Appendix 2

Noise and Blasting Assessment

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Note: A complete colour version of this Appendix is available on the Project CD or from the DPE website

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Noise and Blasting Assessment

Tomingley Gold Mine, Modification 3.

Prepared for : R.W Corkery & Co Pty Ltd

November 2015

Muller Acoustic Consulting

Document Information

Noise and Blasting Assessment

Tomingley Gold Mine, Modification 3

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Document ID	Status	Date	Prepared	Signed
MAC150185RP1	Final	5 November 2015	Oliver Muller (MAAS)	

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Limited (RWC) on behalf of Tomingley Gold Operations Pty Ltd (TGO) to complete a noise and blasting assessment (NBA) for a modification (Mod3) to the existing Tomingley Gold Mine (the 'Mine') project approval (PA) (PA09_0155).

The NBA has been undertaken to quantify potential acoustic impacts associated with Mod3 within the surrounding community and has been prepared to support and accompany the Environmental Assessment (EA) that is being prepared by RWC. The NBA has been prepared in accordance with the following policies and guidelines:

- Environment Protection Authority (EPA) 2000, NSW Industrial Noise Policy (INP);
- NSW Department of Environment, Climate Change and Water (DECCW) 2011, Road Noise Policy (RNP); and
- Australian and New Zealand Environment Conservation Council (ANZECC) 1990; Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration.

This report has referenced historic assessment documents including the following:

- Tomingley Gold Project - Noise and Blasting Assessment (SLR, 2011);
- Tomingley Gold Mine - Environmental Assessment, Modification 2. Appendix 1 - Noise Bund Assessment (Noise and Sound Service, 2014);
- Noise Compliance Report – (Noise and Sound Service, 2015); and
- Tomingley Gold Project - Consolidated Project Approval (Department of Planning and Environment, 2015).

This report has not included an assessment of road traffic noise, as there are no proposed changes to existing off-site traffic flows as a result of the modification. A glossary of terms, definitions and abbreviations used in this report, along with a list of common noise sources and their typical sound level is provided in **Appendix A**.

1.1 Background and Proposal

The Tomingley Gold Mine (the Mine) is located immediately to the south of the village of Tomingley in central western NSW (see **Figure 1**). The Mine is operated by Tomingley Gold Operations Pty Ltd, a wholly owned subsidiary of Alkane Resources Ltd. The Mine comprises the following approved components (**Figure 2**). PA 09_0155 has been amended twice previously as follows.

- Modification 1 (MOD 1) (November 2013) - to adjust a range of commitments made during the original application which were no longer appropriate.
- Modification 2 (MOD 2) (April 2015) - to permit enhancement of the approved and constructed amenity bund and a cut back of the approved Caloma 1 Open Cut.

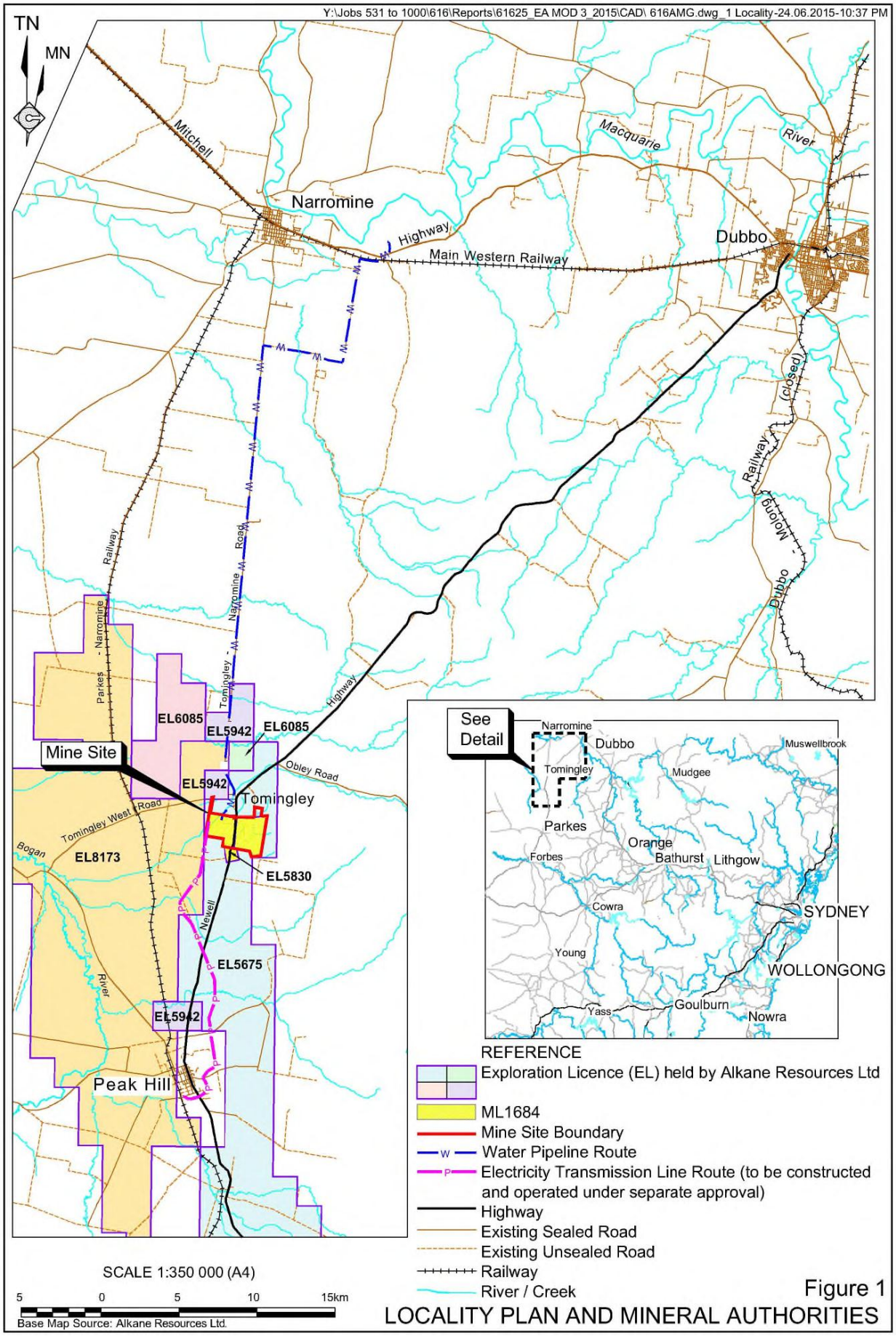
The approved mining operations comprise the following principal components.

