EMGA

Environmental Management
Group Australia

RASP Mine

Noise and Vibration Assessment - Addendum

Prepared for Broken Hill Operations Pty Ltd - December 2009

RASP Mine

Noise and Vibration Assessment - Addendum

For:

BROKEN HILL OPERATIONS PTY LTD

December 2009

Final Report

Environmental Management Group Australia

Level 4, Suite 78
330 Wattle St
Ultimo NSW 2007

EMGA
Environmental Management Group Australia

Level 4 | Suite 78 | 330 Wattle St | Ultimo | NSW | 2007
p | +61 (0)2 9212 3466 e | info@emga.com.au
f | +61(0)2 9212 3468 w | www.emga.com.au

Report No. J09034RP1

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances.

Approved by:	Najah Ishac
Position:	Project Director
Signed:	
Date:	29 December, 2009

Table Of Contents

List of Tables

1 Introduction

Environmental Management Group Australia Pty Limited (EMGA) was engaged by Broken Hill Operations Pty Ltd (BHOP) to prepare an addendum to the ERM Noise Impact Assessment Report 2007 (ERM Report) for proposed changes to the RASP Mine Project (the Project) at Broken Hill. The addendum addresses the updated Director General's Requirements (DGRs) of 29 March 2009 and changes to the proposal since the previous noise assessment.

The key change to the Project is the elimination of the open-cut mining activities previously proposed during the first six months of the Project. This Addendum Report re-assesses the predicted noise emissions from construction activities in isolation from open-cut mining, and provides additional details in accordance with the Department of Environment Climate Change and Water's (DECCW) *NSW Construction Noise Guideline – Draft August 2008,* as required under the updated DGRs. This draft guideline is now gazetted as the *Interim Construction Noise Guideline.*

Other areas addressed herein as a consequence of the updated DGRs include the DECCW's and the Department of Planning's (DoP) *Interim Guideline for Assessment of Noise from Rail Infrastructure Projects April 2007* and DECCW's *Assessing Vibration: A Technical Guideline February 2006*, both in respect of rail noise and vibration associated with the proposal.

The contents of this Report rely on information still considered relevant in the ERM noise assessment and will be referenced as appropriate in the proceeding sections.

2 Existing Noise Environment and Relevant Criteria

The March 2008 Environmental Assessment (EA) report includes a detailed description and quantification of the existing noise climate at representative residential locations in Broken Hill.

The Rasp Mine is bounded by Eyre Street and Holten Drive to the south and east, Menindee Road to the north east, Crystal and Argent Streets to the north, and South Road (Silver City Highway) to the west. These roads form part of the existing trucking route through Broken Hill. The monitoring data indicates that background noise levels at residences in the vicinity of the Project away from the trucking route are generally typical of rural or relatively quiet suburban residential localities, though are higher during the day at Eyre Street and Argent Street, where noise levels from road traffic and commercial activity are more prominent than at other locations. .

2.1 Industrial Noise Policy (January 2000)

The EA noise assessment correctly adopted the DECCW *NSW Industrial Noise Policy (EPA) January 2000* (INP) to develop appropriate noise criteria. These are re-produced in *Table 1* and were derived on the basis of background noise plus 5dB.

Table 1 INP PROJECT SPECIFIC OPERATIONAL NOISE CRITERIA

Receiver No	Location	Criterion, $L_{eq,15minute}$ dB(A)			Comments
		Day	Evening	Night	
A1	Piper St North	38	37	35	This also applies to the southern urban area of Broken Hill.
A2	Piper St Central	38	37	35	-
A3	Eyre St North	44	41	39	-
A4	Eyre St Central	44	41	39	-
A5	Eyre St South	44	41	39	-
A6	Bonanza & Gypsum Sts	48	41	39	-
A7	Carbon St	35	35	35	This also applies to the north west urban area of Broken Hill.
A8	South Rd	48	39	39	-
A9	Crystal St	46	39	39	-
A10	Garnet & Blende Sts	42	41	35	This also applies to the northern urban area of Broken Hill.

Source: ERM 2007

2.2 Interim Construction Noise Guideline (July 2009)

The Interim Construction Noise Guideline (ICNG) is specifically aimed at managing construction works regulated by the DECCW under the *Protection of the Environment Operations Act 1997* (POEO Act). This provides the current and most relevant guidance for construction noise assessment.

