffic volumes closer to the town centre. Along Sheraton Road, there were mainly non-casualty crashes. The crash history data of particular interest to this study is summarised in Table 2.2.

Table 2.2 Five year crash history for the Mitchell Highway and Sheraton Road

	Non-casualty	Minor/other injury	Moderate injury	Serious injury	Fatal
Mitchell Highway (within 500 m east and west of the roundabout)	3	0	1	1	0
Sheraton Road (between 500 m north of the roundabout and the quarry access)	4	0	1	0	0

The low number of reported crashes over the 5 year period on both the Mitchell Highway and Sheraton Road within the areas considered (one crash per year typically for each road), is considered indicative of good local traffic safety conditions for these roads currently.

2.5 Public transport

Figure 2.4 shows public bus routes in the vicinity of the project area. Mitchell Highway is serviced by public bus routes 574 and 575 which provide weekday services with hourly intervals. Currently there are no public (non-school) bus services travelling on Sheraton Road south of Mitchell Highway. There are also many school buses that travel on Sheraton Road between Mitchell Highway and the schools on weekdays.

The school buses are operated by Dubbo Bus lines which provide 21 bus journeys in the AM (to the schools) and 22 bus journeys in the PM (from the schools).

2.6 Cycling infrastructure

Figure 2.5 shows cycling routes within Dubbo. In terms of cycling infrastructure, there is an off-road bicycle route on Sheraton Road south of Mitchell Highway leading up to the schools. Overall, the cycling connectivity between the Dubbo CBD and the schools is excellent, although it terminates at the schools and does not travel further south on Sheraton Road.

2.7 Pedestrian facilities

There is a pedestrian footpath on both sides of Sheraton Road between the Mitchell Highway and the schools. Refuge islands are provided at two locations on Sheraton Road south of Mitchell Highway.

The children's school crossing at St Johns Primary is supervised by two school crossing supervisors (Plate 2.1).

Plate 2.1 School crossing supervisors are preparing themselves before the afternoon school peak

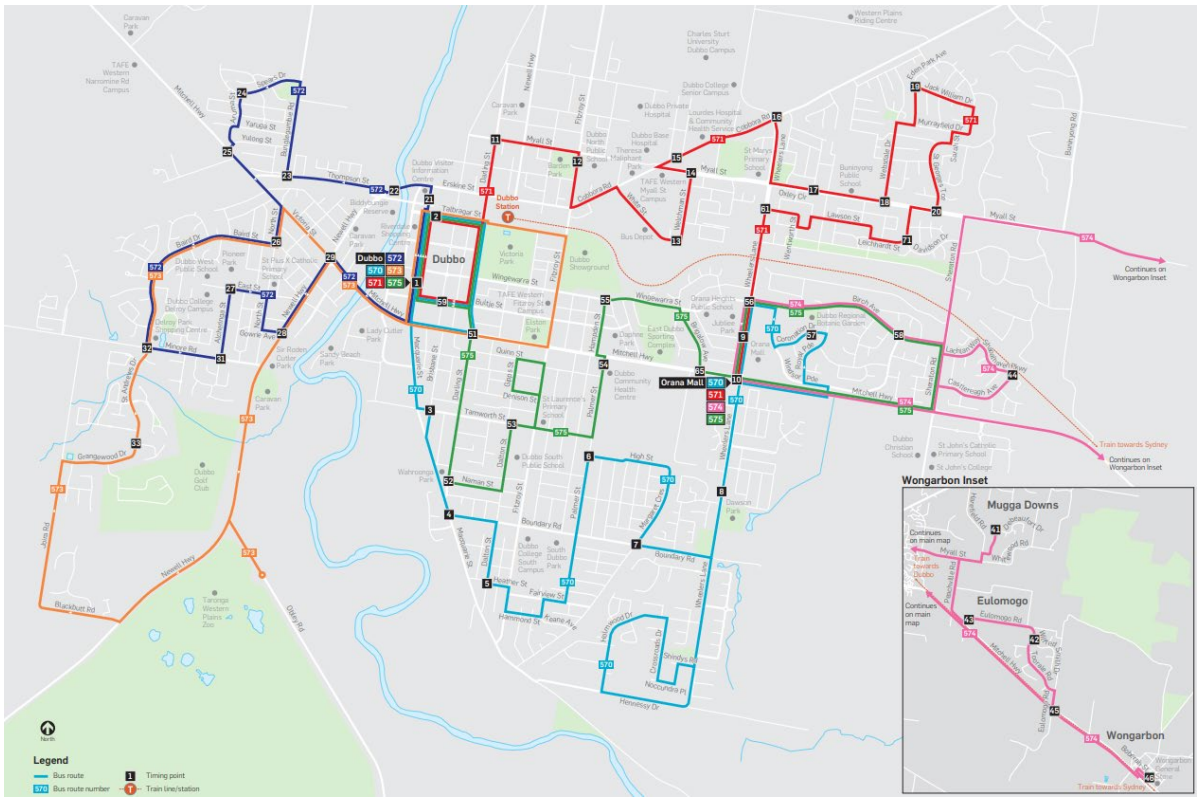
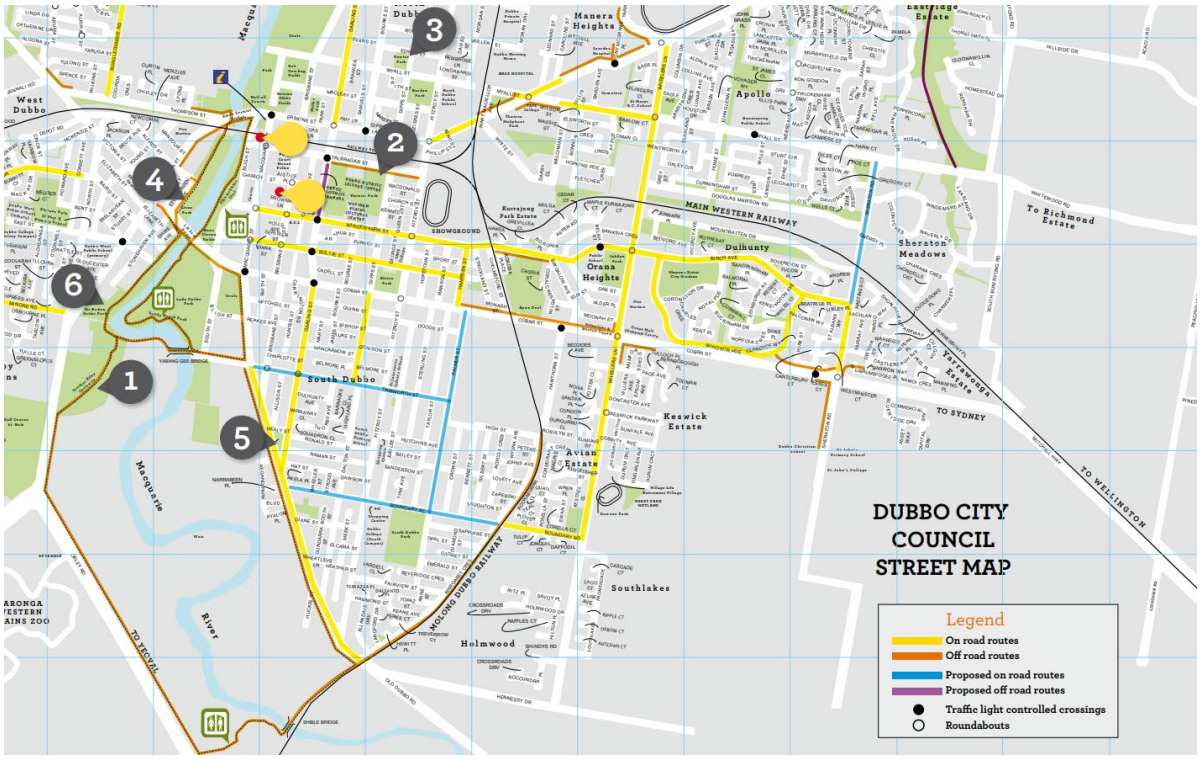


Figure 2.4 Dubbo public bus routes



Source: Dubbo's Cycleways Map (2013)

Figure 2.5 Dubbo cycling routes

3 The project

3.1 Description

As indicated earlier in this report, accessible basalt resources within the existing quarry boundary are close to exhaustion and will potentially only allow a further 2-3 years of production; hence, planning approval is required to allow the quarry to continue operating. The site was established and has been operating since 1980, currently employing approximately 15 quarry staff, 2 contactors and a number of truck drivers. In addition to supplying Dubbo Regional Council with pugmilled products (blended road bases), it supplies to markets as far away as Cobar to the west, north to the Queensland border, east to Orange, and south to Parkes.

The existing quarry is within an existing quarry precinct, that consists of the South Keswick Quarry, operated by Regional Hardrock Pty Ltd (MAAS Group), and Boral's Eulomogo Quarry (currently non-operational) and is consistent with existing surrounding land uses. Figure 3.1 presents a layout of the proposed project area.

The project involves expansion of existing quarry activities into two new resource areas:

- the quarry Western Extension Area (WEA) located within part Lot 22 DP 793541, west and north-west of the existing quarry boundary; and

- the Southern Extension Area (SEA) located within part Lot 100 DP 628628, to the south of the existing quarry boundary on the southern side of Eulomogo Creek.

These resource areas will provide sufficient resource for the quarry to continue operations for up to 25 years. The current consent for quarry operations places no restriction on either daily or annual production rates. The existing quarry infrastructure has the ability to produce a maximum production rate of 500,000 tonnes per annum (tpa). The project does not seek to increase the maximum production rate beyond the capabilities of the existing infrastructure (500,000 tpa). However, it will formalise the restriction of a maximum production rate of 500,000 tpa. The existing quarry produces on average approximately 350,000 tpa.

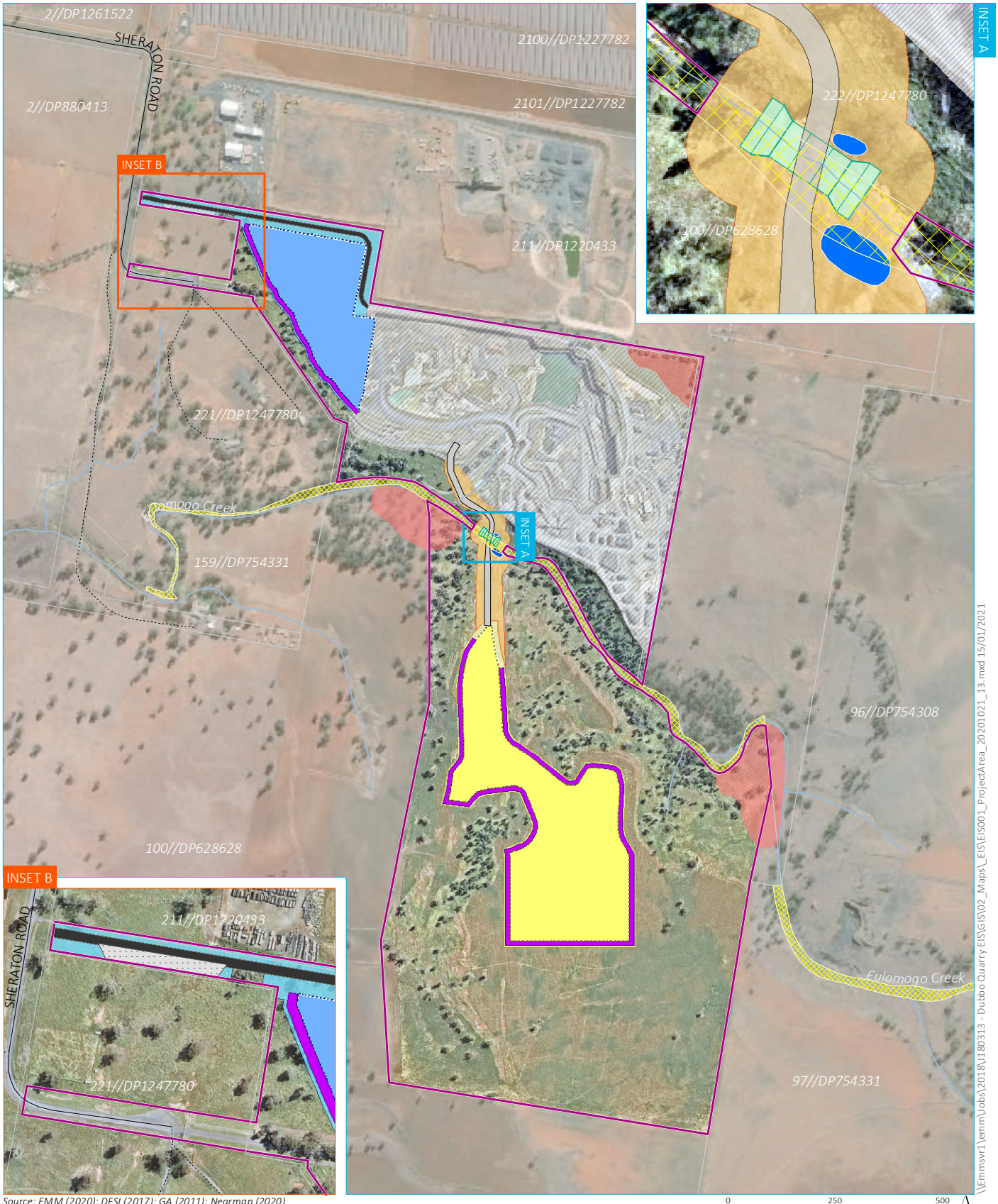
3.2 Construction traffic

The project would involve minimal construction as it is an existing operation. Construction activities involved and the expected traffic generation is detailed below.

- A new private access road off Sheraton Road along the northern boundary of the WEA, connecting to the existing access road that extends to the processing facilities within the existing quarry area. It would be constructed in around Year 2 or 3 of the project, prior to the existing access road being quarried through. Construction would require around nine contractors: two for road grading, four to five for road sealing, and two contractors for road marking. The estimated total time for access road construction is 3-4 weeks. Road base and sealing aggregate for construction of the road would be obtained from the quarry.

- A new haul road from the existing quarry area to the SEA across Eulomogo Creek with a watercourse crossing. This would be constructed in the first two years of the project for a period of 1-2 months. These works would require an additional 4-6 contractors and an average of 20 trucks per month for construction deliveries (of pre-mixed concrete and pre-cast concrete).

- Modification/installation of water management infrastructure within the existing and extension areas would be undertaken in the first two years of the project using existing workforce and equipment.



Source: EMM (2020); DFSI (2017); GA (2011); Nearmap (2020)

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KEY

- Project area
- Sediment pond
- Aboriginal protection zone
- Indicative existing disturbance area
- Proposed haul road
- Indicative proposed water crossing
- Bund wall
- Proposed access road
- Truck tarping area
- Western extension area
- Western disturbance area
- Haul road disturbance area
- Southern extension area
- Southern disturbance area
- Minor road
- Vehicular track
- Watercourse/drainage line
- Waterbody
- Cadastral boundary (data does not align with surveyed site boundary)
- Crown land

Project overview

Dubbo Quarry Continuation Project
Traffic Impact Assessment
Figure 1.3

EMM
creating opportunities

These construction traffic numbers are very low in comparison to the daily quarry operational traffic; thus, it is not expected that the traffic impacts generated from the construction-related vehicles would be significant when compared to the quarry operational traffic. Therefore, this report will focus primarily on the quarry operational traffic, as further detailed assessment of the quarry construction traffic impacts is not required.

3.3 Operational traffic

Extraction within the WEA would commence on receipt of development consent (year 1) and would continue up to exhaustion of available resource within this area, which is estimated within approximately 10 years. Construction of the new access road and associated intersection, relocation of utilities, and modification/construction of new water management system components would be undertaken concurrently with staged extraction within this area.

Construction of the new haul road and watercourse crossing to provide access to the SEA would likely commence in year 2, with extraction from the SEA anticipated to commence in year 3 and continue for up to 23 years.

Processing infrastructure, maintenance and administrative facilities, are proposed to remain in their current location.

3.3.1 Light vehicle movements

For the existing quarry production workforce and site visitors, there will be approximately 15 light vehicle trips (30 vehicle movements) over the day. However, due to the operating shift patterns (6 am to 6 pm), the employee traffic is unlikely to occur during the same road network peak hours as the quarry truck traffic.

3.3.2 Truck movements on an average production day

Information has been provided by Holcim in relation to the quarry truck traffic movements, for the existing and the future maximum quarry production levels, which are 350,000 tpa and 500,000 tpa respectively. The existing quarry has been producing and selling up to 350,000 tpa; however, it is able to produce up to 500,000 tpa under its Environment Protection Licence. Further, there is no limit on quarry production in the existing development consent. The proposed quarry production limit for future quarry operations will continue to be 500,000 tpa.

The average daily and peak hourly traffic generation for the existing and maximum future quarry production levels is summarised in Table 3.1. The peak hourly truck traffic movements are typically 10% of the daily total truck movements on an average production day.

Table 3.1 Daily traffic generation for average daily production

Quantity	Existing (350,000 tpa)	Future maximum (500,000 tpa)
Average daily production (tonnes)	1,167	1,667
Truck load capacity (tonnes)	33	33
Working days per year	300	300
Average daily truck loads (vehicles)	35	50
Average daily truck loads (movements)	70	100
Peak hourly truck loads (all peak hours)	3.5	5.0
Peak hourly truck movements (all peak hours)	7	10

Source: Based on information provided by Holcim

3.3.3 Truck movements on a peak production day

On a small number of busy days each year, the peak daily site truck traffic movements may be significantly higher than on the average production day. The potential peak (maximum) daily and peak hourly truck traffic generation movements for the existing and future maximum quarry production are summarised in Table 3.2.

On peak production days, the peak hourly quarry truck traffic movements can also be a higher proportion (typically up to 15-16%) of the total daily truck movements.

Table 3.2 Daily traffic generation for peak production

Quantity	Existing (350,000 tpa)	Future maximum (500,000 tpa)
Peak daily production (tonnes)	2,200	4,000
Truck load capacity (tonnes)	33	33
Peak daily truck loads (vehicles)	66	121
Peak daily truck loads (movements)	132	242
Peak hourly truck loads (AM peak hour)	8	20
Peak hourly truck loads (PM School peak hour)	10	20
Peak hourly truck loads (PM peak hour)	10	20
Peak hourly truck movements (AM peak hour)	16	40
Peak hourly truck movements (PM School peak hour)	20	40
Peak hourly truck movements (PM peak hour)	20	40

Source: Based on information provided by Holcim

3.3.4 Operational traffic distribution

All quarry-related traffic will exit the site via Sheraton Road, as per the existing operations, up to the intersection with the Mitchell Highway. Where traffic will then generally be distributed approximately 50% to the west, 25% east and 25% further north, in accordance with the current distribution of heavy vehicle traffic movements in the locality.

The respective peak hourly traffic distributions for the existing and future maximum quarry production for the average daily and peak daily production scenarios are presented in Figure 3.2 and Figure 3.3.

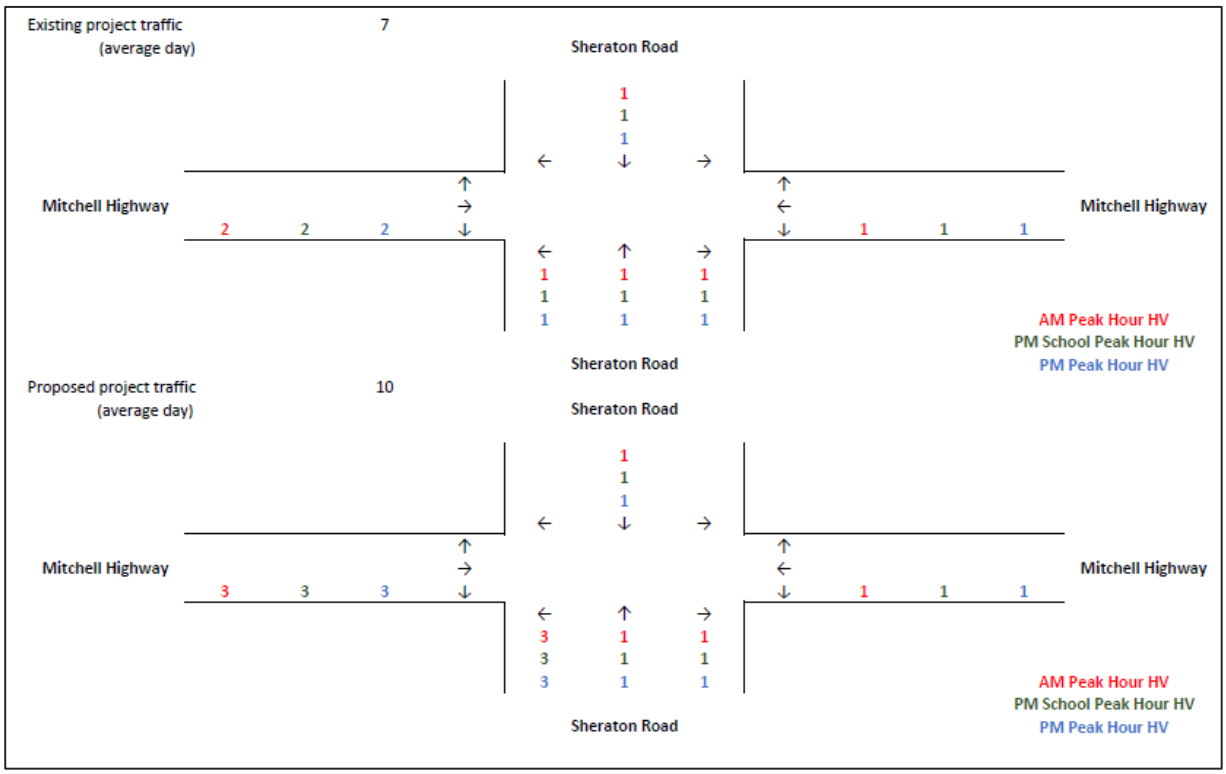


Figure 3.2 **Peak hourly truck movements distributed for average daily production**

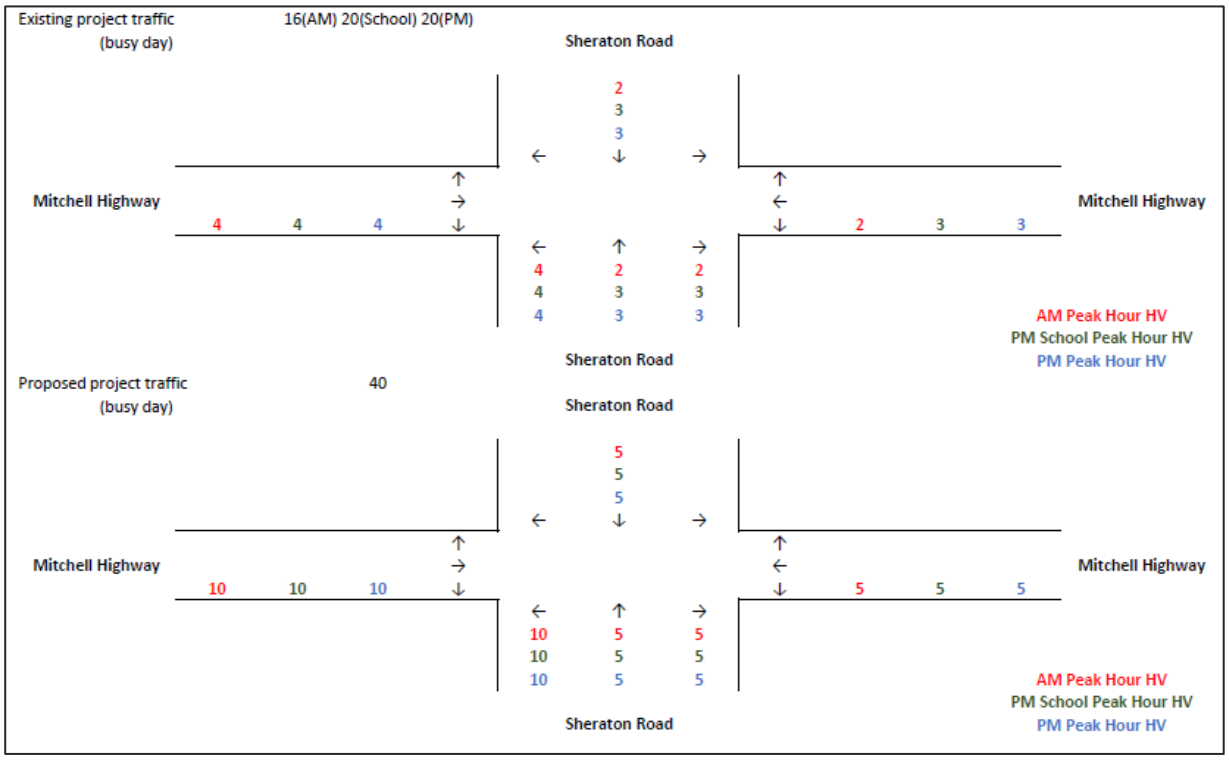


Figure 3.3 **Peak hourly truck movements distributed for peak daily production**

3.4 Background traffic growth

TfNSW Traffic Volume Viewer presents the historic traffic growth trends for major roads near the Dubbo area.

