



**Hodgson Quarries
and Plant Pty Ltd**

NOISE IMPACT ASSESSMENT

Roberts Road Quarry – Modification 4

FINAL

November 2019

Hodgson Quarries and Plant Pty Ltd

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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Hodgson Quarries and Plant Pty Ltd

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Report No. **4465/R04**
Date: **November 2019**



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Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Alex Irwin	12 November 2019	Dave Davis	12 November 2019

Table of Contents

1.0	Introduction	1
1.1	Scope	1
1.2	Description of the Proposed Modification	1
2.0	Existing Noise Environment	3
2.1	Receivers	3
2.2	Noise limits	3
	2.2.1 Operational noise limits	5
	2.2.2 Road traffic noise criteria	5
2.3	Measured Noise Levels	6
3.0	Methodology	7
3.1	Modified Operations	7
3.2	Operational Noise Assessment	7
3.3	Road Traffic Noise Assessment Method	8
4.0	Noise Sources	10
4.1	Quarry Site Noise Sources	10
	4.1.1 Plant and equipment sound power levels	10
	4.1.2 Noise emitting source locations	10
4.2	Traffic noise sources	13
5.0	Predicted Noise Levels	14
5.1	Operational noise	14
5.2	Road traffic noise	14
6.0	Impact Assessment	15
6.1	Operational noise assessment	15
6.2	Road traffic noise assessment	15
7.0	References	16

Figures

Figure 1.1	Location of Roberts Road Quarry	2
Figure 2.1	Noise assessment receivers	4
Figure 4.1	Approved Extraction Area and Sequence	11
Figure 4.2	Indicative Quarry Operating Sequence	12

Tables

Table 2.1	Noise receivers	3
Table 3.1	Average Two-Way Traffic Volumes (derived from EIS (Nexus, 1999) Table 3.10)	9
Table 4.1	Dozer and FEL sound power levels	10
Table 4.2	MOD 2 noise assessment scenarios and equipment	10
Table 4.3	Quarry truck traffic noise sources	13
Table 4.4	Estimated traffic volumes on Old Northern Road and Wisemans Ferry Road 7.00 am to 10.00 pm (Year 2020)	13
Table 5.1	Predicted noise levels at receivers LAeq,15 min dB(A)	14
Table 5.2	Predicted increase in road traffic noise due to the proposed modification (Year 2020)	14

1.0 Introduction

1.1 Scope

Umwelt (Australia) Pty Limited (Umwelt) has undertaken an assessment of the potential noise impacts from the proposed modification of the Roberts Road Quarry (the Quarry) located at Maroota, New South Wales (NSW), across Lots 1 and 2, DP 228308 and Lot 2, DP 312327. The location of the Quarry can be seen in **Figure 1.1**.

The potential noise impacts have been assessed by comparison of predicted noise levels against the applicable noise impact assessment levels. The applicable noise impact assessment levels are the noise limits in the existing Development Consent (DA 267-11-99) and Environmental Protection License (EPL) 6535.

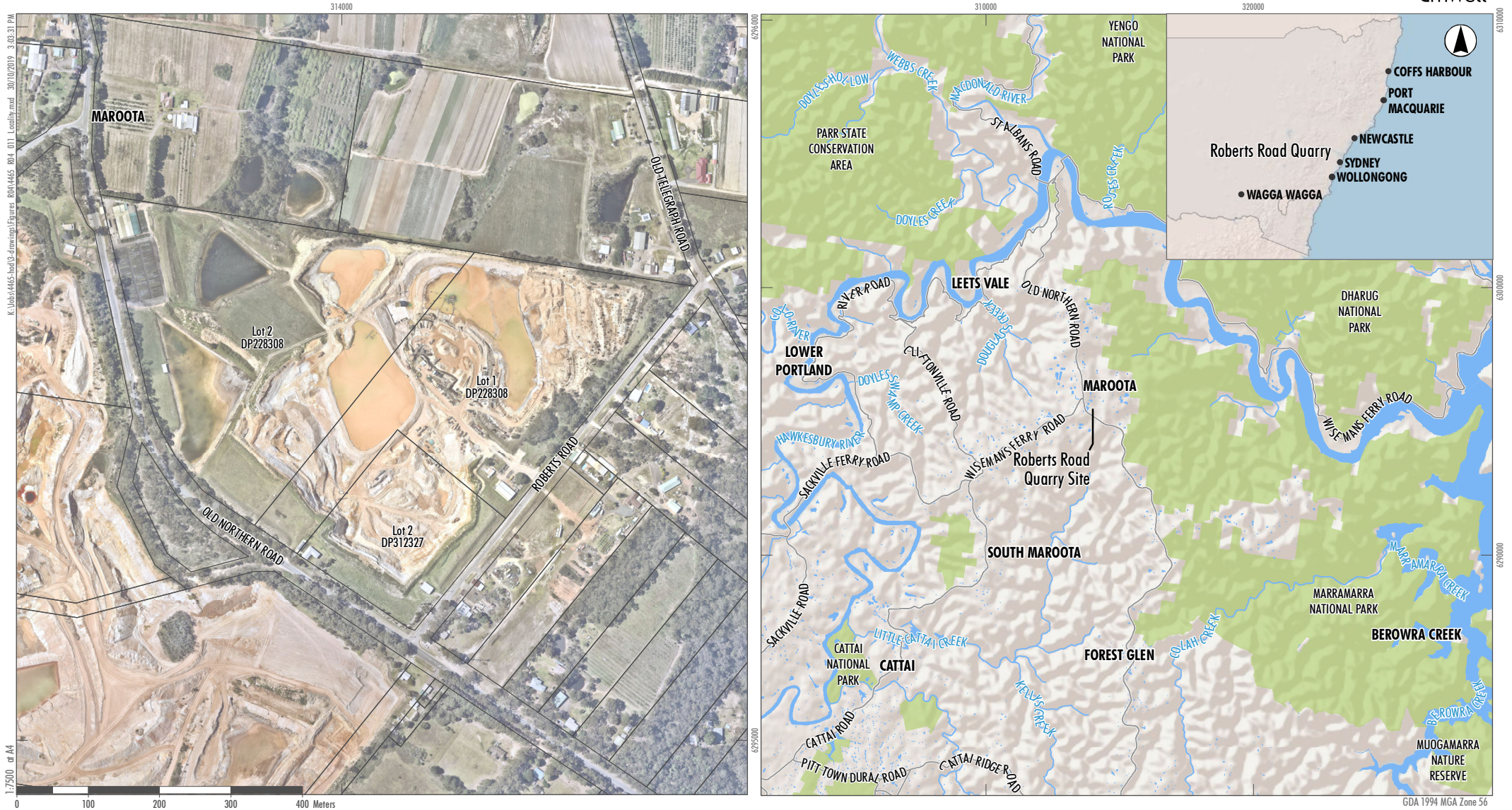
This Noise Impact Assessment (NIA) has been undertaken in accordance with the requirements of the NSW *Noise Policy for Industry* (Environment Protection Authority (EPA), 2017) (NPfi) and the NSW *Road Noise Policy* (Department of Environment and Climate Change (DECC), 2011) (RNP). Any variance from either Policy in the assessment has been justified.

1.2 Description of the Proposed Modification

Hodgson Quarry Products Pty Limited (Hodgson Quarry Products) is proposing to modify DA 267-11-99 to permit the importation of Virgin Excavated Natural Material (VENM) and Excavated Natural Material (ENM) to the Quarry. The imported VENM and ENM would be used to facilitate rehabilitation of the Quarry void to create a final landform that is free-draining, thereby reinstating pre-Quarry drainage, with reduced slopes that will be more sympathetic to the and surrounding topography and more amenable to future use of the land for agricultural or horticultural purposes. A dam would be retained within the final landform to provide for erosion and sediment control during the landform construction and rehabilitation phase, and storage and retention of water in accordance with the licensed allocation of the landholding following rehabilitation. While the management of VENM and ENM on the Quarry site is likely to be completed using existing Quarry mobile equipment, the noise assessment considers the operation of the Quarry dozer and front-end loader (FEL) as a separate noise source.

Imported VENM or ENM with high sand content may be processed, along with the sand excavated from the extraction area, and blended to produce sand products for sale. The proposed processing of the imported VENM and ENM would not require any additional processing infrastructure or noise sources. Blending of material would prolong the life of the extractable resource within the Quarry and as such, the proposed modification includes a five year extension of the operational life of the Quarry, out to 2030.

