

# MANGOOLA OPEN CUT

GLENCORE

*Plan for Mangoola Coal Operations Pty. Limited*

## Blast Management Plan

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## Review History

Version	Date Reviewed	Reviewed By	Amendment
1	1/5/2009	DoP&I	Original BMP approved by DP&I.
2	4/08/2010	Mangoola Coal	Submitted to DoP&I for review.
3	24/10/2010	Mangoola Coal	Comments from DoP&I review in August 2010 incorporated and sent as final for approval.
4	30/04/2013	Mangoola Coal	Review following Modification 4, updated following DP&I request for a Blast Fume Management Strategy and general review of monitoring sites/general content. Submitted to DP&I and EPA.
5	May 2013	Mangoola Coal	Re-submitted in June to DP&I with amendment to Electricity Transmission Line pylon PPV limits to reflect latest TransGrid Agreement.
6	September 2013	Mangoola Coal	BMP approved by DP&I on 11 <sup>th</sup> September 2013. Approval letter attached and document date changed to September 2013.
7	June 2014	Mangoola Coal	Review following Modification 6
8	May 2015	Mangoola Coal	Updated to reflect EPL changes and monitoring station locations.
9	January 2016	Mangoola Coal	Updated to reflect: <ul style="list-style-type: none"> <li>• Variation to EPL 12894 and changes to blast times contained in condition L4.5.</li> <li>• Increase blast limits under agreement with TransGrid.</li> </ul>
10	November 2016	Mangoola Coal	Updated to reflect: <ul style="list-style-type: none"> <li>• Amended monitoring station location BM01 (north-west of operations; renamed to BM07) following acquisition of 281 Wybong PO Road by Mangoola Coal;</li> <li>• Removal of BM02 from the monitoring network due to duplication with BM03 (north-east of operations);</li> <li>• Removal of BM05 and BM06 whilst maintaining compliance with TransGrid agreement;</li> <li>• Removal of interim limit on rock shelters and formations (Project Approval condition regarding 'damage' to rock structures addressed);</li> <li>• Inclusion of Dam Safety Committee approval requirements.</li> </ul>
11	August 2017	Mangoola Coal	Updated in response to comments provided by Department of Planning & Environment including: <ul style="list-style-type: none"> <li>• Annual review of safe blast vibration limit for rock structures</li> <li>• Representative vibration monitoring at Anvil Rock</li> </ul>
12	August 2017	Mangoola Coal	Formatting for website.

13	January 2019	Mangoola Coal	Updated to reflect: <ul style="list-style-type: none"> <li>Amended monitoring location following purchase of nearest private receptor to the south of the mining operation and subsequent EPL12984 variation.</li> <li>Addition of rockshelter identified in 2018 ACHOA inspection,</li> </ul>
14	February 2019	Mangoola Coal	Approved by DP&E on 12.2.2019
15	December 2019	Mangoola Coal	Update of Table 4.1 to acknowledge additional monitoring and ladder required for monitoring of Anvil Rock.
16	May 2020	Mangoola Coal	Reviewed document. Added EPL reporting requirements (R2.2) to section 5.1. Updated table 4.2 to make remediation requirements specific to Anvil Rock as requested by DPIE. Appended Blast Fume Management Procedure as Appendix D in accordance with DPIE directive – Blast Fume Management Strategy 2012.

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# 1 Introduction

Mangoola Coal Operations Pty Limited (Mangoola Coal) operates an open cut coal mine located near Wybong, approximately 20 kilometres west of Muswellbrook and approximately 10 kilometres north of Denman in the Muswellbrook Local Government Area (refer to **Figure 1.1**).

## 1.1 Project Description

In accordance with Project Approval (PA) 06\_0014, Mangoola Coal has a maximum production rate of 13.5 million tonnes per annum (Mtpa) of run of mine (ROM) coal over a mine life of 21 years. The primary mining method utilises hydraulic excavators loading rear dump trucks assisted by dozer push and cast blasting of overburden where appropriate. Dump trucks haul ROM coal to the coal handling facilities along haul roads. The general mining sequence includes the stripping of topsoil, removal of overburden, extraction of coal resource, in pit overburden emplacement and progressive rehabilitation.

Mining operations, coal handling and washing, rail load out and all associated activities operate on a 24 hours per day, seven days per week basis with the exception of the mobile gravel crushing plant which is restricted to 7am to 6pm Monday to Friday and 8am to 1pm on Saturdays with no operations on public holidays or Sundays. In accordance with PA and EPL conditions, Mangoola shall only carry out blasting on site between 9.00 am and 5.00 pm Monday to Saturday inclusive. Blasting is only allowed on Sundays, public holidays, or at any other time under certain circumstances and with the written approval of the EPA.

A detailed description of Mangoola Coal Project and the subsequent modifications is provided in Chapter 3 of the Modification 6 Environmental Assessment (EMGA Mitchell McLennan, 2013). An overview of blast impact assessment findings can also be found in Chapter 8 of this Environmental Assessment.

The conceptual mine plan scenarios utilised in the Modification 6 Environmental Assessment include:

- Year 2 (end 2015) – coal extraction in the north-east area of the mine (the Northern Pit) and progressing in a south-easterly direction towards the mine infrastructure area. The overburden emplacement area is established behind the general progression of the pit;
- Year 5 (end 2018) – coal extraction in the north-west area (the Main Pit) and southern area (the Southern Pit) of the mine. The Main Pit progresses in a south-west direction around Anvil Hill and the Southern Pit in a north-west direction; and
- Year 10 (end 2023) – one active pit in the south-western area of the mine (the Southern Pit). The majority of the mined land is rehabilitated by this time and represents the end stage of the mine life.

Mangoola Coal's mining operations are surrounded by sensitive receptors including private residences, heritage structures, rock formations, Aboriginal rock shelters and 500 kV transmission line. Blast design and mitigation measures will be varied throughout life of mining to minimise impacts on these receptors as operations progress to the west and south.