There is a TfNSW traffic count station at Newell Highway, Eumungerie (station ID: 6156) approximately 38 km north of Dubbo which shows a decreasing trend in daily and peak hourly traffic volumes over the past 5 years. Another station at Newell Highway, Tomingley (station ID: TMGSTC) approximately 57 km south of Dubbo, also shows a decreasing trend in daily and peak hourly traffic volumes over the same period. These records from the two nearest TfNSW traffic count locations suggest there is a decreasing daily traffic volume growth trend for major roads in the Dubbo area currently.

The proposed quarry will be operational for an additional period of up to 25 years, which is up to around the year 2045. As a conservative approach, a linear annual locality traffic growth of 1% has been assumed for additional future baseline traffic growth for this period. Figure 3.4 presents the corresponding forecast year 2045 baseline peak hour traffic.

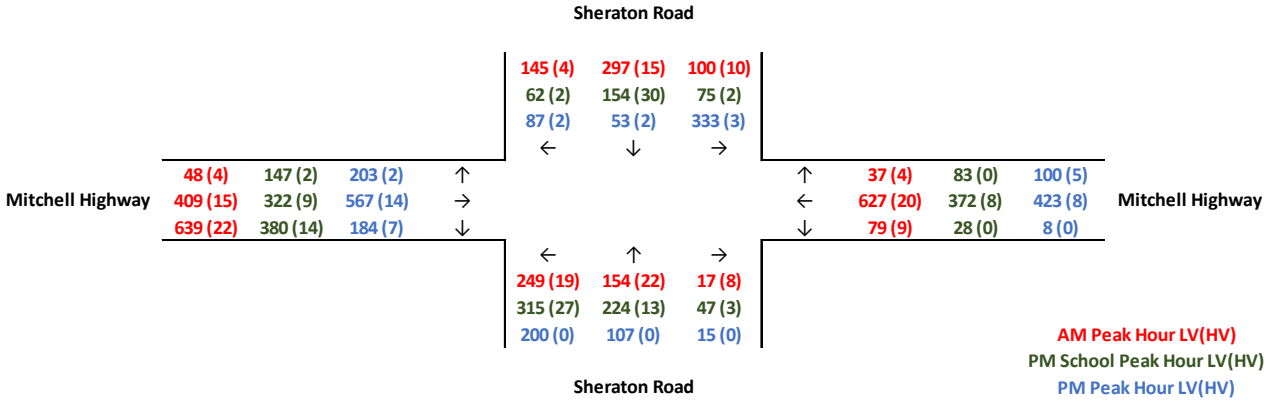


Figure 3.4 Peak hour traffic volumes from forecast year 2045 baseline traffic growth

3.4.1 Future development traffic growth scenarios

The future development traffic has been assessed for the average daily production and maximum daily production traffic scenarios in this TIA report.

The future total (with development) traffic volumes have been obtained by combining the additional quarry generated traffic as is summarised in Figure 3.2 and Figure 3.3 with the existing year 2020 baseline traffic which is presented in Figure 2.2 and the future forecast year 2045 baseline traffic which is shown in Figure 3.4.

These combined future development traffic volumes in comparison to the existing approved development traffic volumes for the current year (2020) and year 2045 baseline traffic conditions, are presented in Figure 3.6 and Figure 3.8 respectively.

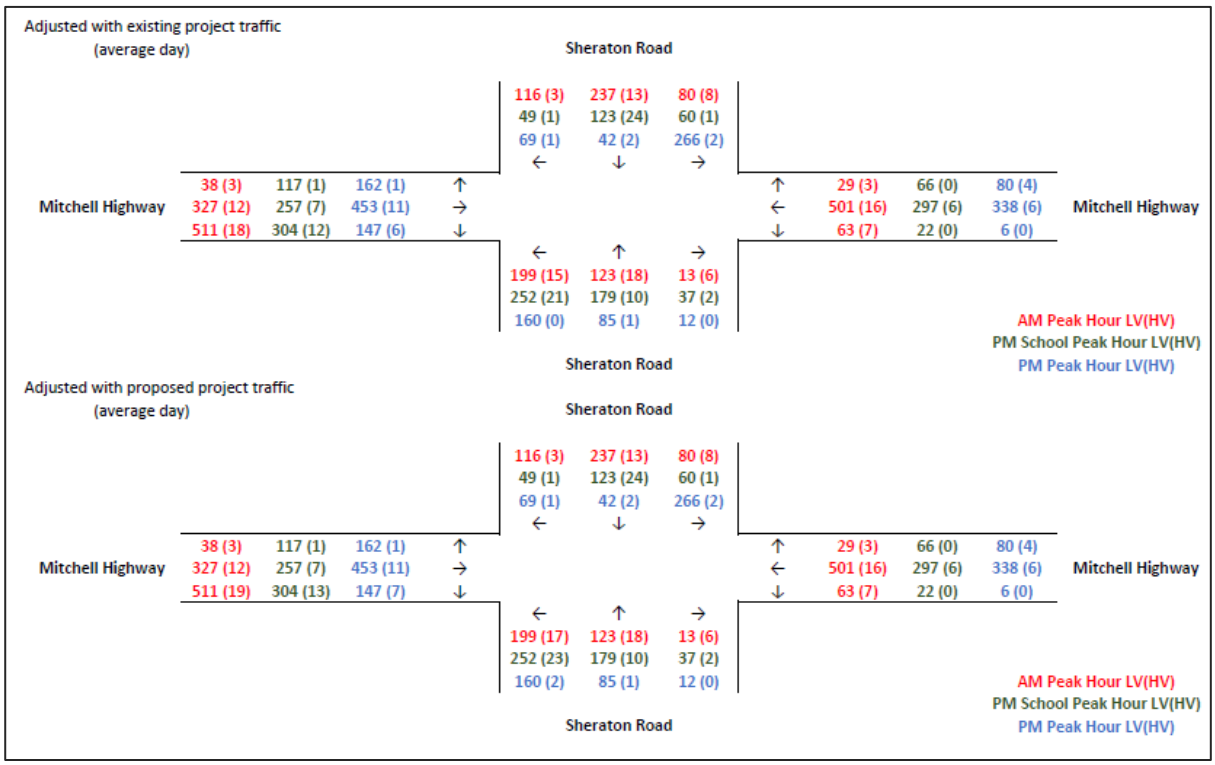


Figure 3.5 **2020 forecast network traffic including average daily quarry production**

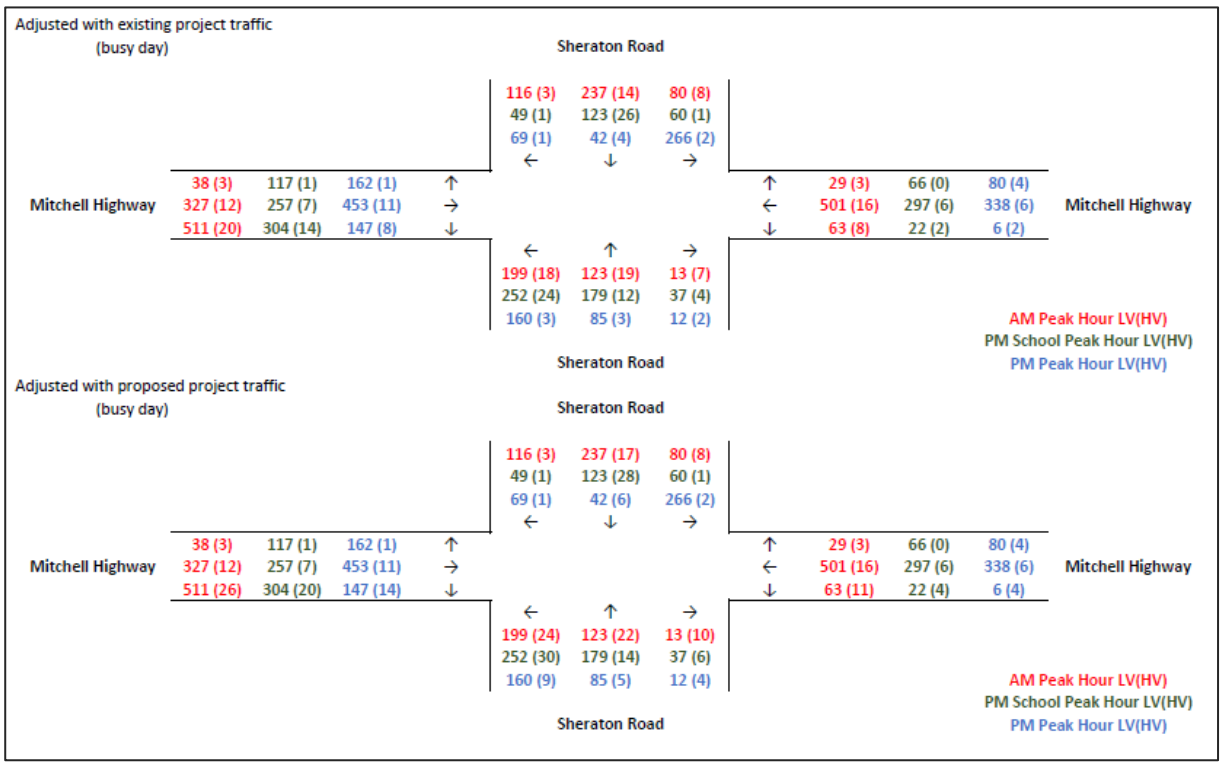


Figure 3.6 **2020 forecast network traffic including peak daily quarry production**

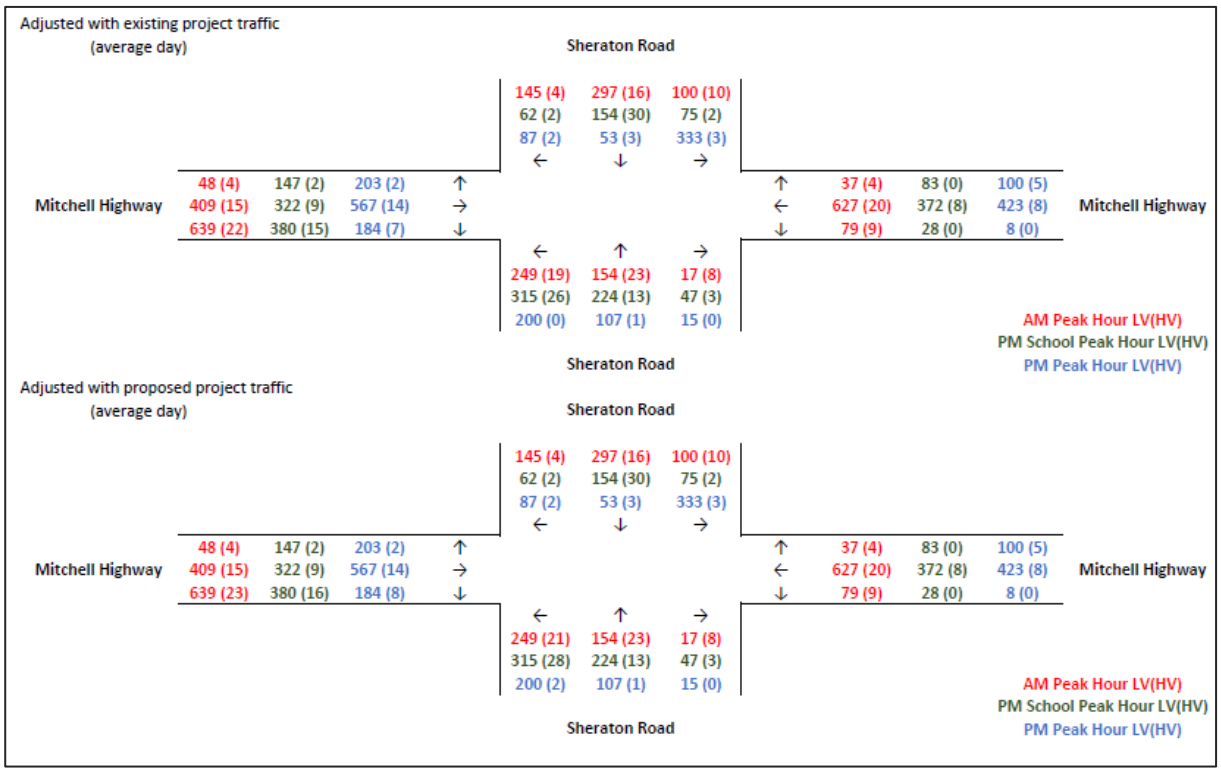


Figure 3.7 **2045 forecast network traffic including average daily quarry production**

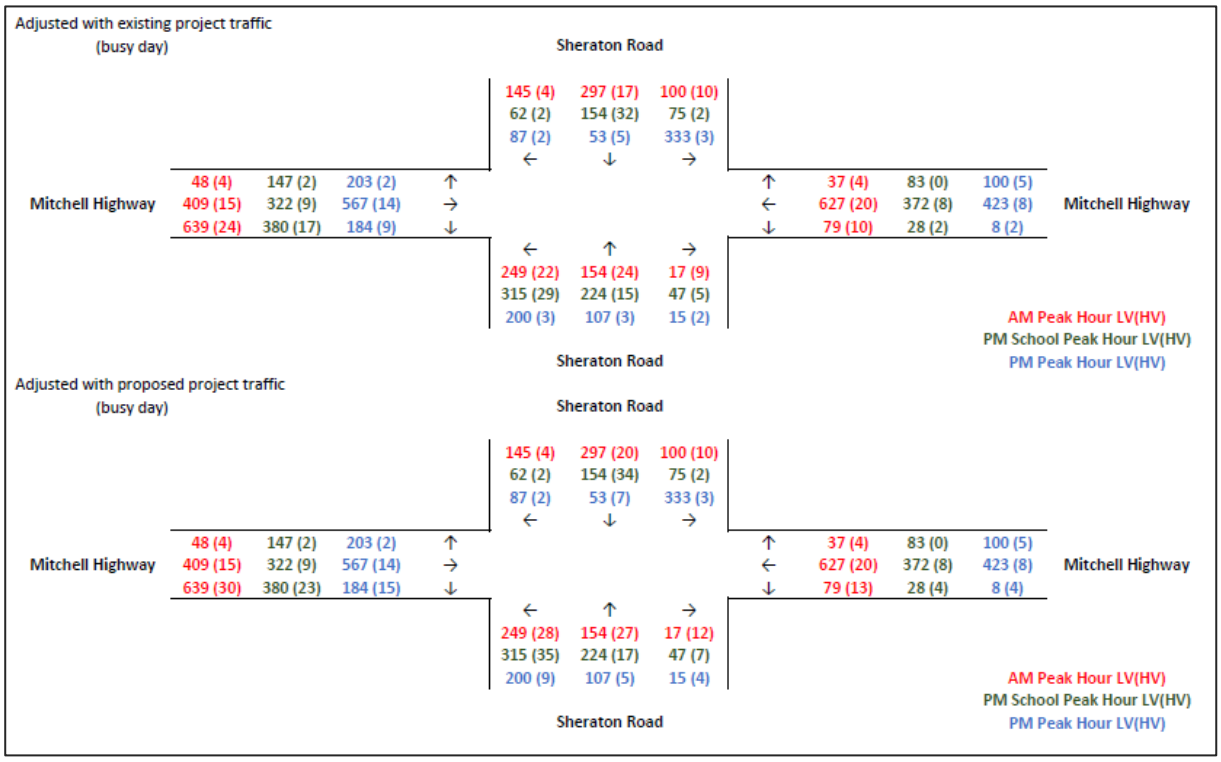


Figure 3.8 **2045 forecast network traffic including peak daily quarry production**

3.5 Car parking

There are currently 16 car spaces within the site. The project will not increase the parking demand or the number of existing onsite parking spaces provided.

3.6 Road works

As mentioned in Section 3.1, there will be a new internal access road off Sheraton Road along the northern boundary of the WEA, connecting to the existing access road that extends to the processing facilities within the existing quarry area.

This access road is 10 m wide and has been designed to accommodate two-way movements by the typical 20 m long truck and dog trailer vehicles which are used at the quarry.

The future site access intersection design was previously approved as part of a subdivision approval for the land in August 2018 (D2017-640). It is noted that the design was for 19 m long trucks with larger truck sizes prohibited from accessing the site under the consent conditions D2017-640. Trucks longer than 19 m currently access the site and will continue to do so under the project.

A modification application for D2017-640 will be submitted to be consistent with this project application. The approved intersection design will be redesigned to accommodate 20 m long trucks plus quad dog trailer and will comply with Austroads Safe Intersection Sight Distance standards and swept path design requirements. Should trucks larger than 20 m need to access the site during operation of the project (eg for equipment deliveries) then additional management measures will be implemented. These will be detailed in the site driver code of conduct and Traffic Management Plan (see Section 4.6).

4 Traffic impact assessment

4.1 Road network impact

The proportional future maximum daily traffic volume increases in comparison to the existing daily traffic volumes using the major local roads and state roads in the locality, is summarised in Table 4.1. These existing daily traffic volumes are well within the normal daily traffic capacity limit for these roads which is at least 30,000 daily vehicle movements for roads which have a four lane divided carriageway, which is the case for both the Mitchell Highway and Sheraton Road at the locations which are assessed in Table 4.1.

Table 4.1 Summary of future maximum daily traffic increases

Road and location	Existing daily traffic volume from Table 2.1	Additional daily traffic on average production day	Proportional daily traffic increase (average production day)	Additional daily traffic on peak production day	Proportional daily traffic increase (peak production day)
Mitchell Highway (west of Sheraton Road)	15,000	14	0.1%	86	0.6%
Mitchell Highway (east of Sheraton Road)	10,000	8	0.1%	43	0.4%
Sheraton Road (north of the Mitchell Highway)	7,000	8	0.1%	43	0.6%
Sheraton Road (south of the Mitchell Highway)	9,000	30	0.3%	172	1.9%

Under the future maximum average day production conditions, the additional proportional daily traffic increases will be very minor and insignificant (less than a 0.3% daily traffic increase at any location) and would have no noticeable effect on the typical locality daily traffic conditions or road network operations.

Under the future maximum peak day production conditions, on most of the locality road network the additional generated proportional daily traffic increases will also be relatively very minor and insignificant (less than a 0.6% traffic increase at any location). However, on Sheraton Road south of the Mitchell Highway, under the future maximum peak day production conditions, the additional proportional daily traffic increases would be +1.9% approximately which would generally be noticeable in comparison to the existing daily traffic on this section of Sheraton Road; however, the increase would not significantly impact the road's capacity.

The additional future maximum truck traffic using Sheraton Road, may have some longer term road pavement related impacts, which could be addressed by means of a future road maintenance agreement to be negotiated by Holcim, with the Dubbo Regional Council.

4.2 Intersection performance

The Mitchell Highway/Sheraton Road intersection has been modelled with SIDRA Intersection 9.0 software, a micro-analytical tool for individual intersections and whole-network modelling. The modelling is based on the year 2019 (assumed year 2020) baseline traffic survey data as detailed in Section 2.3, the future year 2045 locality baseline traffic growth and the approved and proposed quarry operating on an average and a peak production day as discussed in Section 3.1.

SIDRA provides a number of intersection performance output measures which are outlined below:

- Degree of saturation (DOS) – the total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (eg 0.8 = 80% saturation).
- Average delay (DEL) – the average delay in seconds encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the larger free flowing traffic stream on a major road will still result in a low overall average intersection delay.
- Level of service (LOS) – this is a categorization of average delay, intended for simple reference.
- 95% queue lengths (Q95) – is defined to be the queue length in metres that has only a 5% probability of being exceeded during the analysed time period. It transforms the average delay into measurable distance units.

LOS is a good indicator of overall performance for individual intersections, with each level summarised in Table 4.2.

Table 4.2 Intersection 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 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity. At 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: RTA Guide to Traffic Generating Developments

4.2.1 Average daily quarry production

The SIDRA results production at the subject intersection, for the existing and future maximum traffic for average daily quarry production in 2020 and the future year 2045 are included as Appendix C. A summary of the results presented in Table 4.3. For a roundabout intersection, the LOS is based on the highest average delay for any movement at the intersection, which corresponds to either LOS A or B in all cases.

The Mitchell Highway/Sheraton Road intersection is currently operating at LOS A or B at all peak hours with approximately 60% spare capacity to accommodate additional traffic growth. With 25% growth of background traffic by 2045 (1% linear annual growth), the intersection will still perform at LOS A or B in the peak hours, with approximately 40% spare capacity to accommodate additional traffic growth.

The additional development traffic from the future maximum quarry operations will not have any significant impact to the performance of this intersection on an average production day in the year 2020 or year 2045 peak hourly traffic periods considered.

Table 4.3 SIDRA results for year 2020 and year 2045 for average daily quarry production

Year and Peak hour	DOS		LOS		DEL (seconds)		Q95 (metres)	
	Existing production	Future production	Existing production	Future production	Existing production	Future production	Existing production	Future production
2020 AM	0.416	0.417	B	B	15.7	15.7	19.5	19.6
2020 School PM	0.314	0.315	A	A	12.7	13.4	12.8	12.8
2020 PM	0.315	0.315	A	A	11.9	11.9	12.1	12.2
2045 AM	0.593	0.595	B	B	20.8	20.8	35.6	35.8
2045 School PM	0.420	0.421	A	A	13.4	13.4	19.4	19.5
2045 PM	0.409	0.409	A	A	12.4	12.4	17.6	17.7

4.2.2 Peak daily quarry production

The SIDRA results for existing and future maximum traffic for peak daily quarry production at the subject intersection for the existing year 2020 and future year 2045 baseline traffic conditions are included as Appendix D. A summary of the results is presented in Table 4.4.

For a roundabout intersection, the LOS is based on the highest average delay for any movement at the intersection, which corresponds to either LOS A or B in all cases. Similarly to the situation for an average production day, the additional development traffic from the future maximum quarry operations on a peak production day will not have any significant impact to the performance of this intersection. The results in Table 4.4 show there will be minimal changes to the assessed intersection operations, for any of the intersection reporting parameters in the year 2020 or year 2045 peak hourly traffic periods considered.

Table 4.4 SIDRA results for year 2020 and year 2045 for peak daily quarry production

Year and Peak hour	DOS		LOS		DEL (seconds)		Q95 (metres)	
	Existing production	Future production	Existing production	Future production	Existing production	Future production	Existing production	Future production
2020 AM	0.420	0.431	B	B	15.8	16.0	19.8	20.7
2020 School PM	0.317	0.324	A	A	12.7	13.4	13.3	12.8
2020 PM	0.318	0.323	A	A	12.0	11.9	12.8	12.2
2045 AM	0.597	0.609	B	B	20.9	21.4	36.2	37.7
2045 School PM	0.425	0.432	A	A	13.4	13.4	19.7	20.2
2045 PM	0.412	0.418	A	A	12.4	12.5	17.8	18.3

4.3 Impacts on public transport, pedestrian and cycling facilities

Public transport services, pedestrian footpath, and cycling infrastructure do not extend beyond the schools on Sheraton Road leading up to the quarry. Hence, there are no such impacts as a result of the project.

4.4 Road safety

Sheraton Road north of the Mitchell Highway intersection is considered to have good local traffic safety conditions currently given the low number of reported crashes (one crash per year as detailed in Section 2.4). This is expected to continue under the project given that traffic generation will remain consistent with the existing operations related traffic.

The SEARs for the project required preparation of an RSA which was undertaken by Bitzios Consulting and is included as Appendix B to this TIA. A summary of the findings was presented in Chapter 4 of the RSA report, which identified seven safety items currently present on Sheraton Road. The seven safety items and how they relate to the project are discussed further in Table 4.5.

It is noted that the majority of the safety items would require attention regardless of the operation of Holcim's Dubbo Quarry as they primarily relate to the school traffic and pedestrian movements.

4.5 Stakeholder engagement

Holcim has recently established a Community Consultation Committee (CCC) for Dubbo Quarry. Current members include representatives from Holcim, quarry staff, Dubbo Regional Council, Dubbo Christian College and St Johns College.

The first CCC meeting was held on 2 November 2020. A second CCC meeting was held on 14 December 2020 where EMM presented the key traffic, road safety and pavement management outcomes associated with the proposal. The committee was generally satisfied with the EMM traffic impact assessment findings, but mentioned the need to undertake additional future sensitivity analysis of the road network impacts by considering the future traffic effects of the Boundary Road extension when that project is completed.

The SIDRA road network and intersection capacity analysis which EMM has undertaken for the project, which are documented in this report has focussed primarily on intersection capacity analysis at the Mitchell Highway and Sheraton Road intersection as that is the most heavily trafficked location on the relevant road network currently.

In relation to the additional likely future locality traffic changes on Sheraton Road when the Boundary Road extension is completed, it is considered that the EMM SIDRA intersection capacity analysis which is presented in this report is likely to be conservative as the Boundary Road extension will provide a new alternative route for some of the existing schools access traffic which is currently accessing Sheraton Road via the Mitchell Highway intersection, thereby potentially reducing some of the existing schools traffic usage on Sheraton Road at the Mitchell Highway roundabout.

4.6 Recommended mitigation measures

4.6.1 Driver's Code of Conduct and Traffic Management Plan

Holcim will prepare a Driver's Code of Conduct for the project to help facilitate the future safe site operations for all the quarry truck traffic using Sheraton Road, in combination with all the other road users, school buses and pedestrian traffic which is using the road currently.

A Traffic Management Plan will also be prepared for the quarry to define traffic management measures for the quarry access and internal site traffic movements during both the construction and future operations periods.