- Three open cut mines and one underground mine.
- A processing plant and associated Residue Storage Facility (RSF).
- Three waste rock emplacements.
- An underpass under the Newell Highway.
- A range of ancillary infrastructure, including offices, amenity bunds, soil stockpiles, surface water management structures, a water supply pipeline and an electricity transmission line.

Mod3 seeks the consent to permit the following.

- An additional cutback of the Caloma (Cal1) Open Cut
- Establishment of the Caloma Two (Cal2) Open Cut.
- Construction of a portal and decline from the Cal1 Open Cut to enable the development and mining of underground resources below the Cal1, Cal2 Open Cuts.
- Extension of Waste Rock Emplacement (WRE) 3.
- Backfill of the Wyoming Three (Wyo3) Open Cut with waste rock.
- A downstream lift of the RSF and associated modifications to surface water drainage.
- Modifications to surface water management features of the Mine Site.
- Minor modifications to soil management.
- Incidental administrative modifications to PA 09_0155.

Figure 3 presents the location of the proposed modifications to mining, waste rock placement, residue storage, water and soil management.


Y:\Jobs 531 to 1000\616\Reports\61625_EA MOD 3_2015\CAD\ 616AMG.dwg_1 Locality-24.06.2015-10:37 PM
TN
MN
Mitchell
Macquarie River
Narromine
Highway
Dubbo
Main Western Railway
Railway (closed)
Railway
Moolong - Dubbo
Railway
Parkes - Narromine
Narromine Road
Tomingley - Narromine
Highway
EL6085
EL5942
EL6085
Mine Site
EL5942
Tomingley
Obley Road
Tomingley West Road
Bogan
EL8173
EL5830
Newell
EL5675
River
EL5942
Peak Hill
See Detail
Narromine
Dubbo
Muswellbrook
Tomingley
Mudgee
Parkes
Orange
Forbes
Bathurst
Lithgow
Cowra
SYDNEY
Young
WOLLONGONG
Yass
Goulburn
Nowra
REFERENCE
Exploration Licence (EL) held by Alkane Resources Ltd
ML1684
Mine Site Boundary
W Water Pipeline Route
P Electricity Transmission Line Route (to be constructed and operated under separate approval)
Highway
Existing Sealed Road
Existing Unsealed Road
Railway
River / Creek
SCALE 1:350 000 (A4)
5 0 5 10 15km
Base Map Source: Alkane Resources Ltd.
Figure 1
LOCALITY PLAN AND MINERAL AUTHORITIES

