

12.1 Description of Environmental Values

12.1.1 Legislative Framework

Environmental noise in Queensland is governed by the *Environmental Protection (Noise) Policy 2008* (EPP (Noise)) and the *Environmental Protection Regulation 1998* as subordinate legislation to the *Environmental Protection Act 1994*. The applicable intent of the EPP (Noise) is to protect the amenities of sleep, conversation and relaxation.

12.1.2 Local Topography

As previously described in Section 5.1.1, the topography of the proposed ECMP and the surrounding area is relatively flat with ridgelines to the east and north-west of the project area. These ridgelines will provide some noise shielding to homesteads where the line of site to the ECMP site is diminished.

12.1.3 Meteorological Conditions

The general climatic conditions of the site are provided in detail in Section 4. Long term observations from the Bureau of Meteorology indicate that the wind direction is predominantly from the east and south-east with large periods of calm weather occurring during winter. Wind speeds less than 3 m/s are a common occurrence throughout the year.

Meteorological data was collected for seven days in March 2007 using a portable weather station located at Ellensfield homestead. These results indicated large periods of calm (>45%) and light winds from the east and north.

12.1.4 Background Noise

Unattended background noise levels were measured from 8 March 2007 to 15 March 2007 at the Ellensfield (unoccupied) and Red Hill (occupied) homesteads, the two closest residences to the ECMP. The relative distances of these homesteads from the ECMP are as follows.

- Ellensfield 5 km east northeast of mine
- Red Hill 12 km west northwest of mine.

Other homesteads in the area are expected to have similar existing background noise levels to these homesteads.

Measured noise levels were analysed for the day, evening and night periods. The definition of day, evening and night from the "EPA Guideline – Noise: Planning for Noise Control", are:

- Day: 7:00 am – 6:00 pm
- Evening: 6:00 pm – 10:00 pm
- Night: 10:00 pm – 7:00 am.

The results of the unattended background noise monitoring undertaken at the Ellensfield and Red Hill homesteads are summarised in Table 12.1.1.

Table 12.1.1 Existing background noise at nearby homesteads

Time Period	Ellensfield homestead		Red Hill homestead	
	Planning noise level *	L _{Aeq, 1 hour} **	Planning noise level *	L _{Aeq, 1 hour} **
Day	30.8	35.5	29.3	34.5
Evening	33.3	39.5	33.8	42.7
Night	30.8	33.0	30.5	31.8

* Planning Noise Level as defined in EPA Guideline: "Planning for Noise Control"

** Levels stated are the average daily minimum L_{Aeq, 1 hour} for the given period

12.1.5 Existing Sources of Vibration

Existing sources of vibration include blasting at existing mines in the area, the movement of large machinery from an existing mine 15 km west of the proposed ECMP area and local road traffic from the Peak Downs Highway. Other transient sources of vibration are local farming equipment and train movements along the railway south of the ECMP site.

These existing vibration sources are assumed to create negligible vibration levels at the ECMP site and at the surrounding sensitive receptors.

12.2 Potential Impacts and Mitigation Measures

12.2.1 Noise and Vibration Assessment Criteria

12.2.1.1 Construction Noise

Construction noise criteria have been determined using the Australian Standard AS 2107 and the World Health Organisation Guidelines for Community Noise (WHO Guideline). Daytime criteria have been taken from the WHO Guideline, and evening and night time criteria were taken from the more stringent AS 2107.

The adopted construction noise criteria are summarised in Table 12.2.1.

Table 12.2.1 Construction noise level criteria at nearby homesteads

Time Period	Ellensfield homestead	Red Hill homestead
	Noise Criterion L _{Aeq, 1 hour}	Noise Criterion L _{Aeq, 1 hour}
Day	45	45
Evening	35	35
Night	35	35

12.2.1.2 Operational Noise

Noise above 200 Hz

For noise in frequency bands above 200 Hz, noise level criteria for a new project are obtained from the Environmental Protection Agency Guideline "Planning for Noise Control" (Noise Guideline). These noise level criteria are based on the measured pre-development ambient noise levels identified in Section 12.1.4 and recommended planning noise levels set out in the Noise Guideline.

