

Appendix 6

Traffic Impact Assessment

Prepared by Barnson Pty Ltd

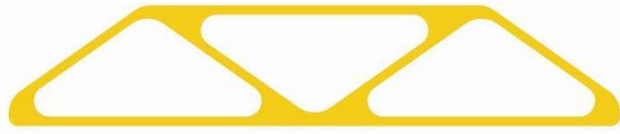
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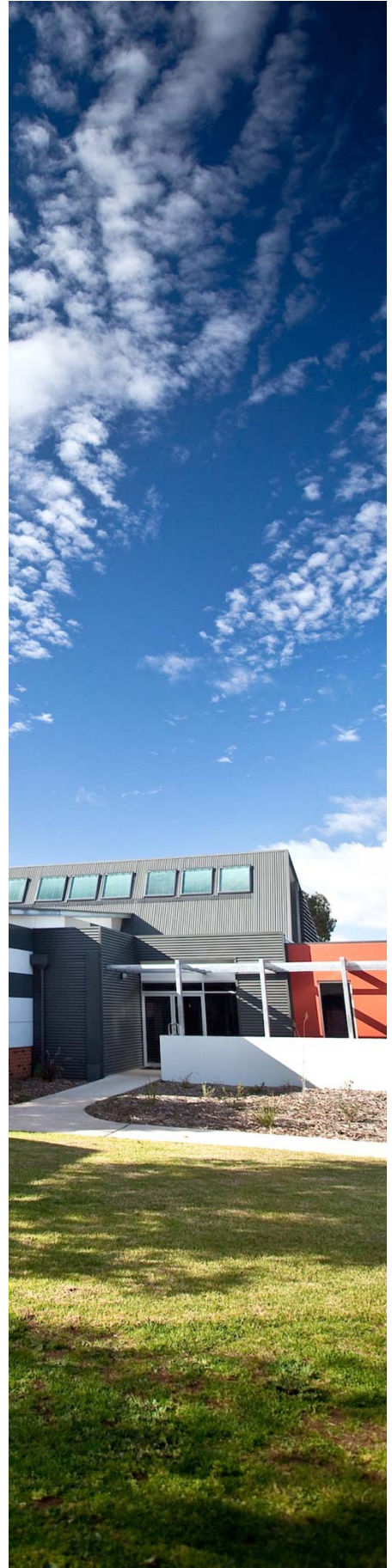


barnson

**Traffic Impact Assessment
for the proposed
Swans Ponds Quarry**

For: R.W Corkery & Co. Pty. Ltd

(Our Reference: 27955_TIA01
Client Reference 952/04)



LIST OF ACRONYMS

The following abbreviations are used throughout this document:

AGTRD	Austrroads Guide to Road Design
DoS	Degree of Saturation
EIS	Environmental Impact Statement
ESA	Equivalent Standard Axles
LEP	Local Environmental Plan
LoS	Level of Service
PCU	Passenger Car Units
RQA	Regional Quarries Australia
SISD	Safe Intersection Sight Distance
Tpa	Tonnes Per Annum
NB	Northbound
SB	Southbound
TIA	Traffic Impact Assessment
veh/day	Vehicles per day
veh/hour	Vehicles per hour

EXECUTIVE SUMMARY

This Traffic Impact Assessment (TIA) has been commissioned by The Yarragrove Family Trust (the Applicant) to support an Environmental Impact Statement (EIS) prepared by RW Corkery and Co Pty. Limited. This TIA assesses the impact of the proposed continued operation of the Swan Ponds Quarry (the Proposal), located on the Mid Western Highway within the Bathurst Regional Local Government Area, approximately 9km southwest of the Bathurst, on the surrounding road network.

The Proposal includes (but is not limited to);

- Extraction of weathered granite from an enlarged Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, using a bulldozer, excavator, scraper or similar for a period of approximately 18 years.
- Processing of extracted weathered granite, including screening and washing.
- Campaign based crushing of weathered granite using a small mobile cone crusher.
- Loading and transportation of extracted and stockpiled material from the Project Site via the Mid Western Highway.
- Progressive rehabilitation of the Project Site to achieve a final land use of nature conservation and/or agriculture.

The impact of the Proposal on the existing road network was assessed for geometric, safety, condition and capacity concerns. This was undertaken by completing a site investigation which included preliminary site measurements, visual condition inspection and desktop analysis.

It was found that traffic generated by the Proposal had negligible impacts on the surrounding road network. The existing Quarry entrance currently has very short sight distances and does not comply with the Approach Sight Distance (ASD) and the Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A. It is suggested the Quarry entrance intersection be fully surveyed to ensure compliance with a AUSTROADS BAR/BAL type intersection.

The impact of traffic generated by the Project Site was considered to be adequately mitigated if the recommendations provided within this report are undertaken by the Applicant.

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1.0 INTRODUCTION

1.1 Project Background

The Yarragrove Family Trust (the Applicant), proposes to seek development consent for the extension of the existing operations of the Swans Ponds Quarry (the Proposal). The Project Site is Lot 241 DP 1185616, Mid Western Highway, Evans Plains, NSW. The Project Site is located approximately 9km south west of Bathurst, within the Bathurst Regional Local Government Area. The land is currently zoned RU1 - Primary Production, as per the *Bathurst Local Environment Plan, 2014*. Extractive industries are permissible with consent from Council, within the RU1 zone. The location of the Project Site is illustrated in **Figure 1**.

The Applicant is a family trust referred to collectively as 'The Yarragrove Family Trust'. The trust was established on the 24 October 2003 and currently employs 1 to 2 full time staff at the Quarry.

1.2 Purpose and Scope

This Traffic Impact Assessment (TIA) has been commissioned by the Applicant to support an Environmental Impact Statement (EIS) prepared by RW Corkery and Co Pty Limited (RWC). The purpose of this report is to assess the impact of the development on the safety and efficiency of the road network and provide recommendations to minimise the impacts of the total traffic generation to maintain safety, efficiency and standard of maintenance along the existing road network. The study area of this TIA includes the public road infrastructure to be used by vehicles generated by the Proposal.