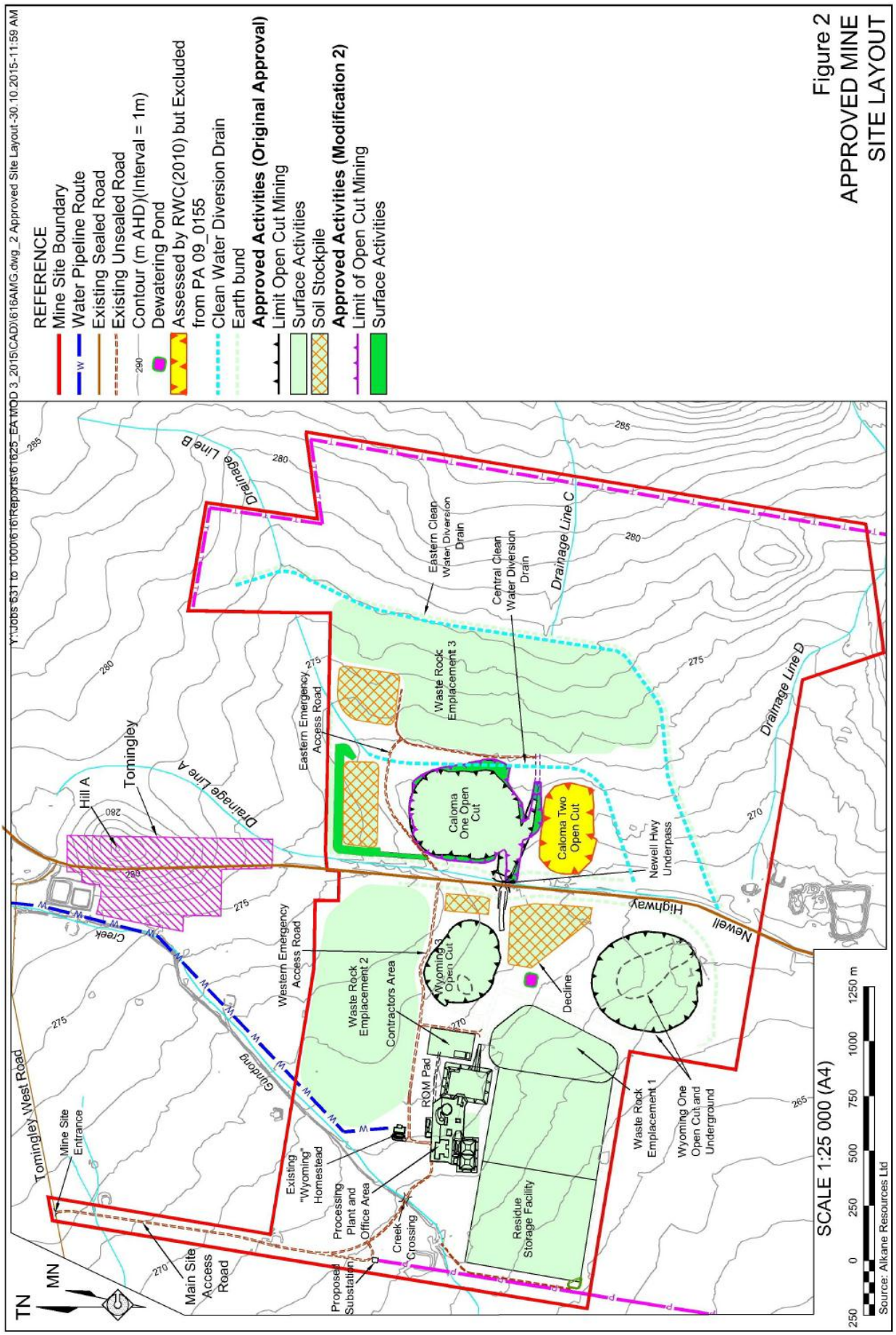


Figure 2
APPROVED MINE
SITE LAYOUT
REFERENCE
Mine Site Boundary
Water Pipeline Route
Existing Sealed Road
Existing Unsealed Road
Contour (m AHD)(Interval = 1m)
Dewatering Pond
Assessed by RWC(2010) but Excluded from PA 09_0155
Clean Water Diversion Drain
Earth bund
Approved Activities (Original Approval)
Limit Open Cut Mining
Surface Activities
Soil Stockpile
Approved Activities (Modification 2)
Limit of Open Cut Mining
Surface Activities
Y:\Jobs 631 to 1000\616\Reports\616 25_EA MOD 3_2015\CAD\616AMG.dwg_2 Approved Site Layout -30.10.2015-11:59 AM
Tomingley West Road
Mine Site Entrance
Main Site Access Road
Proposed Substation
Processing Plant and Office Area
Creek Crossing
Existing "Wyoming" Homestead
ROM Pad
Contractors Area
Waste Rock Emplacement 2
Western Emergency Access Road
Wyoming 3 Open Cut
Decline
Residue Storage Facility
Waste Rock Emplacement 1
Wyoming One Open Cut and Underground
Eastern Emergency Access Road
Waste Rock Emplacement 3
Caloma One Open Cut
Caloma Two Open Cut
Eastern Clean Water Diversion Drain
Central Clean Water Diversion Drain
Newell Hwy Underpass
Newell Highway
Drainage Line A
Drainage Line B
Drainage Line C
Drainage Line D
Tomingley Hill A
Gundong Creek
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Source: Alkane Resources Ltd