The derived operational noise criteria are summarised in Table 12.2.2.

Table 12.2.2 Operational noise level criteria at nearby homesteads

Time Period	Ellensfield homestead	Red Hill homestead
	Noise Criterion $L_{Aeq, 1 \text{ hour}}$	Noise Criterion $L_{Aeq, 1 \text{ hour}}$
Day	33	34
Evening	28	28
Night	28	28

The operational noise criteria presented in Table 12.2.2 are lower than the existing background noise levels as shown in Table 12.2.1. This means the ECMP will need to have minimal impact on noise levels at these homesteads during the operation of the mine. The derivation of the criteria is detailed in Appendix J, Section 5.3.2.

Low Frequency Noise (noise below 200 Hz)

For noise in frequency bands below 200 Hz, noise was assessed using the Environmental Protection Agency Guideline “Assessment of Low Frequency Noise.” The procedure for the initial screening to determine if a more detailed assessment is required is as follows:

- the overall sound pressure level inside residences should not exceed 50 dB(Linear) to avoid complaints of low frequency noise annoyance
- if the dB(Linear) measurement exceeds the dB(A) measurement by more than 15 dB, a one-third octave band measurement in the frequency range 20 to 200 Hz should be carried out.

Noise emissions at the nearest sensitive receivers are predicted to pass the initial screening conditions above and hence, more detailed assessment is not required for low frequency noise emissions from operations at the ECMP.

12.2.1.3 Blasting Criteria

Blasting criteria for the ECMP have been taken from the EPA Guideline, “Noise and Vibration from Blasting”. The adopted criteria are described below.

Ground vibration

Blasting operations must be carried out in such a manner that if ground vibration should propagate to a noise-sensitive place:

- the ground-borne vibration must not exceed a peak particle velocity of 5 mm/s for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts; and*
- the ground-borne vibration must not exceed a peak particle velocity of 10 mm/s for any blast.*

Airblast overpressure

The noise from blasting is reasonable if, measured outside the most exposed part of an affected noise sensitive place:

- the airblast overpressure must be not more than 115dB(linear) peak for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts; and*
- the airblast overpressure must not exceed 120dB(linear) peak for any blast.*

Times of blasting

Blasting should generally only be permitted during the hours of 9am to 3pm, Monday to Friday, and from 9am to 1pm on Saturdays. Blasting should not generally take place on Sundays or public holidays.

Blasting outside these recommended times should be approved only where:

- (a) blasting during the preferred times is clearly impracticable (in such situations blasts should be limited in number and stricter airblast overpressure and ground vibration limits should apply); or
- (b) there is no likelihood of persons in a noise-sensitive place being affected because of the remote location of the blast site.

12.2.2 Noise Modelling

Noise levels from the proposed construction works and operation of the ECMP have been predicted with the proprietary software package SoundPLAN version 6.5 using the in-built CONCAWE prediction method as detailed in Appendix J, Section 4.2.

The modelling considers the effects of meteorological conditions including air temperature, wind and humidity. Propagation calculations include the effect of topographical shielding, ground absorption and vegetative dissipation.

12.2.3 Noise Impact Assessment

The potential impacts of construction and operational noise, including any effects from meteorological conditions such as wind and temperature inversions have been assessed against the adopted noise criteria.

Details of the noise impact assessment are provided in Appendix J, Section 6, with a summary provided as follows.

12.2.3.1 Construction Noise

Noise will be generated by construction activities at the project site including vegetation clearing, ground levelling, pad installation, and the construction of dams, roads, buildings, and the box cut. Construction noise levels were predicted for the expected worst case noise emissions during the initial site set up and infrastructure construction activities for the ECMP under both calm and adverse weather conditions.