The Traffic Management Plan will include procedures for managing oversize vehicles accessing the site, and procedures for monitoring and compliance of the Traffic Management Plan and Driver's Code of Conduct.

The Driver's Code of Conduct will be required to be read and signed by all truck drivers operating to and from the quarry and will include procedures to address all relevant site and locality road safety and traffic management measures such as:

- compliance with all road rules and regulations,
- vehicle speeds,
- driver behaviour near schools, residential and shopping areas,
- courtesy to other road users,
- fatigue management,
- drug and alcohol testing,
- checking vehicles and covering loads,
- the appropriate use of compression braking, and
- safety procedures for accidents and breakdowns.

4.6.2 Road pavement maintenance

The additional project generated truck traffic which will be using Sheraton Road, may have some longer term road pavement maintenance related impacts. Holcim is likely to pay a future royalty fee to the Dubbo Regional Council for the upkeep of the road.

Table 4.5 Response to Road Safety Audit findings

Item	Issue	Risk rating	Response
1	**Children Crossing** The mid-block children crossing located in the northern side of St Johns Primary is supervised by two school crossing supervisors. Sheraton Road is four-lane (two-lane each way) wide at this location. In the event a large vehicle (e.g. bus, semi-rigid or B-Double Truck) occupies the median side lane, it may obscure the site line of the driver on the kerbside lane. The driver may not be able to see pedestrians or even the school crossing supervisor at the crossing. Therefore, the driver may fail to give way and subsequently collide with pedestrians at the crossing.	High	The subject school crossing does not currently comply with current road design standards for the location of new pedestrian crossings, and that new crossings of this type are no longer permitted on four lane roads. Upgrades to this crossing could be considered by the schools and/or Council. Holcim are proposing to implement a Driver's Code of Conduct which all of its truck drivers would be required to comply with as part of their site induction. This document would document requirements for vehicle maintenance, driver behaviour and journey preparation. Failure to comply with the code of conduct will result in immediate removal from site. Further information about the proposed Driver's Code of Conduct is given in Section 4.4.
2	**Bus Movements** During the site visit it was observed that through vehicles on Sheraton Road give way to school buses exiting the bus 'pick-up and drop-off area'. It is possible that an unfamiliar driver may fail to give way and collide with a bus full of school children.	High	The quarry's proposed Driver's Code of Conduct will include a requirement for all truck drivers to give way to school bus movements. Alternative safer locations for buses to turn (for instance a roundabout at the southern end of the median) could be investigated by the school precinct and/or by Council. Alternatively, once constructed, buses can turn at the roundabout with Boundary Road or travel along Boundary Road to or from the school precinct and avoid the need for turns.
3	**U-Turn Movements** Parents and bus drivers travelling south on Sheraton Road use the end of the median in the southern side to undertake a U-turn. During the site visit it was observed that they cross two lanes to complete the U-turn movement. Unfamiliar and speeding drivers on the Sheraton Road northbound may fail to slow down or stop to give way and subsequently collide with the U-turning vehicle.	Medium	This item is not related to project related traffic and is primarily an issue for the School's precinct to manage. School parents and bus drivers are currently making illegal U-turn movements as there is nowhere to legally turn at present without travelling long distances down Sheraton Road. Legal turning locations (for instance a roundabout at the southern end of the median) could be investigated by the school precinct and/or Council. Alternatively, once constructed, parents can turn at the roundabout with Boundary Road or travel along Boundary Road to their destination. Schools should regularly notify parents and bus drivers that U-turn movements are illegal over double white lines.
4	**Queue push back from the drop-off & Pick-up zone** During the site visit it was observed that queues from the 'pick-up and drop-off' area located inside the St Johns Primary extend back along the southbound Sheraton Road. Slow-moving queues of about 100m occupy the kerbside lane	Medium	This item is not related to project related traffic and is primarily an issue for the St Johns Primary school to manage.

Table 4.5 Response to Road Safety Audit findings

Item	Issue	Risk rating	Response
	increasing the risk of rear-end crashes or side swipe crashes due to inappropriate veering to the right at this location.		
5	**Long queues at Sheraton Road/Mitchell Highway** During the afternoon peak period, long queues (about 300m) of slow- moving vehicles were seen on the Sheraton Road (south) approach to the Mitchell Highway intersection. The queues occasionally extend back to the children crossing. This presents a hazard to children at the crossing.	Low	As demonstrated in Section 4.1 of the TIA, the Sheraton Road/Mitchell Highway intersection is currently operating at good or acceptable levels with spare capacity when assessed against RMS criteria. The intersection will continue to operate at these levels under the future maximum production scenarios for the project. The Boundary Road extension may also reduce traffic delays once constructed by providing an alternative travel route.
6	**Bunnings car park** Bunnings has two alternative accesses: one on Sheraton Road and the other on Mitchell Highway. During the site visit it was observed that some vehicles use the Sheraton Road exit to access Mitchell Highway even if they have to give way to four lanes of traffic on Sheraton Road. During the busy PM peak period, it was observed that these drivers were struggling to find suitable gaps in traffic on Sheraton Road. The situation is exacerbated by heavy slow-moving vehicles on the northbound Sheraton Road.	Medium	The traffic delays are related to Bunnings customer car park egress traffic. This is not affected by project related traffic and is a matter for Bunnings to manage. Bunnings were consulted as part of the stakeholder engagement strategy for the EIS.
7	**Pavement condition** Tight bends and poor road pavement surface condition at the south end of Sheraton Road	Medium	Road pavement maintenance can be addressed by means of a future negotiated agreement with Holcim and Dubbo Regional Council. The relevant bends now have 35 km/hr advisory warning speed limit signs installed which addresses potential traffic safety concerns from the potentially overlapping truck turning paths at the bends.

5 Summary and conclusion

Holcim's Dubbo Quarry, located on Sheraton Road in Dubbo, has been operating since 1980. Accessible basalt resources within the existing quarry boundary are close to exhaustion and planning approval is required to allow the quarry to continue operating. Holcim is therefore seeking approval for the development of two new resource areas to the south and west of the existing quarry boundary, which will provide sufficient resource for the quarry to continue operations for approximately 20-25 years.

The current consent for quarry operations places no restriction on production, with the existing infrastructure having the ability to produce a maximum production rate of 500,000 tpa. Maximum production under the project will remain at 500,000 tpa with an average production rate of 350,000 tpa, consistent with the current quarry operations.

The traffic impacts have been assessed and the results are summarised as follows.

- Under the existing and future maximum average daily production scenarios there will be approximately 35 daily truck loads (70 movements) and 50 daily truck loads (100 movements), respectively, operating from the quarry via Sheraton Road. Under the existing and future maximum peak daily production scenarios, there will be approximately 66 daily truck loads (132 movements) and 121 daily truck loads (242 movements), respectively, operating from the quarry via Sheraton Road.

- Under the future maximum average day production conditions, the additional proportional daily traffic increases will be very minor and insignificant (less than a 0.3% daily traffic increase at any location) and would have no noticeable effect on the typical locality daily traffic conditions on Sheraton Road or any other road in the locality.

- Under the future maximum peak day production conditions, on most of the locality road network the additional proportional daily traffic increases will also be very minor and insignificant (less than a 0.6% traffic increase at any location). On Sheraton Road, south of the Mitchell Highway, the additional daily traffic increases would be +1.9% approximately which would potentially be noticeable in comparison to the existing daily traffic operations on this section of Sheraton Road; however, the increase would not significantly impact the road's capacity.

- The Mitchell Highway/Sheraton Road intersection will continue to perform at either LOS A or B in all the assessed peak hours with significant spare traffic capacity (approximately 40%) remaining in 2045 when taking into account maximum future additional quarry traffic (on either an average or a peak production day) and potentially 25% additional background traffic growth by 2045.

The approved quarry haulage route operates past a number of schools on Sheraton Road where a Road Safety Audit report has identified several road safety issues. The majority of the safety issues are related to school generated traffic movements. Holcim is currently undertaking consultation with the School's precinct stakeholders and Dubbo Regional Council in relation to these issues.

Holcim will prepare and implement a Driver's Code of Conduct and Traffic Management Plan for the quarry which will assist with the future site traffic management and road safety for Sheraton Road, to enable Holcim's quarry operations to continue to operate safely in combination with the school and other locality traffic and pedestrians using Sheraton Road, in particular during the peak school hour traffic periods which are between 8-9 am in the mornings and 3-4 pm in the afternoons.


Appendix A

Intersection traffic survey

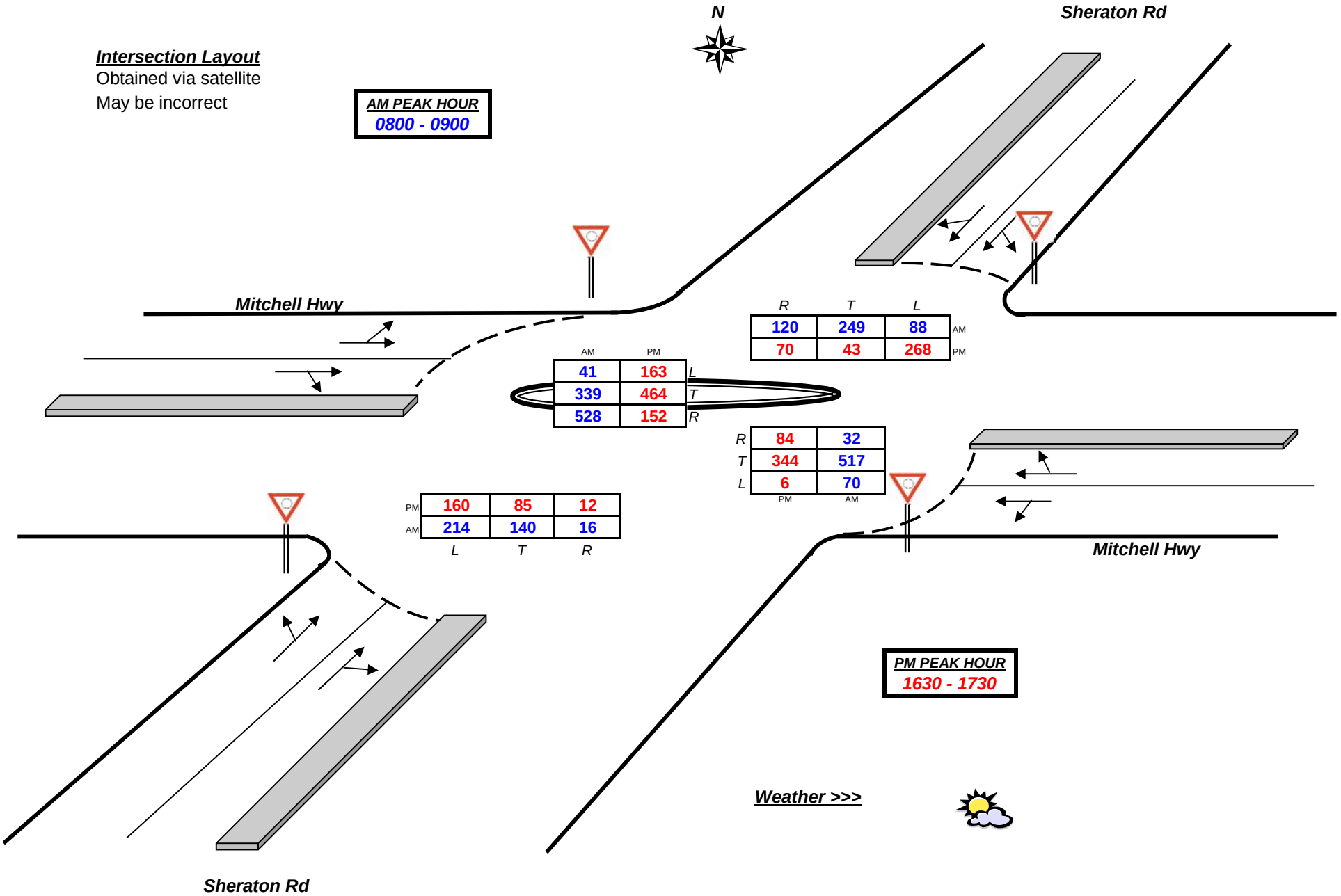



R.O.A.R. DATA
Reliable, Original & Authentic Results
Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Tuesday 4th & Wednesday 6th June 2019

Intersection Layout
Obtained via satellite
May be incorrect

AM PEAK HOUR
0800 - 0900



	AM	PM	
	41	163	L
	339	464	T
	528	152	R

	R	T	L	
	120	249	88	AM
	70	43	268	PM

R	84	32	
T	344	517	
L	6	70	
	PM	AM	

PM	160	85	12
AM	214	140	16
	L	T	R

PM PEAK HOUR
1630 - 1730

Weather >>>

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Wednesday 6th June 2019

Lights

Time Per	NORTH Sheraton Rd L	T	R	WEST Mitchell Hwy L	T	R	SOUTH Sheraton Rd L	T	R	EAST Mitchell Hwy L	T	R	TOT
0600 - 0615	4	2	8	8	18	2	0	0	0	0	17	5	**64**
0615 - 0630	9	3	8	3	23	4	0	0	1	0	25	4	**80**
0630 - 0645	10	4	10	3	36	5	1	0	0	0	19	6	**94**
0645 - 0700	10	9	14	5	39	12	6	3	0	1	68	14	**181**
0700 - 0715	15	11	15	9	42	14	6	1	0	2	33	8	**156**
0715 - 0730	19	9	22	9	52	14	1	1	1	0	47	6	**181**
0730 - 0745	15	2	28	7	57	15	8	1	0	0	53	10	**196**
0745 - 0800	26	18	24	5	63	31	6	5	0	2	87	11	**278**
0800 - 0815	13	26	33	12	74	64	8	14	1	11	117	7	**380**
0815 - 0830	24	48	35	12	84	96	37	20	0	12	113	14	**495**
0830 - 0845	25	77	30	9	84	190	77	32	4	15	149	3	**695**
0845 - 0900	18	86	18	5	85	161	77	57	8	25	122	5	**667**
Period End	**188**	**295**	**245**	**87**	**657**	**608**	**227**	**134**	**15**	**68**	**850**	**93**	**3467**

Lights

Peak Time	NORTH Sheraton Rd L	T	R	WEST Mitchell Hwy L	T	R	SOUTH Sheraton Rd L	T	R	EAST Mitchell Hwy L	T	R	TOT
0600 - 0700	33	18	40	19	116	23	7	3	1	1	129	29	**419**
0615 - 0715	44	27	47	20	140	35	13	4	1	3	145	32	**511**
0630 - 0730	54	33	61	26	169	45	14	5	1	3	167	34	**612**
0645 - 0745	59	31	79	30	190	55	21	6	1	3	201	38	**714**
0700 - 0800	75	40	89	30	214	74	21	8	1	4	220	35	**811**
0715 - 0815	73	55	107	33	246	124	23	21	2	13	304	34	**1035**
0730 - 0830	78	94	120	36	278	206	59	40	1	25	370	42	**1349**
0745 - 0845	88	169	122	38	305	381	128	71	5	40	466	35	**1848**
0800 - 0900	80	237	116	38	327	511	199	123	13	63	501	29	**2237**
PEAK HOUR	**80**	**237**	**116**	**38**	**327**	**511**	**199**	**123**	**13**	**63**	**501**	**29**	**2237**

Heavies

Time Per	NORTH Sheraton Rd L	T	R	WEST Mitchell Hwy L	T	R	SOUTH Sheraton Rd L	T	R	EAST Mitchell Hwy L	T	R	TOT
0600 - 0615	0	0	0	0	0	0	0	0	0	0	1	2	**3**
0615 - 0630	1	0	0	0	2	0	0	0	0	0	4	0	**7**
0630 - 0645	2	0	0	0	1	0	0	0	0	0	1	3	**7**
0645 - 0700	3	0	0	0	4	0	0	0	0	0	0	1	**8**
0700 - 0715	2	0	0	0	3	0	0	0	0	0	1	1	**7**
0715 - 0730	1	0	0	0	3	0	1	0	0	0	5	1	**11**
0730 - 0745	3	1	1	0	6	1	4	0	0	0	1	1	**18**
0745 - 0800	0	0	0	1	6	0	0	0	0	0	3	1	**11**
0800 - 0815	2	0	0	0	1	0	0	0	0	1	1	2	**7**
0815 - 0830	3	5	1	0	4	7	3	5	0	3	4	1	**36**
0830 - 0845	2	5	1	0	3	4	6	6	1	3	8	0	**39**
0845 - 0900	1	2	2	3	4	6	6	6	2	0	3	0	**35**
Period End	**20**	**13**	**5**	**4**	**37**	**18**	**20**	**17**	**3**	**7**	**32**	**13**	**189**

Heavies

Peak Per	NORTH Sheraton Rd L	T	R	WEST Mitchell Hwy L	T	R	SOUTH Sheraton Rd L	T	R	EAST Mitchell Hwy L	T	R	TOT
0600 - 0700	6	0	0	0	7	0	0	0	0	0	6	6	**25**
0615 - 0715	8	0	0	0	10	0	0	0	0	0	6	5	**29**
0630 - 0730	8	0	0	0	11	0	1	0	0	0	7	6	**33**
0645 - 0745	9	1	1	0	16	1	5	0	0	0	7	4	**44**
0700 - 0800	6	1	1	1	18	1	5	0	0	0	10	4	**47**
0715 - 0815	6	1	1	1	16	1	5	0	0	1	10	5	**47**
0730 - 0830	8	6	2	1	17	8	7	5	0	4	9	5	**72**
0745 - 0845	7	10	2	1	14	11	9	11	1	7	16	4	**93**
0800 - 0900	8	12	4	3	12	17	15	17	3	7	16	3	**117**
PEAK HOUR	**8**	**12**	**3**	**3**	**12**	**17**	**15**	**17**	**3**	**7**	**16**	**3**	**117**

Combined

Time Per	NORTH Sheraton Rd L	T	R	WEST Mitchell Hwy L	T	R	SOUTH Sheraton Rd L	T	R	EAST Mitchell Hwy L	T	R	TOT
0600 - 0615	4	2	8	8	18	2	0	0	0	0	18	7	**67**
0615 - 0630	10	3	8	3	25	4	0	0	1	0	29	4	**87**
0630 - 0645	12	4	10	3	37	5	1	0	0	0	20	9	**101**
0645 - 0700	13	9	14	5	43	12	6	3	0	1	68	15	**189**
0700 - 0715	17	11	15	9	45	14	6	1	0	2	34	9	**163**
0715 - 0730	20	9	22	9	55	14	2	1	1	0	52	7	**192**
0730 - 0745	18	3	29	7	63	16	12	1	0	0	54	11	**214**
0745 - 0800	26	18	24	6	69	31	6	5	0	2	90	12	**289**
0800 - 0815	15	26	33	12	75	64	8	14	1	12	118	9	**387**
0815 - 0830	27	53	36	12	88	103	40	25	0	15	117	15	**531**
0830 - 0845	27	82	31	9	87	194	83	38	5	18	157	3	**734**
0845 - 0900	19	88	20	8	89	167	83	63	10	25	125	5	**702**
Period End	**208**	**308**	**250**	**91**	**694**	**626**	**247**	**151**	**18**	**75**	**882**	**106**	**3656**

Combined

Peak Per	NORTH Sheraton Rd L	T	R	WEST Mitchell Hwy L	T	R	SOUTH Sheraton Rd L	T	R	EAST Mitchell Hwy L	T	R	TOT
0600 - 0700	39	18	40	19	123	23	7	3	1	1	135	35	**444**
0615 - 0715	52	27	47	20	150	35	13	4	1	3	151	37	**540**
0630 - 0730	62	33	61	26	180	45	15	5	1	3	174	40	**645**
0645 - 0745	68	32	80	30	206	56	26	6	1	3	208	42	**758**
0700 - 0800	81	41	90	31	232	75	26	8	1	4	230	39	**858**
0715 - 0815	79	56	108	34	262	125	28	21	2	14	314	39	**1082**
0730 - 0830	86	100	122	37	295	214	66	45	1	29	379	47	**1421**
0745 - 0845	95	179	124	39	319	392	137	82	6	47	482	39	**1941**
0800 - 0900	88	249	120	41	339	528	214	140	16	70	517	32	**2354**
PEAK HOUR	**88**	**249**	**120**	**41**	**339**	**528**	**214**	**140**	**16**	**70**	**517**	**32**	**2354**

R.O.A.R DATA

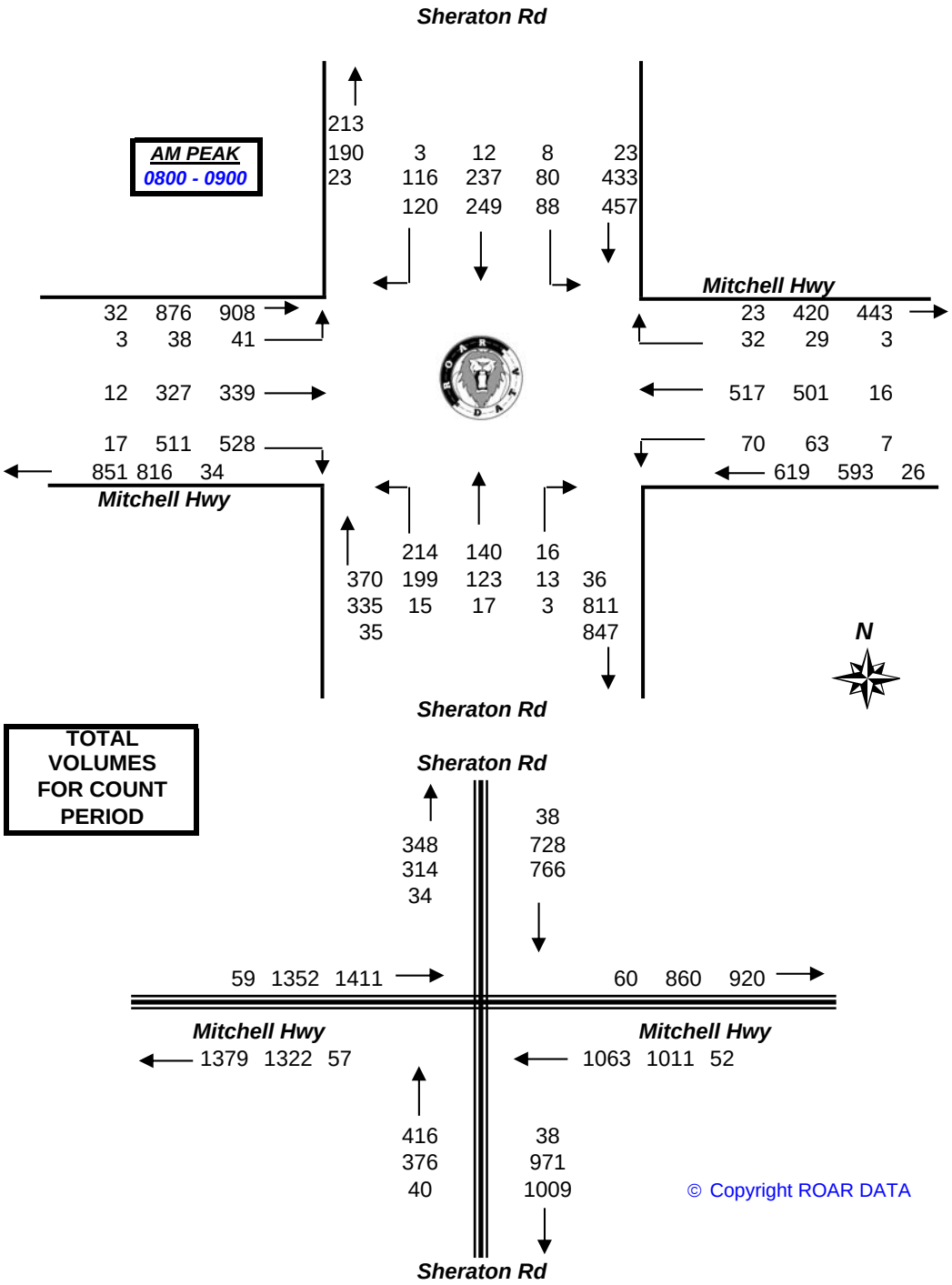
Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Wednesday 6th June 2019

Peds	NORTH	WEST	SOUTH	EAST	
	Sheraton Rd	*Mitchell Hwy*	*Sheraton Rd*	*Mitchell Hwy*	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
0600 - 0615	0	0	0	0	**0**
0615 - 0630	0	0	0	0	**0**
0630 - 0645	0	0	0	0	**0**
0645 - 0700	0	0	0	0	**0**
0700 - 0715	0	0	0	0	**0**
0715 - 0730	0	0	0	0	**0**
0730 - 0745	0	0	0	0	**0**
0745 - 0800	0	0	0	0	**0**
0800 - 0815	0	0	0	0	**0**
0815 - 0830	0	0	0	5	**5**
0830 - 0845	0	0	0	2	**2**
0845 - 0900	1	0	0	3	**4**
Period End	**1**	**0**	**0**	**10**	**11**