One of the first steps in the ICNG is identification of sensitive receivers, which include residences, classrooms, hospitals, places of worship, passive and active recreation areas.

The local Broken Hill hospital is some 2 km north of the site on Thomas Street. Primary and secondary schools are located on Mica Street and Garnet Street respectively, both over 1 km north of any proposed construction activity on site.

Whilst all receivers are important, the most sensitive and those afforded the strictest criteria by the ICNG are residences. For the subject site, residences are also the closest and potentially the most impacted from construction activities. Hence, the assessment will focus on residences. The closest residences are located on the site's southern boundary. The majority of construction activities will be central to the south west area of the site at the proposed processing plant area shown in the ERM Report. This area is typically 400m from any residential properties.

2.2.1 Recommended Standard Hours

The primary management measure is to undertake construction during daytime hours only, which will be adopted for this project. The ICNG recommends works are restricted to:

- Monday to Friday, 7.00 am to 6.00 pm;
- Saturday, 8:00 am to 1:00 pm; and
- no construction work to take place on Sunday and public holidays.

The proposed works will generally be undertaken between these hours only and hence will satisfy what we view as the main objective of the ICNG. However, given the location of the site, contractors will likely need to work during the hours 7am to 7pm and seven days per week. It is generally accepted that construction noise that is inaudible at residences can occur at anytime. This will be tested in the prediction section of this Report, Section 3.

2.2.2 Noise Assessment Criteria

For major industrial type construction developments, the ICNG recommends a quantitative noise assessment approach. The following table is an extract from the ICNG and relates to residential receivers only.

Table 2 ICNG RESIDENTIAL CRITERIA

Time of Day	Management level $L_{Aeq\ (15\ min)}$*	How to apply
Recommended standard hours: Monday to Friday7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. ▪ Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. ▪ Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences2. 2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	▪ A strong justification would typically be required for works outside the recommended standard hours. ▪ The proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. ▪ For guidance on negotiating agreements see section 7.2.2.

* *Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.*

For other receiver types the ICNG provides the recommendations in *Table 3* (sourced directly from the ICNG).

Table 3 NOISE AT SENSITIVE LAND USES (OTHER THAN RESIDENCES) USING QUANTITATIVE ASSESSMENT

Land use	Management level, LAeq (15 min)(applies when properties are being used)
Classrooms at schools and other educational institutions	Internal noise level - 45 dB(A)
Hospital wards and operating theatres	Internal noise level - 45 dB(A)
Places of worship	Internal noise level - 45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level - 65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level - 60 dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

For industrial and commercial receivers not covered above, the ICNG provides the following:

> *"The external noise levels should be assessed at the most-affected occupied point of the premises:*
>
> - *industrial premises: external $L_{Aeq\ (15\ min)}$ 75 dB(A)*
> - *offices, retail outlets: external $L_{Aeq\ (15\ min)}$ 70 dB(A)*
> - *other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.*
>
> *The proponent should assess construction noise levels for the project, and consult with occupants of commercial and industrial premises prior to lodging an application where required.*
>
> *During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work."*

2.3 Interim Guideline for Assessment of Noise from Rail Infrastructure Projects (April 2007)

The *Interim Guideline for Assessment of Noise from Rail Infrastructure Projects (April 2007)* is a joint DECCW and DoP document. This document describes the environmental benefits of rail, objectives for noise and related assessment procedures.

It should also be noted that the Interim Guideline is on trial for new projects over the next three years.

Also, this Interim Guideline states that impacts from **existing rail operations are not covered** and that a package being developed will address existing situations. However, redevelopment of existing rail lines is addressed, quote:

"Redevelopment of an existing rail line applies where residential or noise-sensitive receivers are subject to existing rail noise at or above the noise trigger levels in Table 1 in Chapter 2 for a new rail line development. Typically this will be an existing rail line where it is proposed to carry out works that will increase its capacity to carry rail traffic or alter the track alignment through design or engineering changes. In practice this often means a duplication within an existing rail corridor. Redevelopment does not cover minor works such as crossovers, sidings, turnouts, yards, loops, refuges, relief lines, straightening curves or the installation of track signalling devices where these works will not result in an increase in existing rail noise levels and a level of rail noise beyond the noise trigger levels contained in Tables 1 and 2. For these rail infrastructure projects the potential noise and vibration would be compared against the noise and vibration trigger levels identified in this guideline to decide whether assessment of impacts and feasible and reasonable mitigation measures is necessary."