As shown in Table 12.2.3 and Table 12.2.4, noise from construction at the ECMP is predicted to comply with noise criteria at the nearest and most affected residential locations. No specific construction noise mitigation measures are therefore required.

Table 12.2.3 Predicted noise levels from mine construction during calm conditions

Receiver location	Predicted sound pressure level dB(A)	Criteria dB(A)	
		Day	Evening/Night
Ellensfield	<10	45	35
Red Hill	<10	45	35

Table 12.2.4 Predicted noise levels from mine construction during adverse wind conditions

Receiver location	Predicted sound pressure level dB(A)	Criteria dB(A)	
		Day	Evening/Night
Ellensfield	<10	45	35
Red Hill	<10	45	35

12.2.3.2 Operational Noise

Operations noise sources include dozers, haul trucks, crushers station, power plant, CHPP and conveyors. Noise levels were predicted at the nearest and most affected residential locations surrounding the ECMP for the operational phase of the project. Both calm and adverse meteorological conditions were considered in the modelling process.

The modelled noise sources included conveyors, dozers, vent fans, crushing stations, the CHPP and haul trucks. The coal haul trucks were modelled as point sources at two locations along the haul road. Table 12.2.5 provides the operational sound power level data used to model the noise sources.

Table 12.2.5 Operational sound power level data used in predictive noise assessment

Number of sources	Noise source	Overall		L_{max} Sound power level dB(Lin) re 10^{-12} W at octave band centre frequency (Hz)								
		dB(A)	dB(lin)	31.5	63	125	250	500	1k	2k	4k	8k
4	CAT D11 Dozer	107	115	109	109	107	109	103	101	99	95	88
3	Big Foot Haul Truck	121	127	110	115	123	118	118	116	115	110	105
1	Vent Fan	116	119	95	98	106	115	114	111	106	102	99
1	Crush Station	109	115	105	110	109	106	106	104	101	94	86
1	CHPP	118	120	109	111	111	111	111	111	111	111	111
-	Conveyor per meter	82	91	85	87	84	77	81	78	74	64	56

The proposed power plant as described in Section 2.4.5 and currently in use at the Vale operated Integra underground coal mine, was not included as part of this noise impact assessment. Due to the location of the power plant in the MIA, the distance to the sensitive receptors and the known noise rating of a similar plant operated at the Integra underground coal mine, it was considered that the power plant would not significantly increase the predicted noise levels at the surrounding sensitive receptors.

Figure 12.2.1 and Figure 12.2.2 present the predicted noise levels under calm and or dense meteorological conditions repeatedly expressed as noise contours. Noise emissions from the ECMP are predicted to comply with the criteria for day, evening and night time operation at the closest sensitive receptors; Ellensfield and Red Hill homesteads. No specific operational noise mitigation measures are therefore required.