To accommodate the importation of VENM/ENM, the proposed modification is to include an increase to the approved daily truck movements from 100 movements (50 laden trucks) to 140 movements (70 laden trucks). Where possible, Hodgson Quarry Products will undertake 'double trucking' whereby an inbound laden truck (VENM/ENM) would unload and then be loaded with quarry product and become an outbound laden truck.



Legend
 Roberts Road Quarry Boundary

FIGURE 1.1
 Location of Roberts Road Quarry

2.0 Existing Noise Environment

The area around the Quarry is predominantly rural and rural residential, and there are several other operating sand quarries in the area.

2.1 Receivers

Noise levels have been assessed at the same receivers where noise levels were predicted for the noise assessment that was undertaken for the MOD 2 application (refer *Hodgson Quarry Products Sand Extraction Roberts Road, Maroota - Operational Noise Assessment*, Wilkinson Murray Report No. 14229-B, May 2015) (the MOD 2 noise assessment). The assessed noise receivers are shown in **Table 2.1** and **Figure 2.1**. As the assessment of noise relies upon the previous modelling of the MOD 2 noise assessment, the receiver references of this assessment have been retained. For clarity, the corresponding receiver references used in the Statement of Environmental Effects (SEE) are presented in **Table 2.1**.

Table 2.1 Noise receivers

Receiver ID		Address	Approximate distance to Quarry boundary	Direction from Quarry	MGA Coordinates (m)	
NIA	SEE				Easting	Northing
A	RR03	100 Old Telegraph Road, Maroota	12 m	N	314418	6295660
B	RR10	35 Roberts Road, Maroota	16 m	E	314332	6295397
C	RR02	4471 Old Northern Road, Maroota	109 m	N	313781	6295850
D	RR12	11 Roberts Road, Maroota	29 m	E	314156	6295190
E ¹	-	1700 Wisemans Ferry Road, Maroota	1000 m	WSW	312820	6295008
F	RR01	4460 Old Northern Road, Maroota	46 m	W	313617	6295687
G	RR06	59 Roberts Road, Maroota	27 m	E	314489	6295576
H	RR08	45 Roberts Road, Maroota	25 m	E	314412	6295483

Notes: 1. Only road traffic noise has been assessed at Receiver E. Quarry noise has not been assessed at Receiver E, which is consistent with the MOD 2 noise assessment

2.2 Noise limits

This NIA has been undertaken by comparing the predicted noise levels from the Proposed Modification against the Quarry's existing noise limits. Roberts Road Quarry does not seek a modification of noise limits as the Quarry is confident that continued compliance with existing noise limits can be maintained.



314000



GDA 1994 MGA Zone 56

Legend




-  Roberts Road Quarry Boundary
-  Cadastral boundary
-  Receivers

FIGURE 2.1
Noise Assessment Receivers

2.2.1 Operational noise limits

The noise limits of EPL 6535 are as follows.

L2 Noise limits

L2.1 Noise from the premises must not exceed the sound pressure level expressed as LA10(15 minute) of 45 dB(A), except as expressly provided by this licence.

L2.2 Noise from the premises is to be measured or computed at any point within one metre of any residential boundary, or at any point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition L2.1.

The noise limits in the development consent conditions for DA 267-11-99 (as Modified) are:

For typical operations, noise from the premises must not exceed:

- an LAeq,15 min noise emission criterion of 43 dB(A) (7.00 am to 6.00 pm) Monday to Saturday;
- an LAeq,15 min noise emission criterion of 40 dB(A) (6.00 am to 7.00 am) Monday to Saturday; and
- an LA1,1 minute noise emission criterion of 50 dB(A) (6.00 am to 7.00 am) Monday to Saturday.

The MOD 2 noise assessment discusses that the LAeq,15 min noise limit of 43 dB(A) in the development consent is equivalent to the LA10(15 minute) noise limit of 45 dB(A) in the EPL. Consistent with the approach adopted in the MOD 2 noise assessment, this noise impact assessment has been undertaken under the assumption that demonstration of compliance with the development consent condition will also demonstrate that compliance with the noise limit of EPL 6535 has been achieved, for typical daytime operations (7.00 am to 6.00 pm) Monday to Saturday.

2.2.2 Road traffic noise criteria

Traffic noise limits are provided by Condition 48 of DA 267-11-99 MOD 3. Traffic noise from the development is not to exceed the following noise limits at any affected residence on minor roads:

- an LAeq, 1 hour of 55 dB(A) between 7.00 am and 10.00 pm, and
- an LAeq, 1 hour of 50 dB(A) between 10.00 pm and 7.00 am.

Where existing LAeq traffic noise levels already exceed these criteria, the development is to ensure that traffic noise from the development does not result in an increase of more than 2 dB(A).

In addition to the above, road noise criteria are also provided in the RNP (DECC, 2011) as follows:

*For existing residences and other sensitive land uses affected by **additional traffic on existing roads generated by land use developments**, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*

The NSW EPA Application Note "Applying the NSW Road Noise Policy" further states:

The 2 dB increase applies to both the relevant day and night assessment criteria.

The time periods for the day and night assessment criteria are defined in the RNP as:

- LAeq, (15 hour) represents the LAeq noise level for the period 7.00 am to 10.00 pm.
- LAeq, (9 hour) represents the LAeq noise level for the period 10.00 pm to 7.00 am.

2.3 Measured Noise Levels

Noise monitoring is undertaken annually to confirm noise levels of the Quarry against the limits imposed by DA 267-11-99 and EPL 6535. Noise levels have been measured in accordance with an Operational and Road Noise Management Plan (ORNMP) (MAC, 2016), prepared and implemented in accordance with Condition 46 of DA 267-11-99 in 2016, 2017, 2018 and 2019. All noise measurements have confirmed compliance of Quarry operations with the operational and road traffic noise limits in the conditions of DA 267-11-99 and the EPL 6535.

3.0 Methodology

3.1 Modified Operations

The proposed modified Quarry operations will remain substantially the same as those currently approved, the noise impacts of which were comprehensively assessed for the MOD 2 Application. The only relevant acoustic differences between the Quarry, as assessed by the MOD 2 noise assessment (Wilkinson Murray Pty Ltd [WMPL], 2015), and the proposed modification are:

- the increased use of the Quarry dozer and FELs to profile the VENM and ENM imported to the Quarry (currently these plant are utilised only occasionally for landform construction and profiling activities when sufficient clay waste or consolidated silt is available), and
- an increase in the number of trucks accessing the site per day.

3.2 Operational Noise Assessment

The noise assessment has been undertaken by quantifying the difference in noise levels at receivers between the proposed MOD 4 operations and the currently approved operations (as modelled and predicted by WMPL, 2015). WMPL (2015) predicted the noise levels received at surrounding residences for 3 cases.

1. Typical activities, where typical noise sources (Case 1) modelled for the MOD 2 noise assessment were:
 - 1 × Excavator at base of excavation
 - 2 × dump trucks continuously between face and processing area
 - 1 × FEL feeding processing plant managing stockpiles
 - 1 × Diesel Screen/Conveyers
 - 1 × Processing and Washing Plant/Conveyers
 - 1 × FEL loading haul trucks/managing stockpiles
 - 3 × Haul trucks in 15 minutes taking product off site.
2. Typical activities with Dozer (located at the highest RL within the Extraction or Emplacement area).
3. Typical activities with surface operations behind bund (Extraction or Emplacement).

It is noted that both the dozer and FEL to be used for VENM and ENM management would be effectively repurposed/redeployed and do not represent additional noise sources to those previously assessed and modelled to establish Quarry noise criteria (WMPL, 2015). The potential impact on received noise levels would be as a result of the more frequent operation of the dozer and FEL managing VENM and ENM as part of Quarry backfill, landform construction and rehabilitation operations. The dozer and FEL have therefore been considered as a separate noise source for the purpose of this noise assessment.

The proposed modification has been assessed by combining the predicted noise from the operation of the dozer and FEL in this area to the previously predicted MOD 2 noise levels at receivers (of WMPL, 2015). This has allowed for conservative predictions of the total noise levels from the Quarry (as modified), noting that on the basis of the redeployment of the dozer and FEL, the predicted noise levels of WMPL (2015) are likely to be conservatively high.