Notwithstanding this, and in acknowledgement of the site's DGRs, the Interim Guideline is used here as it provides the only current guiding principles for impact assessment. To that end, the rail operations to which this Interim Guideline will be adopted are those parts of the main rail line only, since rail spurs or loops used solely by the site are covered as an industrial source under the INP. This was the approach correctly adopted in the ERM Report.

The Interim Guideline specifies criteria for two aspects of rail traffic noise, airborne and ground borne.

2.3.1 Airborne Noise Trigger Levels for Heavy Rail

For residential land uses *Table 4* provides criteria according to the Interim Guideline.

Table 4 AIRBORNE RAIL TRAFFIC NOISE TRIGGER LEVELS FOR RESIDENTIAL LAND USES

Type of development	Noise trigger levels dB(A)		
	Day (7 am–10 pm)	**Night (10 pm–7 am)**	**Comment**
New rail line development	Development increases existing rail noise levels and resulting rail noise levels exceed:		These numbers represent external levels of noise that trigger the need for an assessment of the potential noise impacts from a rail infrastructure project. An 'increase' in existing rail noise levels is taken to be an increase of 2 dB(A) or more in L_{Aeq} in any hour or an increase of 3 dB(A) or more in L_{Amax}.
	60 $L_{Aeq(15h)}$	55 $L_{Aeq(9h)}$	
	80 L_{Amax}	80 L_{Amax}	
Redevelopment of existing rail line	Development increases existing rail noise levels and resulting rail noise levels exceed:		
	65 $L_{Aeq(15h)}$	60 $L_{Aeq(9h)}$	
	85 L_{Amax}	85 L_{Amax}	

For land uses other than residential the guideline values are shown in *Table 5*.

Table 5 AIRBORNE RAIL TRAFFIC NOISE TRIGGER LEVELS FOR SENSITIVE LAND USES OTHER THAN RESIDENTIAL

Sensitive land use	Noise trigger levels dB(A)	
	New rail line development	**Redevelopment of existing rail line**
	Development increases existing rail noise levels by 2 dB(A) or more in LAeq in any hour and resulting rail noise levels exceed:	
Schools, educational institutions – internal	40 LAeq(1h)	45 LAeq(1h)
Places of worship – internal	40 LAeq(1h)	45 LAeq(1h)
Hospitals	60 LAeq(1h)	60 LAeq(1h)
Hospitals – internal	35 LAeq(1h)	35 LAeq(1h)
Passive recreation	LAeq as per residential noise level values in Table 1 (does not include maximum noise level component)	
Active recreation (e.g. golf course)	65 LAeq(24h)	65 LAeq(24h)

Technical notes to *Table 4* and *Table 5 (source: DECCW & DoP 2007).*

1. *Specified noise trigger levels refer to noise from rail transportation only and do not include ambient noise from other sources. However, they refer to noise from all rail traffic at the receiver location, not only noise due to the specific rail project under consideration.*

2. *The noise level values represent external levels except where otherwise stated.*

3. *'Residential' typically means any residential premises located in a zone as defined in a planning instrument that permits new residential land use as a primary use. Where there is doubt as to the status of the residential land use, the relevant planning authority should be consulted.*

4. *LAeq(T) (where T is the relevant time period) refers to the equivalent continuous noise level from all train movements (excluding shunting activities in designated shunting areas) occurring during the assessment time period.*

5. *LAmax refers to the maximum noise level not exceeded for 95% of rail pass-by events and is measured using the 'fast' response setting on a sound-level meter.*

6. *Noise levels at residences are assessed 1 metre in front of the most affected building façade. Where only free-field measurements can be made, the measured noise level is corrected (generally by + 2.5 dB(A)) to account for the façade reflection effect. In the case of multi-level residential buildings, the external point of reference for measurement for the trigger is the two floors of the building that are most exposed to rail noise, usually the ground and first floors. On other floors, an internal noise level value 10 dB(A) below the relevant external noise level value applies on the basis that openable windows are opened sufficiently to provide adequate ventilation (refer to minimum ventilation requirements in the Building Code of Australia).*