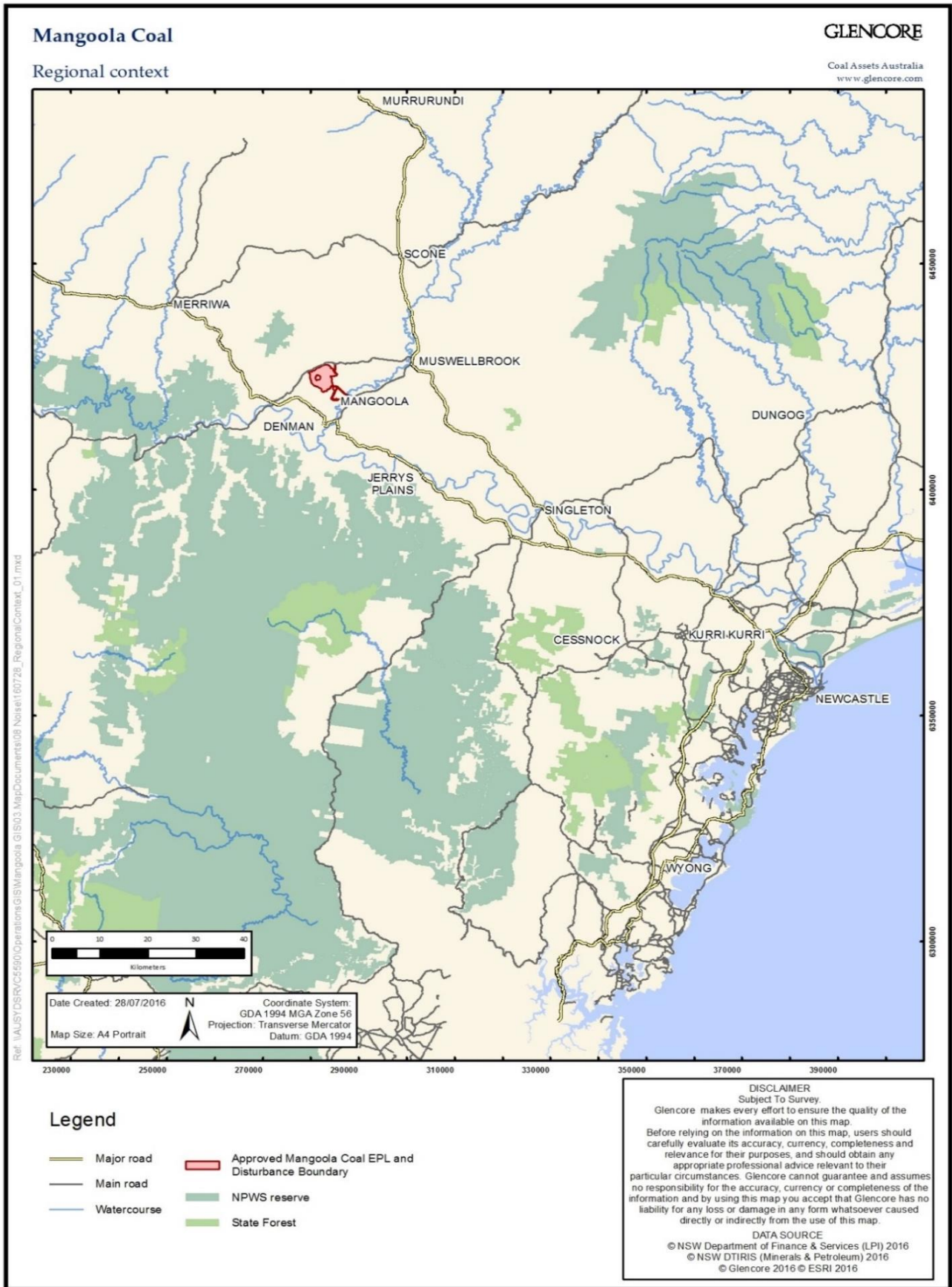


Figure 1.1

## 1.2 Purpose and Scope

To satisfy Schedule 3, Condition 17 of PA 06\_0014, a Blast Management Plan (BMP) is required to be prepared and implemented for the project to the satisfaction of the Secretary.

## 1.3 Objectives

The objectives of this BMP include:

- describe the measures that will be implemented to ensure compliance with the blast criteria and operating conditions of PA 06\_0014;
- propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (refer to **Section 2**);
- establish a blast monitoring system to assess the airblast overpressure and ground vibration impact on surrounding sensitive receivers (refer to **Section 4.2**);
- manage blast related community complaints in a timely and effective manner (refer to **Section 5.3**); and
  - detail the procedure for reporting blast criteria exceedances to the relevant stakeholders (refer to **Section 5.5**).

## 1.4 Regulatory Requirements

### 1.4.1 Project Approval

PA 06\_0014 for Mangoola Coal was granted by the Minister for Planning and Infrastructure under the EP&A Act on 7 June 2007. Eight modifications to PA 06\_0014 have since been granted. The requirement for this BMP arises from Schedule 3, Condition 17 of PA 06\_0014. A detailed list of PA 06\_0014 conditions and where they are addressed in this document is included in **Appendix B**.

### 1.4.2 Environment Protection Licence

Mangoola Coal was issued Environment Protection Licence (EPL) 12894 on 7 July 2008. A full list of the current EPL 12894 conditions relating to blasting and where they are addressed within this document are included in **Appendix B**.

### 1.4.3 Dams Safety Act

Mangoola Coal has onsite water dams and tailings storage facilities which are prescribed dams under the requirements of the NSW Dams Safety Act 1978. These dams are within areas designated by the NSW Dams Safety Committee (DSC) as Mangoola-3 and Mangoola-4. Blast monitoring is undertaken and reported to the DSC as per the conditions administered by the DSC.

## 1.5 Roles and Responsibilities

The roles and responsibilities of Mangoola Coal employees and contractors in relation to blast management and monitoring are outlined in **Table 1.1**.

**Table 1.1 - Roles and Responsibilities**

Role	Responsibilities
<b>Operations Manager</b>	<ul style="list-style-type: none"> <li>providing that sufficient resources are allocated for the implementation of this BMP.</li> </ul>
<b>Mine / Technical Services Manager</b>	<ul style="list-style-type: none"> <li>implementation of this plan for mining operations to ensure compliance with consent requirements.</li> <li>Coordinate design of blasting in accordance with safe blast limit for Anvil Rock, the Book and Rock Shelters</li> </ul>
<b>Environment and Community Manager</b>	<ul style="list-style-type: none"> <li>coordinate training to communicate requirements of this BMP to relevant personnel;</li> <li>provide resourcing and support to allow effective implementation of blast monitoring in accordance with this BMP;</li> <li>coordinate, advise and assist with the implementation of the BMP;</li> <li>notify regulatory authorities and affected landholders of any blasting related exceedance and undertake associated reporting;</li> <li>complete reporting requirements for Annual Review and Annual return regarding blasting management;</li> <li>update monitoring data on the Mangoola Coal website;</li> <li>maintain the Community Response Line and Blasting Hotline and advertise in local newspapers; and</li> <li>where relevant, notify private residents of blasting times.</li> </ul>
<b>Drill and Blast Engineer</b>	<ul style="list-style-type: none"> <li>regularly review blast design parameters on the basis of blast monitoring records;</li> <li>design and carry out blasts to comply with the requirements of this BMP, including the identification of meteorological parameters;</li> <li>conduct pre-blast meteorological assessments in accordance with site procedures; and</li> <li>maintain records for blasts initiated.</li> </ul>
<b>Drill and Blast Supervisor</b>	<ul style="list-style-type: none"> <li>ensure the drill pattern is drilled in accordance with the blast design; and</li> <li>ensure that the blast is loaded with the correct quantity and quality of explosive and stemmed in accordance with the blast design.</li> </ul>
<b>Shottfirers</b>	<ul style="list-style-type: none"> <li>notify the Drill and Blast Engineer and Supervisor of any factors that may lead to non-compliance with this BMP; and</li> <li>load and fire blasts in accordance with the design supplied by the Drill and Blast Engineer.</li> </ul>
<b>Blast Controller</b>	<ul style="list-style-type: none"> <li>implement and comply with the pre-blast environmental assessment process.</li> </ul>
<b>All employees and contractors</b>	<ul style="list-style-type: none"> <li>comply with the requirements of this BMP.</li> </ul>

## 1.6 Definitions

The terminology utilised within this BMP is defined in **Table 1.2**.