Specifically, the TIA assesses the impacts of the Proposal in accordance with RMS *Guide to Traffic Generating Developments 2002*, the DP&E's EIS Guidelines Road and Related Facilities (DUAP, 1996), and the Secretary's Environmental Assessment Requirements (SEARS) EAR Number 1053 dated 18 September 2017 and associated stakeholder advice.

The TIA includes:

- Determination of key intersections and routes impacted by the proposed development;
- A review of existing key transport network conditions;
- Determination of the impact of the traffic generated by the proposed development during the following stages:
 - Establishment and decommissioning phase; and
 - Operational phase;
- Recommendations to minimise the impact of development traffic on safety, efficiency and standard of maintenance along the existing road network.

The Applicant proposes to conduct quarrying activities approximately 9km southwest of Bathurst.

The Proposal includes (but is not limited to);

- Extraction of weathered granite from an enlarged Extraction Area at an average rate of 35 000tpa, with a maximum extraction rate of 50 000tpa, using a bulldozer, excavator, scraper or similar for a period of approximately 18 years.
- Processing of extracted weathered granite, including screening and washing.
- Campaign based crushing of weathered granite using a small mobile cone crusher.
- Loading and transportation of extracted and stockpiled material from the Project Site via the Mid Western Highway.
- Progressive rehabilitation of the Project Site to achieve a final land use of nature conservation and/or agriculture.

Figure 2 illustrates the Project Site layout.



Detail



REFERENCE
 ——— Project Site Boundary

SCALE 1:125 000 (A4)



Base Map Source: Orange and Bathurst 1:100 000 Topographic Maps

Figure 1.1
LOCALITY PLAN

Figure 1 – Location of Swan Ponds Quarry.

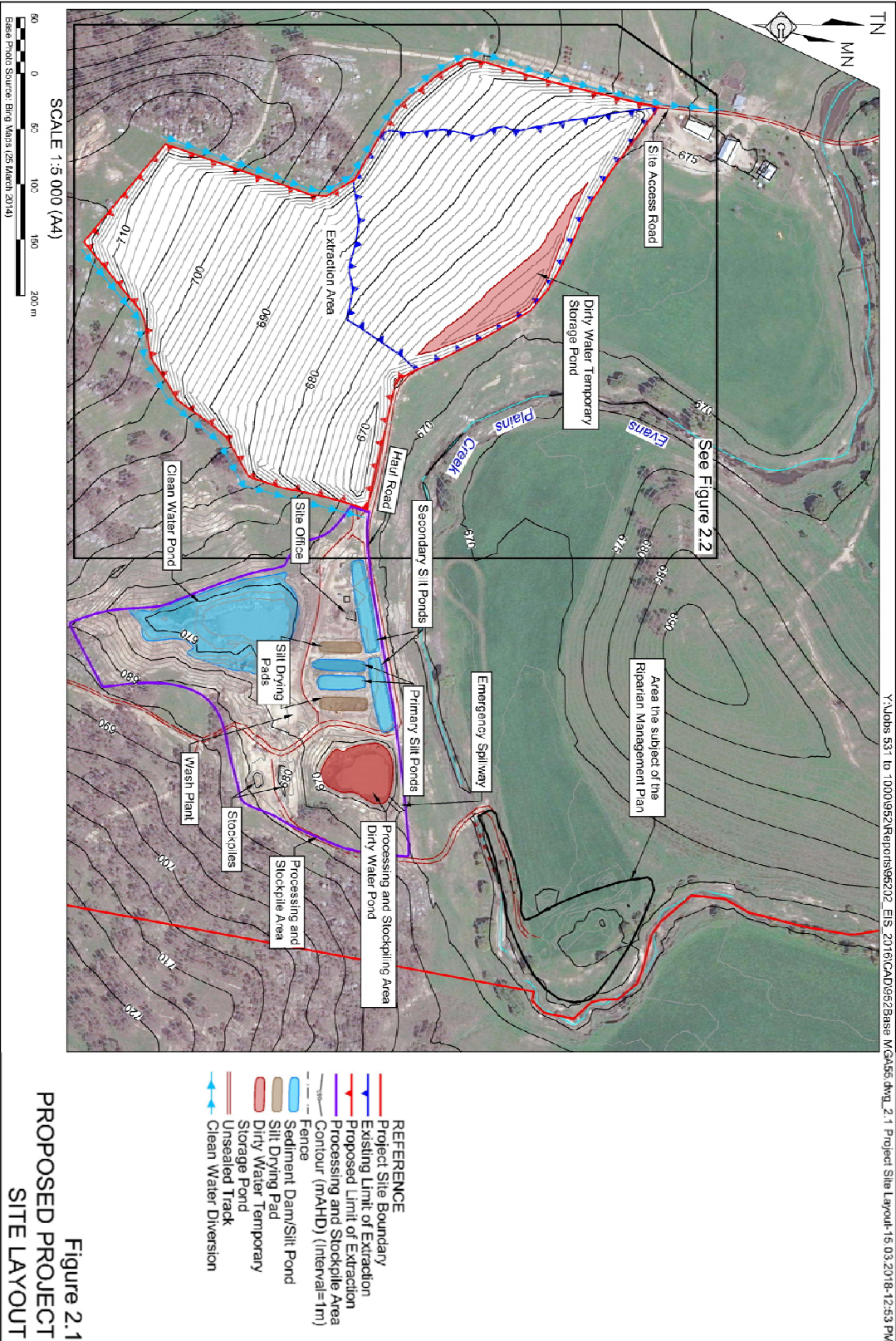


Figure 2 – Proposed Swan Ponds Quarry Layout.

1.3.1

Site Establishment

The Project Site includes a pre-existing Quarry that is planning to continue the scope of its quarrying operation and levels commensurate with previous extraction rates. It is expected that no additional site establishment is required for the proposed operations.