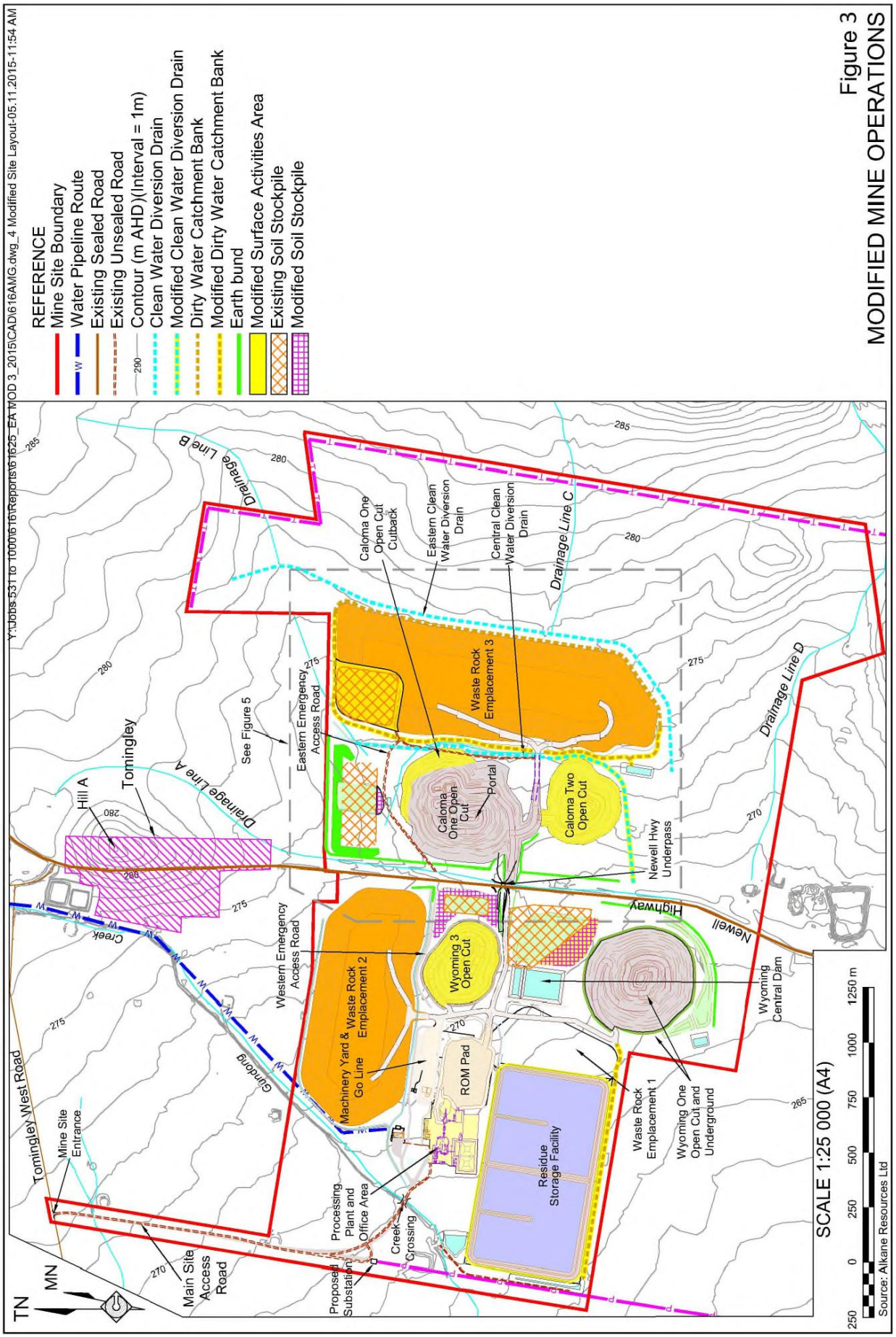


Figure 3
MODIFIED MINE OPERATIONS
REFERENCE
Mine Site Boundary
Water Pipeline Route
Existing Sealed Road
Existing Unsealed Road
Contour (m AHD)(Interval = 1m)
Clean Water Diversion Drain
Modified Clean Water Diversion Drain
Dirty Water Catchment Bank
Modified Dirty Water Catchment Bank
Earth bund
Modified Surface Activities Area
Existing Soil Stockpile
Modified Soil Stockpile
Y:\Jobs 531 to 1000\616\Reports\616_25_EA MOD 3_2015\CAD\616AMG.dwg_4 Modified Site Layout-05.11.2015-11:54 AM
Drainage Line B
Drainage Line C
Drainage Line D
Drainage Line A
Caloma One Open Cut Cutback
Eastern Clean Water Diversion Drain
Central Clean Water Diversion Drain
Waste Rock Emplacement 3
Eastern Emergency Access Road
See Figure 5
Caloma One Open Cut
Portal
Caloma Two Open Cut
Newell Hwy Underpass
Newell Highway
Tomingley
Hill A
Creek
Western Emergency Access Road
Waste Rock Emplacement 2
Machinery Yard & Go Line
Wyoming 3 Open Cut
ROM Pad
Wyoming Central Dam
Waste Rock Emplacement 1
Wyoming One Open Cut and Underground
Residue Storage Facility
Tomingley West Road
Mine Site Entrance
Gundong
Processing Plant and Office Area
Creek Crossing
Proposed Substation
Main Site Access Road
TN
MN
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 1250 m
Source: Alkane Resources Ltd

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2 Criteria

2.1.1 Noise Criteria

Condition 3 of Schedule 3 of PA 09_0155 includes operational noise limits for surrounding receivers. The operational noise criteria have been adopted as the primary criteria for this assessment. Relevant sections of Schedule 3 of PA 09_0155 pertaining to this assessment are summarised below. It is noted that from historic assessments, receivers are allocated into Noise Assessment Groups (NAGs) or noise catchments. Each NAG has been derived according to the relevant background environment that receivers are situated within. This ranges from relatively quiet rural background levels for NAG A and B, to environments that are controlled by ambient road traffic such as NAG C and D, from which higher noise criteria were derived. Condition 3 of Schedule 3 of PA 09_0155 is reproduced below.

3. The Proponent shall ensure that the noise generated by the project does not exceed the criteria in **Table 1** at any residence on privately-owned land or on more than 25 per cent of any privately-owned land.

Table 1 Noise Criteria dBA

Noise Assessment Group	Receivers	Day	Evening	Night	
		LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
NAG A	R1, R6	36	36	36	45
	R5	37	37	37	45
	All other	35	35	35	45
NAG B	All receivers	36	36	36	45
NAG C	R3	49	38	38	45
	R29	48	37	37	45
	All other	46	37	37	45
NAG D	All receivers	43	38	38	46
All other residential receivers		35	35	35	45

Notes : To interpret the locations referred to in Table 1, see the figure in Appendix 4;

Noise generated by the project is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However, these criteria do not apply if the Proponent has an agreement with the relevant owner(s) of these residences / land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: After the first review of any EPL granted for this project under section 78 of the POEO Act, nothing in this approval prevents the EPA from imposing stricter noise limits on the project under the EPL.