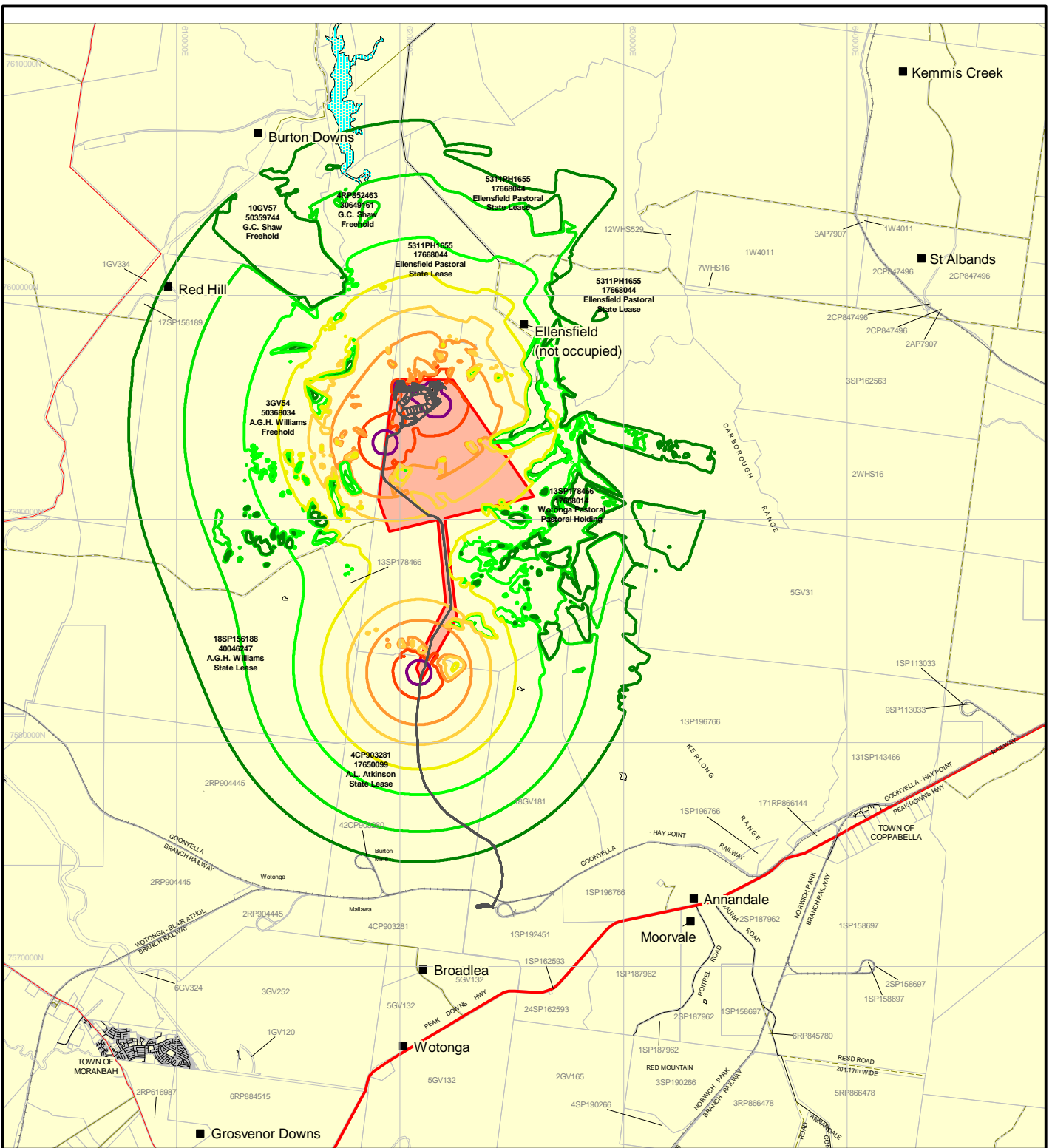
12.2.4 Noise Mitigation Measures

Although no specific noise mitigation measures are required to comply with the noise emission criteria at the nearest sensitive receptors, the following noise mitigation strategies will be implemented during the construction and operational phases of the project:

- All mobile and fixed plant equipment will be well maintained and kept in good working order.
- All mobile equipment will be fitted with appropriate silencing devices, which will also be kept in good working order.

In addition:

- Equipment will be inspected regularly to maintain optimal working conditions.
- ECMP will implement a response program to monitor noise and vibration levels at sensitive receptors for evaluation of off-site impacts on receipt of a substantiated complaint.
- Throughout construction and operations, the Environmental Manager will undertake regular environmental audits.



Parsons Brinckerhoff Australia Pty Limited, ECP Noise and Vibration Technical Report, Figure 6-3



Scale 1:250 000 (A4)

Horizontal Datum: AMG84, Zone 55

Source: Client supplied data set.
 QLD DNRW DCDB (2008).