7. *Internal noise level values refer to the noise level at the centre of the habitable room that is most exposed to the noise source and are applied with windows opened sufficiently to provide adequate ventilation. In cases where gaining internal access for monitoring is difficult, external noise level values 10 dB(A) above the internal level values apply.*

8. *The noise level values for sensitive land uses apply for the periods when the premises are in use.*

9. *In assessing noise levels at passive and active recreational areas as well as in hospital grounds, the noise level is assessed at the most affected point within 50 metres of the area boundary.*

10. *For external activities associated with schools, educational institutions and places of worship, the relevant passive or active recreation categories apply.*

11. *Where the category of the premises is not clear, seek advice from the relevant planning authority.*

12. *For sensitive land uses, LAeq(1h) means the highest 10th-percentile hourly A-weighted Leq during the period when the particular class of receiver building/place is in use. Alternatively, the highest measured LAeq(1h) value can be used where insufficient measurements have been made to provide a valid 10th-percentile level and it can be demonstrated that the measured values are representative.*

13. *For new and redeveloped rail projects, the noise trigger levels apply both immediately after operations commence and for projected traffic volumes over an indicative period into the future that represents the expected typical level of rail traffic usage (e.g. 10 years or a similar period into the future).*

14. *Where noise above the noise trigger levels continues even after all feasible and reasonable mitigation measures have been applied to a project, other long-term strategies need to be applied to minimise impacts. These include reducing noise emissions from rolling stock by applying noise standards to new rolling stock; managing noise emissions from rolling stock already in use; and improved planning, design and construction of adjoining land-use developments.*

15. *There may be situations where it is reasonable to vary the standard time periods applied to the day and night periods. For example, there may be instances where the noise levels in an area begin to rise quickly before 7 am (the standard cut-off point between day and night) because of normal early morning activity by the general community. In these cases it is reasonable to consider varying the standard day- and night-time periods to better reflect the actual temporal changes in noise for that location. Appropriate noise level values for these shoulder periods where night-time noise levels rise quickly to daytime noise levels may be negotiated with the determining or regulatory authority on a case-by-case basis.*

2.3.2 Ground borne Noise Trigger Levels

Ground borne noise is that generated inside a building by ground-borne vibration generated from the pass-by of vehicles on rail. The Interim Guideline states:

> "*Ground-borne noise level values are relevant only where they are higher than the airborne noise from railways (such as in the case of an underground railway) and where the ground-borne noise levels are expected to be, or are, audible within habitable rooms.*"

The subject site will utilise the existing above ground rail network and does not include an underground section of rail. The proposed rail movements are not expected to generate ground borne noise in a sensitive receiver building which is higher than

airborne noise. Hence, the issue of ground-borne noise from rail movements associated with the project does not warrant further consideration.

2.4 Assessing Vibration a Technical Guideline (February 2006)

Vibration emission objectives aim to reduce vibration impacts on the community. For this Project this is relevant to intermittent vibration from proposed rail movements. To minimise the impacts of vibration on receivers, all vibration emissions will be assessed in accordance with the *Environmental Noise Management – Assessing Vibration: A Technical Guideline* (DECC, 2006). The Guideline is based on *British Standard (BS) 6472-1992: Evaluation of human exposure to vibration in buildings (1-80Hz)*.

The Guideline provides preferred and maximum values for continuous, impulsive and intermittent vibration. The vibration dose value (VDV) accumulates the vibration energy received over daytime and night-time periods. The vibration dose is described in detail in BS 6472-1992.

While the criteria provided in the guideline are non-mandatory, all feasible and reasonable mitigation measures should be considered in order to achieve them. *Table 6* reproduces the preferred and maximum values for intermittent vibration as presented in the Guideline.

Table 6 ACCEPTABLE VIBRATION DOSE VALUES (VDV) FOR INTERMITTENT VIBRATION ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

1. Day period is 7:00am to 10:00pm; night period is 10:00pm to 7:00am
2. Critical areas include, for example, hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against continuous or impulsive criteria for critical areas.