**Table 1.2 – Terminology utilised within the BMP**

Term	Definition
<b>Airblast overpressure</b>	An airborne shock wave resulting from detonation of explosives. An airblast may be caused by blasted material movement or the release of expanding gas into the air.
<b>Blasting</b>	Any activity involving the use of explosives for the purpose of producing an explosion to fragment rock for mining.
<b>Blast event</b>	A number of individual blasts fired in quick succession in a discrete area of the mine.
<b>dB</b>	Decibel
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i>
<b>Flyrock</b>	Rock that is propelled outside of the blasting area through the air or along the ground as a result of the detonation of explosives.
<b>Ground vibration</b>	The movement of the ground caused by the blast wave emanating from the blast.
<b>kV</b>	Kilovolt (1000 volts)
<b>Misfire</b>	The failure of one or more holes in a blast pattern to initiate.
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997 (NSW)</i>
<b>PPV</b>	Peak Particle Velocity. A measure of ground vibration. Particle velocity describes the velocity at which a particle of ground vibrates as a result of a seismic wave.
<b>Privately-owned land</b>	Land that is not owned by a public agency, or a mining company (or its subsidiary).
<b>Proponent</b>	Mangoola Coal Operations Pty Limited
<b>Residence</b>	An occupied dwelling (blast criteria does not apply to unoccupied dwellings).

## 2 Blasting Criteria & Frequency

Blasting impacts resulting from operations at Mangoola Coal must not exceed the criteria specified in **Table 2.1**.

**Table 2.1 – Blasting criteria**

Location	Airblast overpressure (dB (Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance
Residence on privately owned land; and EPL Monitoring Points 16, 21 and 32	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
500kV transmission line pylons – tension towers	n/a	60*	0%
500kV transmission line pylons – suspension towers	n/a	125*	0%

\* Proponent has a written agreement with the relevant owner and has advised DP&E in writing of the terms of this agreement.

In accordance with PA 06\_0014 and EPL 12894, Mangoola Coal must only carry out blasting between 9.00 am and 5.00 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the EPA. Supplementary restrictions may also apply when blasting is planned within 500 m of any local road. These conditions include confining blasts between 10.00 am and 2.00 pm weekdays, and are detailed within the Mangoola Coal Closing Public Road Procedure (refer to **Appendix C**).

Additionally, in accordance with Schedule 3, Condition 12 of PA 06\_0014, blasting at Mangoola Coal will be limited to the following frequencies:

- a maximum of two blasts per day; and
- six blasts per week, averaged over a calendar year on the site.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence or privately owned land, blast misfires or blasts required to ensure the safety of the mine or its workers. For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

In compliance with Schedule 3, Condition 16 of PA 06\_0014, Mangoola Coal will not undertake blasting within 500m of any public road or any land outside the site not owned by the Proponent unless the Proponent has:

- a) demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and

- b) updated the BMP to include the specific measures that would be implemented while blasting is being carried out within 500m of the infrastructure or land; or
- c) a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised Department of Planning and Environment (DP&E) in writing of the terms of this agreement.

The Mangoola Coal Closing Public Road Procedure details how these requirements are met (refer to **Appendix C**).

## 3 Blast Management Controls

Blast management and mitigation practices have been developed at Mangoola Coal to minimise the impact of blast fume, dust, odour, fly rock, ground vibration and airblast overpressure. The procedures aim to minimise the impacts to human safety, property and public infrastructure, as well as the blast impacts mentioned above. Blasting impacts upon Aboriginal and cultural heritage items are addressed in the Mangoola Coal Aboriginal Cultural Heritage Management Plan (ACHMP) and Mangoola Coal Conservation Management Strategy (CMS). These procedures will be revised and updated as required based on the outcomes of the blast monitoring program described in **Section 4.2**.

The Mangoola Coal Blast Fume Management Procedure (BFMP) was developed in 2012 to the satisfaction of the Secretary and in accordance with DP&E requirements received in writing in 2012. The BFMP identifies a number of specific control measures for fume management at Mangoola Coal not covered below and is published on the company website.

Specific controls and mitigation measures employed at Mangoola Coal to minimise blast impacts and ensure compliance with relevant PA 06\_0014 and EPL 12894 criteria are listed in the following sections.

### 3.1 Design Controls

A number of blast management controls are incorporated in to the blast design process at Mangoola Coal. These include:

- blast initiation using electronic detonation techniques;
- limiting blast Maximum Instantaneous Charge (MIC);
- implementing a delay detonation system; and
- use of adequate quality stemming together with adequate stemming lengths to ensure maximum confinement of the explosives.

### 3.2 Operational Controls

In addition to design controls, Mangoola Coal implements a number of operational control measures to manage blast related impacts. These controls include:

- conducting a pre blast assessment with consideration to wind speed and direction, wind shear and strength of any temperature inversions;
- use of monitoring data, where applicable, to refine blast design, on bench practices and site models used to predict blasting impacts; and
- adherence to drilling and hole loading designs.

### 3.2.1 Wybong Road

Prior to blasting within 500m of Wybong Road, Mangoola Coal will implement the Mangoola Coal Closing Public Roads Procedure (refer to **Appendix C**). The purpose of this procedure is to provide a management strategy and operating procedure for the temporary closure of Wybong Road, when blasting is required within 500m of the road. This radius may be increased if the risk of fly-rock is considered high, or where there is any other potential risk to road users, or any other environmental factor that requires road closure (e.g. high fume potential).

The key aspects of the Road Closure procedure include:

- the notification of affected parties;
- procedures for road closure and traffic management;
- procedures for modified shot-firing; and
- a protocol for the passage of emergency vehicles.

### 3.3 Continuous Improvement

Mangoola Coal will seek to undertake continuous improvement of blast management across operations. The basis for continuous improvement of blast mitigation measures will be through the ongoing monitoring of blast results. Any new management measures that are implemented as a result of these investigations will be reported in the Annual Review.

Mangoola Coal will also maintain awareness of new technologies for blast management and impact mitigation through participation in relevant industry groups.