2.1.2 Blasting Criteria

Condition 7 of Schedule 3 of PA 09_0155 includes blast limits for surrounding receptors. **Table 2** presents the blasting criteria from PA 09_0155.

Table 2 Blasting Criteria

Location	Airblast Overpressure (dB Lin Peak)	Ground Vibration (mm/s)	Allowable Exceedance
Residences on privately-owned land	120	10	0%
	115	5	5% of total blast over any 12 month period
All public infrastructure		50, or alternatively, a 0% specific limit determined to the satisfaction of the Secretary by the structural design methodology in AS 2187.2-2006, or its latest version	

3 Receiver Review

The Mine is located to the south of the village of Tomingley NSW. Receivers in the locality surrounding the Mine are primarily rural/residential and for consistency the naming convention for each receiver has been retained from historic noise assessments. **Figure 4** provides a locality plan identifying the position of receivers in relation to the Mine. The receiver IDs, MGA(55) coordinates, relevant Noise Assessment Group (NAG) and approximate distance to the project are summarised in **Table 3**.

Table 3 Receiver Locations

Receivers	NAG	Easting	Northing	Approximate Distance to Mine (m)[1]
R1	A	614370.00	6396168.00	1755
R2	B	611373.00	6395459.00	2300
R3	C	614697.00	6395283.00	1350
R4	A	617146.00	6393348.00	3850
R5	A	614220.00	6390481.00	4200
R6	A	611773.00	6392345.00	2870
R8	A	612512.00	6398172.00	3675
R9	A	614081.00	6398014.00	3425
R10	A	615157.00	6396770.00	2695
R11	A	615523.00	6396855.00	2990
R12	A	616534.00	6397951.00	4485
R13	C	614425.00	6396318.00	1912
R16	D	614591.00	6395927.00	1680
R17	D	614541.00	6395905.00	1630
R18	C	614684.00	6395856.00	1690
R19	C	614661.00	6395797.00	1630
R21	C	614666.00	6395742.00	1595
R22	D	614591.00	6395675.00	1495
R23	D	614520.00	6395615.00	1400
R24	D	614585.00	6395604.00	1440
R25	C	614685.00	6395661.00	1555
R26	C	614676.00	6395632.00	1530
R27	C	614679.00	6395520.00	1460
R28	C	614701.00	6395382.00	1400
R29	C	614686.00	6395297.00	1345
R32	D	614893.00	6395401.00	1575
R33	C	614764.00	6395450.00	1490
R35	C	614726.00	6395772.00	1660
R37	D	614874.00	6395819.00	1800
R40	C	614682.00	6395720.00	1595
R41	C	614587.00	6395520.00	1390
R42	C	614625.00	6395893.00	1678

Note 1: Distance measured from residence to TGM Administration Office at x: 613488, y : 6394619