1.3.2

Operations

Operations within the Project Site will comprise extraction, crushing and screening, stockpiling and transportation of the product. It will also include the rehabilitation of the Quarry.

Operational activities will commence after the Project Site has been established and is expected to continue for 18 years, bringing the design life to 2035-2036.

The proposed hours of operation are listed in the following table:

Table 1: Proposed hours of Operation

Activity	Monday to Friday ¹	Saturday ¹	Sunday
Extraction Operations	7:00- 5:00pm	8:00 – 12:00pm	-
Screening, Washing & Crushing	7:00- 5:00pm	8:00 – 12:00pm	-
Loading & transportation Activities	7:00- 5:00pm	8:00 – 12:00pm	-
Rehabilitation Operations	7:00- 5:00pm	8:00 – 12:00pm	-

Note 1: Excludes public holidays which would operate as per Sunday's

Transportation operations during this stage of the project are expected to comprise the following:

- Transportation of product from the Quarry;
- Limited consumables, principally diesel, delivered to the Quarry via approximately one tanker per week;
- Movement of workers, visitors and others to and from the Quarry.

Extracted material would be transported from the Quarry using B-double style side tipper trucks or smaller. The applicant anticipates vehicles transporting material from the Project Site would transport an average of 28T per load. Table 2 presents the anticipated traffic levels associated with the Proposal.

Table 2: Proposed Heavy Vehicle Traffic Levels

Production Rate	Average Load/Vehicle	Vehicle Movements		
		Annual	Average / day ¹	Maximum / day ²
35 000TPA	28T	1 250	4 to 5	40
50 000tpa	28t	1 785	6 to 7	
Note 1: Assumes transportation on 270 days per year				
Note 2: Based on a 10-hour day and 4 trucks per hour				
Source: R.W. Corkery & Co. Pty Limited – EIS Section 2.5.2				

1.3.3 Decommissioning/Rehabilitation

Where practical, the Project Site is to be progressively rehabilitated in completed sections. This would include (but is not limited to):

- Shaping and where required, backfilling of the terminal faces of the Extraction Area to achieve a final wall angle of 1:4 (V:H);
- Spreading of topsoil sourced either from on site or elsewhere;
- Ripping and scarifying perpendicular to the slope to facilitate infiltration of water and seed retention; and
- Stabilising and seeding the prepared landform using hydro mulching of native grass species suitable for the final land use of nature conservation or agriculture.

Following completion of the extraction activities all plant, equipment, and facilities are also be removed and the Project Site rehabilitated in accordance with the final landform plan.

2.0 EXISTING KEY INFRASTRUCTURE

2.1 Road Network

During the establishment and decommissioning phases of the project, the traffic generated by the Proposal will be expected to originate within the local area and surrounding towns; predominately Bathurst and Blaney.

Most operational vehicles entering and exiting the Project Site from the external road network will originate or have their destinations either within the local area (staff), or for vehicles carrying product, it is expected to be 85% towards Bathurst and the remaining 15% towards Blaney. Vehicles will travel to/from Blaney and Bathurst via Mid Western Highway. The key route to/from the Project Site is illustrated in **Figure 3**.

2.1.1 Function and Geometry

2.1.1.1 Mid Western Highway

The Mid Western Highway (A41) is a state road running approximately northeast to southwest connecting Blaney to Bathurst. Although the road is funded by Roads and Maritime Services (RMS), the maintenance of the road has been carried out by the Bathurst Council on behalf of the RMS.

Between Browning Road in Bathurst and Guyong Road east of Blaney, the Lane widths are fairly consistent at approximately 3.3m - 3.5m not allowing for lane widening where super elevation is located. The verge varies from 1.6m - 2.6m wide not including any breakdown/break areas. The side of road drainage consists of concrete lined V-drains, kerb and gutter and grass styled V-drain. This section of road provides access to small/medium acreage residential properties. This road alignment is relatively flat in parts, however in some areas the vertical curves create limited visibility. The horizontal curves are slight to moderate. The posted speed limit between Browning Street and Guyon Rd is 80km/h and 100km/h.

2.1.2 Key Intersections

2.1.2.1 Mid Western Highway/Havannah Street

Havannah Street forms a T-intersection with the Mid Western Highway. The intersection consists of channelised right turn for eastbound traffic and channelised left turn for westbound traffic. Traffic control consists of double hold lines and traffic lights, the road is 2 lanes in each direction and divided with an island in the centre of the road.

2.1.2.2 Mid Western Highway/Boundary Road

Boundary Road forms an offset four-way intersection with Mid Western Highway. Channelised left and right turn bays have been provided for traffic travelling west, while the traffic travelling from East has only been provided with an channelised right turn. Traffic control coming from Boundary Road consists of a hold line with give way sign as shown in **Plate 1**.

The sight distance provided exceed both the Approach Sight Distance (ASD) and the Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A) in all scenarios except for northbound traffic from Boundary Road looking to the east where only the ASD is satisfied for an 80km/h road.

2.1.2.3 Mid Western Highway/McDiarmid Street

McDiarmid Street forms a T-intersection with Mid Western highway. Channelised right turn bays have been provided for traffic travelling west, while the traffic travelling east have been provided a basic left turn. Traffic control coming from McDiarmid Street consists of a hold line with give way sign as shown in **Plate 2**.

The sight distance provided exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A) for an 80km/h speed limit.

2.1.2.4 Mid Western Highway/Cherry Lane

Cherry Lane forms a T-intersection with Mid Western Highway. Channelised right turn bays have been provided for traffic travelling east, while the traffic travelling west has been provided a basic left turn. Traffic control coming from Cherry Lane consists of a hold line and give way sign as shown in **Plate 3**.

The sight distance provided exceed both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A) for an 80km/h speed limit.

2.1.2.5 Mid Western Highway/Delaware Crescent

Delaware Crescent forms a T-intersection with Mid Western Highway. Channelised right turn bays have been provided for traffic travelling east, while the traffic travelling west has been provided a basic left turn. Traffic control coming from Delaware Road consists of a hold line and give way sign as shown in **Plate 4**.