### 3.4 Training

Training will be provided to personnel and contractors who require specific skills or knowledge relating to blast impacts and mitigation. Training will be undertaken in accordance with this BMP and will address the roles and responsibilities of relevant personnel.

## 4 Blast Monitoring Methodology

All monitoring is to be undertaken in accordance with the approved Mangoola BMP and conditions of PA 06\_0014 and EPL 12894 and relevant standards identified in **Section 4.1**.

### 4.1 Monitoring Standards

Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard AS 2187.2-2006 'Explosives – Storage and use – Use of explosives'.

Meteorological monitoring is undertaken in accordance with the 'Approved methods for the sampling and analysis of air pollutants in NSW' (DEC 2007) which refers to Australian Standard AS2923 -1987 (Guide for measurement of horizontal wind for air quality applications).

## 4.2 Blast Monitoring

Blasts are monitored against the criteria specified in PA 06\_0014 (refer to **Appendix B**) and EPL 12894 (refer to **Appendix B**).

In June 2012 the DP&E requested monitoring of blast fumes from 2 July 2012 onwards. This includes documenting a blast fume rating and video record each blast. Details of strategies for managing, monitoring and responding to blast fume are documented in the BFMP.

The prescribed blast monitoring locations are shown on **Figure 4.1** and **Table 4.1**. Data collected from the monitoring of each blast will include:

- measured vibration at each monitoring location;
- measured overpressure at each monitoring location (where relevant);
- distance from blast to each monitoring location;
- number of holes;
- blast type;
- blast fume rating according to the *Prevention and Management of Blast Generated NOx Gases in Surface Blasting* (Australian Explosives Industry and Safety Group Inc., 2011);
- meteorological conditions; and
- blast notifications to neighbouring mines and private residences.