Source: BS 6472-1992

3 Predicted Noise and Vibration Levels

3.1 Operational Noise

The ERM Report is considered to have adequately assessed the Project's proposed site operational noise emissions, including those from open cut, construction, underground mining and processing activities. The DECCW's draft comments on that assessment also indicate this (as per DECCW correspondence of 16 May 2008 to DoP's Paul Freeman). BHOP has determined not to include open-cut mining in their Part 3A application and therefore the noise assessment of Stage 1 is no longer relevant. The identified noise levels in the ERM Report for Stage 1 must therefore be ignored. These are shown in Table 5.1 for open-cut activities and Figure 5.1 of the ERM Report.

Accordingly, this report focuses on the assessment of noise generated by construction activities, as described below.

Operational noise assessment of the remaining stages (ie underground mining) remain unchanged and are shown to satisfy INP noise criteria in the ERM Report.

3.2 Construction Noise

The construction of the surface processing facility will typically entail two broad stages of construction.

The first stage will be establishment of the run of mine pad (ROM) area and includes civil works using equipment such as excavators, backhoes, tip trucks, compactors, generators, mobile cranes (10T to 50T capacity), agitator trucks and concrete vibrators. The expected duration of this stage of construction is 26 weeks.

The second stage will be the structural phase, including mechanical works, piping and electrical works. Typical equipment needed will include mobile cranes (10T – 100T capacity), generators, welding machines, semi trailers, small trucks and hand-held grinders. The expected duration of this stage of construction is 18 weeks. Refer to Figure 4.1 of the ERM Report for the location of the processing facility.

Table 7 provides typical sound emission data that was used to predicted potential construction plant noise levels at representative receiver locations.

Table 7 CONSTRUCTION PLANT SOURCE NOISE LEVELS

Activity	Typical Plant	Typical Representative Leq,15min Sound Power Level, dB(A)
Civil Works	Excavator (eg Komatsu PC 200Lc)	106 (EMGA file J09021)
	Backhoe	106 (as above)
	Tip Truck (eg CAT D350)	104 (EMGA file J09021)
	Compactor (eg TanaG520)	110 (EMGA file J09021)
	Generator (diesel Cummins 550kVA – enclosed)	92 (EMGA file J09041)
	Mobile Crane	103 (truck mounted)
	Agitator Truck	103
	Concrete Vibrator	104
Structural Phase	Mobile Crane	103 (truck mounted)
	Generator (diesel Cummins 550kVA – enclosed)	92 (EMGA file J09041)
	Welding machine	99
	Semi-trailer	103
	Small truck	103
	Hand-held grinder (8-inch)	107 (EMGA file J09008)

Notes: 1.Modelling assumes either excavator or backhoe operate separately, not simultaneously.

Based on the data in *Table 7,* noise levels at representative receiver locations were predicted using the Environmental Noise Model (ENM) software (a DECCW accepted modelling package).

The results of construction noise predictions are summarised in *Table 8* for representative residential locations, as identified in the ERM Report. They are also presented graphically as noise contours in *Figure 1*. The results demonstrate that typical construction activities are expected to satisfy the adopted ICNG criteria at all representative residential locations. To that end, predicted noise levels in *Table 8* are generally below background noise levels at corresponding residential locations (see *Table 1*). Therefore on-site construction noise is not expected to be audible at most residential locations for most of the time. The extension of construction hours to between 7am and 7pm seven days per week is not considered unreasonable.

Table 8 PREDICTED CONSTRUCTION NOISE LEVELS

	Location	Predicted Leq,15min Construction Noise Level, dB(A)		ICNG Daytime Criteria (background +10dB)
		Civil Works	Structural Works	
A1	Piper St North	34	27	43
A2	Piper St Central	37	32	43
A3	Eyre St North	37	34	49
A4	Eyre St Central	40	35	49
A5	Eyre St South	36	32	49
A6	Bonanza & Gypsum Sts	32	27	53
A7	Carbon St	38	29	40
A8	South Rd	33	27	53
A9	Crystal St	36	28	51
A10	Garnet & Blende Sts	32	24	47