The sight distance provided exceed both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A) for traffic travelling westbound, however only the Approach Sight Distance (ASD) is satisfied for eastbound traffic. Vision has been limited by the vertical curve to the west of the intersection.

2.1.2.6 Mid Western Highway/Windemere Road

Windemere Road forms a T-intersection with Mid Western highway. Channelised right turn bays have been provided for traffic travelling west, while the traffic travelling from east has been provided a basic left turn. Traffic control coming from Windemere Street consists of a hold line with give way sign as shown in **Plate 5**.

The sight distance provided exceed both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGR Part 4A) for traffic travelling west bound, however only the Approach Sight Distance (ASD) is satisfied for eastbound traffic. Vision has been limited by the vertical curve to the west of the intersection.

2.1.2.7 Mid Western Highway/McLennan Close

McLennan Close forms a T-intersection with Mid Western highway. Channelised left turn bays have been provided for traffic travelling from Bathurst to Blaney, while the traffic travelling from Blaney to Bathurst been provided an channelised right turn lane. Traffic control coming from McLennan Close consists of a hold line with give way sign as shown in **Plate 6**.

The sight distance provided to the east exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGR Part 4A). Vision to the east exceeds the ASD however the full SISD for an 80km/h road would be very close to the limit of 152m.

2.1.2.8 Mid Western Highway/Hen and Chicken Road

Hen and Chicken Road forms a T-intersection with Mid Western highway. Basic left turn bays have been provided for traffic travelling west, while the traffic travelling east has been provided an auxiliary right turn lane. Traffic control coming from Hen and Chicken Road consists of a hold line with give way sign. There is a breakdown bay to the south of the intersection as shown in **Plate 7 & 8**.

The sight distance provided to the east exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGR Part 4A). Sight distance to the west is only sufficient to adhere to the ASD and not SISD for a 100km/h road due to the horizontal curve in addition to a cut embankment to the west of the intersection.

2.1.2.9 Mid Western Highway/Evans Plain Road

Evans Plain Road forms a T-intersection with Mid Western highway. Basic left turn has been provided for traffic travelling from Blaney to Bathurst, while the traffic travelling from Bathurst to Blaney has been provided an auxiliary right turn lane. Traffic control coming from Evans Plain Road consists of a hold line with give way sign as shown in **Plate 9**.

The sight distance provided to the east exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A). Sight distance to the west is very limited with vision potentially sufficient to adhere to the ASD and not SISD for a 100km/h road due to the horizontal curve in addition to a cut embankment to the west of the intersection.

2.1.2.10 Mid Western Highway/Walkom Road

Walkom Road forms a T-intersection with Mid Western highway in two different locations. These intersections have been summarised below by their locations relative to Kings Plains as shown in **Plates 10 & 11**.

East of Kings Plains

Basic left turn has been provided for traffic travelling west, while the traffic travelling east has been provided a channelised right turn. Traffic control coming from Walkom Road consists of a hold line. This section of road is two lanes in each direction.

The sight distance provided exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A).

West of Kings Plains

Basic left turn has been provided for traffic travelling from west, while the traffic travelling east has been provided a channelised right turn lane. Traffic control coming from Evans Plain Road consists of a hold line, give way sign, reduced speed sign and a T-intersection sign.

The sight distance provided exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A) for a 100km/h road.

2.1.2.11 Mid Western Highway/Dungeon Road

Dungeon Road forms a T-intersection with Mid Western highway. Basic left turn has been provided for traffic travelling to the east, while the traffic travelling west has been provided a channelised right turn. Traffic control coming from Dungeon Road consists of a hold line and give way sign as shown in **Plate 12**.

The sight distance provided exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A) for a 100km/h road.

2.1.2.12

Mid Western Highway/Guyong Road

Guyong Road forms a T-intersection with Mid Western highway. Basic left turn has been provided for traffic travelling east, while the traffic travelling west has been provided an auxiliary right turn. Traffic control coming from Guyong Road consists of a hold line and give way sign. The intersection does not form a 90-degree angle with the Mid Western Highway which makes vision to the west more difficult as shown in **Plate 13**.

The sight distance provided exceeds both the Approach Sight Distance (ASD) and Safe Intersection Sight Distance (SISD) required for trucks by Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A).

2.1.2.13

Project Site Entrance

At present, there is an unpaved entry with an approximately 40m wide entry which narrows to approximately 5m wide 15m from the entry. The existing Mid Western Highway/Quarry entrance location is shown on **Plate 14**. The entrance is a Basic Right (BAR), Basic Left (BAL) type, as per AUTROADS BAR/BAL type, although no formal survey has been conducted.

The sight distance to the east is approximately 180m and approximately 171m to the west of the existing intersection location. The sight distance therefore exceeds the requirement for Approach Sight Distance (ASD) by Table 3.1 of Austroads Guide to Road Design Part 4A: Un-signalised and Signalised Intersections (AGRD Part 4A).