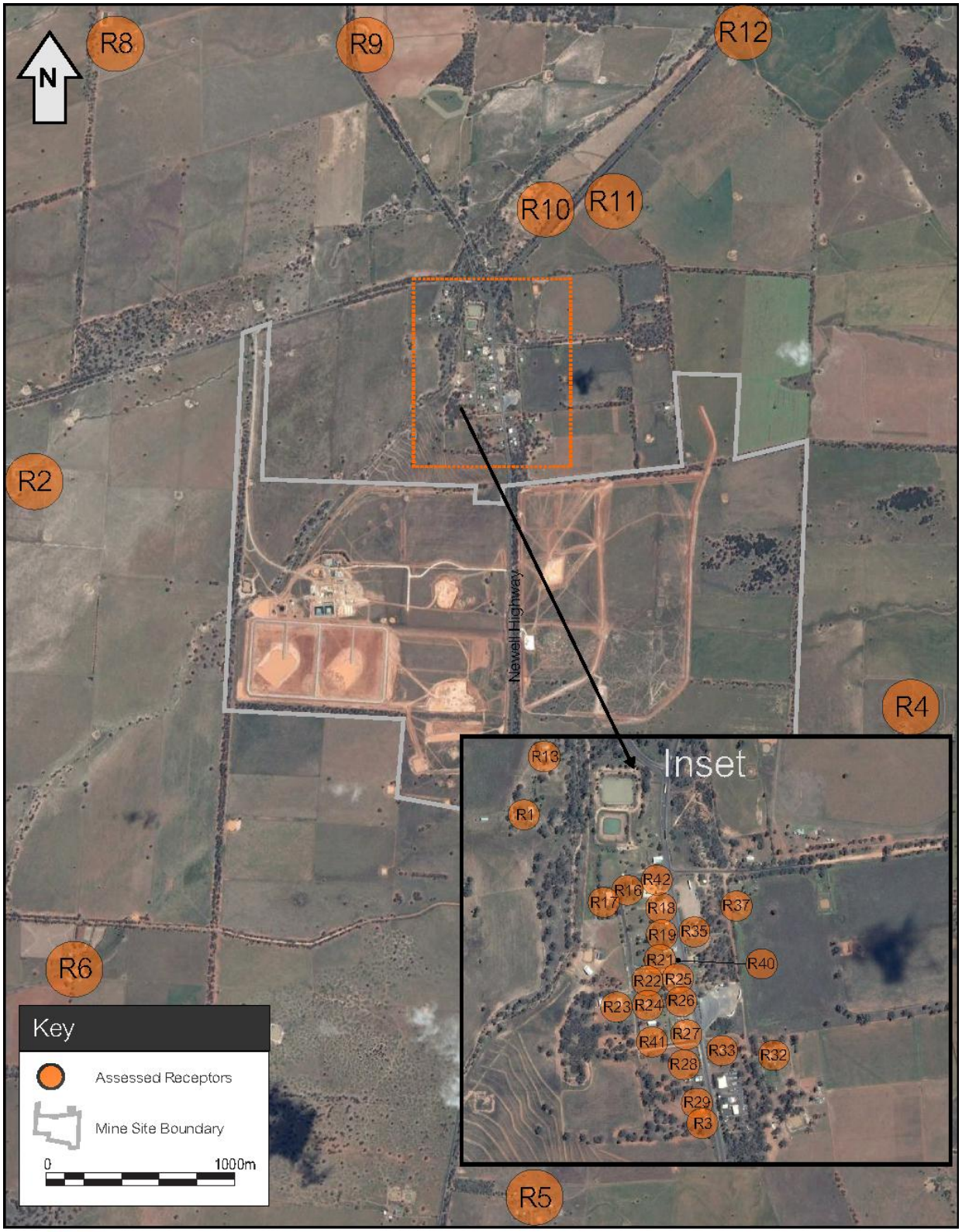

Figure 4 - Locality Plan and Receiver Locations

Tomingley Gold Mine - Modification 3

4 Noise Assessment Methodology

Brüel and Kjær Predictor Type 7810 (Version 11.00) noise modelling software was used to assess potential noise impacts associated with the Mine for four operational stages. A three-dimensional digital terrain map providing all relevant topographic information was used in the modelling process.

Additionally, the model uses relevant noise source data, ground type, shielding such as barriers, stockpiles and/or adjacent buildings and atmospheric information to predict noise levels at assessed receivers. The model calculation method used to predict noise levels is in accordance with ISO 9613-1 'Acoustics - Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere' and ISO 9613-2 'Acoustics - Attenuation of sound during propagation outdoors. Part 2: General method of calculation'.

4.1 Operational Noise Modelling Parameters

The model incorporated three-dimensional digitised ground contours for the Mine, as derived from proposed Mine layout (including the modified open cuts and WREs) for Mod3, the Mod2 noise barrier and the surrounding land base topography, superimposed on each other. Plant and equipment were modelled at various locations and heights, representative of proposed operating conditions for future scenarios. The processing plant was modelled within a semi-enclosed building consistent with the current Mine layout.

The noise model predicts LAeq noise levels. It should be noted that this assessment has assumed all plant and equipment operate simultaneously. In practice, such an operating scenario would be unlikely to occur and the results should therefore be considered conservatively high. Where relevant, modifying factors in accordance with Section 4 of the INP have been applied to calculations.

4.1.1 Meteorological Analysis

Noise emissions from industry can be significantly affected by prevailing weather conditions. Wind has the potential to increase noise at a receiver when it is light and travels from the direction of the noise source. As the strength of the wind increases the noise produced by the wind masks the audibility of most industrial sources.

Meteorological conditions that enhance received noise levels include source to receiver winds and the presence of temperature inversions. To account for the potential for enhancements, the INP specifies that the source to the receiver wind component for speeds up to 3m/s for 30% or more of the time in any seasonal period (ie day, evening or night), are feature winds and must be assessed.

The NSW INP Section 5.3 Wind Effects states:

'Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10m height) of 3m/s or below occur for 30 percent of the time or more in any assessment period in any season.'

Historic noise assessments for the Mine have determined the prevailing conditions in accordance with Section 5.3 of the INP and for consistency have been adopted for this assessment. It is noted that the adopted conditions are also consistent with PA 09_0155 for the Mine. The prevailing conditions are reproduced in **Table 4**.

Table 4 Modelled Prevailing Meteorological Parameters

Assessment Condition	Direction / Wind Speed	Stability Class
Calm	n/a	n/a
Inversion	n/a	F

4.1.2 Sound Power Levels

Mobile plant noise emissions used in modelling for this assessment were obtained via direct measurement of onsite plant or the MAC database of sources. The noise emission levels used in modelling are summarised in **Table 5**. **Appendix B** provides the octave sound power data of modelled plant for the operational scenarios.

Table 5 Equipment Sound Power Levels

Item	Sound Power Level (SWL), dBA
Mobile Plant	
Dozer (x1)	113
Wheeled Dozer (x1)	113
Excavator 120t (x2)	116
Excavator 85t (x1)	112
Grader (x2) [1]	113
FEL (x1)	113
Drill (x2)	114
Lighting Plant (x2)	98
Generator (x2)	93
Scraper (x2)[1]	110
Haul truck (x8) (all scenarios)	114
Processing Plant	
Ball mill (x1)	112
Primary/Secondary Crusher (x1)	115
Underground Plant	
Surface Mine Vehicle (SMV)	108
Mining truck (x1)	96
Ventilation Fan (x1)	104

Note 1 : Day operation only.