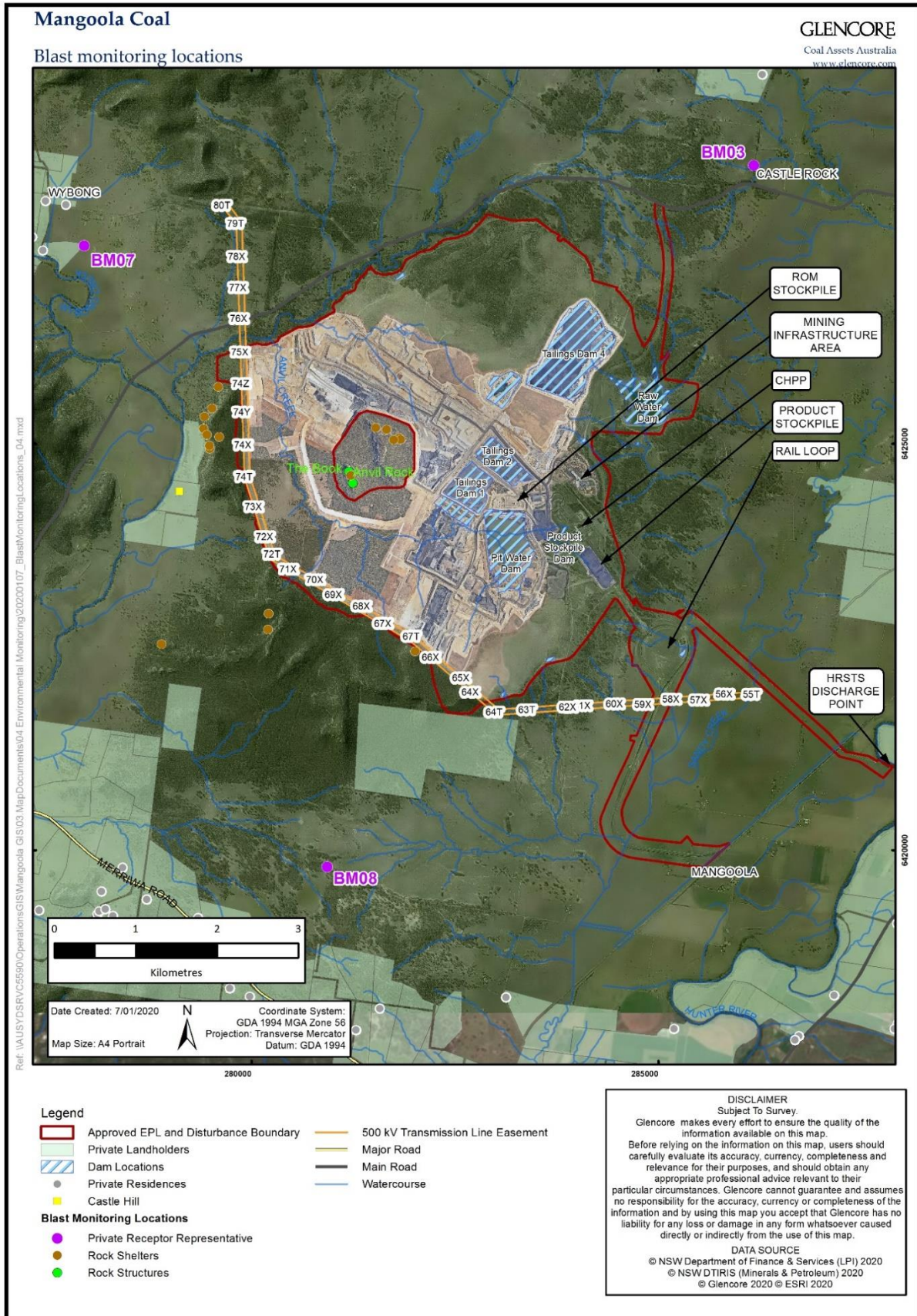


Figure 4.1

**Table 4.1 – Compliance Monitoring Location Summary**

Monitoring Location Requirement	Monitoring Site Name (refer to Figure 4.1)	Monitor I.D.	Airblast Overpressure Limit	Ground Vibration Limit	Comments
<b>PA<sup>1</sup>:</b> Nearest residence on privately owned land  <b>EPL<sup>2</sup>:</b> At monitoring points 16, 21 and 32	Private Property NW	BM07	115 dB (Lin Peak)  (allowable exceedance of 5% over 12 months)  and	5 mm/s (PPV) (allowable exceedance of 5% over 12 months)  and  10 mm/s (PPV)	Blast monitoring is conducted at the nearest residence on privately owned land to the blast zone. Locations may change over the life of the mine as properties are acquired and the mining progresses. Criteria applies to the nearest privately owned residence (as per <b>Table 1.2</b> definition).  The EPL requires blast monitoring at monitoring points 16, 21 and 32 as per Condition M7.1. BM03 represents Point 16, BM07 represents Point 21 and BM08 represents Point 32.
	Church NE	BM03	120 dB (Lin Peak)		
	Private Property South	BM08			
<b>PA<sup>1</sup>:</b> 500 kV Transmission Line	Pylon 64X through to Pylon 75X		N/A (not measured)	60 mm/s* for tension towers    125 mm/s* for suspension towers	Blast monitoring is conducted at the closest pylon of the 500kV transmission line when the predicted PPV exceeds 60 mm/s (for suspension towers) or 30 mm/s (for tension towers). Monitoring requirements and limits apply as per agreement with the infrastructure owner (TransGrid).
<b>PA<sup>1</sup>:</b> Rock Formations	Anvil Rock  The Book  Rockshelter sites		N/A (not measured)	Safe blasting limit as determined by specialist analysis	Representative blast monitoring of Anvil Rock to inform vibration monitoring.  The closest rock formation is monitored for every blast if not Anvil Rock.  NOTES:  1. If there are safety concerns or technological limitations for rock formation monitoring, advice will be sought from a suitably qualified specialist to determine the best location for monitoring to provide a representative result at the location.  2. Monitoring equipment and an access ladders have been placed on Anvil Rock and the adjacent ridgeline to enable safe access and further gather data as per specialist's recommendations. This monitoring equipment will remain in place up until blasting within the approved mine has been completed.  3. For Anvil Rock the monitoring equipment will be removed following the completion of blasting in the approved mine or when the rock formation is no longer the nearest site to any blasting. Locally sourced material along with cement may be used to fill any anchor holes (size approx. 2cm diameter) should these have been required to install any monitoring or access equipment.
Notes:  <sup>1</sup> PA: A requirement of Mangoola Coal's Project Approval 06_0014 (Schedule 3, Condition 10).  <sup>2</sup> EPL: A requirement of Mangoola Coal's Environment Protection Licence 12894 as per condition L4.1, L4.2, L4.3 and L4.4, M7.1 and P1.4.  * As per TransGrid Agreement, refer to <b>Appendix A</b> .					

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## 4.2.1 Meteorological Monitoring

Prior to blasting, a review of weather conditions to identify potential conditions that may significantly increase blasting impacts is undertaken by the Blast Controller in accordance with the Mangoola Coal pre-blast environmental assessment process. When pre-blast weather conditions are unsuitable, the Mine Manager, or delegate, will make the decision whether to proceed with the blasting event.

The meteorological station (North) will be operated for the life of mining activities in accordance with Schedule 3, Condition 24 of the Project Approval. Both meteorological station (North) and meteorological station (South) will be operated in accordance with Condition P1.1 and Condition M4.1 of EPL 12894.

The meteorological stations consist of instruments and a data-logging system attached to a 10 metre mast. Logged meteorological parameters include:

- wind speed at 10m above ground;
- wind direction at 10m above ground;
- sigma-theta from sampled wind direction measurements;
- temperature at 2m and 10m above ground;
- solar radiation; and
- rainfall.

## 4.3 Rock Structure and Rock Shelter Monitoring Program

Rock structure and rock shelter monitoring will be completed to satisfy Schedule 3, Condition 15(b) of PA 06\_0014 requiring Mangoola Coal to “ensure that blasting does not damage rock shelter sites, Anvil Rock and “The Book” rock formations”.

In addition to the blast monitoring identified in **Table 1**, structural condition monitoring of the rock structures and shelters will be completed on a six-monthly basis by a suitably qualified person to monitor for any “damage” of the rock structure and shelters caused by Mangoola Coal blasting operations. Mangoola Coal also engages a suitably qualified specialist to review the safe blast vibration limit for rock formations annually.

The monitoring methodology involves measuring from fixed monitoring points within the shelter or structure (except where fixed points cannot be attached safely or without causing damage) with digital tape extensometers to measure any movement of the rock mass during the monitoring period. As a result of monitoring being completed since 2008, a robust set of baseline data is available to allow interpretation of any associated changes. Any damage deemed to be caused by Mangoola Coal blasting operations as described above will be reported to DP&E as per **Section 5.5** of this BMP.

## 4.4 Blast Impact Evaluation

### 4.4.1 Property Inspections

As per Schedule 3, Condition 13 of PA 06\_0014, the following measures must be undertaken by Mangoola Coal within two months of receiving a written request for a structural property inspection from a landowner located within two kilometres of the site and/or prior to blasting within two kilometres of the property:

- a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:
  - establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report;
    - identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
  - b) give the landowner a copy of the property inspection report.

If any landowners claim that their property may have been damaged as a result of blasting at Mangoola Coal, the investigation process will be triggered as per Schedule 3, Condition 14 of PA 06\_0014, which requires the following actions to be undertaken within two months of receiving this request:

- commissioning of a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and
- give the landowner a copy of the property investigation report.

If the landowner claim is validated by the investigation, and both Mangoola Coal and the landowner agree, then Mangoola Coal will repair the damages to the satisfaction of the Secretary.

If there is a dispute over the selection of the suitably qualified, experience and independent person, or Mangoola Coal or the landowner disagrees with the findings of the investigation, then either party may refer the matter to the Secretary for resolution.

## 4.4.2 Privately Owned Residences

If Mangoola Coal is unsuccessful in acquiring properties in the acquisition zone for blasting impacts, Mangoola Coal will liaise with the landowner to develop controls to ensure the safety of people and livestock and prevent structural damage as a result of Mangoola Coal's blasting activities.

To monitor compliance with the criteria provided in **Table 2.1**, blast monitoring (refer to **Section 4.2**) will be undertaken at the nearest privately owned residence as shown in **Figure 4.1**.

### 4.4.3 500 kV Transmission Line

**Figure 4.1** shows the TransGrid 500 kV electricity transmission line easement (western and southern sides of the approved disturbance boundary).

On the 22<sup>nd</sup> September 2015, DP&E was notified that the TransGrid 500 kV transmission line should be limited to 60 mm/s for the tension pylons and 125 mm/s for the suspension pylons following studies conducted and a letter of approval from TransGrid dated 7<sup>th</sup> September 2015 (refer to **Appendix A**). Any changes to these limits will be agreed upon with the infrastructure owner and a copy of this revised agreement submitted to the DP&E for approval.

The agreement states that flyrock from blasting operation shall not approach within 60m of the line and any damage to the conductors, insulators, tower structures or line hardware due to the impact of flyrock shall be borne by Mangoola Coal. Excessive quantities of dust in the vicinity of the transmission lines will be avoided to minimise potential damage to insulators.

Mangoola Coal has developed a site procedure to describe the controls to be implemented for the management of blasting activities at Mangoola Coal when blasting adjacent to the 500 kV transmission line. The Mangoola Coal Blast Monitoring Procedure for TransGrid Powerlines was developed to the satisfaction of TransGrid on 9<sup>th</sup> November 2015. This procedure details the notification, monitoring and other processes which are implemented in order to comply with the agreement with TransGrid and described in **Table 2.1**.

### 4.4.4 Rock Formations and Aboriginal Rock Shelters

A number of Aboriginal rock shelters and two rock formations of European heritage significance (referred to as Anvil Rock and 'The Book' rock formation) are located within the Project Area.