Noise levels generated by the dozer/FEL VENM/ENM management activities have been predicted with the same modelling software and the same prediction method used in the MOD 2 noise assessment (WMPL, 2015), that is the Cadna/A proprietary noise modelling software using the ISO 9613 noise prediction method. The ISO 9613 noise prediction method (using the default parameters) calculates the long-term average noise levels from noise sources under moderate noise-enhancing meteorological conditions. For the current proposed modification, the noise modelling was undertaken using the default meteorological parameters.

For the purpose of assessment, the predicted noise levels from Case 1 in the MOD 2 noise assessment (of WMPL, 2015) have been used. Cases 1 and 2 of the MOD 2 noise assessment are not considered representative of future operations as these involve around the redeployment of existing equipment to specific activities/operations on the Quarry site. That is, the proposed modification effectively represents a Case 4 if considered in the context of the MOD 2 assessment. The proposed dozer/FEL operations proposed would be instead of, as opposed to in addition to the Case 2 and 3 scenarios.

3.3 Road Traffic Noise Assessment Method

In regards to the increase in the number of trucks accessing the Quarry per day, there is no proposed increase to the number of trucks that will access the site in any single 15-minute period, consequently there will be no net change in noise from the Quarry site due to the number of trucks on site at any time. As the MOD 2 noise assessment modelled the worst case of the maximum number of trucks on site at any time in order to predict the highest $L_{Aeq}(15 \text{ minute})$ noise level, the noise from all trucks on site for the proposed modification have already been predicted. Therefore the net effect of the proposed modification only relates to the road traffic noise levels of trucks on the public roads which are described as an acoustic average over the time period (either Day 7.00 am to 10.00 pm or Night 10.00 pm to 7.00 am).

The modification proposes an increase from a maximum of 100 to 140 truck movements per day. The modification does not propose to increase the maximum number of truck movements per hour of operation. Consequently the only impact will be the change in the total number of truck movements during the daytime period (7.00 am to 10.00 pm).

As Roberts Road is a local road, the noise level criteria in the RNP is given in terms of $L_{Aeq}(1 \text{ hour})$ (refer to **Section 2.2.2**). Notably, the proposed modification would not change the maximum number of truck movements in any hour. As a result no increase in the maximum $L_{Aeq}(1 \text{ hour})$ from quarry trucks would occur as a result of the proposed modification.

The potential road traffic noise impact of the proposed modification has been assessed by estimating the relative increase in $L_{Aeq}(15 \text{ hour})$ traffic noise levels during the daytime period 7.00 am to 10.00 pm as a result of the increased numbers of truck movements in and out of the quarry during the hours of operation 7.00 am to 6.00 pm.

The Traffic Impact Assessment (TIA) (Seca Solution, 2019) describes the proposed increase in the number of trucks as follows:

The subject site has an approved haulage rate of 100 trucks per day (50 laden/50 unladen), which allows for inbound and outbound truck movements with the daily total two-way flows not to exceed 100 per day. The project seeks to increase the daily approval to 140 trucks per day, with no increase proposed for the existing hourly maximum of 20 trucks per hour. Instead the project shall see the additional heavy vehicle movements spread over the course of the day during periods of high demand.

All truck access will remain via the existing site access direct onto Roberts Road, with the existing distribution onto Old Northern Road to be maintained.

- 80% to/from the north, turning right onto Old Northern Road and the reverse left turn in.
- 20% to/from the south, being left turns onto Old Northern Road and right turns in.

Contemporary road traffic volumes data were not available for this NIA, which was also the case for the MOD 2 NIA. The specialist reports including the Acoustic Impact Assessment and the Traffic and Transport Study by Lyle Marshall & Associates that was prepared for the Environmental Impact Statement (EIS) (Appendices 11 and 15 of the EIS respectively) were also not available.

For this NIA, the current daily traffic volumes have been estimated from the traffic volumes presented in the EIS (Nexus, 1999), indexed by an annual growth factor of 2% as nominated in the TIA (Seca Solution, 2019), as shown in **Table 3.1**.

Table 3.1 Average Two-Way Traffic Volumes (derived from EIS (Nexus, 1999) Table 3.10)

Average Daily Vehicles (7 days)	Old Northern Road (Location D)		Wisemans Ferry Road (Location E)	
	1999	2020	1999	2020
Total Vehicles	2026	3071	1769	2681
Light Vehicles	1844	2795	1589	2408
Heavy Vehicles	183	277	180	273

In order to estimate the increase in the daytime 7.00 am to 10.00 pm period noise levels LAeq(15 hour) it is necessary to estimate the proportion of 24-hour traffic that occurs between 7.00 am and 10.00 pm. For the purposes of this assessment, it is considered that a conservatively low estimate of the traffic volumes between 7.00 am and 10.00 pm on Old Northern Road and Wisemans Ferry Road is 75% of total 24-hour volumes.

As described in the TIA, the existing distribution of Quarry trucks will be maintained for the proposed modification, where 80% of trucks will access the Quarry from the north, turning left onto Roberts Road from Old Northern Road, and 20% from the south, turning right onto Roberts Road from Old Northern Road.

4.0 Noise Sources

4.1 Quarry Site Noise Sources

4.1.1 Plant and equipment sound power levels

As noted in **Section 3.2**, the noise sources associated with the proposed modification have been identified as a Dozer and a FEL operating to manage VENM and ENM. As these items of equipment are to be the same as those currently used at the Quarry, the sound power levels used in the modelling are based on the values given in the MOD 2 noise assessment, shown in **Table 4.1**.

Table 4.1 Dozer and FEL sound power levels

Plant Item	Sound Power Level L_w dB(A) re $10^{-12}W$
Volvo L180G Front End Loader (based on Volvo L150 dynamic)	105
Komatsu D375A Dozer (pushing sand)	110

4.1.2 Noise emitting source locations

The previous modelling for the MOD 2 noise assessment placed noise sources in the approved extraction area, the Infrastructure area and the haul/access roads. **Table 4.2** provides the activities modelled by the MOD 2 noise assessment.

Table 4.2 MOD 2 noise assessment scenarios and equipment

Scenario	Operating Equipment
Core Activities	<ul style="list-style-type: none"> 1 Excavator at base of excavation 2 dump trucks continuously between face and processing area 1 FEL feeding processing plant managing stockpiles 1 Diesel Screen/Conveyers 1 Processing and Washing Plant/Conveyers 1 FEL loading haul trucks/managing stockpiles 3 Haul trucks in 15 minutes taking product off site
Dozer Extraction/Emplacement	Dozer at highest RL within extraction or emplacement area
Surface Extraction	1 Excavator (from base) repositioned at surface behind bund
Bund Construction	1 Excavator (from base) repositioned at surface building bund

The dozer extraction /emplacement scenarios considered activities in each of the extraction areas shown in **Figure 4.1**. For the purpose of the MOD 2 noise assessment, extraction operations were modelled in each of the identified extraction stages to ensure the worst-case noise levels were identified at each of the receivers surrounding the Quarry.