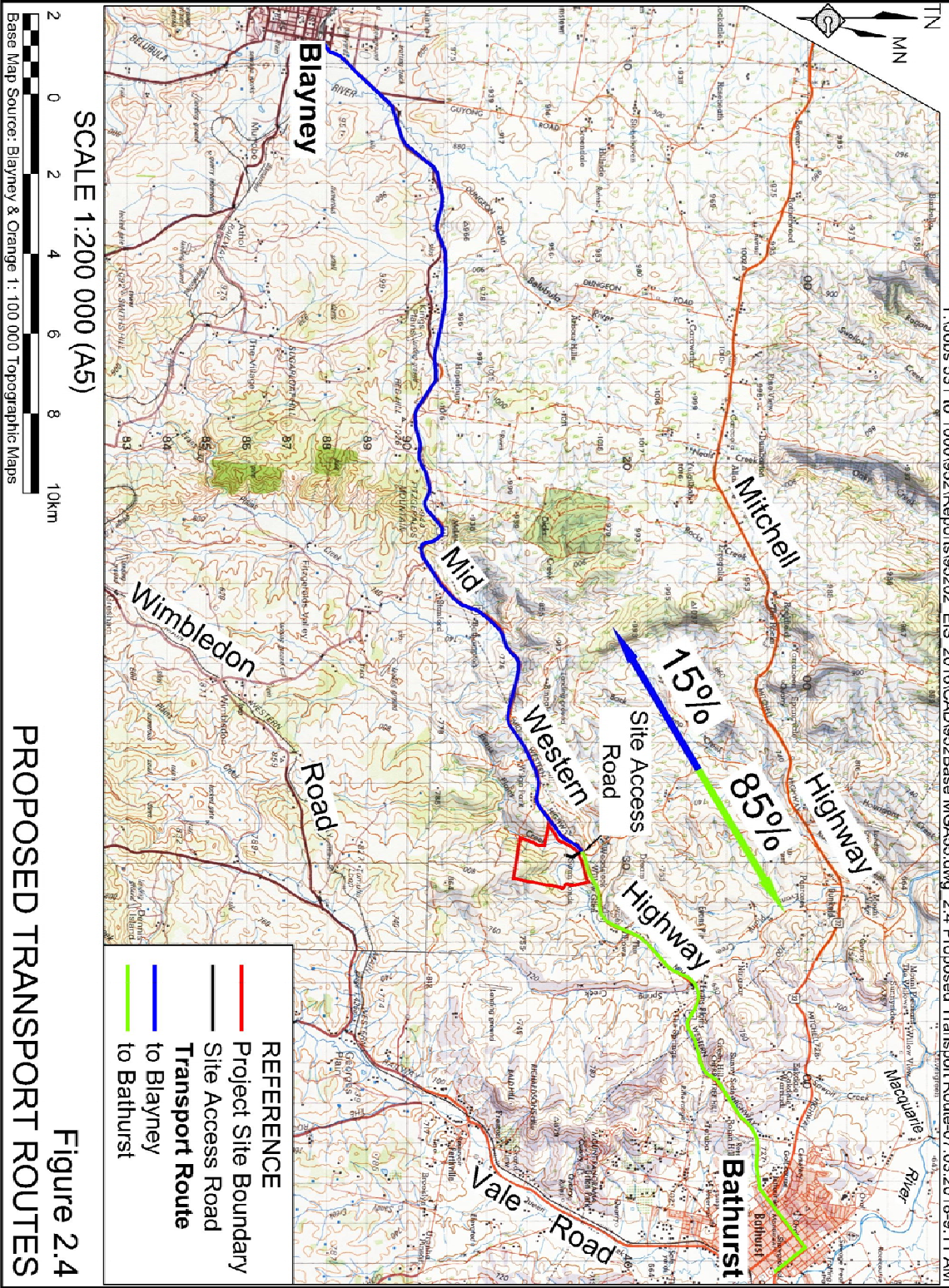


Figure 3 – Access route to/from Swans Ponds Quarry.

There were 8 crashes in the vicinity of the site entrance, with the closest being in close proximity to the entrance. That crash was in 2012 and is described as “Off carriageway, right on left bend into object/parked vehicle” during the daytime. No one was injured, and the vehicle was towed away. The Applicant states that that incident was unrelated to the previous operation of the site and that no Proposal-related traffic incidents have occurred since it assumed control of the Quarry in 2003. The locations of these are shown in Figure 4.

Crashes Map - Bathurst Regional

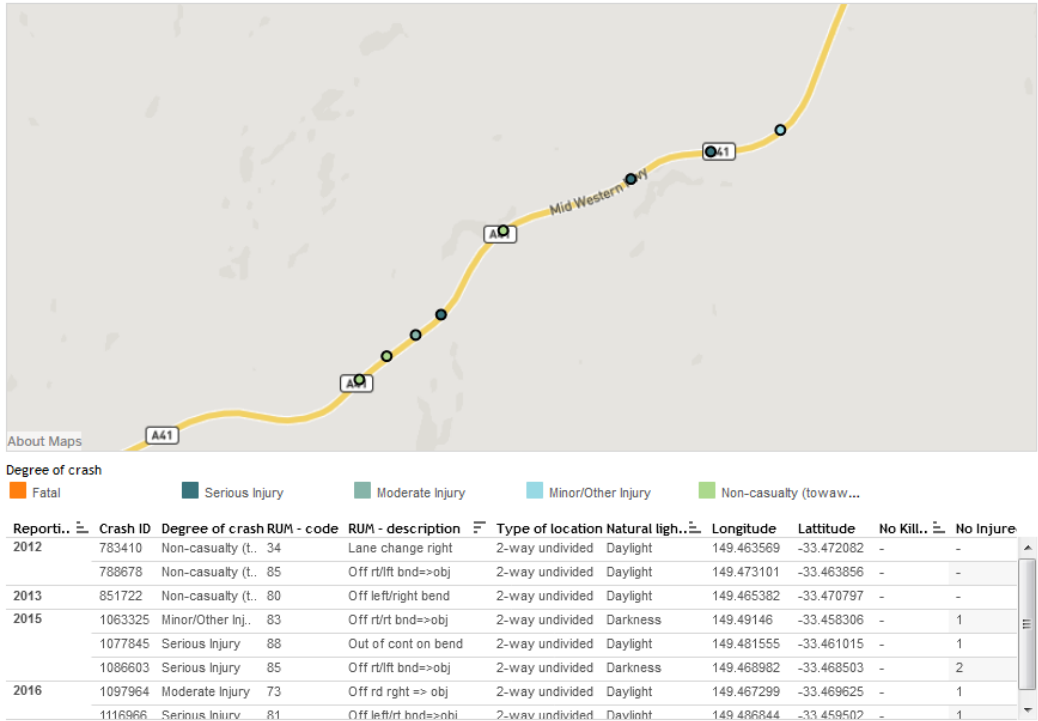


Figure 4 – Bathurst District Crash Map Mid Western Highway



Plate 1: The Great Western Highway/Boundary Road intersection looking north east



Plate 2: The Great Western Highway/McDiarmid Street intersection looking north



Plate 3: The Great Western Highway/Cherry Lane intersection looking south



Plate 4: The Great Western Highway/Delaware Crescent intersection looking north



Plate 5: The Great Western Highway/Windemere intersection looking north west



Plate 6: The Great Western Highway/McLennan Close intersection looking south east