As per **Section 4.2** and the approved Conservation Management Strategy, Mangoola Coal undertakes representative monitoring of Anvil Hill to inform ground vibration impacts to the structures. Mangoola Coal also monitors the closest rock shelter or formation for every blast if not Anvil Rock.

In addition, Mangoola Coal operates a number of blast monitors at identified rock formations and rock shelters to review blast performance relative to modelled predictions and enable a continual improvement process to be implemented.

Mangoola Coal engages a suitably qualified specialist to review the safe blast vibration limit for rock formations annually. The review is based on analysis of blast monitoring and 6 monthly structural integrity monitoring of each rock formation. Based on the strength of Sydney and Hawkesbury Sandstone from the Bertuzzi and Pells study, a non-damaging limit of 200 mm/s is still applicable for the Mangoola formations. Maintaining the nominal Safety Factor of 4 from the non-damaging limit provides a safe PPV limit from blasting of 50 mm/s (Terrock, 2018).

### 4.4.5 Heritage Structures

As per Section 3.4 of the approved Conservation Management Strategy, Mangoola Coal undertakes representative monitoring of the Castle Hill site to inform ground vibration impacts to the heritage structure.

## 5 Reporting and Review

### 5.1 Reporting

Reporting conditions for the Mangoola Coal BMP are summarised in **Table 5.1** below.

**Table 5.1 - Reporting Conditions**

Condition	Requirement	Frequency
Project Approval Schedule 5 Condition 6	<p>A comprehensive review of blast monitoring results for the corresponding year will be included within Annual Review.</p> <p>This includes an assessment of the blast monitoring results against the blast impact assessment criteria, trends from previous years, EA predictions, complaints relating to blasting activities and response actions taken.</p> <p>Any new management measures that are implemented as a result of ongoing blast monitoring will also be included in the Annual Review.</p>	Annually
Project Approval Schedule 5 Condition 11	A summary of blast monitoring results to be made publicly available on the Mangoola Coal website.	Quarterly
NSW Guidelines for establishing a CCC	A summary of environmental monitoring results will be presented at the Mangoola Coal CCC meetings.	Quarterly
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.	Incidents causing or threatening to result in material environmental harm
EPL R1, R4.1	<p>A summary of blast monitoring points results and complaints for the previous reporting period to be provided within the Annual Return.</p> <p>A summary blast monitoring report for the previous reporting period is to be attached to the Annual Return. This will include, date, time, location of all blast events, monitoring results at each monitor for each event, and an explanation of any missing blast monitoring results.</p>	Annually
EPL – Section 66(6) POEO Act	A summary of monitoring data to be made publically available on the Mangoola Coal website.	Within 14 days of acquiring previous month's data

### 5.2 Blasting Notifications

In accordance with Schedule 3, Condition 15(c) of PA 06\_0014, Mangoola Coal has established a hotline for landowners and the general public to contact in regards to the blasting schedule. This hotline is referred to as the Community Response Line and Blasting Hotline (1800 014 339). This hotline is advertised in the local newspaper at least four times per year. In addition, Mangoola Coal

has an established register for local landowners/occupiers to whom notification of scheduled blasts is provided.

Surrounding mine operations will be notified by Mangoola Coal prior to scheduled blasts in order to reduce potential for undertaking blasting events simultaneously. Mangoola Coal also receives notification from neighbouring mine operations.

## 5.3 Complaint Response

Mangoola Coal will maintain a centralised location to record details of relevant external stakeholder communications. A Community Response Line (1800 014 339) will be in operation 24 hours per day, seven days a week and will be regularly advertised in a local newspaper as well as on the Mangoola Coal website. Complaints will be recorded and investigated. Follow up communication with the complainant will be undertaken if requested, to explain the outcome of complaint investigations. A monthly summary of complaints will be uploaded to the website as per Schedule 5, Condition 11 of PA 06\_0014.

## 5.4 Independent Review

If a landowner considers the operation to be in exceedance of the impact assessment criteria, they may request an independent review of the effects of the operation on their land. Such a request must be made in writing to the Secretary of DP&E. If the Secretary determines that an independent review is to be undertaken, Mangoola Coal must follow the procedures outlined in Conditions 4 to 11 of Schedule 4 of PA 06\_0014.

## 5.5 Incident and Exceedance Reporting

In accordance with Schedule 5, Condition 2 of PA 06\_0014, Mangoola Coal must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures outlined in Schedule 3 of PA 06\_0014. If blast monitoring results identify an exceedance of the impact assessment criteria, or, on identifying an incident relating to the escape of flyrock or blast fume onto privately owned property, Mangoola Coal will notify the DP&E and EPA immediately in accordance with PA 06\_0014 and EPL 12894. Affected landowners will be notified as soon as practicable.

Written details of the exceedance or incident will be provided to DP&E in accordance with Schedule 5, Condition 4 of PA 06\_0014.

In addition to the reporting required by PA 06\_0014, if a pollution incident occurs so that material harm to the environment is caused or threatened within the meaning of Part 5.7 of the POEO Act, Mangoola Coal's Pollution Incident Response Management Plan (PIRMP) will be immediately implemented. All incidents with the potential to cause material harm will be reported immediately to the relevant authorities and parties as described in the PIRMP.

## 5.6 Corrective Action

**Table 5.2** summarises the potential blasting related issues that may arise and the appropriate corrective action to be taken.

**Table 5.2 - Corrective Actions**

Problem	Corrective Action
Single exceedance of environment protection licence conditions for airblast overpressure or ground vibration criteria (e.g. 120 dBL and 10 mm/s respectively)	Investigation of exceedance, including the identification and implementation of measures for future blasting where applicable. If validated blast monitoring results identify an exceedance of the impact assessment criteria report exceedance to the EPA and DP&E (refer to <b>Section 5.5</b> ) as required.
Exceedance of 5 per cent per annum criteria for overpressure or ground vibration (e.g. 115 dBL and 5mm/s respectively)	Investigation of exceedance, including the identification and implementation of measures for future blasting where applicable. Report exceedance to EPA and DP&E (refer to <b>Section 5.5</b> ).
Community complaints	Investigation of complaint, including the identification and implementation of measures for future blasting where applicable and provision of feedback to complainant. Monitoring at the complainants residence is to be undertaken where appropriate and considered necessary by Mangoola Coal.
Private property damage as a result of blasting operations	Investigation of issue in accordance with PA 06_0014 and initiation of property investigations measures detailed in Schedule 3, Conditions 13 and 14 of PA 06_0014 where appropriate.
Incident resulting in environmental harm	Reporting, investigation and corrective actions to be implemented in accordance with the Mangoola PIRMP.
Blast results within the 5% allowable exceedance criteria.	Blast design and monitoring results will be reviewed internally with any improvements actioned as required.
Exceedance of limits on TransGrid transmission line pylons.	In liaison with TransGrid or relevant structural specialist, cease blasting events, complete investigation of exceedance and develop mitigation or corrective measures. Report exceedance to DP&E (as per <b>Section 5.5</b> ) as required. Recommencement of blasting under direction of TransGrid, structural specialist and / or government department, as applicable.
Damage recorded on rock formations or Aboriginal rock shelters.	Complete investigation of cause of damage and, if mining related, develop mitigation or corrective measures. Provide report to DP&E (as per <b>Section 5.5</b> ).