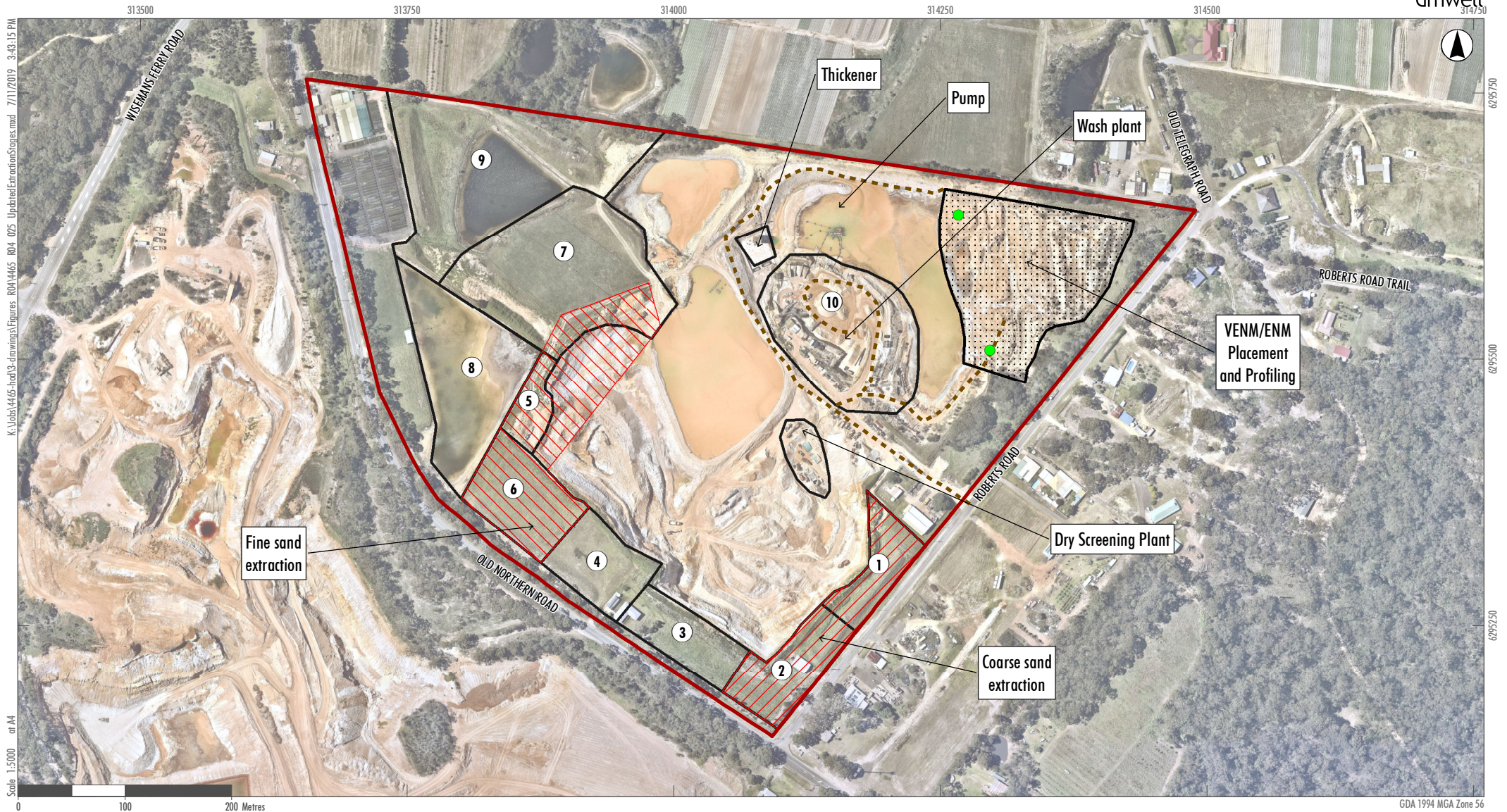
The dozer and FEL noise sources were located in the proposed MOD 4 VENM/ENM Placement and Profiling area, as shown in **Figure 4.2**. These locations reflect the fact that backfill and landform construction activities at the very north-eastern extent of the extraction area has been completed. These locations represent the most exposed locations of these noise sources to the nearest receivers.



Legend

- Quarry Site
- Approved Extraction Area
- Processing Plant and Product Stockpile
- Land Being Prepared for Rehabilitation
- Water Management
- Nursery
- Bundwalls (including topsoil)
- Extraction Sequence Stages
- Production Bores

FIGURE 4.1
Approved Extraction Area and Sequence



Legend

- Quarry Site
- Quarry Features
- Coarse sand extraction
- Fine sand extraction
- VENM/ENM Placement and Profiling
- Road Truck Routes
- Dozer and FEL Profiling VENM/ENM

Image Source: Nearmap (2019) Data source: Umwelt (2019); NSW LPI DTDB/DCDB (2018)

FIGURE 4.2
Location of Proposed Noise Sources

4.2 Traffic noise sources

The current approved daily truck movements for the quarry is 100 total truck movements (50 laden trucks). The modification is seeking approval for up to 140 movements per day (70 laden trucks). Based on the expected distribution of 80% of trucks to/from the north, and 20% to/from the south, the maximum increase in the number of quarry trucks during the daytime period is:

- 8 trucks per day on Old Northern Road south of Roberts Road, and
- 32 trucks per day on Old Northern Road north of Roberts Road and Wisemans Ferry Road.

The posted speed limits at the locations where traffic volumes were previously measured (Nexus, 1999) and where traffic noise levels have been previously assessed are 90 km/hr on Old Northern Road and 80 km/hr on Wisemans Ferry Road. **Table 4.3** summarises the additional noise sources.

Table 4.3 Quarry truck traffic noise sources

Road	Speed km/h	Number of additional quarry trucks per day 7 am to 10 pm
Old Northern Road, south of Roberts Road	90	8
Old Northern Road, north of Roberts Road	90	32
Wisemans Ferry Road, south of Old Northern Road	80	32

Based on the methodology described in **Section 3.3**, the existing and proposed traffic volumes for Old Northern Road and Wisemans Ferry Road between 7.00 am to 10.00 pm are shown in **Table 4.4**. Traffic projections were based on the traffic volumes used in the EIS (Nexus Environmental Planning, 1999) and indexed by a growth rate of 2% as advised by traffic consultants SECA Solution (email: 30 May 2019).

Table 4.4 Estimated traffic volumes on Old Northern Road and Wisemans Ferry Road 7.00 am to 10.00 pm (Year 2020)

Road	Existing LV ¹	Existing HV ¹	Proposed Additional Quarry Trucks	Proposed Total HV
Old Northern Road (south of Roberts Road)	2096	208	8	216
Old Northern Road (north of Roberts Road)	2096	208	32	240
Wisemans Ferry Road	1806	205	32	237

Note 1: LV = Light Vehicles (Class 2 and below); HV = Heavy Vehicles (Class 3 and above)

5.0 Predicted Noise Levels

5.1 Operational noise

The predicted noise levels at receivers are presented in **Table 5.1**. These consider the worst-case noise levels predicted by WMPL (2015) (Case 1 operations), noise received as a result of the VENM/ENM management activities (FEL/Dozer operation) and combined noise predictions.

Table 5.1 Predicted noise levels at receivers LAeq,15 min dB(A)

Receiver		MOD 2 Assessment (Location of Typical activities) ¹	MOD 2 noise assessment ¹	Noise from FEL/Dozer ²	Combined noise
NIA ³	SEE ⁴				
A	RR03	1A	37	35	39
B	RR10	1A	42	39	44
		5A	43	39	44
C	RR02	6B	38	38	41
D	RR12	5A	40	39	43
F	RR01	6B	35	35	38
G	RR06	1A	38	32	39
H	RR08	1A	41	38	43

Note 1: Refer to Figure 4.1 Note 2: Refer to Figure 4.2

Note 3: Noise receivers identified in the MOD 2 noise assessment and this MOD4 noise impact assessment (refer **Table 2.1**)

Note 4: Noise receivers reference as identified in the SEE (refer **Table 2.1**)

5.2 Road traffic noise

The predicted change in road traffic noise LAeq(15 hour) due to the addition of 40 trucks between 7.00 am and 6.00 pm is shown in **Table 5.2**.

Table 5.2 Predicted increase in road traffic noise due to the proposed modification (Year 2020)

Road	Speed km/hr	Existing Total Traffic Volume 7.00 am-10.00 pm	Existing %HV	Proposed Total Traffic Volume 7.00 am-10.00 pm	Proposed %HV	Increase in noise level LAeq(15 hour) dB(A)
Old Northern Road (south of Roberts Road)	90	2304	9.0	2312	9.3	0.1
Old Northern Road (north of Roberts Road)	90	2304	9.0	2336	10.3	0.3
Wisemans Ferry Road	80	2011	10.2	2043	11.6	0.3

As shown in **Table 5.2** the maximum increase in LAeq(15 hour) road traffic noise levels is predicted to be 0.3 dB(A) due to the proposed modification.

6.0 Impact Assessment

6.1 Operational noise assessment

As shown in **Table 5.1**, the predicted noise levels from the proposed modification would comply with the noise limit of 43 dB(A) $L_{Aeq}(15 \text{ minute})$ at all receivers, except for minor 1 dB(A) exceedances at Receiver B (Receiver RR10).

As previously noted in the MOD 2 noise assessment, the plant on site is considered to be modern and well maintained, and the site is already protected by acoustic bunds at the site perimeter.