Plate 7: The Great Western Highway/Hen and Chicken Road intersection looking east



Plate 8: The Great Western Highway/Hen and Chicken Road intersection looking south



Plate 9: The Great Western Highway/Evans Plain Road intersection looking east



Plate 10: The Great Western Highway/Walkom Road intersection looking east



Plate 11: The Great Western Highway/Walkom Road West intersection looking north



Plate 12: The Great Western Highway/Dungeon Road intersection looking west



Plate 13: The Great Western Highway/Guyong Road intersection looking north



Plate 14: The Great Western Highway/Quarry Entrance South East

3.0 ROAD CONDITION ASSESSMENT

The road network was assessed using Surface Inspection Ratings to evaluate the condition of the pavement. This was undertaken using *VicRoads Guide to Surface Inspection Rating* which is based upon *Austrroads Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design*. The mode of distress, extent and severity of the distress was recorded along the key routes identified within this TIA. Both core and non-core assessment criteria were used to estimate the current condition of Spray Sealed Surfaces. The core criteria establish the level of integrity of the surfacing layer and provide an indication of remaining service life of the pavement. Non-core criteria are secondary criteria used to indicate expected performance of the surfacing with regard to issues of traffic safety and ride quality.

Table 3 below specifies the core and non-core assessment criteria used in the visual condition inspections.

Table 3: Core and Non-Core Criteria for Surface Inspection Ratings

Core criteria	Non-core criteria
Cracking	Loss of Surface Texture
Loss of Aggregate (Stripping)	Deformation
Binder Condition	

3.1.1 Assumed Existing Pavement Design

All highways, roads and local streets within the key road network potentially impacted by the Proposal are expected to be flexible pavements, consisting of a double/double two coat spray seal pavement over base and sub base materials, ranging in thickness.

The existing pavements have some issues due to shallow pavement thickness, insufficient pavement drainage, heavy traffic, weak subgrades or combinations of these. The existing pavement thickness or subgrade conditions have not been confirmed.

3.1.2 Visual Condition Inspection Findings

Pavement observed throughout the key road network potentially impacted by the Proposal appears to be under repair in section as poor road condition is evident in older sections of road.

Stripping of the binder, and minor deformities of the base and sub base seem to be evident from Boundary Road, however, the deformities appear to worsen in the western direction.

Table 4 records the findings from the visual condition inspection of Escort Way pavement conducted on 10th October 2017.

Table 4: Pavement visual condition inspection findings for the Mid Western Highway.

Chainage*	Core/ Non-core	Mode of Distress	Extent	Severity Rating	Plate Reference
5,000m	Core & Non-core	Minor stripping of aggregate, loss of texture and minor deformation in driving line	Section of pavement	Minor	Plate 15
6,300m	Non-core	Minor stripping of aggregate, loss of texture and minor deformation in driving line	Section of pavement	Minor to Moderate	Plate 16
9,500m	Core & Non-core	Minor stripping of aggregate, loss of texture and minor deformation in driving line - evidence of repaired section of road	Section of pavement	Minor	Plate 17
12,000m	Core & Non-core	Minor stripping of aggregate and loss of texture.	Section of pavement	Minor to Moderate	Plate 18
12,900m	Core & Non-core	Block cracking, stripping of aggregate, loss of texture and significant deformation	Section of pavement	Moderate to Significant	Plate 19
20,600m	Core & Non-core	Stripping of aggregate, loss of texture and significant deformation	Section of pavement	Moderate to Significant	Plate 20
22,700m	Core & Non-core	Block cracking, stripping of aggregate, loss of texture and some deformation – evidence of repairs	Section of pavement	Moderate	Plate 21
29,800m	Core & Non-core	Block cracking, stripping of aggregate, loss of texture and some deformation – evidence of repairs	Section of pavement	Moderate	Plate 22
31,000m	Core & Non-core	Block cracking, some stripping of aggregate, loss of texture and some deformation	Localised	Moderate	Plate 23
32,100m	Core & Non-core	Block cracking, some stripping of aggregate, loss of texture and some deformation	Section of pavement	Minor to Moderate	Plate 24
33,000m	Core & Non-core	Stripping of aggregate, loss of texture and deformation – repaired potholes on right of lane	Section of pavement	Minor to Moderate	Plate 25

*Chainage is measured from Havannah Street



Plate 15: Minor stripping of aggregate, loss of texture and minor deformation.



Plate 16: Minor stripping of aggregate, loss of texture and minor deformation.



Plate 17: Minor stripping of aggregate and loss of texture – evidence of recent repair.



Plate 18: Stripping of aggregate and loss of texture – evidence of recent repair.



Plate 19: Block cracking, stripping of aggregate, loss of texture and significant deformation



Plate 20: Stripping of aggregate, loss of texture and significant deformation



Plate 21: Block cracking, stripping of aggregate, loss of texture and some deformation – evidence of repairs



Plate 22: Block cracking, stripping of aggregate, loss of texture and moderate deformation – evidence of repairs



Plate 24: Block cracking, some stripping of aggregate, loss of texture and some deformation



Plate 23: Block Cracking, stripping of aggregate, loss of texture and deformation



Plate 25: Stripping of aggregate, loss of texture and deformation – evidence of repaired potholes

4.0 TRAFFIC FORECASTING

4.1 Existing Traffic Counts

Traffic counts on Mid Western Highway were obtained from the RMS Western Region. The traffic counter was located 2.68km to the East of the Bathampton Road, Bathampton 2795, approximately 12km west of the Project Site entrance. These counts were undertaken in 2006. Counts taken indicate an average Annual Daily Traffic (AADT) of 1941 vehicles of which 88% are light vehicles for both east and west travelling traffic.