## 5.7 Records

In accordance with Condition M1.2 of EPL 12894, monitoring records will be maintained on site for at least four years.

## 5.8 Review

In accordance with Schedule 5, Condition 9 of PA 06\_0014 Mangoola Coal will review and where necessary revise the BMP within three months of the submission of an audit, Annual Review, an incident report, or any modification to the conditions of the Project Approval. The BMP will further be subject to a 3 year periodic review. The review of the BMP will reflect changes in environmental requirements, technology and operational procedures. In addition, the document review table is to be completed as part of each review (refer to cover page).

## 6 References

- Australian Explosives Industry and Safety Group Inc. (AEISG) Code of Practice - Prevention and Management of Blast Generated NOx Gases in Surface Blasting, Edition 2, August 2011.
- Australian and New Zealand Environment and Conservation Council (ANZECC) (1990). Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration. ANZECC, Canberra.
- B. Fraser, 10<sup>th</sup> December 2010, Mangoola Mine Blast Vibration Limits – TransGrid 5A3/5A4 500kV Transmission Line. TransGrid – Letter.
- Environmental Planning and Assessment Act 1979 (No 203) (EP&A Act) (NSW).
- Environmental Planning and Assessment Amendment Regulation 2010 (NSW).
- EMGA Mitchell McLennan (2013). *Mangoola Coal Modification 6 Environmental Assessment*. Report prepared for Xstrata Mangoola Pty Limited.
- Mangoola Open Cut Pty Limited as updated from time to time:
  - i. Blast Fume Management Procedure
  - ii. Blast Monitoring Procedure for TransGrid Powerlines.
  - iii. Pre-Blast Environmental Assessment Procedure.
  - iv. Mangoola Mining Procedure - Closing Public Roads.
- Moore, A.J. and Howarth, P. (2013). *Xstrata Mangoola Coal – NSW: Baseline Measurement of Aboriginal and European Cultural Heritage Sites 2008 – 2012*. Terrock Consulting Engineers, Eltham Victoria.
- Moore, A.J. and Richards, J. (2018). *Glencore Mangoola Coal: Review of Blast Vibration Limit for Mangoola Heritage Rock formations 2017*. Terrock Consulting Engineers, Eltham Victoria.
- NSW Department of Environment and Conservation (2007). *Approved methods for the sampling and analysis of air pollutants in NSW*. Department of Environment and Conservation, Sydney.
- Standards Australia (2006). Explosives – Storage and Use – Use of Explosives. (AS 2187.2:2006).
- Letter (2012): Blast Fume Management Strategy. Department of Planning and Infrastructure. Chris Wilson and Scott Brooks.

## **Appendix A - Authority Correspondence**

To be added on approval



ABN 19 622 755 774  
180 Thomas Street, Sydney  
PO Box A1000 Sydney South  
NSW 1235 Australia  
T (02) 9284 3000  
F (02) 9284 3456

7/09/2015

**Technical Service Manager**

Mangoola Coal Operations Pty Ltd  
PO Box 495  
MUSWELLBROOK NSW 2333

Attention: Mr. M Williams

Dear Mark

**Mangoola Mine**

**BLAST VIBRATION LIMITS – TRANSGRID 5A3/5A4 500kV TRANSMISSION LINE**

We refer to your recent correspondence requesting approval to increase the limits for blasting in the vicinity of TransGrid 5A3/5A4 500kV Transmission Line.

TransGrid will not object to an increase in the limits for the blasting, provided Mangoola Mines executes and returns the acknowledgement (attached) reflecting its intention to adhere to the following requirements:

**1. Design Limits – peak particle velocity (ppv)**

Mangoola Coal shall design its blasting operations such that:

- 1.1 The ppv for the suspension towers will not exceed 125mm/sec (Note 1).
- 1.2 The ppv for the tension towers will not exceed 60mm/sec (Note 2).
- 1.3 Fly-rock is not to approach within 60m of the line.
- 1.4 Generation of excessive dust in the vicinity of the transmission line shall be avoided.

**2. Non-Destructive Tests (NDT)**

Mangoola Coal shall undertake, at its own cost, a non-destructive testing programme and methodology agreed by TransGrid of the tower footings that will be affected by the blasting, as follows:

- 2.1 Prior to the commencement of the blasting operations that will affect the towers, NDT "baseline measurements" shall be obtained for each affected tower.
- 2.2 During the mine's blasting operations, any tower subject to a ppv in excess of the above limits (refer to items 1.1 and 1.2) shall have additional NDT performed.
- 2.3 At the conclusion of the mine's operations in the vicinity of the Transmission Line, NDT on all affected towers shall be performed.

The NDT, and analysis of the results, shall be undertaken by an independent third party consultant engaged by Mangoola Coal, and agreed to by TransGrid.

**3. Monitoring Programme**

Mangoola Coal shall undertake, at its own cost, a monitoring programme, agreed to by TransGrid, as follows:

- 3.1 All towers that will be affected during the blasting operations shall be monitored during the blasting.
- 3.2 Prior to the commencement of blasting, an email shall be sent to TransGrid detailing the predicted ppv of the blasting on each of the TransGrid towers being monitored.
- 3.3 Subsequent to each blasting operation, the ppv measurements for each monitored tower shall be forwarded by email to TransGrid, highlighting any exceedances of the predicted ppv and or limits.
- 3.4 If the ppv measured exceeds the limits specified above (refer to 1.1 and 1.2), the blasting operations shall cease until TransGrid is consulted and agrees to the recommencement of blasting operations.

The monitoring and analysis of the ppv results shall be undertaken using methodology agreed to by TransGrid.

**4. Remedial Costs**

Mangoola Coal shall agree to meet the full costs of rectifying any damage to TransGrid assets as follows:

- 4.1 Any footing found to be damaged by the blasting as determined by the non-destructive tests.
- 4.2 Damage to the conductors, insulators, tower structures, or line hardware due to the impact of fly rock.
- 4.3 Damage and/or upgrading of insulation levels due to excessive dust generation.

**5. General Conditions for Working in the Vicinity of TransGrid Assets**

Work associated with the mine's operation within 60 metres of the transmission line shall be undertaken in accordance with "WorkCover NSW Guidelines – Work Near Overhead Power lines Code of Practice". This Code requires approved work practices as well as prior consultation with TransGrid.