However, as the noise predictions undertaken for the MOD 2 noise assessment and the noise predictions for the proposed modification shown in **Table 5.1** are based on worst-case site noise emissions, it is expected that compliance with noise limits will be achievable by adherence to the ongoing noise control strategies in the Quarry ORNMP (MAC, 2016). The most relevant of these, with modifications recommended to reflect the VENM and ENM management identified in *underlined italics*.

“... use overburden to establish perimeter bunds to shield mobile plant from surrounding receivers as much as possible. As works progress, plant work below the surface and hence noise attenuation is increased.”

In addition to the above controls, ... implement temporary noise shielding such as temporary bunds when extraction or VENM and ENM placement and profiling occurs in close proximity to the property boundary of neighbouring receivers. Prior to constructing the bunds, consultation with the neighbouring residence is sought which provided clear lines of communication between the quarry and community.”

6.2 Road traffic noise assessment

As seen in **Table 5.2**, the predicted worst-case increase in road traffic noise due to the proposed maximum number of quarry trucks along Old Northern Road and Wisemans Ferry Road is below 2dB(A). This increase in road traffic noise complies with the RNP criteria for the increase in noise levels due to the proposed modification.

7.0 References

Hodgson Quarry Products Sand Extraction Roberts Road, Maroota - Operational Noise Assessment, Wilkinson Murray Report No. 14229-B, May 2015

Nexus Environmental Planning Pty Ltd, 1999. *Environmental Impact Statement Sand, Clay & Pebble Extraction, Lot 1 & 2 DP 228308, Lot 2, DP 312327 Maroota. Volume I – Text.*

ISO 9613-2:1996 Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation, International Organization for Standardization

Development Consent for DA-267-11-99 (as Modified 18 March 2016)

New South Wales Environmental Protection Licence 6535

New South Wales *Noise Policy for Industry*, Environmental Protection Authority, 2017

New South Wales *Road Noise Policy*, Department of Environment and Climate Change, 2011

Traffic impact assessment letter report, Seca Solution Project Reference P1340, 1 February 2019

Noise Monitoring Assessment, Muller Acoustic Consulting Report MAC160257PR1, 2 June 2016

Noise Monitoring Assessment, Muller Acoustic Consulting Report MAC160257RP1, 15 May 2017

Noise Monitoring Assessment, Muller Acoustic Consulting Report MAC160257RP3, 31 May 2018

Noise Monitoring Assessment, Muller Acoustic Consulting Report MAC160257RP4, 20 June 2019



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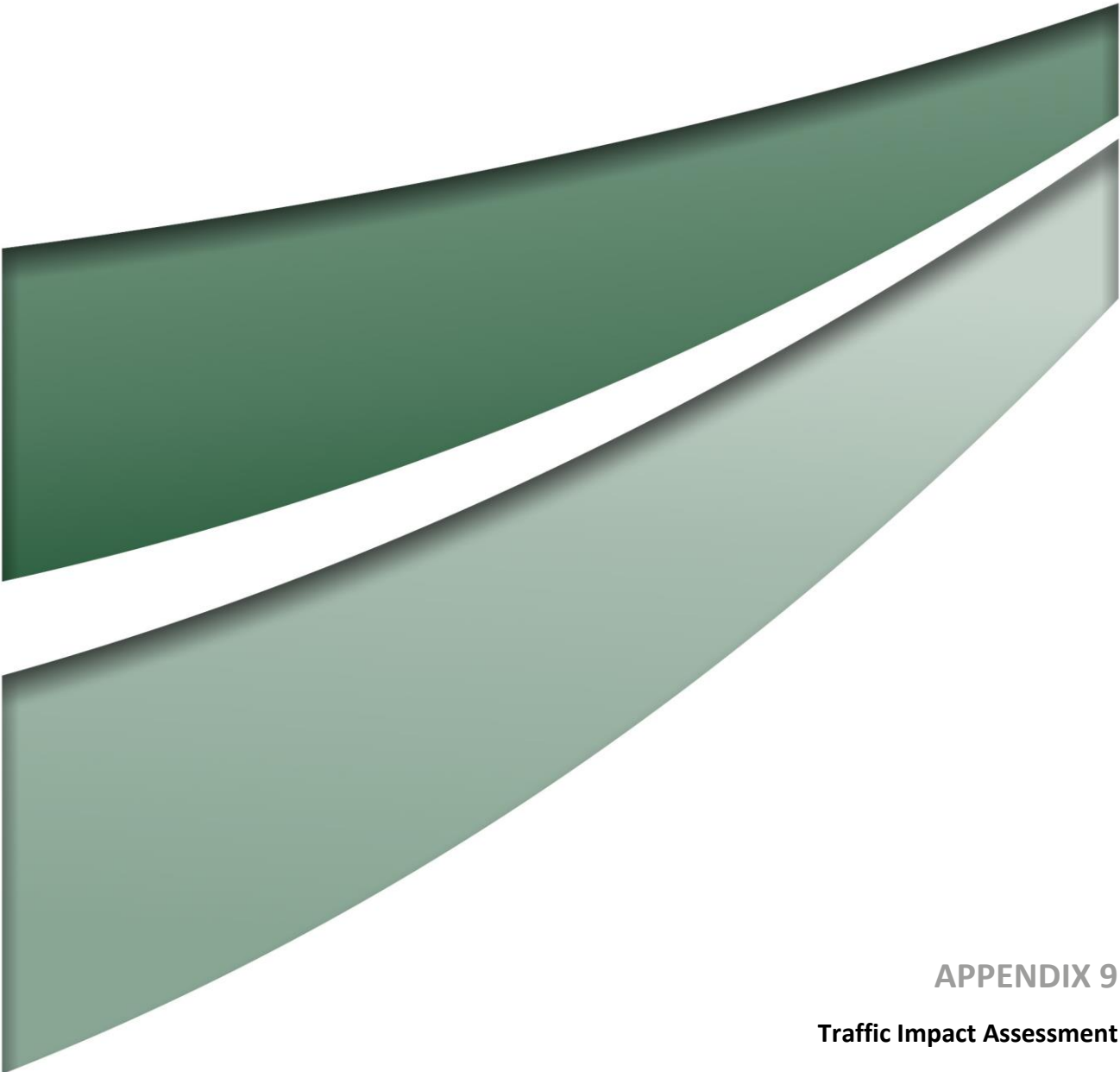
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APPENDIX 9
Traffic Impact Assessment

1 February 2019

P1340 Umwelt Roberts Road Quarry

Umwelt (Australia) Pty Ltd
75 York Street
Teralba NSW 2284

Attn: Alex Irwin

Dear Alex,

Proposed modification to Roberts Road Quarry, Maroota, NSW

Further to our recent correspondence, we have reviewed the previous traffic assessment completed by Lyle Marshall and Associates (May 2015) and have discussed the proposed modifications to consent for the existing Roberts Road Quarry to obtain an understanding of the project requirements. We have completed a site visit and collected traffic data via traffic surveys in the surrounding area to obtain the current traffic flows.

Hodgson Quarry Products Pty Ltd operates the Roberts Road Quarry, a sand extraction and processing operation, located at the corner of Roberts Road and Old Northern Road, Maroota. The quarry obtained original consent in 2000, with this being modified three times to accommodate change to the extraction process, sequence of extraction and to extend the life of the quarry.

The existing consent allows for operation until 2025 for the extraction and processing of up to 480,000 tonnes of quarry products per annum and up to 100 truck movements per day, with a maximum of 20 truck movements per hour. This proposal seeks to increase the truck movements to 140 per day, including 30-40 movements associated with the importation of Excavated Natural Material (ENM) and Virgin Excavated Natural Material (VENM), and extend the quarry life by 5 years to 2030. No change to the existing quarry hours of operation are proposed.

The following assessment has been undertaken to determine the traffic impacts of the proposed increase in daily truck movements. This assessment has taken into consideration the Austroads Guidelines and Section 2.3 of the RMS Guide to Traffic Generating Developments, which provides the structure for the reporting of key issues to be addressed when determining the impacts of traffic associated with a development.

Existing situation

The subject site is located at the corner of Roberts Road and Old Northern Road, Maroota incorporating Lots 1 and 2 DP228308 and Lot 2 DP 312327 (Figure 1). Access is available via a single vehicle access direct off Roberts Road. Roberts Road is a local rural road which provides access to the subject site, an additional quarry and several land holdings. Roberts Road intersects with Old Telegraph Road to the east, which provides access to further landholdings.