Peds	NORTH	WEST	SOUTH	EAST	
	Sheraton Rd	*Mitchell Hwy*	*Sheraton Rd*	*Mitchell Hwy*	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
0600 - 0700	0	0	0	0	**0**
0615 - 0715	0	0	0	0	**0**
0630 - 0730	0	0	0	0	**0**
0645 - 0745	0	0	0	0	**0**
0700 - 0800	0	0	0	0	**0**
0715 - 0815	0	0	0	0	**0**
0730 - 0830	0	0	0	5	**5**
0745 - 0845	0	0	0	7	**7**
0800 - 0900	1	0	0	10	**11**
PEAK HR	**1**	**0**	**0**	**10**	**11**



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Tuesday 4th June 2019

Lights

Time Per	NORTH Sheraton Rd			WEST Mitchell Hwy			SOUTH Sheraton Rd			EAST Mitchell Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1500 - 1515	16	56	13	22	60	96	43	32	2	7	61	18	**426**
1515 - 1530	15	34	9	32	57	87	95	65	19	5	81	14	**513**
1530 - 1545	16	25	13	24	65	85	68	59	9	7	86	16	**473**
1545 - 1600	13	8	14	39	75	36	46	23	7	3	69	18	**351**
1600 - 1615	26	17	23	37	97	36	41	27	2	5	75	23	**409**
1615 - 1630	9	10	21	38	100	42	37	23	3	2	86	23	**394**
1630 - 1645	18	11	15	38	83	31	37	25	3	1	108	19	**389**
1645 - 1700	12	7	12	42	116	58	50	21	5	1	82	34	**440**
1700 - 1715	23	12	23	36	102	29	39	20	1	1	89	10	**385**
1715 - 1730	213	12	19	46	152	29	34	19	3	3	59	17	**606**
1730 - 1745	10	8	15	39	99	35	26	15	1	1	68	19	**336**
1745 - 1800	14	18	30	45	89	37	22	20	1	5	50	11	**342**
Period End	**385**	**218**	**207**	**438**	**1095**	**601**	**538**	**349**	**56**	**41**	**914**	**222**	**5064**

Lights

Peak Time	NORTH Sheraton Rd			WEST Mitchell Hwy			SOUTH Sheraton Rd			EAST Mitchell Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1500 - 1600	60	123	49	117	257	304	252	179	37	22	297	66	**1763**
1515 - 1615	70	84	59	132	294	244	250	174	37	20	311	71	**1746**
1530 - 1630	64	60	71	138	337	199	192	132	21	17	316	80	**1627**
1545 - 1645	66	46	73	152	355	145	161	98	15	11	338	83	**1543**
1600 - 1700	65	45	71	155	396	167	165	96	13	9	351	99	**1632**
1615 - 1715	62	40	71	154	401	160	163	89	12	5	365	86	**1608**
1630 - 1730	266	42	69	162	453	147	160	85	12	6	338	80	**1820**
1645 - 1745	258	39	69	163	469	151	149	75	10	6	298	80	**1767**
1700 - 1800	260	50	87	166	442	130	121	74	6	10	266	57	**1669**
PEAK HOUR	**266**	**42**	**69**	**162**	**453**	**147**	**160**	**85**	**12**	**6**	**338**	**80**	**1820**

Heavies

Time Per	NORTH Sheraton Rd			WEST Mitchell Hwy			SOUTH Sheraton Rd			EAST Mitchell Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1500 - 1515	1	8	1	0	1	1	5	2	0	0	0	0	**19**
1515 - 1530	0	12	0	0	2	6	6	2	0	0	3	0	**31**
1530 - 1545	0	2	0	0	2	3	9	4	0	0	3	0	**23**
1545 - 1600	0	2	0	1	2	1	1	2	2	0	0	0	**11**
1600 - 1615	0	2	0	1	8	0	1	0	1	0	2	1	**16**
1615 - 1630	0	0	0	0	0	0	0	1	0	0	2	1	**4**
1630 - 1645	1	0	0	1	5	0	0	0	0	0	2	2	**11**
1645 - 1700	0	1	0	0	2	4	0	0	0	0	2	1	**10**
1700 - 1715	1	0	1	0	3	0	0	0	0	0	1	0	**6**
1715 - 1730	0	0	0	0	1	1	0	0	0	0	1	1	**4**
1730 - 1745	1	0	0	1	3	0	0	0	0	0	0	0	**5**
1745 - 1800	2	0	0	0	2	0	0	0	0	0	1	1	**6**
Period End	**6**	**27**	**2**	**4**	**31**	**16**	**22**	**11**	**3**	**0**	**17**	**7**	**146**

Heavies

Peak Per	NORTH Sheraton Rd			WEST Mitchell Hwy			SOUTH Sheraton Rd			EAST Mitchell Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1500 - 1600	1	24	1	1	7	11	21	10	2	0	6	0	**84**
1515 - 1615	0	18	0	2	14	10	17	8	3	0	8	1	**81**
1530 - 1630	0	6	0	2	12	4	11	7	3	0	7	2	**54**
1545 - 1645	1	4	0	3	15	1	2	3	3	0	6	4	**42**
1600 - 1700	1	3	0	2	15	4	1	1	1	0	8	5	**41**
1615 - 1715	2	1	1	1	10	4	0	1	0	0	7	4	**31**
1630 - 1730	2	1	1	1	11	5	0	0	0	0	6	4	**31**
1645 - 1745	2	1	1	1	9	5	0	0	0	0	4	2	**25**
1700 - 1800	4	0	1	1	9	1	0	0	0	0	3	2	**21**
PEAK HOUR	**2**	**1**	**1**	**1**	**11**	**5**	**0**	**0**	**0**	**0**	**6**	**4**	**31**

Combined

Time Per	NORTH Sheraton Rd			WEST Mitchell Hwy			SOUTH Sheraton Rd			EAST Mitchell Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1500 - 1515	17	64	14	22	61	97	48	34	2	7	61	18	**445**
1515 - 1530	15	46	9	32	59	93	101	67	19	5	84	14	**544**
1530 - 1545	16	27	13	24	67	88	77	63	9	7	89	16	**496**
1545 - 1600	13	10	14	40	77	37	47	25	9	3	69	18	**362**
1600 - 1615	26	19	23	38	105	36	42	27	3	5	77	24	**425**
1615 - 1630	9	10	21	38	100	42	37	24	3	2	88	24	**398**
1630 - 1645	19	11	15	39	88	31	37	25	3	1	110	21	**400**
1645 - 1700	12	8	12	42	118	62	50	21	5	1	84	35	**450**
1700 - 1715	24	12	24	36	105	29	39	20	1	1	90	10	**391**
1715 - 1730	213	12	19	46	153	30	34	19	3	3	60	18	**610**
1730 - 1745	11	8	15	40	102	35	26	15	1	1	68	19	**341**
1745 - 1800	16	18	30	45	91	37	22	20	1	5	51	12	**348**
Period End	**391**	**245**	**209**	**442**	**1126**	**617**	**560**	**360**	**59**	**41**	**931**	**229**	**5210**

Combined

Peak Per	NORTH Sheraton Rd			WEST Mitchell Hwy			SOUTH Sheraton Rd			EAST Mitchell Hwy			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1500 - 1600	61	147	50	118	264	315	273	189	39	22	303	66	**1847**
1515 - 1615	70	102	59	134	308	254	267	182	40	20	319	72	**1827**
1530 - 1630	64	66	71	140	349	203	203	139	24	17	323	82	**1681**
1545 - 1645	67	50	73	155	370	146	163	101	18	11	344	87	**1585**
1600 - 1700	66	48	71	157	411	171	166	97	14	9	359	104	**1673**
1615 - 1715	64	41	72	155	411	164	163	90	12	5	372	90	**1639**
1630 - 1730	268	43	70	163	464	152	160	85	12	6	344	84	**1851**
1645 - 1745	260	40	70	164	478	156	149	75	10	6	302	82	**1792**
1700 - 1800	264	50	88	167	451	131	121	74	6	10	269	59	**1690**
PEAK HOUR	**268**	**43**	**70**	**163**	**464**	**152**	**160**	**85**	**12**	**6**	**344**	**84**	**1851**

R.O.A.R DATA

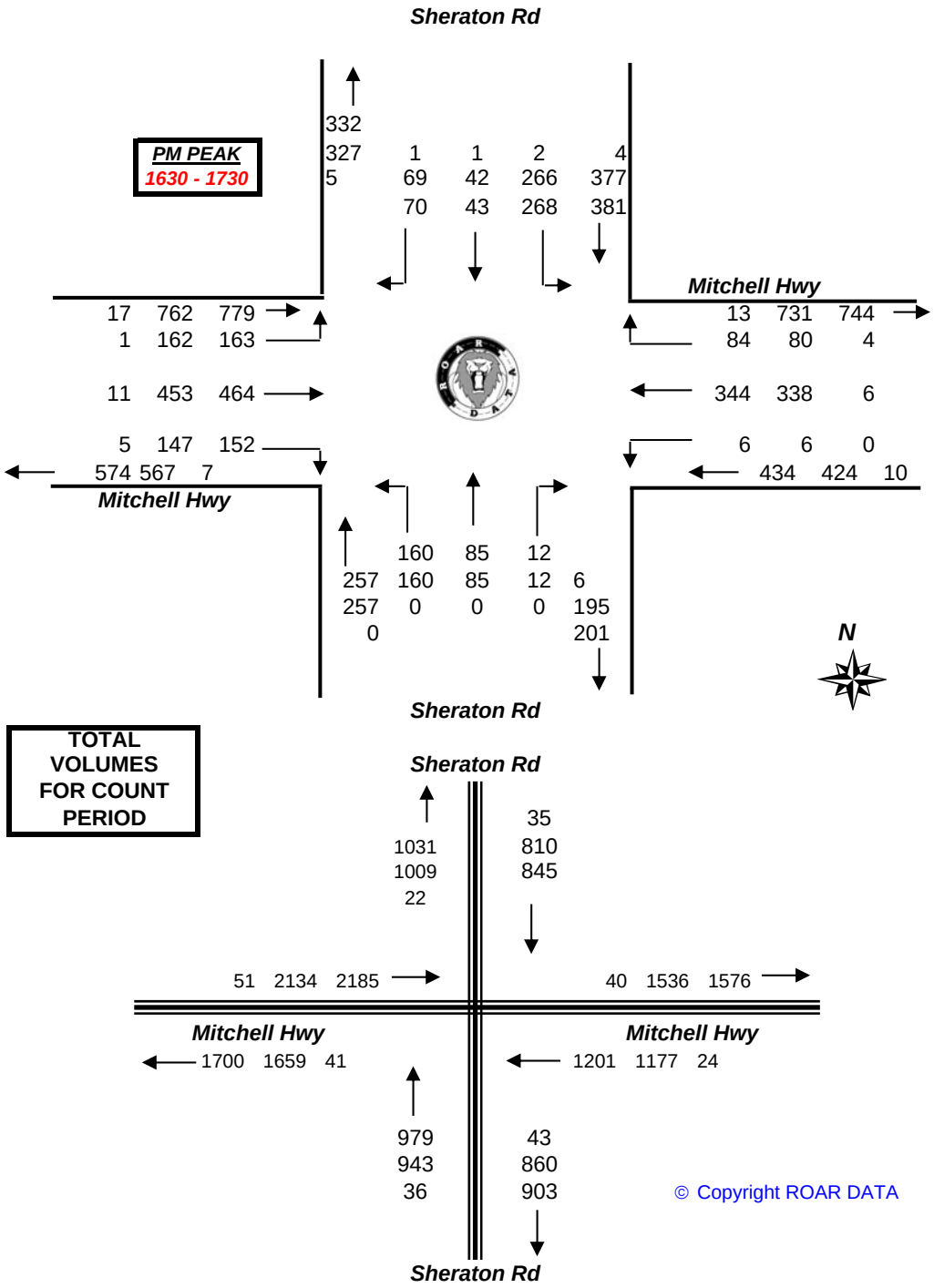
Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Tuesday 4th June 2019

Peds	NORTH	WEST	SOUTH	EAST	
	Sheraton Rd	*Mitchell Hwy*	*Sheraton Rd*	*Mitchell Hwy*	
Time Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1500 - 1515	0	0	0	1	1
1515 - 1530	0	0	3	7	10
1530 - 1545	5	4	3	7	19
1545 - 1600	0	0	0	0	0
1600 - 1615	2	0	0	1	3
1615 - 1630	0	0	0	0	0
1630 - 1645	0	0	1	0	1
1645 - 1700	0	1	1	0	2
1700 - 1715	0	1	0	0	1
1715 - 1730	0	0	0	0	0
1730 - 1745	0	1	0	0	1
1745 - 1800	0	0	0	0	0
Period End	**7**	**7**	**8**	**16**	**38**

Peds	NORTH	WEST	SOUTH	EAST	
	Sheraton Rd	*Mitchell Hwy*	*Sheraton Rd*	*Mitchell Hwy*	
Peak Per	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	TOT
1500 - 1600	5	4	6	15	30
1515 - 1615	7	4	6	15	32
1530 - 1630	7	4	3	8	22
1545 - 1645	2	0	1	1	4
1600 - 1700	2	1	2	1	6
1615 - 1715	0	2	2	0	4
1630 - 1730	0	2	2	0	4
1645 - 1745	0	3	1	0	4
1700 - 1800	0	2	0	0	2
PEAK HR	**0**	**2**	**2**	**0**	**4**




Appendix B

Road safety audit




Holcim Dubbo Quarry

Road Safety Audit

BITZIOS consulting
traffic engineering • transport planning

EMM

17 August 2020

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P4656.002R Holcim Dubbo Quarry RSA	A. Giyahi	A. Ahmed	A. Giyahi	17/08/2020	auddin@emmconsulting.com.au

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1. INTRODUCTION

1.1 Background

Bitzios Consulting has been engaged by EMM to undertake a Road Safety Audit (RSA) for the existing Sheraton Road and Mitchell Highway with the view of forecasting the risks associated with the expansion of Holcim Quarry which will potentially incur more heavy vehicle movements along Sheraton Road and Mitchell Highway. Figure 1.1 identifies the Holcim Quarry and surrounding Sheraton Road and Mitchel Highway Road Network (audit area).

1.2 Project Details

It is understood that Holcim Quarry is pursuing a development application to expand its current extractive industry in Sheraton Road to increase the basalt extraction capacity of the quarry.

1.3 Study Area

The study area includes a section of Sheraton Road from the intersection with Mitchell Highway to Holcim Quarry as shown in Figure 1.1.

Figure 1.1: Study Area

1.4 Scope of Audit

The RSA was undertaken in accordance with the procedure set out in *Austroads Guide to Road* Safety. The RSA involved undertaking an audit of the Mitchell Highway / Sheraton Road intersection and Sheraton Road South existing operation, for the various road users and vehicle types during different peak hours particularly during school drop of and pick up times outside school holidays.

The scope of the RSA included reviewing the existing Sheraton Road operation and heavy vehicle movements along this road in conjunction with school zone operation during drop off and pick up times and existing site conditions.

Specifically, the following items were reviewed from an operational road safety perspective:

- Sight distances and grades
- Signs and pavement markings
- Roadside objects and hazards
- School Children Crossing
- Schools Drop off and Pick up Areas
- Existing Traffic Conditions and Driving Behaviour

This RSA details a list of safety issues identified during the site visit and review of the submitted design, that present a road safety risk.

2. EXISTING TRAFFIC AND TRANSPORT

2.1 Overview

The section of Sheraton Road between Mitchell Highway and Holcim Quarry is about 3.0km long. It is a north-south running local road which provides access to the educational, recreational, and industrial developments within. Based on the surrounding land uses, the section of Sheraton Road can be sub-divided into two sub-sections:

- **Northern Section**: The northern section of Sheraton Road is about 700m long and is four lanes wide (two-lane each way). The section has adequate traffic signs and road markings and the pavement is in fair condition
- **Southern Section**: The southern section is two-lane wide (one-lane each way). Generally, the pavement is in poor condition particularly at bends and intersection approaches.

2.2 Existing Land Use

2.2.1 Overview

The land use in the northern section of Sheraton Road is predominantly educational, retail, industrial. The Holcim Quarry is located on the southern section, which is zoned as special industry and urban expansion land uses, as shown in Figure 2.1.

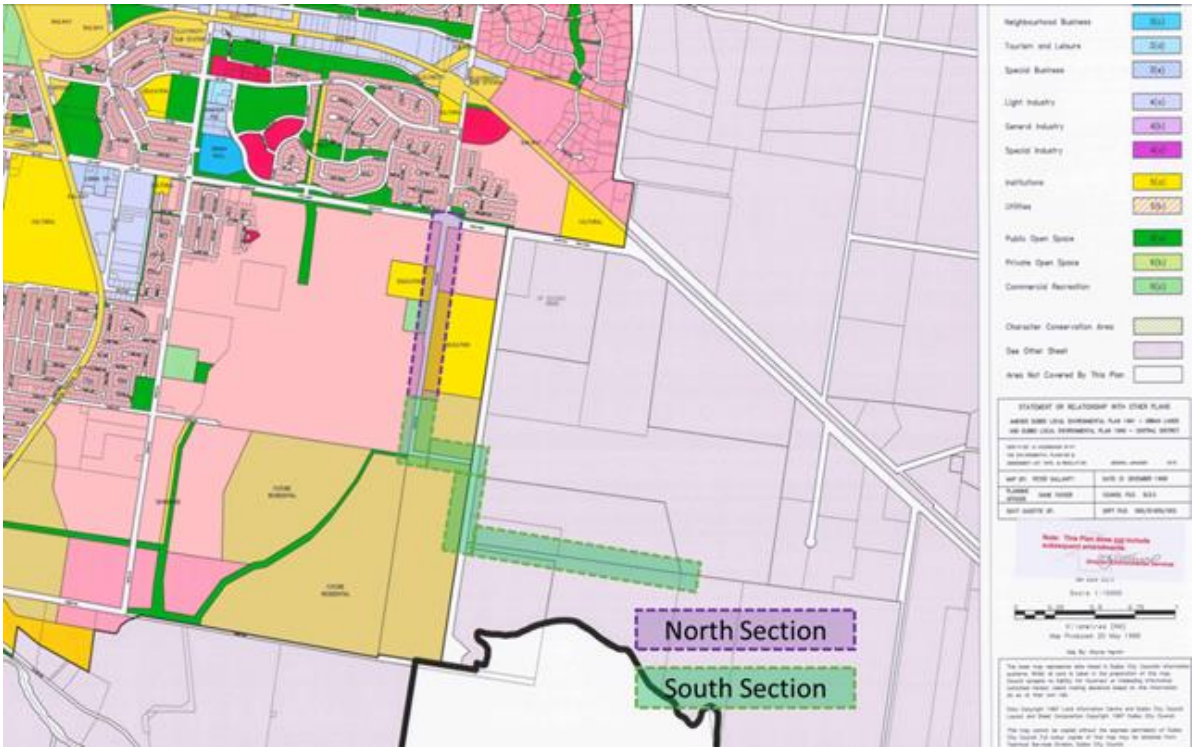


Figure 2.1: Existing Land Use

2.2.2 Education Precinct

Sheraton Road accommodates several education institutes and schools:

- Saint Johns Primary
- St Johns College
- Dubbo Christian School.

2.2.2.1 Saint Johns Primary

St John's Primary School moved to its current location on Sheraton Road in 2006 where it currently caters for students from Kindergarten to Year 6.

2.2.2.2 St Johns College

The College caters for Catholic education for boys and girls from Year 7 to 12 and operated on Sheraton Road. At present there are 980 students enrolled at the College. The College employs a teaching staff of 83.

2.2.2.3 Dubbo Christian School

The school is located at 141 Sheraton Road. They offer Bible-based and Christ centred schooling to students from Preschool to Year 12. The school was established in 1983 as a K-6 co-educational Christian school and has since grown to be a Preschool to Year 12 school of approximately 600 students.

2.2.3 Bunnings Warehouse

The recently opened Bunnings Warehouse is located at Corner of Sheraton Road and Mitchell Highway and operates everyday between 6:30am-7:00pm. One of the two accesses to Bunnings is located on Sheraton Road. The development generates substantial number of trips during the afternoon.

2.2.4 Holcim Quarry

Dubbo Quarry is a basalt quarry owned and operated by Holcim (Australia) Pty Limited (Holcim), located approximately 1.9 kilometres (km) west of the city of Dubbo on Sheraton Road. The quarry produces high quality basalt aggregates for use in the construction industry such as concrete and asphalt production and for use as road base. Precoated sealing aggregates from crushed basalt are also produced at the quarry.

The quarry uses a drill and blast quarrying method to produce many types of road base, both specification and non-specification, such as the premium road base product Heavy Duty DGB20 which is frequently used by local councils and RMS for the construction and upgrade of roads. The quarry also sells construction materials to civil construction projects, engineering projects, subdivision work, industrial projects, commercial and domestic customers.

2.2.5 MAAS Group

MAAS Group is located at 20L Sheraton Road, Dubbo NSW 2830. MAAS Group is a civil construction company that operates primarily throughout Central West NSW. Their activities mainly comprise :

- Residential, Commercial and Industrial Developments
- Road Works
- Dams and Drainage
- Infrastructure Construction
- Quarrying.

2.2.6 Dubbo Sports World

Dubbo Sportsworld is a large, multipurpose sports facility catering for a host of indoor sports including netball, basketball, cricket, soccer, floor ball, and the ideal party activities laser skirmish, bubble soccer, and indoor sports. The facility was closed at the time of inspection due to Covid-19 outbreak.

2.3 Public Transport

An exclusive bus 'pick-up and drop-off' area is located east of Sheraton Road between Saint Johns Primary and St Johns College. The schools within the study area are serviced by the following Bus Lines:

- Frog Line 3
- Penguin Line 4
- Horse Line 6
- Owl Line 7
- Hippopotamus Line 9
- Zebra Line 10
- Lion Line 11
- Parrot Line 12
- Squirrel Line 16
- Butterfly Line 18
- Swan Line 19
- Monkey Line 20
- Rhino Line 2

During the site visit it was observed that:

- When buses exit the 'pick-up and drop-off' area and subsequently undertake a 'U' turn, the northbound and southbound vehicles on Sheraton Road give way to these buses as shown in Figure 2.2
- This behaviour cases flow disruptions on Sheraton Road during the school drop-off and pick-up periods.

Figure 2.2: General Traffic Give Way to Turning Buses

2.4 Pedestrian Provisions

Connected footpaths are available along the entire length of the Northern Section of Sheraton Road. In addition, there are two mid-block children crossings with dropped kerbs:

- One outside the northern side of St Johns Primary
- One outside the northern side of St Johns College.

The children crossing in the northern side of St Johns Primary are supervised by two school crossing supervisors.

2.5 Traffic Volumes

Turning counts surveys at the Mitchell Highway/Sheraton Road roundabout intersection were undertaken by Roar Traffic during the following time periods:

- **AM Peak:** Wednesday 5th June 2019 between 8.00am and 9.00am
- **PM Peak:** Tuesday 4th June 2019 between 4.30pm and 5.30pm

The survey results are included in **Appendix A**. A detailed analysis of the AM and PM peak traffic flows on the Sheraton Road (South) approach shows that:

- In the core AM peak (between 8.00am and 9.00am) the proportion of heavy vehicles could be as high as 12% in the total traffic mix as shown in Figure 2.3.
- In the core PM peak (between 3.00pm and 4.00pm) the heavy vehicle proportion could be up to 9% as shown in Figure 2.4.

While the number of heavy vehicles is made up predominantly of school buses, during the site visit a number of heavy trucks were seen to have used Sheraton Road (South).