4.2 Modelling Scenarios

Four modelling scenarios were adopted in this assessment to represent noise emissions for existing and proposed Mod3 operations. It should be noted that all scenarios include hauling of product to the crusher for processing which remains unchanged for the life of the Mine. Modelled scenarios are summarised in Sections 4.2.1 to 4.2.4.

4.2.1 Scenario 1

Existing operations (Site Validation for 2015) within Cal1 and Wyo3 open cuts. Processing and dumping of overburden has been modelled to either WRE2 or WRE3 (north). This scenario has been completed to validate modelled levels against existing emissions quantified via attended compliance monitoring. Once calibrated against in-field results, the model parameters were adopted for subsequent scenarios.

4.2.2 Scenario 2

Scenario 2 consists of Mod3 operations of Cal2 at surface and Wyo1 operation near surface. Over the period of surface and near surface mining within Cal2, the concurrent mining operations could switch between Wyo1 and Cal1. Preliminary results show there is minimal difference between the two scenarios. Notwithstanding, the model results for Cal2 and Wyo1 scenario were identified as being slightly more conservative and consequently adopted for this assessment.

Dumping of overburden has been modelled to WRE3 north and south for day periods and WRE3 south for night periods. While waste rock from Wyo1 would likely be placed on WRE2 (behind 15m northern 'bund' at night) or within Wyo1 (as backfill), placement on WRE3 is considered worst-case for the purpose of this scenario.

Scenario 2 is envisaged to occur for a duration of approximately six months while operations work deeper into both Cal2 and Wyo1 pits.

4.2.3 Scenario 3

Mod3 operations of Cal2 at 15m below surface and Wyo1 at 80m below surface was assessed in Scenario 3. For Cal2, dumping of overburden has been modelled to WRE3 north and south for daytime and WRE3 south for night periods. For Wyo1 it is anticipated that waste would be backfilled to Wyo3. This scenario includes the commencement of underground operations within Cal1 near the proposed portal. This scenario is anticipated to occur for a duration of approximately 18 months following the commissioning of underground operations.

4.2.4 Scenario 4

Proposed underground operations only. This includes underground plant operating at the pit floor (near the proposed portal) of Cal1 and hauling to the processing plant. This scenario is anticipated to occur for the remaining two to three years of Mine life.

Appendix C provides modelled plant locations adopted for this assessment.

5 Noise Modelling Results and Discussion

5.1 Operational Noise Results

5.1.1 Scenario 1 Results Summary

Existing operations were calibrated against in-field compliance measurements that were conducted over three 24 hour periods in October 2015 (Noise and Sound Services). The compliance report did not state the exact meteorological conditions at the time of each survey, however it is noted that winds were generally calm at the time of each measurement. Therefore, from historic analysis of meteorological data for the site it is evident that inversion meteorological conditions were present at the time of the assessment. For consistency, inversion meteorological conditions were modelled for Scenario 1. **Table 6** compares the noise predictions against the mining noise contribution for assessed receivers presented in the compliance report for typical night operations in October 2015. **Appendix D** presents the noise contours for inversion meteorological conditions for all scenarios.

Table 6 Scenario 1 – Comparison of Existing Operational Noise Levels, dBA $L_{Aeq(15minute)}$

Receiver	NAG	Estimated Mine Contribution[1]	Modelled Result	Criteria
R2	B	30-35	32	36
R3	C	**42-46**	**42**	38
R4	A	**32-42**	**37**	35
R5	A	<35	32	37
R6	A	<30	34	36
R22	D	**42-46**	**40**	38
R29	C	**39-42**	**41**	37

Note bold denotes exceedance of the relevant criteria.

Note 1 : This is the range of Mine noise contributions over a 3 x 24hr monitoring period.

Noise predictions for Scenario 1 generally compare well with in-field Mine contributions. Notwithstanding, any discrepancies between the modelled and measured levels are due to precise location/position of plant at the time of the survey compared to the adopted location of plant in the noise model. Additionally, the noise model does not account for fluctuating meteorological conditions that may occur during in-field measurements.

It is understood that since completion of the October compliance monitoring assessment the Mine has implemented management and mitigation initiatives. This includes dumping to WRE3 south during night periods. Additionally, TGO have completed architectural building treatments to the majority of the 17 dwellings surrounding the Mine, with remaining treatments scheduled to be completed in 2015. The treatments include upgrades to existing glazing of dwellings along with installation of air conditioning.

5.1.2 Scenario 2 Results Summary

The predicted noise levels at each assessed receiver during prevailing meteorologic conditions for Scenario 2 are provided in **Table 7**.