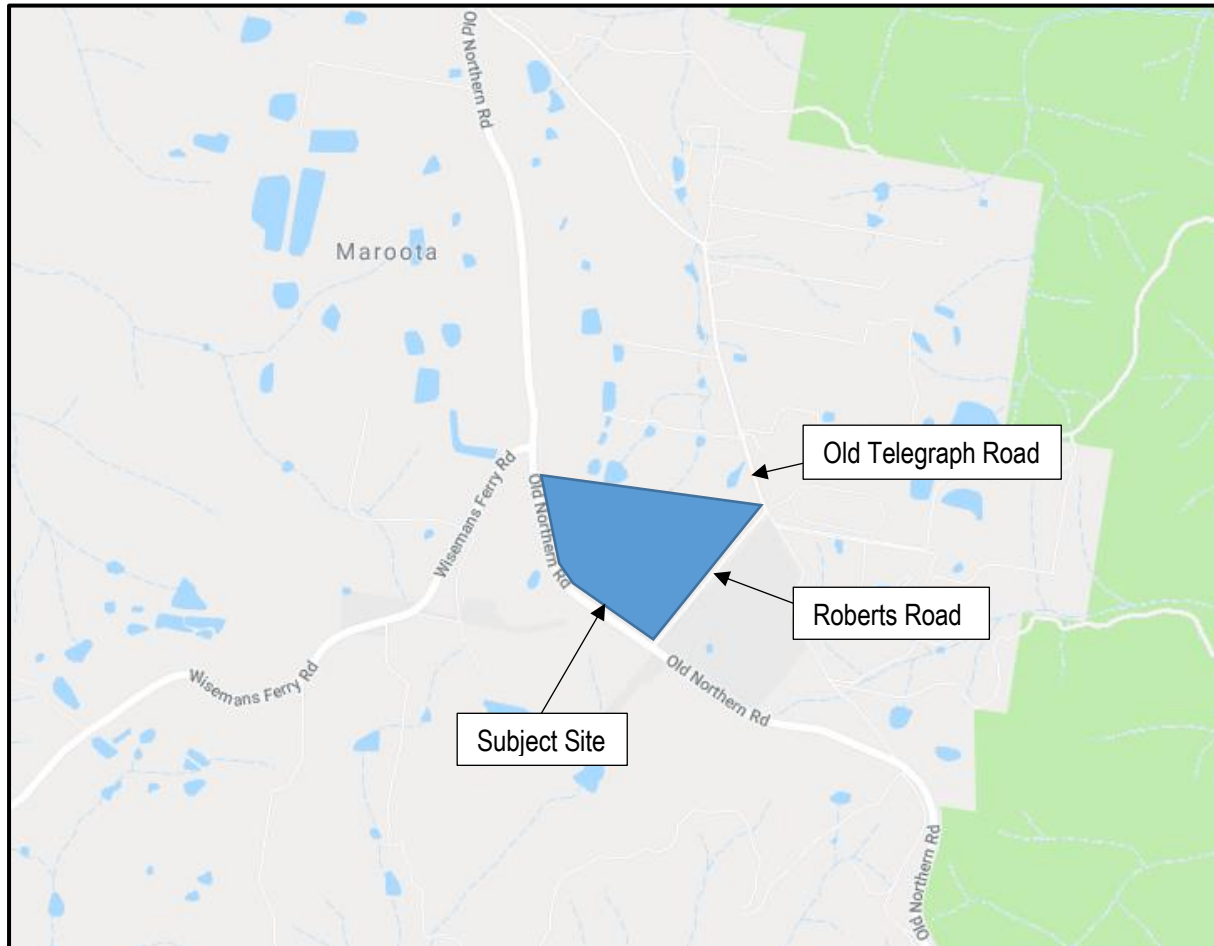


Figure 1 - Subject site in the context of the local road network

Access

There are no proposed changes to the existing access to the quarry. The site access is located on the northern side of Roberts Road, approximately 290 metres east of the intersection with Old Northern Road. Roberts Road in this location offers a straight horizontal alignment allowing for good visibility in each direction along its length. Sight distance to the right (south-west) is 290 metres with clear visibility to sight Old Northern Road as shown in Figure 2, whilst sight distance to the left (north-east) is 220 metres as shown in Figure 3.

Sight distance requirements for access driveways to commercial vehicle facilities are outlined in AS2890.2. For the speed limit of 60km/hr along Roberts Road a minimum sight distance of 83 metres is required (5 second gap), with 133 metres specified for an 8 second gap. As noted above sight distance in both directions out of the site access is well in excess of the required 83 metres and also satisfies the higher requirement. Therefore, the site access provides sight distance in accordance with AS2890.2.



Figure 2 - Visibility to the right (south-west) out of the existing site access



Figure 3 - Visibility to the left (north-east) out of the existing site access

The intersection of Old Northern Road and Roberts Road has also been assessed. Sight distance requirements at intersections are outlined in the Austroads Guide to Road Design Part 4A, with safe intersection sight distance (SISD) being the critical requirement. For the posted speed limit of 90km/hr along Old Northern Road a SISD of 214 metres is required.

Sight distances were measured on site, with visibility to the left out of Roberts Road being 300 metres, whilst visibility to the right is 278 metres. As such, the intersection satisfies Austroads requirements in regard to sight distance. The layout of this intersection also includes a channelised right turn lane for turning movements into Roberts Road, which has a storage length of approximately 35 metres with approximately 20 metres of additional storage available within the painted median. This allows storage for at least two quarry trucks with through traffic still able to pass along Old Northern Road. Given the relatively low traffic flows and minimal delays for turning movements observed during the site work this turn lane has sufficient capacity.

Traffic Flows

As part of the project work Seca Solution completed a traffic survey at the intersection of Old Northern Road and Roberts Road to determine the current peak hour traffic flows in this location. This survey was completed on the 4th December 2018 between 7am to 9am, with the peak hour determined as 7:15am to 8:15am. The distribution of traffic during the morning peak hour is shown in Figure 4 following, with the raw survey data provided in **Attachment A**.

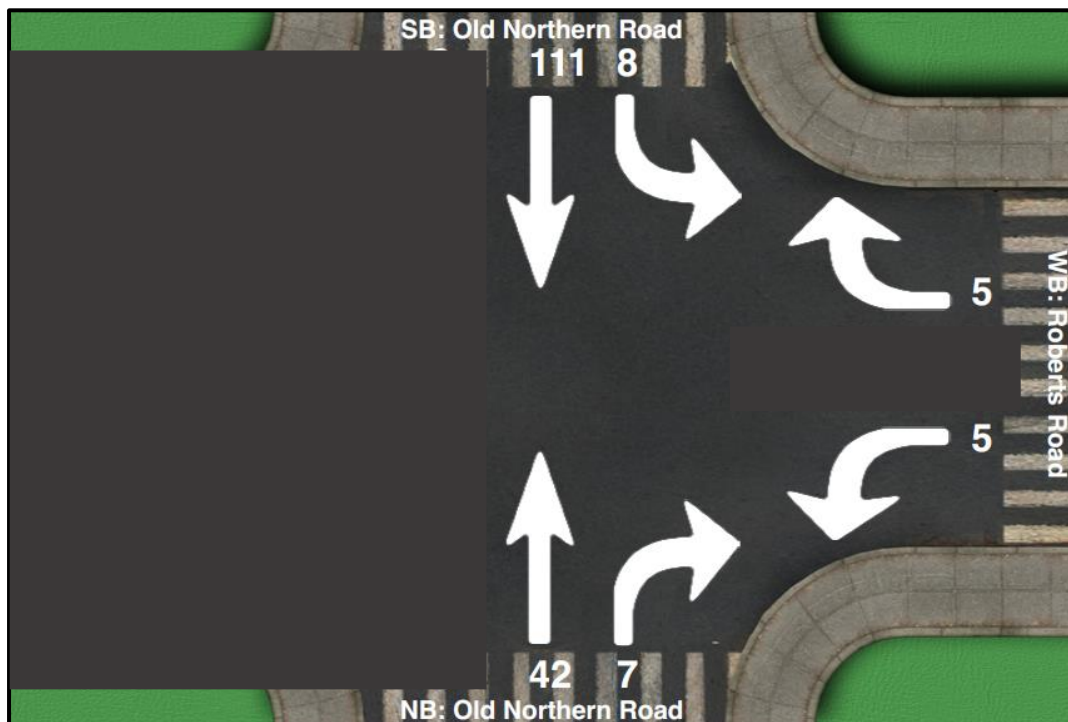


Figure 4 - Morning peak hour flows at the intersection of Old Northern Road / Roberts Road

- The two-way movements along Roberts Road during the intersection AM peak hour were 25 vehicles.
- The two-way flows along Old Northern Road (to the north of Roberts Road) were 166 vehicles.