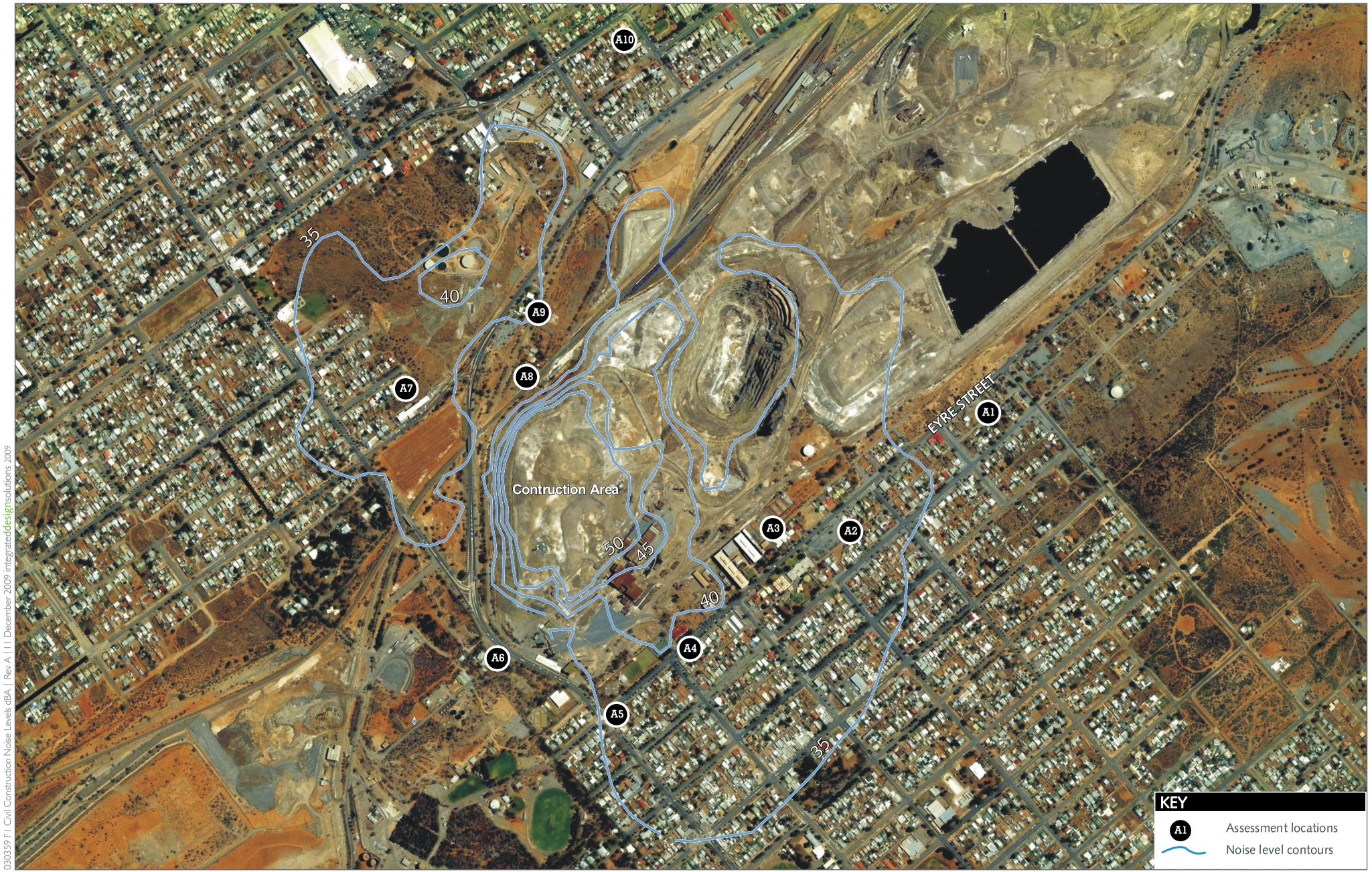

Figure 1

Civil Construction Noise Levels dBA

Broken Hill Operations Pty Ltd

EMGA

3.3 Rail Noise (main rail line only)

As described in the ERM Report, rail operations on the site's dedicated spur is included and assessed as part of industrial noise sources on site, and hence are not considered here.

The rail operations on the main line are assessed under the *Interim Guideline for Assessment of Noise from Rail Infrastructure Projects (April 2007)*. The current rail operations fluctuate between three to seven trains per day on average. The Project proposes that rail volumes will be one train per day or two movements, which will be absorbed by the daily fluctuation in existing operations and hence there will be no net increase in rail volumes, generally. Where this one train cannot be accommodated by the current rail operations of up to seven trains per day, there will be one additional operation per week.