4.2 Traffic Growth

For the basis of this report, an Annual Growth rate of 1.5% has been adopted, which is the industry standard.

4.3 Background Traffic - Year of Opening (2018) and Design Year (2033)

Using an Annual Growth rate of 1.5%, the compound traffic growth of background traffic within the study area is summarised in **Table 5** below for vehicles per day.

Table 5: Background Traffic Summary – AADT (vpd)

	Two-way AADT Traffic Count	Year of Traffic Count	% HV	Background Traffic – 2018	Background Traffic – 2036
Mid Western Highway	1941	2006	12%	2320	3034

Conservatively, peak hour flows are taken as 12% of the AADT as per *Austrroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* for both rural urban fringe roads (Escort Way) and Rural Strategic Roads.

4.4 Traffic Generation

4.4.1 Establishment/Decommissioning Traffic

As summarised in Section 1.3.1, Site Establishment Traffic has already been completed and would not require any additional works as the Project Site has been established.

Decommissioning traffic would consist of heavy vehicles transporting equipment, infrastructure and plant from the Quarry. This traffic is forecast to be approximately 8 vehicles in total travelling to/from the Project Site over a period of 2 weeks.

Of these vehicles, it is anticipated that none would be over size or over mass vehicles.

4.4.2 Operational Traffic

As detailed in Section 1.3, at maximum production the Proposal would produce an average of forty (40) heavy vehicle movements from the Project Site over one week. However, on a campaign basis, the Proposal may produce a maximum of 40 movements per day. The maximum outlined trips, based on a 10-hour day.

The heavy vehicle traffic is considered to be negligible as it will add a maximum of 4 vehicle movements per hour, which equates to an additional 240 trips per week. This will only be conducted on a campaign basis. The average heavy vehicle movements generated from the Quarry will be approximately 48 movements per week.

The design vehicle for this assessment is the 19m B-Double vehicle.

4.4.3 Employee and General Traffic

The Applicant anticipates that during each stage of the project, a maximum of 2 staff will be on site on a campaign basis.

Most employees of the Proposal are expected to arrive prior to 7:00am. Likewise, it is expected that the majority of employees will leave the Project Site after 5:00pm each day. Employees will therefore arrive at the Project Site outside of the peak hours of the external road network, however it is noted that they will likely leave during a peak period. Due to the small amount of staff this effect is considered negligible.

4.4.3.1 Staff Car Parking

The geometric layout and number of car parks will be designed in accordance with AS2890-2004 Parking Facilities – off-street car parking.

4.4.4 Traffic Generation Summary

Based upon the traffic generation above, it is considered that the maximum traffic generation per day to the Project Site will consist of 46 trips to/from the Quarry per day. This will increase traffic on Mid Western Highway by approximately 3%. This number of trips will have a negligible impact on the performance of the surrounding road network and intersection performance.

4.5 Traffic Distribution

Vehicles will travel to/from Bathurst and Blaney via Mid Western Highway. It is assumed that the vehicles entering and/or exiting the Project Site would be a 15% - 85% split for left and right turns onto Mid Western Highway.

4.6 Cumulative Impacts

There are no known other approved developments within the Quarry vicinity that would impact the projected traffic generation rates.

5.1 Road Performance - Level of Service

Table 6 below, taken from Section 4.1 of the *RTA Guide to Traffic Generating Developments* specifies the level of service of two lane rural roads based upon peak hour (veh/hr) flows.

The level of service (LoS) for Mid Western Highway within the study area is summarised in Table 7 below for background traffic only.

Table 6: Peak Hour Flows on Two-lane rural roads (veh/hr) Design speed of 100km/hr.

Terrain	Level of Service	Percent of Heavy Vehicles			
		0	5	10	15
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

Table 7: Road Performance – Level of Service for Background Traffic.

	Year/Level of Service	
	2017	2033
Mid Western Highway	B	B

A level of service of **B** is considered to be satisfactory operation.

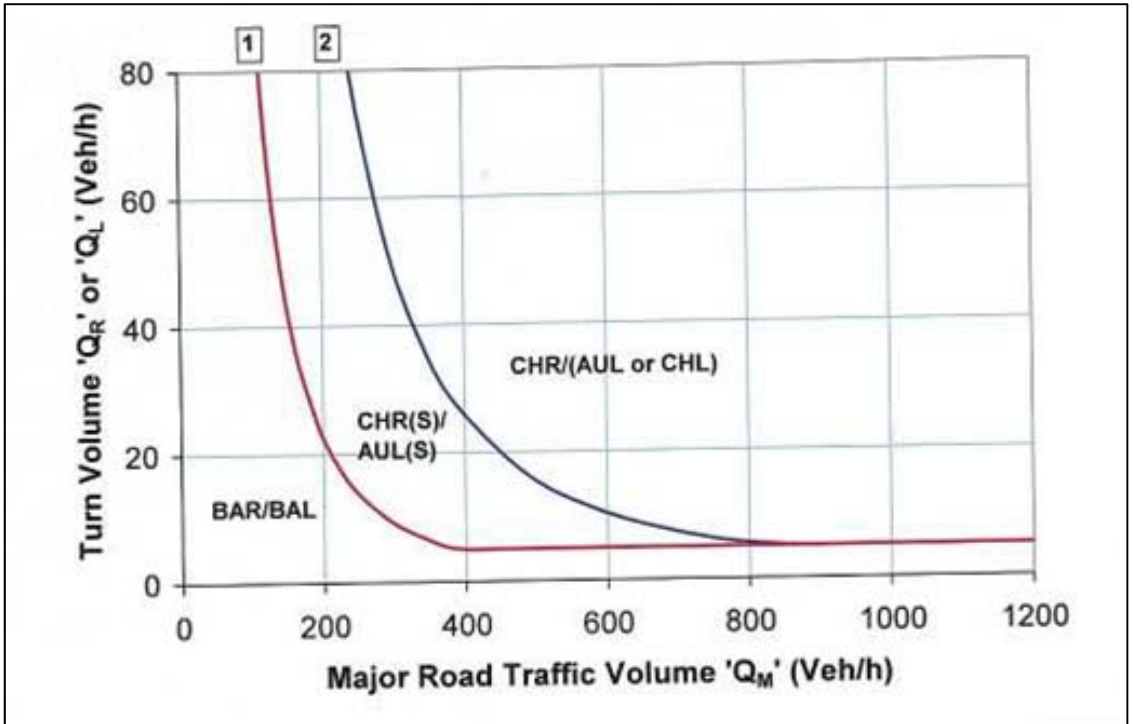
As the Project Site is only expected to generate a maximum of 46 trips per day, with trips concentrated before 7:00am and after 5:00pm, there will be no changes to the above level of service for the road sections and therefore the impact of Proposal-generated traffic is considered negligible.