The RMS Guide to Traffic Generating Developments states peak hourly flows typically represent 8-12% of daily flows. Based on the average of 10% the daily flows on Old Northern Road would be in the order of 1,660 vehicles per day whilst Roberts Road would be in the order of 250 vehicles per day.

Current Road Network Operation

Heavy vehicles represent 18% (32 vehicles) of the total flows recorded through the intersection. It is noted that the truck movements associated with the quarry operations were observed and noted as part of this survey.

The intersection of Old Northern Road and Roberts Road was modelled using Sidra Intersection 8, with the results outlined in Table 1.

Table 1 – 2018 AM Sidra results for the intersection of Old Northern Road/Roberts Road

Movement	Level of Service	Average Delay (seconds)	Back of Queue (m)
Right turn into Roberts Road	A	5.9	0.1
Left turn out of Roberts Road	A	6.2	0.4
Right turn out of Roberts Road	A	7.3	0.4
Left turn into Roberts Road	A	6.2	0.0

It can be seen from the above that the intersection currently operates well, operating at LoS A with minimal delays for all turning movements. The Sidra outputs are provided in **Attachment B**.

Proposed Development

Site operations

The subject site has an approved haulage rate of 100 trucks per day (50 laden/50 unladen), which allows for inbound and outbound truck movements with the daily total two-way flows not to exceed 100 per day. The project seeks to increase the daily approval to 140 trucks per day, with no increase proposed for the existing hourly maximum of 20 trucks per hour. Instead the project shall see the additional heavy vehicle movements spread over the course of the day during periods of high demand.

All truck access will remain via the existing site access direct onto Roberts Road, with the existing distribution onto Old Northern Road to be maintained.

- 80% to/from the north, turning right onto Old Northern Road and the reverse left turn in.
- 20% to/from the south, being left turns onto Old Northern Road and right turns in.

Quarry generated truck movements for the site currently have significant hourly and day to day variation, depending on market demands. During the survey the quarry was not operating at its highest capacity of 20 vehicles per hour. To assess the operation of the Old Northern Road/Roberts Road intersection for the Quarry operating at its maximum approval (up to 20 truck movements) during the peak hour, an allowance for an additional 10 inbound and 10 outbound trucks has been made (per the distributions outlined above). This is on top of the truck flows already recorded during the traffic survey which accounted for the movements of trucks associated with the quarry operating on that day but also included other background traffic. As such this assessment provides a robust assessment of the intersection.

As the increase in daily movements does not increase the hourly trucks the above was modelled using Sidra with the results outlined in Table 2.

Table 2 – 2018 AM Sidra results for the intersection of Old Northern Road/Roberts Road with maximum quarry trucks per hour

Movement	Level of Service	Average Delay (seconds)	Back of Queue (m)
Right turn into Roberts Road	A	6.3	0.2
Left turn out of Roberts Road	A	6.6	1.2
Right turn out of Roberts Road	A	8.4	1.2
Left turn into Roberts Road	A	6.4	0.0

It can be seen from the above that the intersection will continue to operate at the highest LoS allowing for the maximum hourly truck movements for the site. The Sidra outputs are provided in **Attachment B**.



Impact of operations to 2030

As well as the increase to daily movements, the quarry operations are seeking to operate for 5 years beyond the approval life of the existing consent, which is 2025.

To allow for assessment of the potential daily traffic flows in 2030, an annual increase of 2.0% per annum has been applied for through movements along Old Northern Road. This rate accounts for increased flows associated with the growth of other quarry operations in the area. Along Roberts Road an allowance for growth of 1% per annum has been applied to cater for other quarry operations, including the quarry located on Old Telegraph Road off Roberts Road, which recently began operation. The above growth rates were applied to the intersection flows through to 2030 with the results outlined in Table 3.

Table 3 – 2030 AM Sidra results for the intersection of Old Northern Road/Roberts Road with maximum quarry trucks per hour

Movement	Level of Service	Average Delay (seconds)	Back of Queue (m)
Right turn into Roberts Road	A	6.4	0.3
Left turn out of Roberts Road	A	6.7	1.4
Right turn out of Roberts Road	A	9.0	1.4
Left turn into Roberts Road	A	6.4	0.0

It can be seen from the above that the intersection will continue to operate at the highest LoS allowing for the maximum hourly truck movements and background growth through to 2030. The Sidra outputs are provided in **Attachment B**.

Impact on Daily Traffic flows

Based on the traffic survey completed, the current two-way daily traffic flows along Old Northern Road (to the north of Roberts Road) are in the order of 1,660 vpd. It is known that the quarry was operating on this day with some of these movements therefore relating to the existing quarry operations. In order to ensure a worst case assessment of the impact on daily traffic flows, an allowance for an additional 140 vpd associated with the quarry has been allowed for on top of the surveyed flows, therefore assuming the recorded flows accounted for no quarry traffic.

Based on the 80/20 (north/south) distribution of quarry traffic to the north/south there shall be:

- 112 vehicles to/from the north along Old Northern Road
- 28 vehicles to/from the south along Old Northern Road

The above shall see daily flows shall increase from 1,660 to 1,772 vpd along Old Northern Road to the north of Roberts Road. This represents an increase of 32 vpd of the current 1,740 in this direction for the existing approval of 100 trucks per day (80 vehicles northbound / 20 vehicles southbound). This increase is less than 2% and well within the capacity of the road network.

Allowing for the background growth to 2030 flows on Old Northern Road (north of Roberts Road) could be in the order of 2,200 including the quarry expansion associated with the subject site. This is still well within the capacity of the road.

Impact on Road Safety

It is noted that there is an existing school bus stop along Roberts Road. During the morning survey two buses were observed with one at approximately 7:15am and the other at 8:30am. Both turned left in and left out of the intersection of Old Northern Road and Roberts Road.

Given the low traffic flows along Roberts Road and the good visibility for Quarry trucks, it is considered the proposed increase in daily truck movements will not impact upon the operation of these buses. The hourly approval for the site will not change and as such the existing situation will remain with no identifiable safety issues for the current Roberts Road and quarry access layout. Similarly as there is no proposed change to hourly operations there shall be no impact on school bus operations.

Conclusion

The development traffic will remain consistent with its current hourly level with daily capacity increasing by an additional 40 truck movements per day.

It can thus be seen that the impact of the trucks in the future design year of 2030 is acceptable with the intersection of Roberts Road and Old Northern Road continuing to operate at a high level of service (LoS A).

Overall it is concluded that the on-going use of the site as a quarry operation with 140 truck movements per day and 20 truck movements per hour, can continue to occur in a safe and appropriate manner with an acceptable impact upon the local road network to the future design year of 2030.

Please feel free to contact me on 4032 7979, should you have any queries.