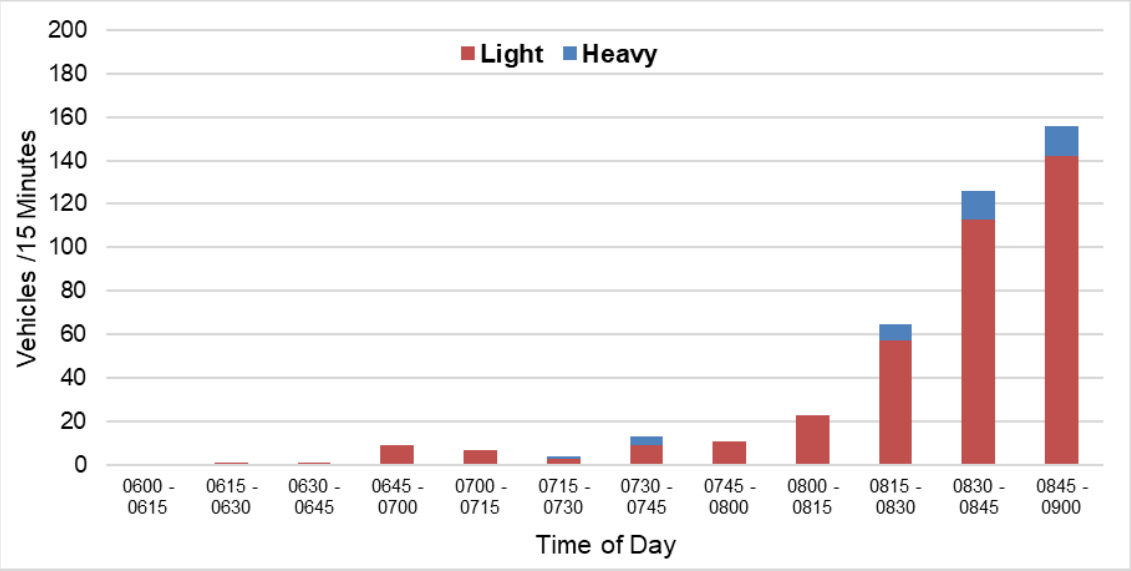


Figure 2.3: **AM Peak Traffic Flows Compositions - Sheraton Road (South) Approach**

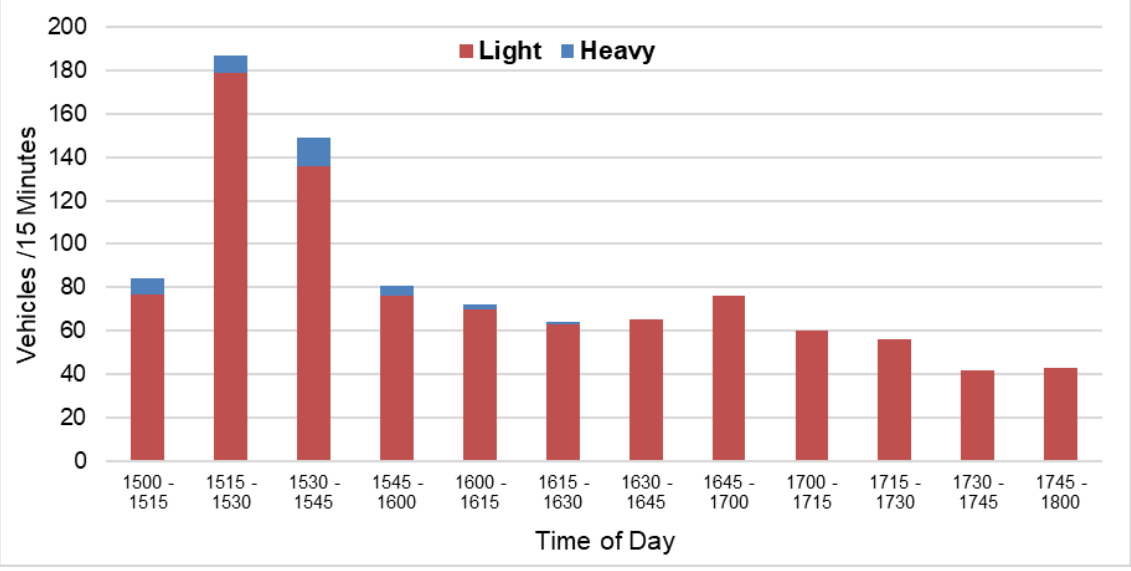


Figure 2.4: **PM Peak Traffic Flows Compositions – Sheraton Road (South) Approach**

2.6 Speed Limit

The northern section of Sheraton Road is subject to 60km/h speed limit. The only school zone is located for the most part of the northern section. The southern section of Sheraton Road has a speed limit of 100km/h with advisory speed limit as low as 35km/h at locations on approaches to significant bends as shown in Figure 2.5. The speed limit of 100km/h is considered to be too high for the existing road environment.

Figure 2.5: Advisory Speed Limit Signs on the Southern Section

2.7 Pavement Conditions

The pavement in the northern section of Sheraton Road is in fair condition as shown in Figure 2.6. However, the pavement in the southern section is in poor condition as shown in Figure 2.7. There are cracks at a number of locations and the surface is generally rough.

Figure 2.6: Pavement Condition - Northern Section

Figure 2.7: Pavement Condition - Southern Section

2.8 Future Road Connections

Dubbo Regional Council is currently constructing the Boundary Road extension. It is understood that the eastern side of the extension will be connected to Sheraton Road through a proposed roundabout as shown in Figure 2.8.

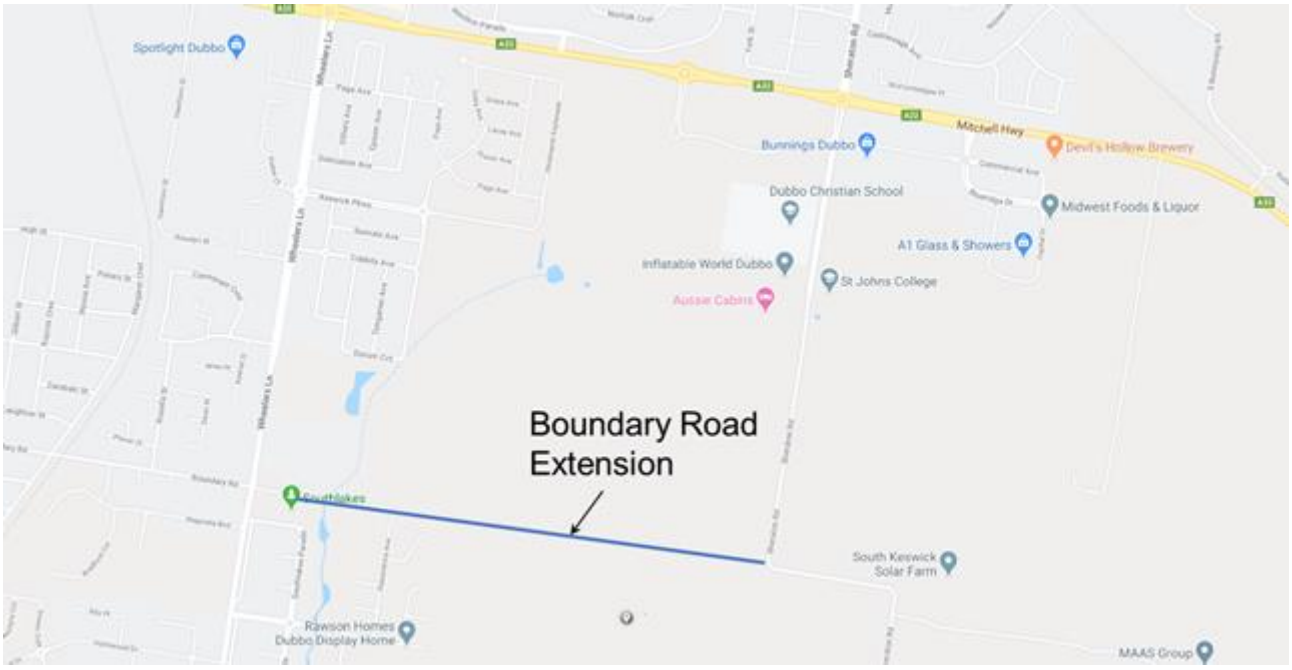


Figure 2.8: Boundary Road Extension

2.9 Crash Data Analysis

Five-year crash data for the 3km section of Sheraton Road was sourced from Council. Crash analysis suggests that in the five-year period ending December 2019, a total of six crashes have been reported. Three crashes resulted in casualties and the remaining are damage only crashes.

All six are single or multi-vehicle crashes with no pedestrians involved in any of the reported crashes. The outcomes from the crash analysis are summarised in Figure 2.9.

Location	RUM Code	RUM Description	Severity	Vehicle Movement (Guess)
A	84	Off right/left bend	Non-Casualty	Southbound vehicle misses turn
B	71	Off rd left => obj	Non-Casualty	-
C	71	Off rd left => obj	Non-Casualty	-
D	21	Right through	Moderate Injury	Southbound vehicle turning right into northbound vehicle
E	10	Cross traffic	Non-Casualty	Northbound vehicle into eastbound vehicle
F	30	Rear end	Non-Casualty	-

Figure 2.9: Sheraton Road Crash Data Analysis Summary

3. ROAD SAFETY AUDIT PROCESS

3.1 Definition, Objectives and Benefits

Austroads GTRS Part 6 defines a road safety audit as: *"a formal, robust technical assessment of road safety risks associated with road transport projects".* An RSA can also consider existing infrastructure.

The key elements of an RSA are that it is:

- A formal process and not an informal check
- An independent process
- To be carried out by someone with appropriate experience and training
- To be restricted to identifying transport safety issues.

The key objectives of an RSA are to:

- Identify any existing safety deficiencies of design, layout and road furniture which are not consistent with the road's function or use
- Identify potential safety problems for road users and others affected by a road project
- Ensure that measures to eliminate or reduce the problems are considered fully.

The benefits of conducting an RSA include that the:

- Likelihood of accidents on the road network can be reduced
- Severity of accidents can be reduced.

Importantly, the RSA was carried out generally in accordance with *Austroads GTRS Part 6 and Austroads GTRS Part 6A requirements.*

3.2 Methodology

The audit team assessed crash data and traffic volume in conjunction with 3 site visit to carefully observe road users behaviour and vehicular traffic condition during peak hours of the days particularly during school times. The risks associated with increasing the number of heavy vehicles due to expansion of Holcim Quarry was assessed considering the existing road condition. Potential road safety issues and risks associated with proposed expansion were raised and assessed in Table 4.1.

3.3 Audit Team

The RSA was carried out by the following persons:

- Alex Giyahi - Accredited NSW Road Safety Auditor (Lead Auditor)
- Arif Ahmed - Accredited NSW Road Safety Auditor.

3.4 Information Sources

Traffic Survey data was provided by EMM for the purpose of this audit. No specific design or plans were provided by the client for this audit.

3.5 Site Inspections

A day-time (morning School Zone), mid-day (afternoon School Zone) and night-time site inspection was carried out as part of the RSA. These inspections were carried out on 11th and 12th June 2020.

3.6 Audit History

The audit team is not aware of any previous Road Safety Audits undertaken at this location.

3.7 Risk Assessment

The issues identified have been prioritised based on AustRoads' Standard risk assessment. The risk level is based on a combination of the frequency that a crash type will happen by the severity of the resulting crash. Table 3.1 is from *AustRoads' Guide to Road Safety: Part 6A.*

Table 3.1: Adopted Risk Matrix (Frequency vs. Severity)

Risk Matrix		Frequency			
		Improbable	Occasional	Probable	Frequent
Severity	Catastrophic	High	Intolerable	Intolerable	Intolerable
	Serious	Medium	High	Intolerable	Intolerable
	Minor	Low	Medium	High	Intolerable
	Limited	Low	Low	Medium	High

Table 3.2 outlines the suggested treatment approach for each risk level which was sourced from *AustRoads' Guide to Road Safety: Part 6A.*

Table 3.2: Suggested Treatment Approach)

Risk	Definition
Intolerable	Must be corrected
High	Should be corrected or the risk significantly reduced, even if the treatment cost is high
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate
Low	Should be corrected or the risk reduced, if the treatment cost is low

4. ROAD SAFETY AUDIT PROCESS

4.1 Overview

The section summarises the safety issues identified during the audit of the site inspection. The key audit findings are outlined in Section 4.2 followed by a table of specific issues in Section 4.3.

4.2 Key Audit Findings

A summary of key audit findings is provided below:

- A mid-block children crossing with more than one traffic lanes in each direction
- An unconventional way to give way school buses by the familiar drives which might be unknown to unfamiliar drivers
- The 'U' turn movements at south side of Northern Section of Sheraton Road
- Drop-off and pick-up queue overflow onto Sheraton Road southbound
- Long queues at the Sheraton Road (South) approach to the Mitchell Highway intersection might push back to the children crossing
- Long waiting time for vehicles turning right out of the Bunnings access onto Sheraton Road in the afternoon during school pick-up time and lack of "Keep Clear" area
- Three tight bends in the southern section of Sheraton Road with insufficient width for the heavy vehicles passing each other and poor pavement conditions.

Issues maps are provided in **Appendix B** identifying the locations of each item detailed in Table 4.1

4.3 Audit Findings

The various safety issues identified are detailed in Table 4.1.

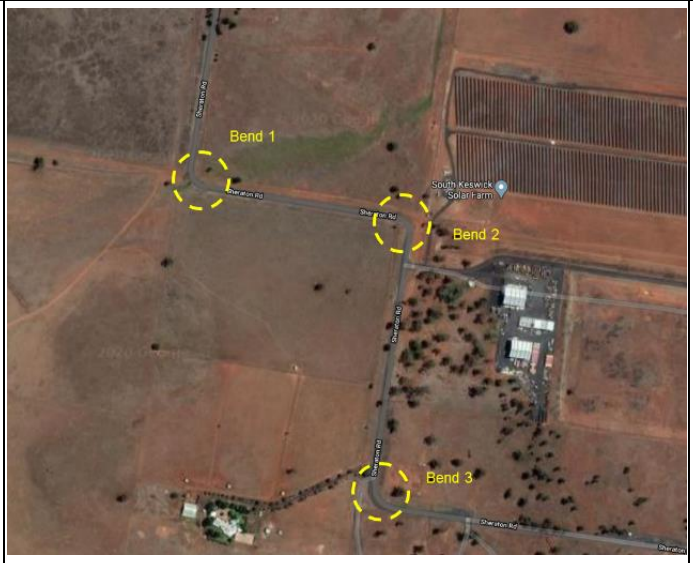
Table 4.1: Road Safety Review Findings

Item	Issues	Risk	Site Illustrations	Responses
1	**Children Crossing** The mid-block children crossing located in the northern side of St Johns Primary is supervised by two school crossing supervisors. Sheraton Road is four-lane (two-lane each way) wide at this location. In the event a large vehicle (e.g. bus, semi-rigid or B-Double Truck) occupies the median side lane, it may obscure the site line of the driver on the kerbside lane. The drive may not be able to see pedestrians or even the school crossing supervisor at the crossing. Therefore, the diver may fail to give way and subsequently collide with pedestrians at the crossing.	High		

Item	Issues	Risk	Site Illustrations	Responses
2	**Bus Movements** During the site visit it was observed that through vehicles on Sheraton Road give way to school buses exiting the bus 'pick-up and drop-off area'. It is possible that an unfamiliar driver may fail to give way and collide with a bus full of school children.	High	 	
3	**U-Turn Movements** Parents and bus drivers travelling south on Sheraton Road use the end of the median in the southern side to undertake a U-turn. During the site visit it was observed that they cross two lanes to complete the U-turn movement. Unfamiliar and speeding drivers on the Sheraton Road northbound may fail to slow down or stop to give way and subsequently collide with the U-turning vehicle.	Medium		

Item	Issues	Risk	Site Illustrations	Responses
4	**Queue push back from the drop-off & Pick-up zone** During the site visit it was observed that queues from the 'pick-up and drop-off' area located inside the St Johns Primary extend back along the southbound Sheraton Road. Slow-moving queues of about 100m occupy the kerbside lane increasing the risk of rear-end crashes or side swipe crashes due to inappropriate veering to the right at this location.	Medium		
5	**Long queues at Sheraton Road/Mitchell Highway** During the afternoon peak period, long queues (about 300m) of slow- moving vehicles were seen on the Sheraton Road (south) approach to the Mitchell Highway intersection. The queues occasionally extend back to the children crossing. This presents a hazard to children at the crossing.	Low		

Item	Issues	Risk	Site Illustrations	Responses
6	Bunnings has two alternative accesses: one on Sheraton Road and the other on Mitchell Highway. During the site visit it was observed that some vehicles use the Sheraton Road exit to access Mitchell Highway even if they have to give way to four lanes of traffic on Sheraton Road. During the busy PM peak period, it was observed that these drivers were struggling to find suitable gaps in traffic on Sheraton Road. The situation is exacerbated by heavy slow-moving vehicles on the northbound Sheraton Road.	Medium	 	

Item	Issues	Risk	Site Illustrations	Responses
7	**Tight Bends South of Sheraton Road** The carriageway at three bends in the southern section of Sheraton Road is not wide enough to accommodate two heavy vehicles to pass simultaneously. During the site visit it was observed that one approaching truck has to stop and give way to the other truck coming from the opposite direction. The lack of coordination between two truck approaching from different directions could result in head-on collision. Moreover, the pavement at these bends is of a poor standard including the following deficiencies: ▪ Cracking, rough surfaces and corrugations ▪ Narrow formation and deteriorating pavement edge condition. The cracked pavement and rough surface conditions have the potential to de-stabilise a vehicle. This could lead to axel and tyre damage, and reduced skid resistance due to loss of tyre pavement contact. The cracked pavement also causes water ponding leading to direct and indirect safety risks.	Medium	   	

5. CONCLUDING STATEMENT

This RSA was carried out generally in accordance with procedures set out in the Austroads GTRS Part 6A and Austroads GTRS Part 6.

Issues expected to impact traffic and transport related safety were identified. However, it is important to note that no guarantee is made that every issue was identified.

Importantly, if all of the possible remedial measures identified in this report were implemented, there is no guarantee that the transport network would be 'safe'. Rather, it is expected that these measures would only improve safety.

Alex Giyahi
Bitzios Consulting
Principal Traffic Engineer and Transport Planner
Accredited Level 3 Road Safety Auditor (Lead Auditor)

Arif Ahmed
Bitzios Consulting
Principal Traffic Engineer and Transport Planner
Accredited Road Safety Auditor

Appendix A: Traffic Survey Results

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Wednesday 6th June 2019

Lights

Time Per	NORTH Sheraton Rd L	NORTH Sheraton Rd T	NORTH Sheraton Rd R	WEST Mitchell Hwy L	WEST Mitchell Hwy T	WEST Mitchell Hwy R	SOUTH Sheraton Rd L	SOUTH Sheraton Rd T	SOUTH Sheraton Rd R	EAST Mitchell Hwy L	EAST Mitchell Hwy T	EAST Mitchell Hwy R	TOT
0600 - 0615	4	2	8	8	18	2	0	0	0	0	17	5	**64**
0615 - 0630	9	3	8	3	23	4	0	0	1	0	25	4	**80**
0630 - 0645	10	4	10	3	36	5	1	0	0	0	19	6	**94**
0645 - 0700	10	9	14	5	39	12	6	3	0	1	68	14	**181**
0700 - 0715	15	11	15	9	42	14	6	1	0	2	33	8	**156**
0715 - 0730	19	9	22	9	52	14	1	1	1	0	47	6	**181**
0730 - 0745	15	2	28	7	57	15	8	1	0	0	53	10	**196**
0745 - 0800	26	18	24	5	63	31	6	5	0	2	87	11	**278**
0800 - 0815	13	26	33	12	74	64	8	14	1	11	117	7	**380**
0815 - 0830	24	48	35	12	84	96	37	20	0	12	113	14	**495**
0830 - 0845	25	77	30	9	84	190	77	32	4	15	149	3	**695**
0845 - 0900	18	86	18	5	85	161	77	57	8	25	122	5	**667**
Period End	**188**	**295**	**245**	**87**	**657**	**608**	**227**	**134**	**15**	**68**	**850**	**93**	**3467**

Lights

Peak Time	NORTH Sheraton Rd L	NORTH Sheraton Rd T	NORTH Sheraton Rd R	WEST Mitchell Hwy L	WEST Mitchell Hwy T	WEST Mitchell Hwy R	SOUTH Sheraton Rd L	SOUTH Sheraton Rd T	SOUTH Sheraton Rd R	EAST Mitchell Hwy L	EAST Mitchell Hwy T	EAST Mitchell Hwy R	TOT
0600 - 0700	33	18	40	19	116	23	7	3	1	1	129	29	**419**
0615 - 0715	44	27	47	20	140	35	13	4	1	3	145	32	**511**
0630 - 0730	54	33	61	26	169	45	14	5	1	3	167	34	**612**
0645 - 0745	59	31	79	30	190	55	21	6	1	3	201	38	**714**
0700 - 0800	75	40	89	30	214	74	21	8	1	4	220	35	**811**
0715 - 0815	73	55	107	33	246	124	23	21	2	13	304	34	**1035**
0730 - 0830	78	94	120	36	278	206	59	40	1	25	370	42	**1349**
0745 - 0845	88	169	122	38	305	381	128	71	5	40	466	35	**1848**
0800 - 0900	80	237	116	38	327	511	199	123	13	63	501	29	**2237**
PEAK HOUR	**80**	**237**	**116**	**38**	**327**	**511**	**199**	**123**	**13**	**63**	**501**	**29**	**2237**

Heavies

Time Per	NORTH Sheraton Rd L	NORTH Sheraton Rd T	NORTH Sheraton Rd R	WEST Mitchell Hwy L	WEST Mitchell Hwy T	WEST Mitchell Hwy R	SOUTH Sheraton Rd L	SOUTH Sheraton Rd T	SOUTH Sheraton Rd R	EAST Mitchell Hwy L	EAST Mitchell Hwy T	EAST Mitchell Hwy R	TOT
0600 - 0615	0	0	0	0	0	0	0	0	0	0	1	2	**3**
0615 - 0630	1	0	0	0	2	0	0	0	0	0	4	0	**7**
0630 - 0645	2	0	0	0	1	0	0	0	0	0	1	3	**7**
0645 - 0700	3	0	0	0	4	0	0	0	0	0	0	1	**8**
0700 - 0715	2	0	0	0	3	0	0	0	0	0	1	1	**7**
0715 - 0730	1	0	0	0	3	0	1	0	0	0	5	1	**11**
0730 - 0745	3	1	1	0	6	1	4	0	0	0	1	1	**18**
0745 - 0800	0	0	0	1	6	0	0	0	0	0	3	1	**11**
0800 - 0815	2	0	0	0	1	0	0	0	0	1	1	2	**7**
0815 - 0830	3	5	1	0	4	7	3	5	0	3	4	1	**36**
0830 - 0845	2	5	1	0	3	4	6	6	1	3	8	0	**39**
0845 - 0900	1	2	2	3	4	6	6	6	2	0	3	0	**35**
Period End	**20**	**13**	**5**	**4**	**37**	**18**	**20**	**17**	**3**	**7**	**32**	**13**	**189**

Heavies

Peak Per	NORTH Sheraton Rd L	NORTH Sheraton Rd T	NORTH Sheraton Rd R	WEST Mitchell Hwy L	WEST Mitchell Hwy T	WEST Mitchell Hwy R	SOUTH Sheraton Rd L	SOUTH Sheraton Rd T	SOUTH Sheraton Rd R	EAST Mitchell Hwy L	EAST Mitchell Hwy T	EAST Mitchell Hwy R	TOT
0600 - 0700	6	0	0	0	7	0	0	0	0	0	6	6	**25**
0615 - 0715	8	0	0	0	10	0	0	0	0	0	6	5	**29**
0630 - 0730	8	0	0	0	11	0	1	0	0	0	7	6	**33**
0645 - 0745	9	1	1	0	16	1	5	0	0	0	7	4	**44**
0700 - 0800	6	1	1	1	18	1	5	0	0	0	10	4	**47**
0715 - 0815	6	1	1	1	16	1	5	0	0	1	10	5	**47**
0730 - 0830	8	6	2	1	17	8	7	5	0	4	9	5	**72**
0745 - 0845	7	10	2	1	14	11	9	11	1	7	16	4	**93**
0800 - 0900	8	12	4	3	12	17	15	17	3	7	16	3	**117**
PEAK HOUR	**8**	**12**	**3**	**3**	**12**	**17**	**15**	**17**	**3**	**7**	**16**	**3**	**117**

Combined

Time Per	NORTH Sheraton Rd L	NORTH Sheraton Rd T	NORTH Sheraton Rd R	WEST Mitchell Hwy L	WEST Mitchell Hwy T	WEST Mitchell Hwy R	SOUTH Sheraton Rd L	SOUTH Sheraton Rd T	SOUTH Sheraton Rd R	EAST Mitchell Hwy L	EAST Mitchell Hwy T	EAST Mitchell Hwy R	TOT
0600 - 0615	4	2	8	8	18	2	0	0	0	0	18	7	**67**
0615 - 0630	10	3	8	3	25	4	0	0	1	0	29	4	**87**
0630 - 0645	12	4	10	3	37	5	1	0	0	0	20	9	**101**
0645 - 0700	13	9	14	5	43	12	6	3	0	1	68	15	**189**
0700 - 0715	17	11	15	9	45	14	6	1	0	2	34	9	**163**
0715 - 0730	20	9	22	9	55	14	2	1	1	0	52	7	**192**
0730 - 0745	18	3	29	7	63	16	12	1	0	0	54	11	**214**
0745 - 0800	26	18	24	6	69	31	6	5	0	2	90	12	**289**
0800 - 0815	15	26	33	12	75	64	8	14	1	12	118	9	**387**
0815 - 0830	27	53	36	12	88	103	40	25	0	15	117	15	**531**
0830 - 0845	27	82	31	9	87	194	83	38	5	18	157	3	**734**
0845 - 0900	19	88	20	8	89	167	83	63	10	25	125	5	**702**
Period End	**208**	**308**	**250**	**91**	**694**	**626**	**247**	**151**	**18**	**75**	**882**	**106**	**3656**

Combined

Peak Per	NORTH Sheraton Rd L	NORTH Sheraton Rd T	NORTH Sheraton Rd R	WEST Mitchell Hwy L	WEST Mitchell Hwy T	WEST Mitchell Hwy R	SOUTH Sheraton Rd L	SOUTH Sheraton Rd T	SOUTH Sheraton Rd R	EAST Mitchell Hwy L	EAST Mitchell Hwy T	EAST Mitchell Hwy R	TOT
0600 - 0700	39	18	40	19	123	23	7	3	1	1	135	35	**444**
0615 - 0715	52	27	47	20	150	35	13	4	1	3	151	37	**540**
0630 - 0730	62	33	61	26	180	45	15	5	1	3	174	40	**645**
0645 - 0745	68	32	80	30	206	56	26	6	1	3	208	42	**758**
0700 - 0800	81	41	90	31	232	75	26	8	1	4	230	39	**858**
0715 - 0815	79	56	108	34	262	125	28	21	2	14	314	39	**1082**
0730 - 0830	86	100	122	37	295	214	66	45	1	29	379	47	**1421**
0745 - 0845	95	179	124	39	319	392	137	82	6	47	482	39	**1941**
0800 - 0900	88	249	120	41	339	528	214	140	16	70	517	32	**2354**
PEAK HOUR	**88**	**249**	**120**	**41**	**339**	**528**	**214**	**140**	**16**	**70**	**517**	**32**	**2354**

R.O.A.R DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

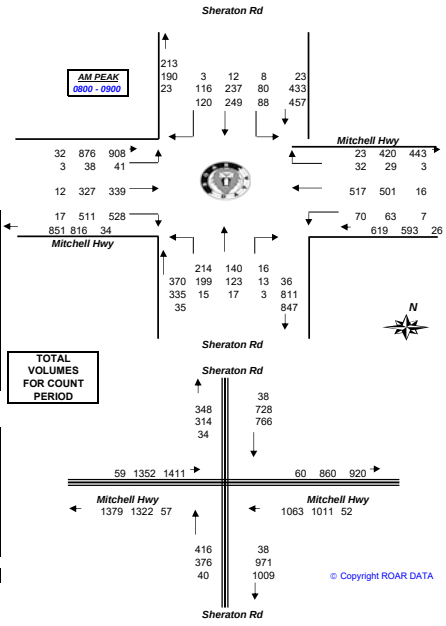
Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rc
Day/Date : Wednesday 6th June 2019

Peds

Time Per	NORTH Sheraton Rd UNCLASSIFIED	WEST Mitchell Hwy UNCLASSIFIED	SOUTH Sheraton Rd UNCLASSIFIED	EAST Mitchell Hwy UNCLASSIFIED	TOT
0600 - 0615	0	0	0	0	**0**
0615 - 0630	0	0	0	0	**0**
0630 - 0645	0	0	0	0	**0**
0645 - 0700	0	0	0	0	**0**
0700 - 0715	0	0	0	0	**0**
0715 - 0730	0	0	0	0	**0**
0730 - 0745	0	0	0	0	**0**
0745 - 0800	0	0	0	0	**0**
0800 - 0815	0	0	0	0	**0**
0815 - 0830	0	0	0	5	**5**
0830 - 0845	0	0	0	2	**2**
0845 - 0900	1	0	0	3	**4**
Period End	**1**	**0**	**0**	**10**	**11**

Peds

Peak Per	NORTH Sheraton Rd UNCLASSIFIED	WEST Mitchell Hwy UNCLASSIFIED	SOUTH Sheraton Rd UNCLASSIFIED	EAST Mitchell Hwy UNCLASSIFIED	TOT
0600 - 0700	0	0	0	0	**0**
0615 - 0715	0	0	0	0	**0**
0630 - 0730	0	0	0	0	**0**
0645 - 0745	0	0	0	0	**0**
0700 - 0800	0	0	0	0	**0**
0715 - 0815	0	0	0	0	**0**
0730 - 0830	0	0	0	5	**5**
0745 - 0845	0	0	0	7	**7**
0800 - 0900	1	0	0	10	**11**
PEAK HR	**1**	**0**	**0**	**10**	**11**



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rd
Day/Date : Tuesday 4th June 201!