5.2 Intersection Performance

At present, the entrance is a Basic Right (BAR), Basic Left (BAL) type, as per AUTROADS BAR/BAL type, although no formal survey has been conducted. From section 4.3, the traffic volume along Mid Western Highway is approximately 2286 veh/day. This is equivalent to 229 veh/hour.

From section 4.4.4, the expected maximum traffic generation per day to the Project Site will consist of 46 trips to/from the Quarry per day. This is equivalent to approximately 5 veh/hour.

From *Austrroads Guide to Road Design: Part 4A unsignalised and signalised intersections*. Based upon Section 5 and **Figure 5** below, it can be noted that a BAR/BAL treatment is satisfactory for this level of demand.



Source: *Austrroads Guide to Road Design: Part 4A unsignalised and signalised intersections*

Figure 5 – Turn Warrants

Therefore, the current BAR/BAL type Project Site entrance is adequate.

6.0 RECOMMENDATIONS

6.1 Capacity

The traffic generated by the Proposal would have a negligible effect on the surrounding road network operation, with no changes to the Level of Service that the existing roads and intersections are operating.

6.2 Intersection

As per section 5.2, the current BAR/BAL type Project Site entrance is adequate, subject to final survey.

7.0 CONCLUSION

7.1 Secretary’s Environmental Assessment Requirements

The Secretary’s Environmental Assessment Requirements (SEAR) have been addressed. **Table 8** itemises the sections in which the key issues are addressed.

Table 8: Addressed SEARs

SEARs/Key Issues	Section Addressed
<p>Impact of establishment, operational and decommissioning phase generated traffic including: and Operation of the Quarry site: Road Transport Volumes and Vehicle Types broken down into:</p> <ul style="list-style-type: none"> • Movement of vehicles; • Parking of construction related and personal vehicles. 	<p>1.3 Proposed Development</p>
<p>Projected Transport Operations including:</p> <ul style="list-style-type: none"> • Existing and anticipated traffic generated on the surrounding road network; • Vehicle types and volumes; • Peak traffic volumes; • Travel routes for vehicles accessing the development site; • Cumulative impacts of existing and anticipated volumes on the surrounding road network. 	<p>2.0 Existing Key Infrastructure 0 Traffic Forecasting 5.0 Road and Intersection Assessment 6.0 Recommendations</p>
<p>Traffic Management Plan for all operations across the whole site</p>	<p>A Traffic Management Plan, including Driver Code of Conduct, will be developed at a later stage, once initial approvals have been granted.</p>

In summary, the impact of site establishment, operational and decommissioning traffic generated by the Proposal could be successfully mitigated by undertaking the recommendations provided in Table 9 below.

Table 9: Mitigation Summary Table

Impact	Recommendations
Capacity	<p>No recommendations.</p> <p>Traffic impacts on existing road network capacity from the Project Site is minor, with all road infrastructure operating at the same Level of Service prior to the development traffic being applied.</p>
Geometric	<p>Any future Mid Western Highway upgrades to allow for a sealed width of 7.2m with unsealed 0.5m wide shoulders. The upgrade should consist of the following, with detailed design undertaken in accordance with Australian Standards, Council and AUSTRROAD specifications:</p> <ul style="list-style-type: none"> • Pavement Design based upon 20-year design life to account for high percentage of heavy vehicles and geometry. • Widening of the road carriageway and sealing shoulders to allow for adequate manoeuvrability of road users. Final road cross sections to be subject to final design.
Intersection	<p>The current Quarry entrance should be surveyed to ensure AUSTRROADS compliance with a BAR/BAL type intersection.</p>
Safety	<p>The Applicant should develop and enforce an appropriate Driver Code of Conduct as part of a Traffic Management Plan for the Project Site to manage road safety issues associated with the development.</p>

8.0 REFERENCES

Australian Standards 2009, *AS1742.2: 2009 – Manual of Uniform Traffic Control Devices*

AUSTROADS 2011, *Guide to Road Design: Part 3: Geometric Conditions*

AUSTROADS 2011, *Guide to Road Design: Part 4A: Unsignalised and Signalised Intersections*

AUSTROADS 2011, *Guide to Road Design: Part 4B: Roundabouts*

AUSTROADS 2011, *Guide to Pavement Technology Part 5: Pavement Evaluation and Treatment Design*

Roads and Maritime Services 2010, *RMS Delineation Section 17 – Alignment Signs and Markers Version 1*

Roads and Maritime Services 2015, *RMS Supplement to Austroads Guide to Road Design Part 3: Geometric Design Version 2.0 publication NO. 11.092 12 August 2015.*

Vic Roads 2009, *Technical Bulletin 50 Guide to Surface Inspection Rating for Pavements Surfaced with Spray Seals and Asphalt*