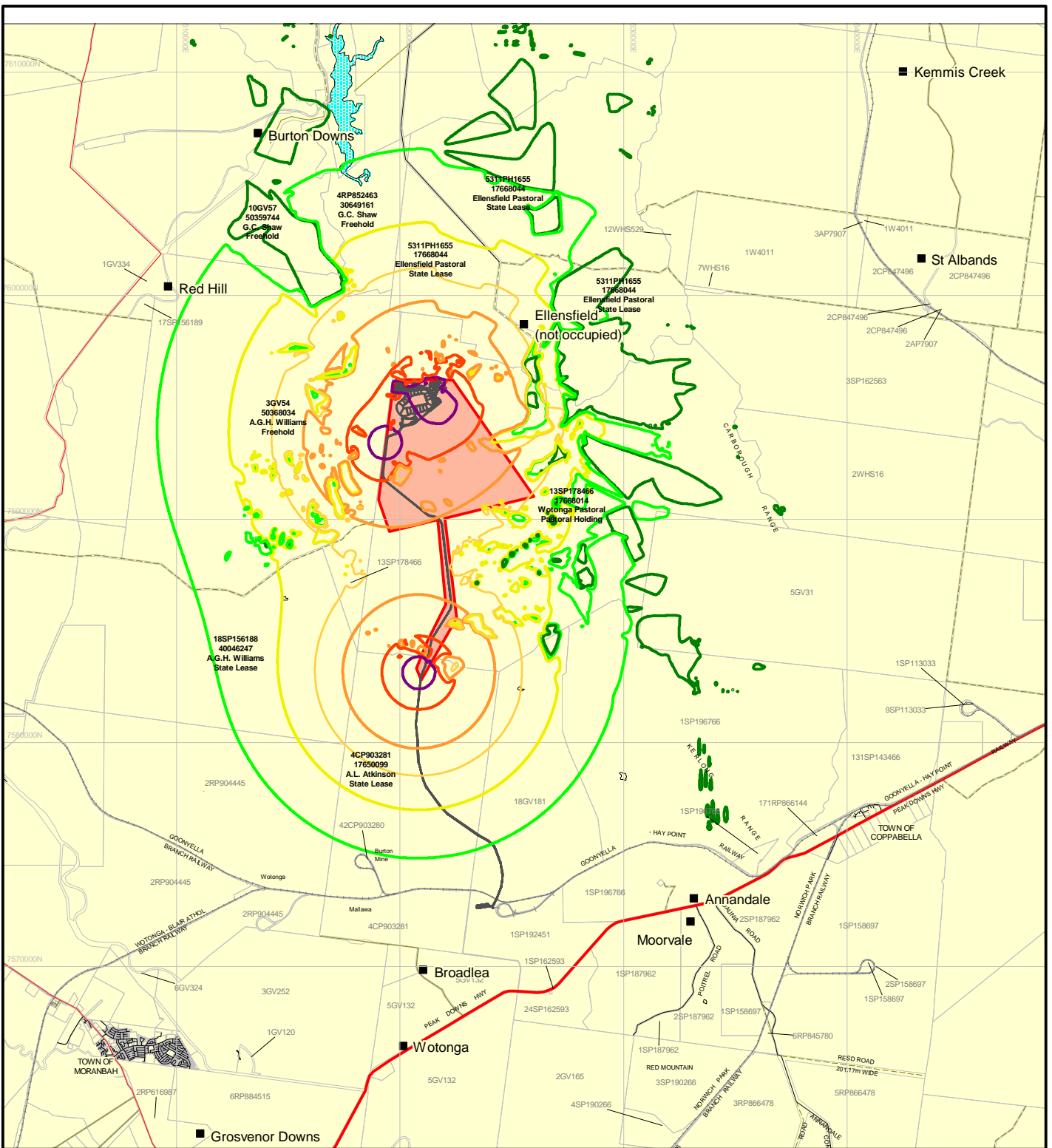
- Project Area
- Cadastre
- Homestead
- Project Components

Sound Pressure Level (dB(A))