Lights

	NORTH			WEST			SOUTH			EAST			
	Sheraton Rd			*Mitchell Hwy*			*Sheraton Rd*			*Mitchell Hwy*			
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1515	16	56	13	22	60	96	43	32	2	7	61	18	**426**
1515 - 1530	15	34	9	32	57	87	95	65	19	5	81	14	**513**
1530 - 1545	16	25	13	24	65	85	68	59	9	7	86	16	**473**
1545 - 1600	13	8	14	39	75	36	46	23	7	3	69	18	**351**
1600 - 1615	26	17	23	37	97	36	41	27	2	5	75	23	**409**
1615 - 1630	9	10	21	38	100	42	37	23	3	2	86	23	**394**
1630 - 1645	18	11	15	38	83	31	37	25	3	1	108	19	**389**
1645 - 1700	12	7	12	42	116	58	50	21	5	1	82	34	**440**
1700 - 1715	23	12	23	36	102	29	39	20	1	1	89	10	**385**
1715 - 1730	213	12	19	46	152	29	34	19	3	3	59	17	**606**
1730 - 1745	10	8	15	39	99	35	26	15	1	1	68	19	**336**
1745 - 1800	14	18	30	45	89	37	22	20	1	5	50	11	**342**
Period End	**385**	**218**	**207**	**438**	**1095**	**601**	**538**	**349**	**56**	**41**	**914**	**222**	**5064**

Lights

	NORTH			WEST			SOUTH			EAST			
	Sheraton Rd			*Mitchell Hwy*			*Sheraton Rd*			*Mitchell Hwy*			
Peak Time	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1600	60	123	49	117	257	304	252	179	37	22	297	66	**1763**
1515 - 1615	70	84	59	132	294	244	250	174	37	20	311	71	**1746**
1530 - 1630	64	60	71	138	337	199	192	132	21	17	316	80	**1627**
1545 - 1645	66	46	73	152	355	145	161	98	15	11	338	83	**1543**
1600 - 1700	65	45	71	155	396	167	165	96	13	9	351	99	**1632**
1615 - 1715	62	40	71	154	401	160	163	89	12	5	365	86	**1608**
1630 - 1730	266	42	69	162	453	147	160	85	12	6	338	80	**1820**
1645 - 1745	258	39	69	163	469	151	149	75	10	6	298	80	**1767**
1700 - 1800	260	50	87	166	442	130	121	74	6	10	266	57	**1669**
PEAK HOUR	**266**	**42**	**69**	**162**	**453**	**147**	**160**	**85**	**12**	**6**	**338**	**80**	**1820**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Sheraton Rd			*Mitchell Hwy*			*Sheraton Rd*			*Mitchell Hwy*			
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1515	1	8	1	0	1	1	5	2	0	0	0	0	**19**
1515 - 1530	0	12	0	0	2	6	6	2	0	0	3	0	**31**
1530 - 1545	0	2	0	0	2	3	9	4	0	0	3	0	**23**
1545 - 1600	0	2	0	1	2	1	1	2	2	0	0	0	**11**
1600 - 1615	0	2	0	1	8	0	1	0	1	0	2	1	**16**
1615 - 1630	0	0	0	0	0	0	0	1	0	0	2	1	**4**
1630 - 1645	1	0	0	1	5	0	0	0	0	0	2	2	**11**
1645 - 1700	0	1	0	0	2	4	0	0	0	0	2	1	**10**
1700 - 1715	1	0	1	0	3	0	0	0	0	0	1	0	**6**
1715 - 1730	0	0	0	0	1	1	0	0	0	0	1	1	**4**
1730 - 1745	1	0	0	1	3	0	0	0	0	0	0	0	**5**
1745 - 1800	2	0	0	0	2	0	0	0	0	0	1	1	**6**
Period End	**6**	**27**	**2**	**4**	**31**	**16**	**22**	**11**	**3**	**0**	**17**	**7**	**146**

Heavies

	NORTH			WEST			SOUTH			EAST			
	Sheraton Rd			*Mitchell Hwy*			*Sheraton Rd*			*Mitchell Hwy*			
Peak Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1600	1	24	1	1	7	11	21	10	2	0	6	0	**84**
1515 - 1615	0	18	0	2	14	10	17	8	3	0	8	1	**81**
1530 - 1630	0	6	0	2	12	4	11	7	3	0	7	2	**54**
1545 - 1645	1	4	0	3	15	1	2	3	3	0	6	4	**42**
1600 - 1700	1	3	0	2	15	4	1	1	1	0	8	5	**41**
1615 - 1715	2	1	1	1	10	4	0	1	0	0	7	4	**31**
1630 - 1730	2	1	1	1	11	5	0	0	0	0	6	4	**31**
1645 - 1745	2	1	1	1	9	5	0	0	0	0	4	2	**25**
1700 - 1800	4	0	1	1	9	1	0	0	0	0	3	2	**21**
PEAK HOUR	**2**	**1**	**1**	**1**	**11**	**5**	**0**	**0**	**0**	**0**	**6**	**4**	**31**

Combined

	NORTH			WEST			SOUTH			EAST			
	Sheraton Rd			*Mitchell Hwy*			*Sheraton Rd*			*Mitchell Hwy*			
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1515	17	64	14	22	61	97	48	34	2	7	61	18	**445**
1515 - 1530	15	46	9	32	59	93	101	67	19	5	84	14	**544**
1530 - 1545	16	27	13	24	67	88	77	63	9	7	89	16	**496**
1545 - 1600	13	10	14	40	77	37	47	25	9	3	69	18	**362**
1600 - 1615	26	19	23	38	105	36	42	27	3	5	77	24	**425**
1615 - 1630	9	10	21	38	100	42	37	24	3	2	88	24	**398**
1630 - 1645	19	11	15	39	88	31	37	25	3	1	110	21	**400**
1645 - 1700	12	8	12	42	118	62	50	21	5	1	84	35	**450**
1700 - 1715	24	12	24	36	105	29	39	20	1	1	90	10	**391**
1715 - 1730	213	12	19	46	153	30	34	19	3	3	60	18	**610**
1730 - 1745	11	8	15	40	102	35	26	15	1	1	68	19	**341**
1745 - 1800	16	18	30	45	91	37	22	20	1	5	51	12	**348**
Period End	**391**	**245**	**209**	**442**	**1126**	**617**	**560**	**360**	**59**	**41**	**931**	**229**	**5210**

Combined

	NORTH			WEST			SOUTH			EAST			
	Sheraton Rd			*Mitchell Hwy*			*Sheraton Rd*			*Mitchell Hwy*			
Peak Per	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**TOT**
1500 - 1600	61	147	50	118	264	315	273	189	39	22	303	66	**1847**
1515 - 1615	70	102	59	134	308	254	267	182	40	20	319	72	**1827**
1530 - 1630	64	66	71	140	349	203	203	139	24	17	323	82	**1681**
1545 - 1645	67	50	73	155	370	146	163	101	18	11	344	87	**1585**
1600 - 1700	66	48	71	157	411	171	166	97	14	9	359	104	**1673**
1615 - 1715	64	41	72	155	411	164	163	90	12	5	372	90	**1639**
1630 - 1730	268	43	70	163	464	152	160	85	12	6	344	84	**1851**
1645 - 1745	260	40	70	164	478	156	149	75	10	6	302	82	**1792**
1700 - 1800	264	50	88	167	451	131	121	74	6	10	269	59	**1690**
PEAK HOUR	**268**	**43**	**70**	**163**	**464**	**152**	**160**	**85**	**12**	**6**	**344**	**84**	**1851**

R.O.A.R DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

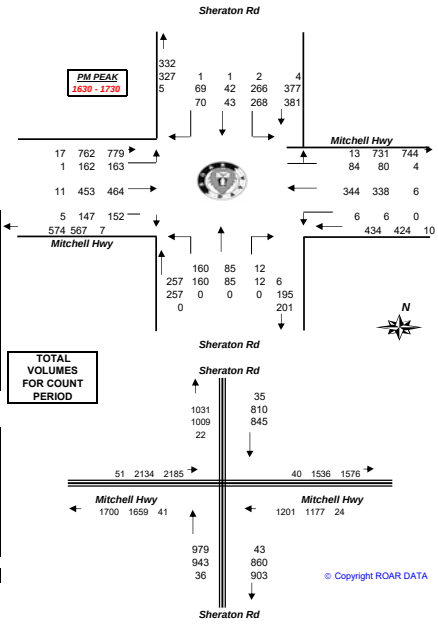
Client : EMM
Job No/Name : 7103 DUBBO Sheraton Rc
Day/Date : Tuesday 4th June 2019

Peds

	NORTH	WEST	SOUTH	EAST	
	Sheraton Rd	*Mitchell Hwy*	*Sheraton Rd*	*Mitchell Hwy*	
Time Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
1500 - 1515	0	0	0	1	**1**
1515 - 1530	0	0	3	7	**10**
1530 - 1545	5	4	3	7	**19**
1545 - 1600	0	0	0	0	**0**
1600 - 1615	2	0	0	1	**3**
1615 - 1630	0	0	0	0	**0**
1630 - 1645	0	0	1	0	**1**
1645 - 1700	0	1	1	0	**2**
1700 - 1715	0	1	0	0	**1**
1715 - 1730	0	0	0	0	**0**
1730 - 1745	0	1	0	0	**1**
1745 - 1800	0	0	0	0	**0**
Period End	**7**	**7**	**8**	**16**	**38**

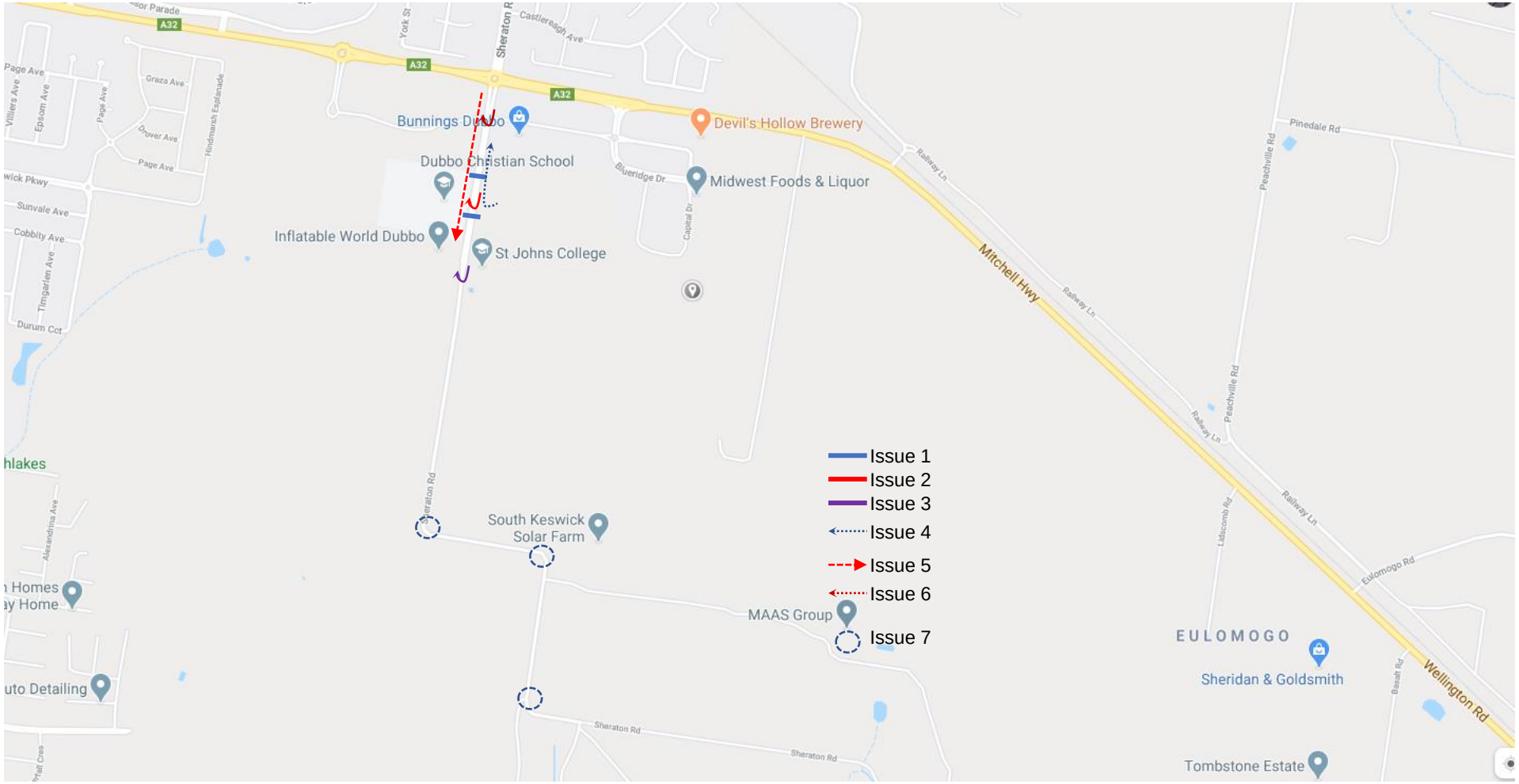
Peds

	NORTH	WEST	SOUTH	EAST	
	Sheraton Rd	*Mitchell Hwy*	*Sheraton Rd*	*Mitchell Hwy*	
Peak Per	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**UNCLASSIFIED**	**TOT**
1500 - 1600	5	4	6	15	**30**
1515 - 1615	7	4	6	15	**32**
1530 - 1630	7	4	3	8	**22**
1545 - 1645	2	0	1	1	**4**
1600 - 1700	2	1	2	1	**6**
1615 - 1715	0	2	2	0	**4**
1630 - 1730	0	2	2	0	**4**
1645 - 1745	0	3	1	0	**4**
1700 - 1800	0	2	0	0	**2**
PEAK HR	**0**	**2**	**2**	**0**	**4**



TOTAL VOLUMES FOR COUNT PERIOD

Appendix B: Issue Map


Issue 1
Issue 2
Issue 3
Issue 4
Issue 5
Issue 6
Issue 7
Bunnings Dubbo
Devil's Hollow Brewery
Dubbo Christian School
Midwest Foods & Liquor
Inflatable World Dubbo
St Johns College
South Keswick Solar Farm
MAAS Group
EULOMOGO
Sheridan & Goldsmith
Tombstone Estate
Mitchell Hwy
Wellington Rd
Sheraton Rd
Castlereagh Ave
Pinedale Rd
Peachville Rd
Railway Ln
Eulomogo Rd
Blueridge Dr
Page Ave
Graza Ave
Sunvale Ave
Cobbity Ave
Durum Cct
A32


Appendix C

SIDRA results for average daily traffic

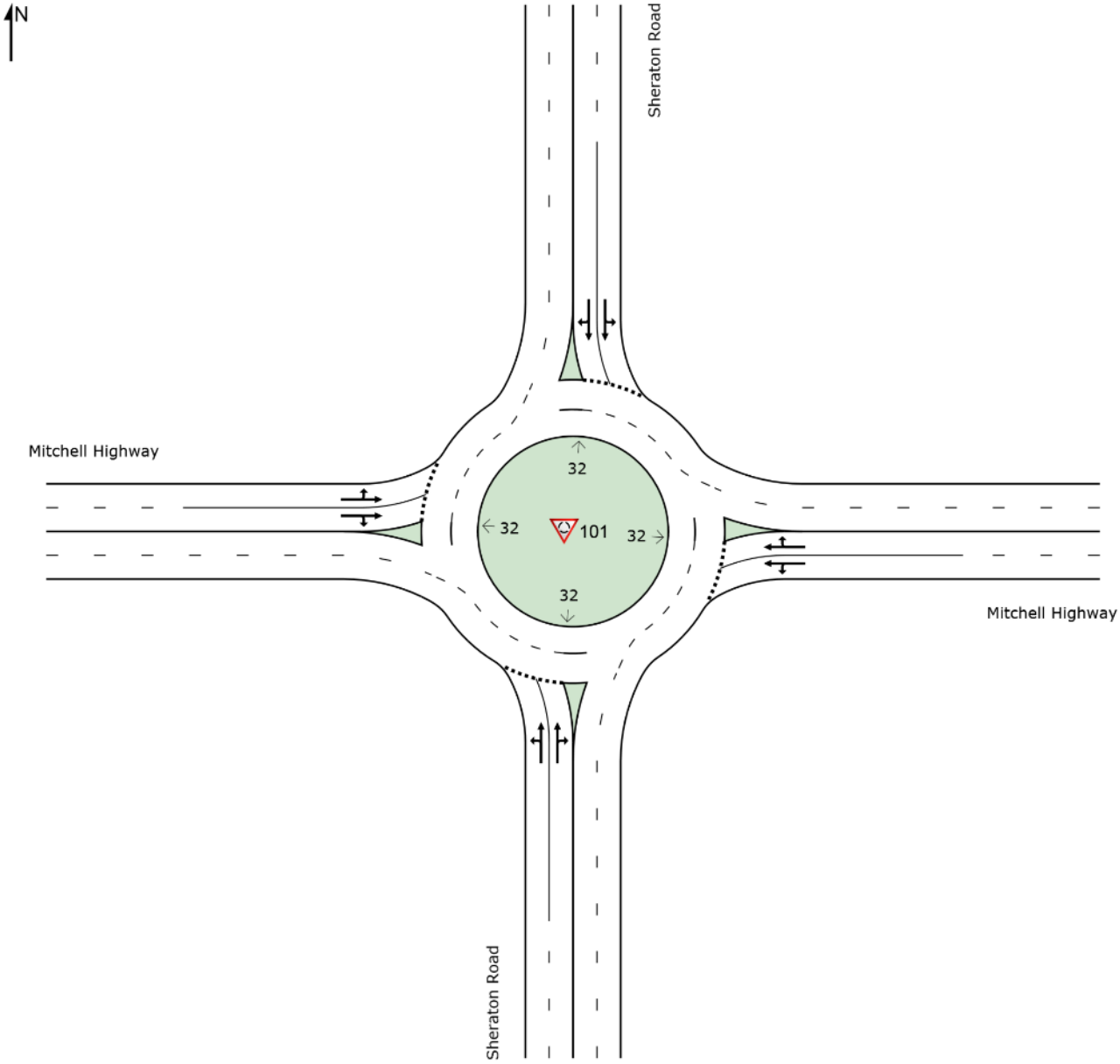



SITE LAYOUT

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Approved Traffic AM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Existing Traffic AM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	214	15	225	7.0	0.226	5.4	LOS A	1.1	8.2	0.59	0.65	0.59	56.8
2	T1	141	18	148	12.8	0.219	6.0	LOS A	1.0	7.8	0.61	0.62	0.61	54.8
3	R2	19	6	20	31.6	0.219	12.5	LOS A	1.0	7.8	0.61	0.62	0.61	50.8
Approach		374	39	394	10.4	0.226	6.0	LOS A	1.1	8.2	0.60	0.64	0.60	55.7
East: Mitchell Highway														
4	L2	70	7	74	10.0	0.395	8.5	LOS A	2.3	16.8	0.73	0.77	0.76	55.5
5	T1	517	16	544	3.1	0.395	8.9	LOS A	2.3	16.8	0.73	0.81	0.78	60.2
6	R2	32	3	34	9.4	0.395	15.7	LOS B	2.2	15.9	0.73	0.86	0.80	57.1
Approach		619	26	652	4.2	0.395	9.2	LOS A	2.3	16.8	0.73	0.81	0.78	59.5
North: Sheraton Road														
7	L2	88	8	93	9.1	0.283	6.2	LOS A	1.4	10.3	0.65	0.64	0.65	55.8
8	T1	250	13	263	5.2	0.283	6.2	LOS A	1.4	10.3	0.66	0.69	0.66	54.5
9	R2	119	3	125	2.5	0.283	12.4	LOS A	1.3	9.5	0.66	0.80	0.66	55.1
Approach		457	24	481	5.3	0.283	7.8	LOS A	1.4	10.3	0.66	0.71	0.66	54.9
West: Mitchell Highway														
10	L2	41	3	43	7.3	0.350	5.7	LOS A	2.0	14.8	0.44	0.51	0.44	57.1
11	T1	339	12	357	3.5	0.350	5.8	LOS A	2.0	14.8	0.44	0.51	0.44	62.4
12	R2	529	18	557	3.4	0.416	11.7	LOS A	2.7	19.5	0.45	0.67	0.45	55.4
Approach		909	33	957	3.6	0.416	9.2	LOS A	2.7	19.5	0.44	0.60	0.44	57.9
All Vehicles		2359	122	2483	5.2	0.416	8.4	LOS A	2.7	19.5	0.58	0.68	0.60	57.3

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

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Existing Traffic School PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	273	21	287	7.7	0.251	4.9	LOS A	1.2	8.7	0.48	0.58	0.48	57.2
2	T1	189	10	199	5.3	0.239	5.0	LOS A	1.1	7.9	0.49	0.54	0.49	55.4
3	R2	39	2	41	5.1	0.239	10.8	LOS A	1.1	7.9	0.49	0.54	0.49	57.0
Approach		501	33	527	6.6	0.251	5.4	LOS A	1.2	8.7	0.48	0.56	0.48	56.5
East: Mitchell Highway														
4	L2	22	0	23	0.0	0.196	6.2	LOS A	0.9	6.6	0.51	0.57	0.51	56.9
5	T1	303	6	319	2.0	0.196	6.5	LOS A	0.9	6.6	0.52	0.60	0.52	61.3
6	R2	66	0	69	0.0	0.196	12.7	LOS A	0.9	6.4	0.53	0.67	0.53	57.9
Approach		391	6	412	1.5	0.196	7.5	LOS A	0.9	6.6	0.52	0.61	0.52	60.4
North: Sheraton Road														
7	L2	61	1	64	1.6	0.144	5.1	LOS A	0.6	4.8	0.53	0.56	0.53	57.0
8	T1	147	24	155	16.3	0.144	5.5	LOS A	0.6	4.8	0.53	0.61	0.53	54.9
9	R2	50	1	53	2.0	0.144	11.2	LOS A	0.6	4.6	0.54	0.66	0.54	56.4
Approach		258	26	272	10.1	0.144	6.5	LOS A	0.6	4.8	0.53	0.61	0.53	55.7
West: Mitchell Highway														
10	L2	118	1	124	0.8	0.314	5.8	LOS A	1.8	12.8	0.47	0.55	0.47	57.2
11	T1	264	7	278	2.7	0.314	6.0	LOS A	1.8	12.8	0.47	0.55	0.47	62.2
12	R2	316	12	333	3.8	0.314	12.2	LOS A	1.7	12.6	0.49	0.71	0.49	55.4
Approach		698	20	735	2.9	0.314	8.8	LOS A	1.8	12.8	0.48	0.62	0.48	58.1
All Vehicles		1848	85	1945	4.6	0.314	7.3	LOS A	1.8	12.8	0.50	0.60	0.50	57.8