Table 7 Scenario 2 – Predicted Operational Noise Levels, dBA $L_{Aeq(15minute)}$

Receiver	NAG	Calm	Inversion	Criteria	
				Day	Evening/Night
R1	A	30	36	36	36
R2	B	<30	31	36	36
R3	C	35	**40**	49	38
R4	A	<30	**36**	35	35
R5	A	<30	31	37	37
R6	A	<30	34	36	36
R8	A	<30	<30	35	35
R9	A	<30	<30	35	35
R10	A	<30	32	35	35
R11	A	<30	31	35	35
R12	A	<30	<30	35	35
R13	C	<30	34	46	37
R16	D	31	36	43	38
R17	D	31	37	43	38
R18	C	33	37	46	37
R19	C	32	37	46	37
R21	C	33	37	46	37
R22	D	33	37	43	38
R23	D	33	**39**	43	38
R24	D	32	37	43	38
R25	C	33	37	46	37
R26	C	34	37	46	37
R27	C	34	**38**	46	37
R28	C	34	**39**	46	37
R29	C	35	**40**	48	37
R32	D	37	**39**	43	38
R33	C	34	**39**	46	37
R35	C	33	37	46	37
R37	D	33	37	43	38
R40	C	33	37	46	37
R41	C	33	**38**	46	37
R42	C	31	36	46	37

Scenario 2 predictions show that operations within Cal2 and Wyo1 would satisfy the relevant criteria for all receivers during calm meteorological conditions. During inversion meteorological conditions, the night criteria is predicted to be exceeded by between 1 to 3 dBA at several receivers. This is an improvement on current emissions and is due to the relocation of the overburden dozer to the southern end of WRE3 during night inversion periods.

5.1.3 Scenario 3 Results Summary

The predicted noise levels at each assessed receiver during prevailing meteorologic conditions for Scenario 3 are provided in **Table 8**.

Table 8 Scenario 3 – Predicted Operational Noise Levels, dBA $L_{Aeq(15minute)}$

Receiver	NAG	Calm	Inversion	Criteria	
				Day	Evening/Night
R1	A	<30	35	36	36
R2	B	<30	31	36	36
R3	C	33	38	49	38
R4	A	<30	**36**	35	35
R5	A	<30	31	37	37
R6	A	<30	33	36	36
R8	A	<30	<30	35	35
R9	A	<30	<30	35	35
R10	A	<30	31	35	35
R11	A	<30	31	35	35
R12	A	<30	<30	35	35
R13	C	<30	34	46	37
R16	D	30	36	43	38
R17	D	30	36	43	38
R18	C	31	36	46	37
R19	C	31	36	46	37
R21	C	32	36	46	37
R22	D	30	36	43	38
R23	D	31	38	43	38
R24	D	31	36	43	38
R25	C	32	36	46	37
R26	C	31	36	46	37
R27	C	32	37	46	37
R28	C	33	**38**	46	37
R29	C	33	**38**	48	37
R32	D	34	38	43	38
R33	C	33	37	46	37
R35	C	32	35	46	37
R37	D	32	35	43	38
R40	C	32	36	46	37
R41	C	31	37	46	37
R42	C	30	36	46	37

Predicted noise levels for Scenario 3 show that noise emissions would satisfy the relevant criteria for all receivers during calm meteorological conditions. During inversion meteorological conditions, the night criteria is predicted to be exceeded by 1dBA at receivers R4, R28 and R29.

5.1.4 Scenario 4 Results Summary

The predicted noise levels at each assessed receiver during prevailing meteorologic conditions for Scenario 4 are provided in **Table 9**.

Table 9 Scenario 4 – Predicted Operational Noise Levels, dBA $L_{Aeq(15minute)}$

Receiver	NAG	Calm	Inversion	Criteria	
				Day	Evening/Night
R1	A	<30	32	36	36
R2	B	<30	<30	36	36
R3	C	30	35	49	38
R4	A	<30	<30	35	35
R5	A	<30	<30	37	37
R6	A	<30	31	36	36
R8	A	<30	<30	35	35
R9	A	<30	<30	35	35
R10	A	<30	<30	35	35
R11	A	<30	<30	35	35
R12	A	<30	<30	35	35
R13	C	<30	31	46	37
R16	D	<30	33	43	38
R17	D	<30	33	43	38
R18	C	<30	33	46	37
R19	C	<30	34	46	37
R21	C	<30	32	46	37
R22	D	<30	33	43	38
R23	D	30	35	43	38
R24	D	<30	33	43	38
R25	C	<30	33	46	37
R26	C	<30	33	46	37
R27	C	<30	33	46	37
R28	C	<30	34	46	37
R29	C	30	35	48	37
R32	D	<30	34	43	38
R33	C	<30	34	46	37
R35	C	<30	32	46	37
R37	D	<30	31	43	38
R40	C	<30	32	46	37
R41	C	<30	33	46	37
R42	C	<30	33	46	37

Predicted noise levels for Scenario 4 show that emissions from underground operations would satisfy the relevant criteria for all receivers during calm and prevailing meteorological conditions.

5.2 Sleep Disturbance Results

People asleep in their homes may be disturbed by intermittent on site noise, such as bulldozer tracks, reversing alarms or dumping of material on overburden stockpiles. Typical noise levels from the loudest of these events are presented in **Table 10**.

Table 10 Maximum Noise Emissions, dBA LAmax

Source	Sound Power Level
Haul truck (hard overburden ie blue metal)	125
Haul truck (standard overburden)	120
Reverse alarm	105–115 (with maximum modifying factor adjustment)

Table 10 presents LAmax levels that represent the varying types of overburden that exist at the Mine. Due to its hard consistency, blue metal type overburden is notably louder when dumped on overburden stockpiles. The maximum sound power level of unmitigated haul trucks dumping has previously been measured to be typically 120 dBA. Maximum noise levels for each assessed receiver was calculated during inversion meteorological conditions.

Predicted LA_{max} noise levels from trucks dumping on the northern and southern ends of WRE3 for both types of overburden are presented in **Table 11**.