- 10
- 12
- 16
- 20
- 25
- 30
- 40
- 50

<p>Client</p>	<p>Project</p> <p style="text-align: center;">ELLENSFIELD COAL MINE PROJECT ENVIRONMENTAL IMPACT STATEMENT</p>	<p>Title</p> <p style="text-align: center;">PREDICTED NOISE CONTOURS - UNDER CALM CONDITIONS</p>
<p>Drawn: CA Approved: RS Date: 22-06-2009</p>		<p>Figure: 12.2.1</p>
<p>Job No: 4262 6093 File No: 42626093-g-569b.wor</p>		
		<p>Rev: B</p> <p style="text-align: center;">A4</p>

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Parsons Brinckerhoff Australia Pty Limited, ECP Noise and Vibration Technical Report, Figure 6-4



Scale 1:250 000 (A4)

Horizontal Datum: AMG84, Zone 55

Source: Client supplied data set.
QLD DNRW DCDB (2008).



Project Area



Cadastre



Homestead



Project Components

Sound Pressure Level (dB(A))

- 10
- 16
- 20
- 25
- 30
- 40
- 50

Client



Project

ELLENSFIELD COAL MINE PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Title

**PREDICTED NOISE CONTOURS
- UNDER ADVERSE CONDITIONS**

Drawn: VH

Approved: RS

Date: 22-06-2009

Figure: 12.2.2

Rev: B

Job No: 4262 6093

File No: 42626093-g-570b.wor

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12.2.5 Blasting Ground Vibration and Airblast Overpressure Impact Assessment

Blasting calculations for airblast overpressure and ground vibration have been based on the prediction method described in Appendix J of AS 2187.2-2006 “Explosives—Storage and use Part 2: Use of explosives” (the Standard).

The airblast overpressure predictions have been based on parameters provided in the Standard for confined blasting. Airblast overpressure can increase rapidly if blasts are poorly confined and hence a conservative 10dB safety factor has been applied to blasting impact predictions. The areas of airblast impact have therefore been calculated based on a limit of 105dB (linear).

The predictions have not considered the effect of topographic shielding or meteorological conditions and are only given as a guide for the identification of potential impacts from blasting. Modelling undertaken has been limited to the construction (box cut) scenario as it is expected to have the highest potential impact.

Airblast overpressure and ground vibration resulting from blasting at the mine site were assessed for the construction scenario at the nearest and most affected residential locations surround the ECMP.

The ground vibration and airblast overpressure are predicted to comply with the assessment criteria for the expected blasting charge sizes.

12.2.6 Blast and Vibration Mitigation Measures

Due to the ground vibration and airblast overpressure being predicted to comply with the assessment criteria no specific blast mitigation measures are expected to be required, however the following control strategies in accordance with the EPA Guideline, “Noise and Vibration from Blasting” will be implemented on the site as part of the operating procedures and part of the EM Plan.

Ground vibration:

Blasting operations must be carried out in such a manner that if ground vibration should propagate to a noise-sensitive place:

- the ground-borne vibration must not exceed a peak particle velocity of 5 mm/s for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts; and
- the ground-borne vibration must not exceed a peak particle velocity of 10 mm/s for any blast.

Airblast overpressure:

The noise from blasting is reasonable if, measured outside the most exposed part of an affected noise sensitive place-

- the airblast overpressure is not more than 115 dB(linear) peak for nine out of any 10 consecutive blasts initiated, regardless of the interval between blasts; and
- the airblast overpressure does not exceed 120 dB(linear) peak for any blast.

Times of blasting:

Overburden blasting should be undertaken during the hours of 9am to 3pm, Monday to Friday, and from 9am to 1pm on Saturdays. Overburden blasting should not generally take place on Sundays or public holidays.

Blasting outside these recommended times should be approved only where:

- blasting during the preferred times is clearly impracticable (in such situations blasts should be limited in number and stricter airblast overpressure and ground vibration limits should apply);or
- there is no likelihood of persons in a noise-sensitive place being affected because of the remote location of the blast site.