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Existing Traffic PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	160	0	168	0.0	0.143	4.8	LOS A	0.6	4.2	0.46	0.58	0.46	57.8
2	T1	86	1	91	1.2	0.109	5.1	LOS A	0.4	3.1	0.47	0.54	0.47	55.7
3	R2	12	0	13	0.0	0.109	10.9	LOS A	0.4	3.1	0.47	0.54	0.47	58.6
Approach		258	1	272	0.4	0.143	5.2	LOS A	0.6	4.2	0.46	0.56	0.46	57.1
East: Mitchell Highway														
4	L2	6	0	6	0.0	0.189	5.5	LOS A	0.9	6.6	0.39	0.50	0.39	57.6
5	T1	344	6	362	1.7	0.189	5.8	LOS A	0.9	6.6	0.39	0.54	0.39	62.1
6	R2	84	4	88	4.8	0.189	11.9	LOS A	0.9	6.5	0.40	0.60	0.40	58.3
Approach		434	10	457	2.3	0.189	6.9	LOS A	0.9	6.6	0.40	0.55	0.40	61.2
North: Sheraton Road														
7	L2	268	2	282	0.7	0.255	5.3	LOS A	1.2	8.3	0.55	0.64	0.55	57.3
8	T1	44	2	46	4.5	0.149	5.9	LOS A	0.6	4.4	0.54	0.73	0.54	53.5
9	R2	70	1	74	1.4	0.149	11.6	LOS A	0.6	4.4	0.54	0.73	0.54	55.9
Approach		382	5	402	1.3	0.255	6.5	LOS A	1.2	8.3	0.54	0.66	0.54	56.6
West: Mitchell Highway														
10	L2	163	1	172	0.6	0.315	5.3	LOS A	1.7	12.1	0.36	0.50	0.36	57.9
11	T1	464	11	488	2.4	0.315	5.5	LOS A	1.7	12.1	0.36	0.54	0.36	62.1
12	R2	153	6	161	3.9	0.315	11.6	LOS A	1.7	12.1	0.37	0.58	0.37	58.4
Approach		780	18	821	2.3	0.315	6.7	LOS A	1.7	12.1	0.36	0.54	0.36	60.5
All Vehicles		1854	34	1952	1.8	0.315	6.5	LOS A	1.7	12.1	0.42	0.57	0.42	59.3

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

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Proposed Traffic AM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	216	17	227	7.9	0.230	5.5	LOS A	1.1	8.3	0.59	0.65	0.59	56.7
2	T1	141	18	148	12.8	0.219	6.0	LOS A	1.0	7.8	0.61	0.62	0.61	54.8
3	R2	19	6	20	31.6	0.219	12.5	LOS A	1.0	7.8	0.61	0.62	0.61	50.8
Approach		376	41	396	10.9	0.230	6.0	LOS A	1.1	8.3	0.60	0.64	0.60	55.7
East: Mitchell Highway														
4	L2	70	7	74	10.0	0.395	8.5	LOS A	2.3	16.9	0.73	0.77	0.76	55.5
5	T1	517	16	544	3.1	0.395	8.9	LOS A	2.3	16.9	0.73	0.81	0.78	60.2
6	R2	32	3	34	9.4	0.395	15.7	LOS B	2.2	15.9	0.73	0.86	0.80	57.1
Approach		619	26	652	4.2	0.395	9.2	LOS A	2.3	16.9	0.73	0.81	0.78	59.5
North: Sheraton Road														
7	L2	88	8	93	9.1	0.284	6.2	LOS A	1.4	10.3	0.65	0.64	0.65	55.8
8	T1	250	13	263	5.2	0.284	6.2	LOS A	1.4	10.3	0.66	0.69	0.66	54.5
9	R2	119	3	125	2.5	0.284	12.5	LOS A	1.3	9.5	0.66	0.80	0.66	55.1
Approach		457	24	481	5.3	0.284	7.8	LOS A	1.4	10.3	0.66	0.71	0.66	54.9
West: Mitchell Highway														
10	L2	41	3	43	7.3	0.350	5.7	LOS A	2.0	14.8	0.44	0.51	0.44	57.1
11	T1	339	12	357	3.5	0.350	5.8	LOS A	2.0	14.8	0.44	0.51	0.44	62.4
12	R2	530	19	558	3.6	0.417	11.7	LOS A	2.7	19.6	0.45	0.67	0.45	55.4
Approach		910	34	958	3.7	0.417	9.2	LOS A	2.7	19.6	0.44	0.60	0.44	57.8
All Vehicles		2362	125	2486	5.3	0.417	8.4	LOS A	2.7	19.6	0.58	0.68	0.60	57.3

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

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Proposed Traffic School PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	275	23	289	8.4	0.254	4.9	LOS A	1.2	8.9	0.48	0.58	0.48	57.2
2	T1	189	10	199	5.3	0.239	5.0	LOS A	1.1	7.9	0.49	0.54	0.49	55.4
3	R2	39	2	41	5.1	0.239	10.8	LOS A	1.1	7.9	0.49	0.54	0.49	57.0
Approach		503	35	529	7.0	0.254	5.4	LOS A	1.2	8.9	0.49	0.56	0.49	56.4
East: Mitchell Highway														
4	L2	22	0	23	0.0	0.196	6.2	LOS A	0.9	6.7	0.52	0.57	0.52	56.9
5	T1	303	6	319	2.0	0.196	6.5	LOS A	0.9	6.7	0.52	0.61	0.52	61.3
6	R2	66	0	69	0.0	0.196	12.7	LOS A	0.9	6.4	0.53	0.67	0.53	57.9
Approach		391	6	412	1.5	0.196	7.5	LOS A	0.9	6.7	0.52	0.61	0.52	60.4
North: Sheraton Road														
7	L2	61	1	64	1.6	0.144	5.1	LOS A	0.6	4.8	0.53	0.56	0.53	57.0
8	T1	147	24	155	16.3	0.144	5.5	LOS A	0.6	4.8	0.53	0.61	0.53	54.9
9	R2	50	1	53	2.0	0.144	11.2	LOS A	0.6	4.6	0.54	0.66	0.54	56.4
Approach		258	26	272	10.1	0.144	6.5	LOS A	0.6	4.8	0.53	0.61	0.53	55.7
West: Mitchell Highway														
10	L2	118	1	124	0.8	0.315	5.8	LOS A	1.8	12.8	0.47	0.55	0.47	57.2
11	T1	264	7	278	2.7	0.315	6.0	LOS A	1.8	12.8	0.47	0.55	0.47	62.2
12	R2	317	13	334	4.1	0.315	12.2	LOS A	1.7	12.6	0.49	0.71	0.49	55.4
Approach		699	21	736	3.0	0.315	8.8	LOS A	1.8	12.8	0.48	0.62	0.48	58.1
All Vehicles		1851	88	1948	4.8	0.315	7.3	LOS A	1.8	12.8	0.50	0.60	0.50	57.8

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Proposed Traffic PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	162	2	171	1.2	0.146	4.8	LOS A	0.6	4.4	0.46	0.58	0.46	57.7
2	T1	86	1	91	1.2	0.109	5.1	LOS A	0.4	3.1	0.47	0.54	0.47	55.7
3	R2	12	0	13	0.0	0.109	10.9	LOS A	0.4	3.1	0.47	0.54	0.47	58.6
Approach		260	3	274	1.2	0.146	5.2	LOS A	0.6	4.4	0.46	0.56	0.46	57.0
East: Mitchell Highway														
4	L2	6	0	6	0.0	0.189	5.5	LOS A	0.9	6.6	0.39	0.50	0.39	57.5
5	T1	344	6	362	1.7	0.189	5.8	LOS A	0.9	6.6	0.40	0.54	0.40	62.1
6	R2	84	4	88	4.8	0.189	11.9	LOS A	0.9	6.5	0.40	0.60	0.40	58.3
Approach		434	10	457	2.3	0.189	7.0	LOS A	0.9	6.6	0.40	0.55	0.40	61.2
North: Sheraton Road														
7	L2	268	2	282	0.7	0.255	5.3	LOS A	1.2	8.4	0.55	0.64	0.55	57.3
8	T1	44	2	46	4.5	0.149	5.9	LOS A	0.6	4.4	0.54	0.73	0.54	53.5
9	R2	70	1	74	1.4	0.149	11.7	LOS A	0.6	4.4	0.54	0.73	0.54	55.9
Approach		382	5	402	1.3	0.255	6.5	LOS A	1.2	8.4	0.55	0.66	0.55	56.6
West: Mitchell Highway														
10	L2	163	1	172	0.6	0.315	5.3	LOS A	1.7	12.2	0.36	0.50	0.36	57.9
11	T1	464	11	488	2.4	0.315	5.5	LOS A	1.7	12.2	0.36	0.54	0.36	62.1
12	R2	154	7	162	4.5	0.315	11.6	LOS A	1.7	12.1	0.37	0.59	0.37	58.4
Approach		781	19	822	2.4	0.315	6.7	LOS A	1.7	12.2	0.36	0.54	0.36	60.5
All Vehicles		1857	37	1955	2.0	0.315	6.5	LOS A	1.7	12.2	0.42	0.57	0.42	59.3

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

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Existing Traffic AM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	268	19	282	7.1	0.322	5.9	LOS A	1.7	12.7	0.70	0.71	0.70	56.3
2	T1	177	23	186	13.0	0.322	6.7	LOS A	1.7	12.7	0.71	0.69	0.71	54.3
3	R2	25	8	26	32.0	0.322	13.4	LOS A	1.6	12.4	0.71	0.69	0.71	50.3
Approach		470	50	495	10.6	0.322	6.6	LOS A	1.7	12.7	0.70	0.70	0.70	55.2
East: Mitchell Highway														
4	L2	88	9	93	10.2	0.593	12.7	LOS A	4.9	35.6	0.88	1.03	1.19	53.0
5	T1	647	20	681	3.1	0.593	13.4	LOS A	4.9	35.6	0.87	1.03	1.20	56.6
6	R2	41	4	43	9.8	0.593	20.8	LOS B	4.4	31.6	0.87	1.03	1.21	53.2
Approach		776	33	817	4.3	0.593	13.7	LOS A	4.9	35.6	0.87	1.03	1.20	56.0
North: Sheraton Road														
7	L2	110	10	116	9.1	0.421	7.6	LOS A	2.5	18.5	0.78	0.81	0.86	55.1
8	T1	313	16	329	5.1	0.421	7.8	LOS A	2.5	18.5	0.78	0.85	0.87	53.7
9	R2	149	4	157	2.7	0.421	14.4	LOS A	2.3	16.8	0.78	0.93	0.89	53.9
Approach		572	30	602	5.2	0.421	9.5	LOS A	2.5	18.5	0.78	0.86	0.87	54.0
West: Mitchell Highway														
10	L2	52	4	55	7.7	0.462	6.2	LOS A	3.0	21.9	0.55	0.56	0.55	56.5
11	T1	424	15	446	3.5	0.462	6.3	LOS A	3.0	21.9	0.55	0.56	0.55	61.7
12	R2	661	22	696	3.3	0.543	12.1	LOS A	4.1	29.4	0.58	0.71	0.58	54.9
Approach		1137	41	1197	3.6	0.543	9.7	LOS A	4.1	29.4	0.56	0.64	0.56	57.3
All Vehicles		2955	154	3111	5.2	0.593	10.2	LOS A	4.9	35.6	0.71	0.80	0.81	56.0

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

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Existing Traffic School PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	341	26	359	7.6	0.333	5.3	LOS A	1.7	12.4	0.56	0.63	0.56	56.9
2	T1	237	13	249	5.5	0.325	5.4	LOS A	1.6	11.5	0.58	0.59	0.58	54.9
3	R2	50	3	53	6.0	0.325	11.3	LOS A	1.6	11.5	0.58	0.59	0.58	56.4
Approach		628	42	661	6.7	0.333	5.8	LOS A	1.7	12.4	0.57	0.61	0.57	56.0
East: Mitchell Highway														
4	L2	28	0	29	0.0	0.271	6.7	LOS A	1.4	10.1	0.61	0.62	0.61	56.4
5	T1	380	8	400	2.1	0.271	7.1	LOS A	1.4	10.1	0.61	0.66	0.61	60.7
6	R2	83	0	87	0.0	0.271	13.4	LOS A	1.3	9.5	0.62	0.73	0.62	57.3
Approach		491	8	517	1.6	0.271	8.1	LOS A	1.4	10.1	0.61	0.67	0.61	59.8
North: Sheraton Road														
7	L2	77	2	81	2.6	0.202	5.5	LOS A	1.0	7.3	0.61	0.61	0.61	56.5
8	T1	184	30	194	16.3	0.202	6.0	LOS A	1.0	7.3	0.62	0.66	0.62	54.5
9	R2	64	2	67	3.1	0.202	11.8	LOS A	0.9	6.9	0.62	0.73	0.62	55.6
Approach		325	34	342	10.5	0.202	7.0	LOS A	1.0	7.3	0.62	0.66	0.62	55.2
West: Mitchell Highway														
10	L2	149	2	157	1.3	0.420	6.4	LOS A	2.7	19.4	0.59	0.60	0.59	56.6
11	T1	331	9	348	2.7	0.420	6.6	LOS A	2.7	19.4	0.59	0.61	0.59	61.5
12	R2	395	15	416	3.8	0.420	12.9	LOS A	2.6	18.9	0.60	0.76	0.60	54.9
Approach		875	26	921	3.0	0.420	9.4	LOS A	2.7	19.4	0.60	0.68	0.60	57.5
All Vehicles		2319	110	2441	4.7	0.420	7.8	LOS A	2.7	19.4	0.60	0.65	0.60	57.2

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

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Existing Traffic PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	200	0	211	0.0	0.191	5.1	LOS A	0.8	5.9	0.53	0.61	0.53	57.5
2	T1	108	1	114	0.9	0.148	5.5	LOS A	0.6	4.3	0.53	0.58	0.53	55.3
3	R2	15	0	16	0.0	0.148	11.3	LOS A	0.6	4.3	0.53	0.58	0.53	58.2
Approach		323	1	340	0.3	0.191	5.5	LOS A	0.8	5.9	0.53	0.60	0.53	56.8
East: Mitchell Highway														
4	L2	8	0	8	0.0	0.250	5.9	LOS A	1.3	9.4	0.47	0.53	0.47	57.1
5	T1	431	8	454	1.9	0.250	6.2	LOS A	1.3	9.4	0.47	0.57	0.47	61.6
6	R2	105	5	111	4.8	0.250	12.4	LOS A	1.3	9.2	0.48	0.64	0.48	57.9
Approach		544	13	573	2.4	0.250	7.4	LOS A	1.3	9.4	0.47	0.58	0.47	60.8
North: Sheraton Road														
7	L2	336	3	354	0.9	0.348	5.8	LOS A	1.8	12.5	0.64	0.70	0.64	56.9
8	T1	56	3	59	5.4	0.210	6.5	LOS A	0.9	6.5	0.62	0.79	0.62	53.0
9	R2	89	2	94	2.2	0.210	12.3	LOS A	0.9	6.5	0.62	0.79	0.62	55.2
Approach		481	8	506	1.7	0.348	7.1	LOS A	1.8	12.5	0.63	0.72	0.63	56.1
West: Mitchell Highway														
10	L2	205	2	216	1.0	0.409	5.6	LOS A	2.5	17.6	0.44	0.53	0.44	57.5
11	T1	581	14	612	2.4	0.409	5.9	LOS A	2.5	17.6	0.45	0.57	0.45	61.7
12	R2	191	7	201	3.7	0.409	12.0	LOS A	2.4	17.4	0.46	0.61	0.46	58.0
Approach		977	23	1028	2.4	0.409	7.0	LOS A	2.5	17.6	0.45	0.57	0.45	60.0
All Vehicles		2325	45	2447	1.9	0.409	6.9	LOS A	2.5	17.6	0.50	0.61	0.50	58.9

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Proposed Traffic AM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	270	21	284	7.8	0.325	6.0	LOS A	1.7	13.0	0.70	0.71	0.70	56.3
2	T1	177	23	186	13.0	0.323	6.7	LOS A	1.6	12.5	0.71	0.69	0.71	54.3
3	R2	25	8	26	32.0	0.323	13.4	LOS A	1.6	12.5	0.71	0.69	0.71	50.3
Approach		472	52	497	11.0	0.325	6.6	LOS A	1.7	13.0	0.70	0.70	0.71	55.1
East: Mitchell Highway														
4	L2	88	9	93	10.2	0.595	12.8	LOS A	4.9	35.8	0.88	1.04	1.20	52.9
5	T1	647	20	681	3.1	0.595	13.5	LOS A	4.9	35.8	0.87	1.03	1.20	56.6
6	R2	41	4	43	9.8	0.595	20.8	LOS B	4.4	31.8	0.87	1.03	1.21	53.2
Approach		776	33	817	4.3	0.595	13.8	LOS A	4.9	35.8	0.87	1.03	1.20	56.0
North: Sheraton Road														
7	L2	110	10	116	9.1	0.422	7.6	LOS A	2.5	18.6	0.78	0.81	0.87	55.1
8	T1	313	16	329	5.1	0.422	7.8	LOS A	2.5	18.6	0.78	0.85	0.87	53.7
9	R2	149	4	157	2.7	0.422	14.4	LOS A	2.3	16.8	0.78	0.94	0.89	53.9
Approach		572	30	602	5.2	0.422	9.5	LOS A	2.5	18.6	0.78	0.86	0.88	54.0
West: Mitchell Highway														
10	L2	52	4	55	7.7	0.462	6.3	LOS A	3.1	22.2	0.55	0.56	0.55	56.5
11	T1	424	15	446	3.5	0.462	6.3	LOS A	3.1	22.2	0.55	0.56	0.55	61.6
12	R2	662	23	697	3.5	0.546	12.2	LOS A	4.1	29.9	0.58	0.71	0.58	54.9
Approach		1138	42	1198	3.7	0.546	9.7	LOS A	4.1	29.9	0.57	0.64	0.57	57.2
All Vehicles		2958	157	3114	5.3	0.595	10.2	LOS A	4.9	35.8	0.71	0.80	0.82	55.9

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Proposed Traffic School PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	343	28	361	8.2	0.336	5.3	LOS A	1.7	12.6	0.57	0.63	0.57	56.8
2	T1	237	13	249	5.5	0.325	5.5	LOS A	1.6	11.5	0.58	0.59	0.58	54.9
3	R2	50	3	53	6.0	0.325	11.3	LOS A	1.6	11.5	0.58	0.59	0.58	56.4
Approach		630	44	663	7.0	0.336	5.8	LOS A	1.7	12.6	0.57	0.61	0.57	56.0
East: Mitchell Highway														
4	L2	28	0	29	0.0	0.271	6.7	LOS A	1.4	10.1	0.61	0.62	0.61	56.4
5	T1	380	8	400	2.1	0.271	7.1	LOS A	1.4	10.1	0.62	0.66	0.62	60.7
6	R2	83	0	87	0.0	0.271	13.4	LOS A	1.4	9.6	0.62	0.73	0.62	57.3
Approach		491	8	517	1.6	0.271	8.2	LOS A	1.4	10.1	0.62	0.67	0.62	59.8
North: Sheraton Road														
7	L2	77	2	81	2.6	0.202	5.5	LOS A	1.0	7.3	0.61	0.61	0.61	56.5
8	T1	184	30	194	16.3	0.202	6.0	LOS A	1.0	7.3	0.62	0.66	0.62	54.5
9	R2	64	2	67	3.1	0.202	11.9	LOS A	0.9	6.9	0.62	0.73	0.62	55.6
Approach		325	34	342	10.5	0.202	7.0	LOS A	1.0	7.3	0.62	0.66	0.62	55.2
West: Mitchell Highway														
10	L2	149	2	157	1.3	0.421	6.4	LOS A	2.7	19.5	0.59	0.60	0.59	56.6
11	T1	331	9	348	2.7	0.421	6.6	LOS A	2.7	19.5	0.59	0.61	0.59	61.5
12	R2	396	16	417	4.0	0.421	12.9	LOS A	2.6	19.0	0.60	0.76	0.60	54.9
Approach		876	27	922	3.1	0.421	9.4	LOS A	2.7	19.5	0.60	0.68	0.60	57.5
All Vehicles		2322	113	2444	4.9	0.421	7.8	LOS A	2.7	19.5	0.60	0.66	0.60	57.2

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

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Proposed Traffic PM (Site Folder: Average daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	201	1	212	0.5	0.192	5.1	LOS A	0.9	6.0	0.53	0.62	0.53	57.4
2	T1	108	1	114	0.9	0.148	5.5	LOS A	0.6	4.3	0.53	0.58	0.53	55.3
3	R2	15	0	16	0.0	0.148	11.3	LOS A	0.6	4.3	0.53	0.58	0.53	58.2
Approach		324	2	341	0.6	0.192	5.5	LOS A	0.9	6.0	0.53	0.60	0.53	56.7
East: Mitchell Highway														
4	L2	8	0	8	0.0	0.249	5.9	LOS A	1.3	9.4	0.47	0.53	0.47	57.1
5	T1	431	8	454	1.9	0.249	6.2	LOS A	1.3	9.4	0.47	0.57	0.47	61.6
6	R2	105	5	111	4.8	0.249	12.4	LOS A	1.3	9.2	0.48	0.64	0.48	57.9
Approach		544	13	573	2.4	0.249	7.4	LOS A	1.3	9.4	0.47	0.58	0.47	60.8
North: Sheraton Road														
7	L2	336	3	354	0.9	0.348	5.8	LOS A	1.8	12.5	0.64	0.70	0.64	56.9
8	T1	55	2	58	3.6	0.208	6.5	LOS A	0.9	6.4	0.61	0.79	0.61	53.1
9	R2	89	2	94	2.2	0.208	12.3	LOS A	0.9	6.4	0.61	0.79	0.61	55.2
Approach		480	7	505	1.5	0.348	7.1	LOS A	1.8	12.5	0.63	0.72	0.63	56.1
West: Mitchell Highway														
10	L2	205	2	216	1.0	0.409	5.6	LOS A	2.5	17.7	0.44	0.53	0.44	57.4
11	T1	581	14	612	2.4	0.409	5.9	LOS A	2.5	17.7	0.45	0.57	0.45	61.7
12	R2	192	8	202	4.2	0.409	12.0	LOS A	2.4	17.5	0.46	0.61	0.46	58.0
Approach		978	24	1029	2.5	0.409	7.0	LOS A	2.5	17.7	0.45	0.57	0.45	60.0
All Vehicles		2326	46	2448	2.0	0.409	6.9	LOS A	2.5	17.7	0.50	0.61	0.50	58.9

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.