Yours sincerely



Sean Morgan

Director

Attachment A

Turn Count Summary

Location: Old Northern Road at Roberts Road , Maroota
GPS Coordinates: Lat=-33.467309, Lon=150.999862
Date: 2018-12-04
Day of week: Tuesday
Weather:
Analyst: SL

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:52	2	12	0	0	0	1	0	3	0	0	0	0	18
07:00	1	21	0	2	0	2	0	6	1	0	0	0	33
07:15	0	37	0	2	0	0	0	14	1	0	0	0	54
07:30	1	23	0	3	0	1	0	9	1	0	0	0	38
07:45	3	21	0	0	0	2	0	13	2	0	0	0	41
08:00	4	30	0	0	0	2	0	6	3	0	0	0	45
08:15	4	21	0	1	0	1	0	8	0	0	0	0	35
08:30	3	26	0	5	0	4	0	6	4	0	0	0	48
08:45	1	21	0	0	0	4	0	7	1	0	0	0	34
09:00	3	24	0	3	0	1	0	10	0	0	0	0	41
09:15	0	10	0	0	0	1	0	8	0	0	0	0	19
09:30	1	17	0	0	0	1	0	16	0	0	0	0	35
09:45	2	10	0	0	0	2	0	14	6	0	0	0	34

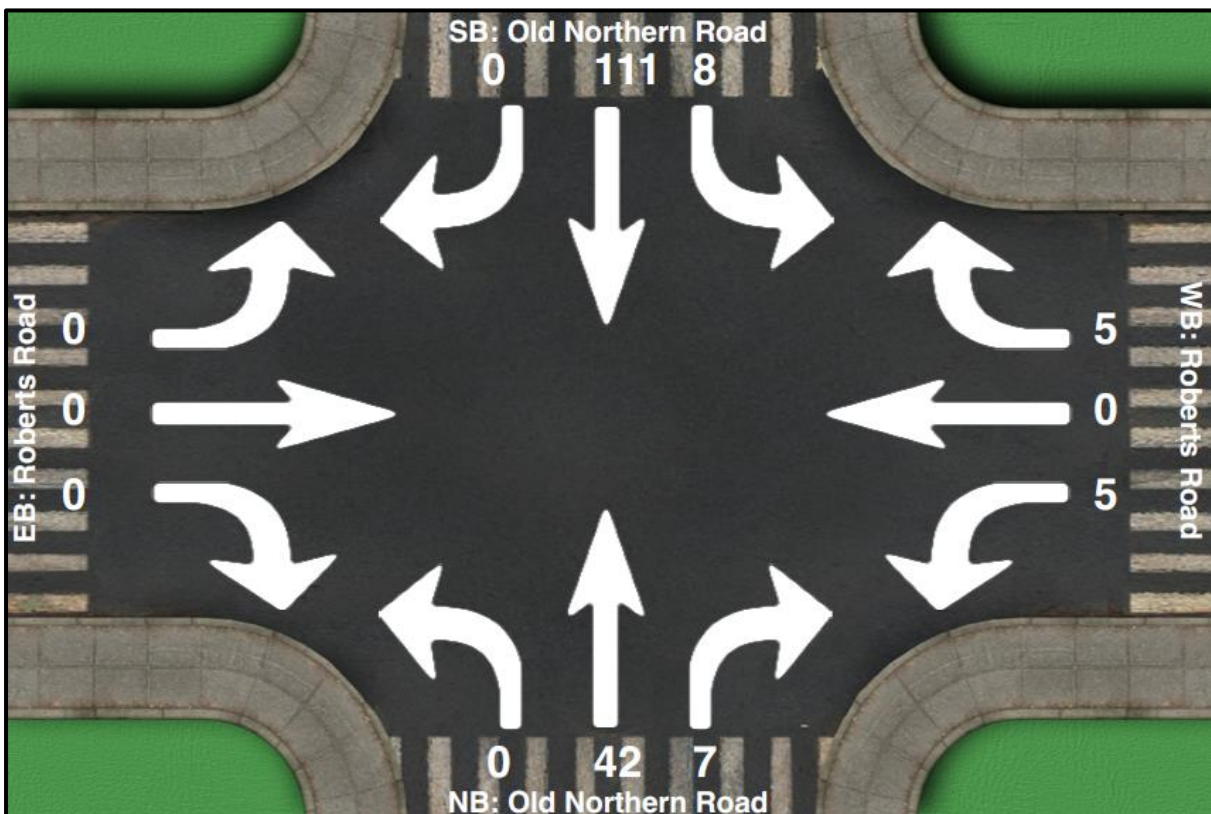
Intersection Peak Hour

07:15 - 08:15

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	8	111	0	5	0	5	0	42	7	0	0	0	178
Factor	0.50	0.75	0.00	0.42	0.00	0.62	0.00	0.75	0.58	0.00	0.00	0.00	0.82
Approach Factor	0.80			0.62			0.82			0.00			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	4	99	0	4	0	3	0	29	7	0	0	0	146
Truck	4	12	0	1	0	2	0	13	0	0	0	0	32



Sidra Outputs

MOVEMENT SUMMARY

▽ Site: 101 [2018 AM Existing]

Old Site: Northern Road / Roberts Road (None)
 Giveway / Yield (Two-Way) Category:

Movement Performance - Vehicles													
Mov ID	Turn	Demand Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
South: Old Northern Road													
2	T1	44	31.0	0.027	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0	
3	R2	7	0.0	0.005	5.9	LOS A	0.0	0.1	0.23	0.53	0.23	54.2	
Approach		52	26.5	0.027	0.8	NA	0.0	0.1	0.03	0.08	0.03	59.3	
East: Roberts Road													
4	L2	5	20.0	0.011	6.2	LOS A	0.0	0.4	0.27	0.55	0.27	53.6	
6	R2	5	40.0	0.011	7.3	LOS A	0.0	0.4	0.27	0.55	0.27	51.9	
Approach		11	30.0	0.011	6.7	LOS A	0.0	0.4	0.27	0.55	0.27	52.8	
North: Old Northern Road													
7	L2	8	50.0	0.070	6.1	LOS A	0.0	0.0	0.00	0.04	0.00	52.2	
8	T1	117	10.8	0.070	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.9	
Approach		125	13.4	0.070	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5	
All Vehicles		187	18.0	0.070	0.9	NA	0.0	0.4	0.02	0.08	0.02	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.

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

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

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

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

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

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Project: C:\Sidra folders\P1340 Roberts Road Quarry.sip8

MOVEMENT SUMMARY

▽ Site: 101 [2018 AM Max truck movements]

Old Site Giveway / Yield (Two-Way) Northern Road Category: / Roberts Road (None)

Movement Performance - Vehicles													
Mov ID	Turn	Demand Total	Flows HV	Deg. Satn %	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h		
South: Old Northern Road													
2	T1	44	31.0	0.027	0.0	LOS A	0.0	0.00	0.00	0.00	60.0		
3	R2	9	22.2	0.007	6.3	LOS A	0.0	0.26	0.53	0.26	51.7		
Approach		54	29.4	0.027	1.1	NA	0.0	0.05	0.09	0.05	58.8		
East: Roberts Road													
4	L2	7	42.9	0.028	6.6	LOS A	0.1	0.32	0.57	0.32	52.6		
6	R2	14	76.9	0.028	8.4	LOS A	0.1	0.32	0.57	0.32	50.3		
Approach		21	65.0	0.028	7.8	LOS A	0.1	0.32	0.57	0.32	51.1		
North: Old Northern Road													
7	L2	17	75.0	0.078	6.4	LOS A	0.0	0.00	0.07	0.00	49.5		
8	T1	117	10.8	0.078	0.0	LOS A	0.0	0.00	0.07	0.00	59.9		
Approach		134	18.9	0.078	0.8	NA	0.0	0.00	0.07	0.00	58.9		
All Vehicles		208	26.3	0.078	1.6	NA	0.1	0.04	0.13	0.04	58.2		

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

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

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

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

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

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

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

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MOVEMENT SUMMARY

▽ Site: 101 [2030 AM with Max truck movements]

Old Site Giveway: Northern / Design Life Analysis (Final Year): Results for 12 years
 Road Category: Road (None) (Two-Way)
 / Yield

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
South: Old Northern Road												
2	T1	55	31.0	0.034	0.0	LOS A	0.0	0.00	0.00	0.00	60.0	
3	R2	11	22.2	0.008	6.4	LOS A	0.0	0.29	0.54	0.29	51.7	
Approach		65	29.5	0.034	1.0	NA	0.0	0.05	0.09	0.05	58.9	
East: Roberts Road												
4	L2	8	42.9	0.033	6.7	LOS A	0.1	0.36	0.59	0.36	52.3	
6	R2	15	76.9	0.033	9.0	LOS A	0.1	0.36	0.59	0.36	50.0	
Approach		24	65.0	0.033	8.2	LOS A	0.1	0.36	0.59	0.36	50.9	
North: Old Northern Road												
7	L2	19	75.0	0.095	6.4	LOS A	0.0	0.00	0.07	0.00	49.5	
8	T1	145	10.8	0.095	0.0	LOS A	0.0	0.00	0.07	0.00	59.9	
Approach		164	18.2	0.095	0.8	NA	0.0	0.00	0.07	0.00	58.9	
All Vehicles		253	25.5	0.095	1.5	NA	0.1	0.05	0.12	0.05	58.3	

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

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

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

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

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

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



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