Hence, existing average train noise levels (day $L_{Aeq(15h)}$ and night $L_{Aeq(9h)}$) will remain unchanged from the operation of the main line. Similarly, maximum (L_{max}) train noise levels will also remain unchanged, with up to one additional maximum train noise event expected per week.

The closest existing residential property to the main rail line is approximately 30 m north of the track (location A8 in the ERM Report). However, the general residential population of Broken Hill to the north is at least 75 m away.

The former Rail Access Corporation (RAC) publishes measured noise levels for various train sets and these are used here for demonstrating likely noise levels. *Table 9* provides calculated train pass-by noise levels for two distances from the rail track, one representing the closest, but isolated, residential location and the other representing the closest general residential area of Broken Hill. The data indicates that freight type trains (including locomotives, coal, ore and other freight) generally produce a noise level of 80dB(A) as a median value (with a 6dB(A) standard deviation) at 30 m. This satisfies the non-mandatory Guideline value of 85dB(A) L_{max}. At 75 m away, where the general residential area of Broken Hill begins to the north of the site, noise levels are well below adopted criteria.

Table 9 TRAIN PASS-BY NOISE LEVELS AT 30m AND 75m

Location	Existing Noise levels				RASP Freight		DECCW/DoP Criteria
	Passenger		Freight				
	L_{max} dB(A)	Frequency	L_{max} dB(A)	Frequency	L_{max} dB(A)	Frequency	L_{max} dB(A)
30m	71-80	1/day	63-93 80median	3-7/day	63-93 80median	2/day	85
75m	63-72	1/day	55-85 72 median	3-7/day	55-85 72 median	2/day	85

Notes: 1.The median value noise level has a standard deviation of 6dB.

3.4 Rail Vibration

The *Environmental Noise Management – Assessing Vibration: A Technical Guideline (DECC, 2006),* shows how to calculate the estimated VDV (eVDV) as a screening method. For intermittent vibration Appendix B of the Guideline provides the following equation:

$$eVDV = 0.07 \times v_{rms} \times t^{0.25} \text{ m/s}^{1.75}$$

where v_{rms} is the vibration velocity (root mean square) in mm/s and

t is the total period of the day (in seconds) during which the vibration may occur (ie summation of all train pass-bys).

The vibration caused by a freight train pass-by will vary, depending on site conditions such as track bed type, track condition (continuous welded rail or other), presence of crossovers, train speed and load. Whilst site specific rail vibration data was not collected on this occasion, typical vibration levels are used to estimate emissions. *Table 10* provides typical vibration levels from freight train pass-bys at several distances. It is clear that at even 15 m, the eVDV value will satisfy the adopted criteria. The 30 m vibration level representing the closest residence to the track was determined through interpolation of eVDV values at other distances.

Table 10 Train passby vibration levels

Distance, m	Vibration, mm/s	Passbys	Time, s	eVDV, $m/s^{1.75}$	Day Residential Criteria, $m/s^{1.75}$
15	0.25	1	90	0.05	0.2 - 0.4
22	0.25	1	90	0.05	
30				*0.04*	
44	0.1	1	90	0.02	
48	0.1	1	90	0.02	

Source: Assessment of Proposed Rail Sidings, IPMG Printing Facility, Warwick Farm (Noise and Vibration Assessment from the NSW DoP Major Projects Register, July 2009 (www.planning.nsw.gov.au))

4 Conclusion

EMGA has completed a review and assessment of proposed construction noise, rail noise and rail vibration impacts on the surrounding community from proposed activities for the Rasp Mine Project. The review and assessment have been undertaken to address the requests in the Project's current DGRs and, together with the original ERM noise assessment constitute a complete noise and vibration review and assessment of the proposal.

The results of this Addendum demonstrate that noise levels projected to be generated by the proposal are expected to satisfy current guidelines and relevant DECCW criteria at the nominated representative receivers.

This Report is an addendum to the original Noise Impact Assessment Report prepared by ERM in 2007.

References

DECCW - Assessing Vibration a Technical Guideline (February 2006)

DECCW - Industrial Noise Policy (January 2000)

DECCW - Interim Construction Noise Guideline (July 2009)

DECCW & DoP - Interim Guideline for Assessment of Noise from Rail Infrastructure Projects (April 2007)

ERM Australia report reference 63850 19 November 2007

EMGA

Environmental Management
Group Australia