Appendix D

SIDRA results for peak daily traffic




MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Existing Traffic AM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	217	18	228	8.3	0.232	5.5	LOS A	1.1	8.4	0.60	0.65	0.60	56.7
2	T1	142	19	149	13.4	0.223	6.0	LOS A	1.0	8.0	0.61	0.62	0.61	54.8
3	R2	20	7	21	35.0	0.223	12.7	LOS A	1.0	8.0	0.61	0.62	0.61	50.2
Approach		379	44	399	11.6	0.232	6.1	LOS A	1.1	8.4	0.60	0.64	0.60	55.6
East: Mitchell Highway														
4	L2	71	8	75	11.3	0.397	8.6	LOS A	2.3	17.1	0.73	0.78	0.77	55.5
5	T1	517	16	544	3.1	0.397	8.9	LOS A	2.3	17.1	0.73	0.82	0.78	60.2
6	R2	32	3	34	9.4	0.397	15.8	LOS B	2.2	16.1	0.73	0.87	0.80	57.1
Approach		620	27	653	4.4	0.397	9.2	LOS A	2.3	17.1	0.73	0.82	0.78	59.4
North: Sheraton Road														
7	L2	88	8	93	9.1	0.285	6.2	LOS A	1.4	10.5	0.66	0.64	0.66	55.8
8	T1	251	14	264	5.6	0.285	6.2	LOS A	1.4	10.5	0.66	0.69	0.66	54.4
9	R2	119	3	125	2.5	0.285	12.5	LOS A	1.3	9.6	0.67	0.80	0.67	55.1
Approach		458	25	482	5.5	0.285	7.8	LOS A	1.4	10.5	0.66	0.71	0.66	54.9
West: Mitchell Highway														
10	L2	41	3	43	7.3	0.352	5.8	LOS A	2.1	14.9	0.44	0.52	0.44	57.1
11	T1	339	12	357	3.5	0.352	5.8	LOS A	2.1	14.9	0.44	0.52	0.44	62.4
12	R2	531	20	559	3.8	0.420	11.7	LOS A	2.7	19.8	0.45	0.67	0.45	55.4
Approach		911	35	959	3.8	0.420	9.3	LOS A	2.7	19.8	0.45	0.61	0.45	57.8
All Vehicles		2368	131	2493	5.5	0.420	8.5	LOS A	2.7	19.8	0.59	0.69	0.60	57.3

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

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Existing Traffic School PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	276	24	291	8.7	0.255	4.9	LOS A	1.2	9.0	0.48	0.58	0.48	57.1
2	T1	191	12	201	6.3	0.245	5.0	LOS A	1.1	8.2	0.49	0.55	0.49	55.3
3	R2	41	4	43	9.8	0.245	11.0	LOS A	1.1	8.2	0.49	0.55	0.49	55.9
Approach		508	40	535	7.9	0.255	5.4	LOS A	1.2	9.0	0.49	0.57	0.49	56.3
East: Mitchell Highway														
4	L2	24	2	25	8.3	0.199	6.4	LOS A	0.9	6.8	0.52	0.57	0.52	56.6
5	T1	303	6	319	2.0	0.199	6.5	LOS A	0.9	6.8	0.52	0.61	0.52	61.3
6	R2	66	0	69	0.0	0.199	12.7	LOS A	0.9	6.5	0.53	0.67	0.53	57.9
Approach		393	8	414	2.0	0.199	7.5	LOS A	0.9	6.8	0.52	0.62	0.52	60.4
North: Sheraton Road														
7	L2	61	1	64	1.6	0.146	5.1	LOS A	0.6	4.9	0.53	0.56	0.53	57.0
8	T1	149	26	157	17.4	0.146	5.5	LOS A	0.6	4.9	0.54	0.61	0.54	54.9
9	R2	50	1	53	2.0	0.146	11.3	LOS A	0.6	4.7	0.55	0.67	0.55	56.4
Approach		260	28	274	10.8	0.146	6.5	LOS A	0.6	4.9	0.54	0.61	0.54	55.7
West: Mitchell Highway														
10	L2	118	1	124	0.8	0.317	5.8	LOS A	1.8	13.0	0.48	0.55	0.48	57.2
11	T1	264	7	278	2.7	0.317	6.0	LOS A	1.8	13.0	0.48	0.55	0.48	62.2
12	R2	318	14	335	4.4	0.317	12.3	LOS A	1.8	12.8	0.49	0.71	0.49	55.3
Approach		700	22	737	3.1	0.317	8.8	LOS A	1.8	13.0	0.49	0.63	0.49	58.0
All Vehicles		1861	98	1959	5.3	0.317	7.3	LOS A	1.8	13.0	0.50	0.61	0.50	57.7

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

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Existing Traffic PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	163	3	172	1.8	0.147	4.8	LOS A	0.6	4.4	0.46	0.58	0.46	57.6
2	T1	88	3	93	3.4	0.116	5.1	LOS A	0.5	3.4	0.48	0.54	0.48	55.6
3	R2	14	2	15	14.3	0.116	11.3	LOS A	0.5	3.4	0.48	0.54	0.48	55.1
Approach		265	8	279	3.0	0.147	5.3	LOS A	0.6	4.4	0.47	0.57	0.47	56.8
East: Mitchell Highway														
4	L2	8	2	8	25.0	0.191	6.0	LOS A	0.9	6.7	0.40	0.50	0.40	56.9
5	T1	344	6	362	1.7	0.191	5.8	LOS A	0.9	6.7	0.40	0.54	0.40	62.0
6	R2	84	4	88	4.8	0.191	12.0	LOS A	0.9	6.6	0.41	0.61	0.41	58.2
Approach		436	12	459	2.8	0.191	7.0	LOS A	0.9	6.7	0.40	0.55	0.40	61.2
North: Sheraton Road														
7	L2	268	2	282	0.7	0.256	5.3	LOS A	1.2	8.4	0.55	0.64	0.55	57.3
8	T1	46	4	48	8.7	0.154	6.0	LOS A	0.6	4.6	0.55	0.73	0.55	53.4
9	R2	70	1	74	1.4	0.154	11.7	LOS A	0.6	4.6	0.55	0.73	0.55	55.8
Approach		384	7	404	1.8	0.256	6.5	LOS A	1.2	8.4	0.55	0.66	0.55	56.5
West: Mitchell Highway														
10	L2	163	1	172	0.6	0.318	5.3	LOS A	1.7	12.3	0.36	0.50	0.36	57.9
11	T1	464	11	488	2.4	0.318	5.6	LOS A	1.7	12.3	0.37	0.54	0.37	62.1
12	R2	155	8	163	5.2	0.318	11.7	LOS A	1.7	12.3	0.38	0.59	0.38	58.3
Approach		782	20	823	2.6	0.318	6.7	LOS A	1.7	12.3	0.37	0.54	0.37	60.4
All Vehicles		1867	47	1965	2.5	0.318	6.5	LOS A	1.7	12.3	0.43	0.57	0.43	59.2

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

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Proposed Traffic AM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	223	24	235	10.8	0.243	5.6	LOS A	1.2	9.0	0.60	0.66	0.60	56.5
2	T1	145	22	153	15.2	0.237	6.1	LOS A	1.1	8.7	0.62	0.63	0.62	54.8
3	R2	23	10	24	43.5	0.237	13.0	LOS A	1.1	8.7	0.62	0.63	0.62	48.5
Approach		391	56	412	14.3	0.243	6.2	LOS A	1.2	9.0	0.61	0.65	0.61	55.3
East: Mitchell Highway														
4	L2	74	11	78	14.9	0.405	8.9	LOS A	2.4	17.8	0.74	0.79	0.79	55.3
5	T1	517	16	544	3.1	0.405	9.1	LOS A	2.4	17.8	0.74	0.84	0.80	60.1
6	R2	32	3	34	9.4	0.405	16.0	LOS B	2.3	16.6	0.74	0.88	0.82	57.1
Approach		623	30	656	4.8	0.405	9.4	LOS A	2.4	17.8	0.74	0.83	0.80	59.3
North: Sheraton Road														
7	L2	88	8	93	9.1	0.293	6.3	LOS A	1.5	10.9	0.67	0.65	0.67	55.8
8	T1	254	17	267	6.7	0.293	6.3	LOS A	1.5	10.9	0.67	0.70	0.67	54.4
9	R2	119	3	125	2.5	0.293	12.6	LOS A	1.4	10.0	0.67	0.81	0.67	55.0
Approach		461	28	485	6.1	0.293	7.9	LOS A	1.5	10.9	0.67	0.72	0.67	54.8
West: Mitchell Highway														
10	L2	41	3	43	7.3	0.356	5.8	LOS A	2.1	15.1	0.45	0.52	0.45	57.0
11	T1	339	12	357	3.5	0.356	5.9	LOS A	2.1	15.1	0.45	0.52	0.45	62.3
12	R2	537	26	565	4.8	0.431	11.8	LOS A	2.8	20.7	0.47	0.67	0.47	55.3
Approach		917	41	965	4.5	0.431	9.3	LOS A	2.8	20.7	0.46	0.61	0.46	57.7
All Vehicles		2392	155	2518	6.5	0.431	8.6	LOS A	2.8	20.7	0.60	0.70	0.61	57.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Proposed Traffic School PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	282	30	297	10.6	0.264	5.0	LOS A	1.2	9.5	0.49	0.59	0.49	57.0
2	T1	193	14	203	7.3	0.252	5.0	LOS A	1.1	8.6	0.50	0.55	0.50	55.3
3	R2	43	6	45	14.0	0.252	11.1	LOS A	1.1	8.6	0.50	0.55	0.50	54.9
Approach		518	50	545	9.7	0.264	5.5	LOS A	1.2	9.5	0.49	0.57	0.49	56.2
East: Mitchell Highway														
4	L2	26	4	27	15.4	0.202	6.6	LOS A	1.0	7.0	0.53	0.58	0.53	56.4
5	T1	303	6	319	2.0	0.202	6.6	LOS A	1.0	7.0	0.53	0.61	0.53	61.2
6	R2	66	0	69	0.0	0.202	12.7	LOS A	0.9	6.6	0.54	0.67	0.54	57.8
Approach		395	10	416	2.5	0.202	7.6	LOS A	1.0	7.0	0.53	0.62	0.53	60.3
North: Sheraton Road														
7	L2	61	1	64	1.6	0.149	5.1	LOS A	0.7	5.0	0.54	0.56	0.54	56.9
8	T1	151	28	159	18.5	0.149	5.6	LOS A	0.7	5.0	0.54	0.61	0.54	54.9
9	R2	50	1	53	2.0	0.149	11.3	LOS A	0.6	4.8	0.55	0.67	0.55	56.4
Approach		262	30	276	11.5	0.149	6.6	LOS A	0.7	5.0	0.54	0.61	0.54	55.6
West: Mitchell Highway														
10	L2	118	1	124	0.8	0.324	5.9	LOS A	1.9	13.3	0.49	0.55	0.49	57.2
11	T1	264	7	278	2.7	0.324	6.1	LOS A	1.9	13.3	0.49	0.55	0.49	62.2
12	R2	324	20	341	6.2	0.324	12.4	LOS A	1.8	13.3	0.50	0.72	0.50	55.1
Approach		706	28	743	4.0	0.324	8.9	LOS A	1.9	13.3	0.50	0.63	0.50	57.9
All Vehicles		1881	118	1980	6.3	0.324	7.4	LOS A	1.9	13.3	0.51	0.61	0.51	57.6

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2020 Mitchell Hwy/Sheraton Rd Proposed Traffic PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	169	9	178	5.3	0.157	4.9	LOS A	0.7	4.9	0.47	0.59	0.47	57.4
2	T1	90	5	95	5.6	0.123	5.2	LOS A	0.5	3.7	0.48	0.55	0.48	55.5
3	R2	16	4	17	25.0	0.123	11.6	LOS A	0.5	3.7	0.48	0.55	0.48	52.7
Approach		275	18	289	6.5	0.157	5.4	LOS A	0.7	4.9	0.47	0.57	0.47	56.5
East: Mitchell Highway														
4	L2	10	4	11	40.0	0.194	6.4	LOS A	1.0	6.9	0.41	0.51	0.41	56.4
5	T1	344	6	362	1.7	0.194	5.8	LOS A	1.0	6.9	0.41	0.54	0.41	62.0
6	R2	84	4	88	4.8	0.194	12.0	LOS A	0.9	6.7	0.42	0.61	0.42	58.2
Approach		438	14	461	3.2	0.194	7.0	LOS A	1.0	6.9	0.41	0.56	0.41	61.1
North: Sheraton Road														
7	L2	268	2	282	0.7	0.257	5.3	LOS A	1.2	8.5	0.56	0.64	0.56	57.3
8	T1	48	6	51	12.5	0.159	6.2	LOS A	0.7	4.8	0.55	0.73	0.55	53.3
9	R2	70	1	74	1.4	0.159	11.7	LOS A	0.7	4.8	0.55	0.73	0.55	55.8
Approach		386	9	406	2.3	0.257	6.6	LOS A	1.2	8.5	0.55	0.67	0.55	56.5
West: Mitchell Highway														
10	L2	163	1	172	0.6	0.323	5.3	LOS A	1.8	12.7	0.37	0.50	0.37	57.8
11	T1	464	11	488	2.4	0.323	5.6	LOS A	1.8	12.7	0.38	0.54	0.38	62.1
12	R2	161	14	169	8.7	0.323	11.8	LOS A	1.8	12.8	0.39	0.59	0.39	58.1
Approach		788	26	829	3.3	0.323	6.8	LOS A	1.8	12.8	0.38	0.55	0.38	60.3
All Vehicles		1887	67	1986	3.6	0.323	6.6	LOS A	1.8	12.8	0.44	0.58	0.44	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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Existing Traffic AM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	271	22	285	8.1	0.328	6.0	LOS A	1.8	13.1	0.70	0.71	0.70	56.2
2	T1	178	24	187	13.5	0.328	6.8	LOS A	1.8	13.1	0.71	0.70	0.72	54.3
3	R2	26	9	27	34.6	0.328	13.5	LOS A	1.6	12.8	0.71	0.70	0.72	49.8
Approach		475	55	500	11.6	0.328	6.7	LOS A	1.8	13.1	0.71	0.71	0.71	55.1
East: Mitchell Highway														
4	L2	89	10	94	11.2	0.597	12.9	LOS A	5.0	36.2	0.88	1.04	1.21	52.9
5	T1	647	20	681	3.1	0.597	13.6	LOS A	5.0	36.2	0.88	1.04	1.21	56.5
6	R2	41	4	43	9.8	0.597	20.9	LOS B	4.4	32.1	0.87	1.04	1.22	53.1
Approach		777	34	818	4.4	0.597	13.9	LOS A	5.0	36.2	0.88	1.04	1.21	55.9
North: Sheraton Road														
7	L2	110	10	116	9.1	0.425	7.7	LOS A	2.5	18.8	0.78	0.81	0.87	55.1
8	T1	314	17	331	5.4	0.425	7.8	LOS A	2.5	18.8	0.78	0.85	0.88	53.6
9	R2	149	4	157	2.7	0.425	14.5	LOS A	2.4	17.0	0.78	0.94	0.89	53.8
Approach		573	31	603	5.4	0.425	9.5	LOS A	2.5	18.8	0.78	0.87	0.88	54.0
West: Mitchell Highway														
10	L2	52	4	55	7.7	0.464	6.3	LOS A	3.1	22.2	0.55	0.56	0.55	56.5
11	T1	424	15	446	3.5	0.464	6.3	LOS A	3.1	22.2	0.55	0.56	0.55	61.6
12	R2	663	24	698	3.6	0.548	12.2	LOS A	4.2	30.0	0.59	0.71	0.59	54.9
Approach		1139	43	1199	3.8	0.548	9.7	LOS A	4.2	30.0	0.57	0.65	0.57	57.2
All Vehicles		2964	163	3120	5.5	0.597	10.3	LOS A	5.0	36.2	0.71	0.80	0.82	55.9

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Existing Traffic School PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	344	29	362	8.4	0.338	5.3	LOS A	1.7	12.7	0.57	0.63	0.57	56.8
2	T1	239	15	252	6.3	0.333	5.5	LOS A	1.6	11.9	0.58	0.60	0.58	54.9
3	R2	52	5	55	9.6	0.333	11.5	LOS A	1.6	11.9	0.58	0.60	0.58	55.5
Approach		635	49	668	7.7	0.338	5.9	LOS A	1.7	12.7	0.57	0.61	0.57	55.9
East: Mitchell Highway														
4	L2	29	1	31	3.4	0.274	6.8	LOS A	1.4	10.2	0.61	0.62	0.61	56.2
5	T1	380	8	400	2.1	0.274	7.1	LOS A	1.4	10.2	0.62	0.66	0.62	60.6
6	R2	83	0	87	0.0	0.274	13.4	LOS A	1.4	9.6	0.62	0.73	0.62	57.3
Approach		492	9	518	1.8	0.274	8.2	LOS A	1.4	10.2	0.62	0.67	0.62	59.8
North: Sheraton Road														
7	L2	77	2	81	2.6	0.206	5.5	LOS A	1.0	7.5	0.62	0.61	0.62	56.5
8	T1	186	32	196	17.2	0.206	6.1	LOS A	1.0	7.5	0.62	0.66	0.62	54.5
9	R2	64	2	67	3.1	0.206	11.9	LOS A	0.9	7.0	0.63	0.73	0.63	55.6
Approach		327	36	344	11.0	0.206	7.1	LOS A	1.0	7.5	0.62	0.66	0.62	55.2
West: Mitchell Highway														
10	L2	149	2	157	1.3	0.425	6.4	LOS A	2.8	19.7	0.60	0.60	0.60	56.6
11	T1	331	9	348	2.7	0.425	6.6	LOS A	2.8	19.7	0.60	0.61	0.60	61.5
12	R2	397	17	418	4.3	0.425	13.0	LOS A	2.6	19.2	0.61	0.77	0.61	54.9
Approach		877	28	923	3.2	0.425	9.4	LOS A	2.8	19.7	0.60	0.68	0.60	57.5
All Vehicles		2331	122	2454	5.2	0.425	7.9	LOS A	2.8	19.7	0.60	0.66	0.60	57.2

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

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Existing Traffic PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	202	2	213	1.0	0.194	5.1	LOS A	0.9	6.1	0.53	0.62	0.53	57.4
2	T1	110	3	116	2.7	0.154	5.5	LOS A	0.6	4.6	0.54	0.58	0.54	55.3
3	R2	16	1	17	6.3	0.154	11.5	LOS A	0.6	4.6	0.54	0.58	0.54	56.6
Approach		328	6	345	1.8	0.194	5.6	LOS A	0.9	6.1	0.53	0.60	0.53	56.6
East: Mitchell Highway														
4	L2	9	1	9	11.1	0.251	6.1	LOS A	1.3	9.5	0.47	0.54	0.47	56.8
5	T1	431	8	454	1.9	0.251	6.2	LOS A	1.3	9.5	0.48	0.57	0.48	61.5
6	R2	105	5	111	4.8	0.251	12.4	LOS A	1.3	9.3	0.48	0.64	0.48	57.8
Approach		545	14	574	2.6	0.251	7.4	LOS A	1.3	9.5	0.48	0.58	0.48	60.7
North: Sheraton Road														
7	L2	336	3	354	0.9	0.349	5.8	LOS A	1.8	12.5	0.64	0.70	0.64	56.9
8	T1	58	5	61	8.6	0.215	6.6	LOS A	0.9	6.7	0.62	0.79	0.62	53.0
9	R2	89	2	94	2.2	0.215	12.3	LOS A	0.9	6.7	0.62	0.79	0.62	55.2
Approach		483	10	508	2.1	0.349	7.1	LOS A	1.8	12.5	0.64	0.73	0.64	56.1
West: Mitchell Highway														
10	L2	205	2	216	1.0	0.412	5.6	LOS A	2.5	17.8	0.45	0.53	0.45	57.4
11	T1	581	14	612	2.4	0.412	5.9	LOS A	2.5	17.8	0.46	0.57	0.46	61.6
12	R2	193	9	203	4.7	0.412	12.1	LOS A	2.5	17.6	0.47	0.61	0.47	57.9
Approach		979	25	1031	2.6	0.412	7.0	LOS A	2.5	17.8	0.46	0.57	0.46	59.9
All Vehicles		2335	55	2458	2.4	0.412	6.9	LOS A	2.5	17.8	0.51	0.61	0.51	58.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Proposed Traffic AM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	277	28	292	10.1	0.342	6.1	LOS A	1.8	14.0	0.71	0.72	0.71	56.1
2	T1	181	27	191	14.9	0.342	6.9	LOS A	1.8	14.0	0.72	0.72	0.74	54.2
3	R2	29	12	31	41.4	0.342	14.0	LOS A	1.7	13.8	0.72	0.72	0.74	48.5
Approach		487	67	513	13.8	0.342	6.9	LOS A	1.8	14.0	0.71	0.72	0.72	54.9
East: Mitchell Highway														
4	L2	92	13	97	14.1	0.609	13.4	LOS A	5.1	37.7	0.89	1.05	1.24	52.5
5	T1	647	20	681	3.1	0.609	14.0	LOS A	5.1	37.7	0.88	1.05	1.24	56.2
6	R2	41	4	43	9.8	0.609	21.4	LOS B	4.6	33.2	0.88	1.05	1.25	52.8
Approach		780	37	821	4.7	0.609	14.3	LOS A	5.1	37.7	0.88	1.05	1.24	55.5
North: Sheraton Road														
7	L2	110	10	116	9.1	0.434	7.8	LOS A	2.6	19.6	0.79	0.83	0.89	55.0
8	T1	317	20	334	6.3	0.434	8.0	LOS A	2.6	19.6	0.79	0.87	0.90	53.5
9	R2	149	4	157	2.7	0.434	14.7	LOS B	2.4	17.7	0.79	0.95	0.91	53.7
Approach		576	34	606	5.9	0.434	9.7	LOS A	2.6	19.6	0.79	0.88	0.90	53.8
West: Mitchell Highway														
10	L2	52	4	55	7.7	0.468	6.3	LOS A	3.1	22.2	0.56	0.56	0.56	56.4
11	T1	424	15	446	3.5	0.468	6.3	LOS A	3.1	22.2	0.56	0.56	0.56	61.6
12	R2	669	30	704	4.5	0.559	12.2	LOS A	4.2	30.7	0.60	0.72	0.60	54.8
Approach		1145	49	1205	4.3	0.559	9.8	LOS A	4.2	30.7	0.58	0.65	0.58	57.1
All Vehicles		2988	187	3145	6.3	0.609	10.5	LOS A	5.1	37.7	0.72	0.81	0.84	55.7

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

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Proposed Traffic School PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	350	35	368	10.0	0.348	5.3	LOS A	1.8	13.3	0.57	0.63	0.57	56.7
2	T1	241	17	254	7.1	0.341	5.5	LOS A	1.7	12.4	0.58	0.60	0.58	54.8
3	R2	54	7	57	13.0	0.341	11.6	LOS A	1.7	12.4	0.58	0.60	0.58	54.7
Approach		645	59	679	9.1	0.348	5.9	LOS A	1.8	13.3	0.58	0.62	0.58	55.8
East: Mitchell Highway														
4	L2	31	3	33	9.7	0.278	7.1	LOS A	1.5	10.5	0.62	0.63	0.62	56.0
5	T1	380	8	400	2.1	0.278	7.2	LOS A	1.5	10.5	0.63	0.67	0.63	60.6
6	R2	83	0	87	0.0	0.278	13.4	LOS A	1.4	9.9	0.63	0.74	0.63	57.2
Approach		494	11	520	2.2	0.278	8.2	LOS A	1.5	10.5	0.63	0.68	0.63	59.7
North: Sheraton Road														
7	L2	77	2	81	2.6	0.210	5.6	LOS A	1.0	7.7	0.62	0.61	0.62	56.4
8	T1	188	34	198	18.1	0.210	6.1	LOS A	1.0	7.7	0.63	0.67	0.63	54.4
9	R2	64	2	67	3.1	0.210	11.9	LOS A	0.9	7.2	0.63	0.74	0.63	55.6
Approach		329	38	346	11.6	0.210	7.1	LOS A	1.0	7.7	0.63	0.67	0.63	55.1
West: Mitchell Highway														
10	L2	149	2	157	1.3	0.432	6.4	LOS A	2.8	20.2	0.61	0.61	0.61	56.5
11	T1	331	9	348	2.7	0.432	6.6	LOS A	2.8	20.2	0.61	0.61	0.61	61.5
12	R2	403	23	424	5.7	0.432	13.1	LOS A	2.7	19.9	0.62	0.77	0.62	54.7
Approach		883	34	929	3.9	0.432	9.5	LOS A	2.8	20.2	0.61	0.68	0.61	57.4
All Vehicles		2351	142	2475	6.0	0.432	7.9	LOS A	2.8	20.2	0.61	0.66	0.61	57.1

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [2045 Mitchell Hwy/Sheraton Rd Proposed Traffic PM (Site Folder: Maximum daily production)]

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Sheraton Road														
1	L2	208	8	219	3.8	0.204	5.2	LOS A	0.9	6.6	0.53	0.62	0.53	57.2
2	T1	112	5	118	4.5	0.162	5.6	LOS A	0.7	5.0	0.54	0.59	0.54	55.2
3	R2	18	3	19	16.7	0.162	11.8	LOS A	0.7	5.0	0.54	0.59	0.54	54.2
Approach		338	16	356	4.7	0.204	5.7	LOS A	0.9	6.6	0.54	0.61	0.54	56.3
East: Mitchell Highway														
4	L2	11	3	12	27.3	0.255	6.6	LOS A	1.4	9.8	0.48	0.54	0.48	56.3
5	T1	431	8	454	1.9	0.255	6.3	LOS A	1.4	9.8	0.49	0.58	0.49	61.5
6	R2	105	5	111	4.8	0.255	12.5	LOS A	1.3	9.5	0.49	0.65	0.49	57.8
Approach		547	16	576	2.9	0.255	7.5	LOS A	1.4	9.8	0.49	0.59	0.49	60.6
North: Sheraton Road														
7	L2	336	3	354	0.9	0.351	5.8	LOS A	1.8	12.7	0.65	0.70	0.65	56.9
8	T1	60	7	63	11.7	0.221	6.8	LOS A	1.0	7.0	0.63	0.79	0.63	52.9
9	R2	89	2	94	2.2	0.221	12.3	LOS A	1.0	7.0	0.63	0.79	0.63	55.1
Approach		485	12	511	2.5	0.351	7.1	LOS A	1.8	12.7	0.64	0.73	0.64	56.0
West: Mitchell Highway														
10	L2	205	2	216	1.0	0.418	5.6	LOS A	2.6	18.3	0.46	0.54	0.46	57.4
11	T1	581	14	612	2.4	0.418	5.9	LOS A	2.6	18.3	0.47	0.57	0.47	61.6
12	R2	199	15	209	7.5	0.418	12.2	LOS A	2.5	18.2	0.48	0.62	0.48	57.7
Approach		985	31	1037	3.1	0.418	7.1	LOS A	2.6	18.3	0.47	0.58	0.47	59.9
All Vehicles		2355	75	2479	3.2	0.418	7.0	LOS A	2.6	18.3	0.52	0.62	0.52	58.7

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


Turbot St
EXIT