**Notes**

**Note 1** – Based on work undertaken by Terrock Consulting Engineers and testing carried out by Mangoola Coal.

**Note 2** – TransGrid imposes a lower ppv limit for tension towers than suspension towers. The lower limit for tension towers relates not only to their criticality in the overall line design, but more importantly to the difficulties in rectifying any footing damage due to the significant permanent loads acting on these structures.

TransGrid has considered increasing the permitted (ppv) blasting limit only for TL5A3/5A4 line based on the recent testing and inspection of tower footings on TL5A3/5A4, where ppv levels were recorded at the tower footings of up to 117mm/sec. There is no evidence (through measurement) that footing have safely endured ppv levels greater than this.

In relation to the option of further increasing the permitted blasting limits in the future, it is advised that TransGrid would only consider requests on a case by case basis, to be determined by site specific conditions and supported by extensive testing and investigations as was the case in this instance. TransGrid must be satisfied the proposed increase will not pose potential risks to TransGrid's infrastructure.

If you have any further questions regarding this matter, please do not hesitate to contact Jennifer Sai on (02) 9284 3523.

Yours sincerely



Warren Barat  
Manager Customer Engagement




Please sign and return this page only to TransGrid  
(c/o Jennifer Sai at PO Box A1000 Sydney South NSW 1235)


Mangoola Coal Operations Pty Ltd acknowledges TransGrid's conditional approval for the increase the limits for blasting in the vicinity of TransGrid 5A3/5A4 500kV Transmission Line as expressed in TransGrid's letter to Mangoola Coal Operations Pty Ltd dated 3 September 2015 ("increased blasting limit conditions").

Mangoola Coal Operations Pty Ltd undertakes to adhere to the increased blasting limit conditions and agrees TransGrid may, if Mangoola Coal Operations Pty Ltd departs from the increased blasting limit conditions:

1. Withdraw its approval; and
2. Seek recovery of costs for damages.

Executed by Mangoola Coal Operations Pty Limited by its authorised representative:

  
\_\_\_\_\_  
Signature of witness  
  
MARK WILLIAMS  
\_\_\_\_\_  
Print name  
  
17/11/15.  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Signature of authorised representative  
  
Tony Israel  
\_\_\_\_\_  
Print name  
  
17. 11. 15.  
\_\_\_\_\_  
Date

## Appendix B - Approvals Summary

**Table B-1 – Project Approval Conditions**

Condition No.	Condition	Section of Document																			
<b>Schedule 2, Condition 4</b>	<p>The Proponent must comply with any reasonable requirement/s of the Secretary arising from the Department’s assessment of:</p> <ul style="list-style-type: none"> <li>a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with this approval;</li> <li>b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence; and</li> <li>c) the implementation of any actions or measures contained in these documents.</li> </ul>	<b>Entire Document</b>																			
<b>Schedule 3, Condition 10</b>	<p><b>Airblast Overpressure Impact Assessment Criteria</b></p> <p>The Proponent must ensure that blasting onsite does not cause exceedances of the criteria in Table 4.</p> <p style="text-align: center;"><i>Table 4: Airblast overpressure impact assessment criteria</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><i>Location</i></th> <th style="text-align: center;"><i>Airblast overpressure (dB (Lin Peak))</i></th> <th style="text-align: center;"><i>Ground vibration (mm/s)</i></th> <th style="text-align: center;"><i>Allowable exceedance</i></th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">Residence on privately owned land</td> <td style="text-align: center;">120</td> <td style="text-align: center;">10</td> <td style="text-align: center;">0%</td> </tr> <tr> <td style="text-align: center;">115</td> <td style="text-align: center;">5</td> <td style="text-align: center;">5% of the total number of blasts over a period of 12 months</td> </tr> <tr> <td style="text-align: center;">500kV transmission line pylons – tension towers</td> <td></td> <td style="text-align: center;">50</td> <td style="text-align: center;">0%</td> </tr> <tr> <td style="text-align: center;">500kV transmission line pylons – suspension towers</td> <td></td> <td style="text-align: center;">100</td> <td style="text-align: center;">0%</td> </tr> </tbody> </table> <p>However, these criteria do not apply if the Proponent has a written agreement with the relevant owner to exceed these criteria, and has advised P&amp;I in writing of the terms of this agreement.</p>	<i>Location</i>	<i>Airblast overpressure (dB (Lin Peak))</i>	<i>Ground vibration (mm/s)</i>	<i>Allowable exceedance</i>	Residence on privately owned land	120	10	0%	115	5	5% of the total number of blasts over a period of 12 months	500kV transmission line pylons – tension towers		50	0%	500kV transmission line pylons – suspension towers		100	0%	<b>2</b>
<i>Location</i>	<i>Airblast overpressure (dB (Lin Peak))</i>	<i>Ground vibration (mm/s)</i>	<i>Allowable exceedance</i>																		
Residence on privately owned land	120	10	0%																		
	115	5	5% of the total number of blasts over a period of 12 months																		
500kV transmission line pylons – tension towers		50	0%																		
500kV transmission line pylons – suspension towers		100	0%																		
<b>Schedule 3, Condition 11</b>	<p><b>Blasting Hours</b></p> <p>The Proponent must only carry out blasting on site between 9am and 3pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of EPA.</p>	<b>1.2; 2</b>																			

Condition No.	Condition	Section of Document
<p><b>Schedule 3, Condition 12</b></p>	<p><b>Blasting Frequency</b></p> <p>The Proponent may carry out:</p> <ul style="list-style-type: none"> <li>d) a maximum of 2 blasts a day;</li> <li>e) 6 blasts a week, averaged over a calendar year on the site;</li> </ul> <p>This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, blasts misfires or blasts required to ensure the safety of the mine or its workers.</p> <p><i>Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.</i></p>	<p><b>1.2; 2</b></p>
<p><b>Schedule 3, Condition 13</b></p>	<p><b>Property Inspections</b></p> <p>If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Proponent must:</p> <ul style="list-style-type: none"> <li>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to: <ul style="list-style-type: none"> <li>• establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and</li> <li>• identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and</li> </ul> </li> <li>(b) give the landowner a copy of the new or updated property inspection report.</li> </ul> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.</p>	<p><b>4.4.1</b></p>

Condition No.	Condition	Section of Document
<p><b>Schedule 3, Condition 14</b></p>	<p><b>Property Investigations</b></p> <p>If the owner of any privately-owned land within 2km of the site (or on any other land where the Secretary agrees that a property investigation is warranted) claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent must:</p> <ul style="list-style-type: none"> <li>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and</li> <li>(b) give the landowner a copy of the property investigation report.</li> </ul> <p>If this independent property investigation confirms the landowner’s claim, and both parties agree with these findings, then the Proponent must repair the damage to the satisfaction of the Secretary.</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.</p>	<p><b>4.4.1</b></p>
<p><b>Schedule 3, Condition 15</b></p>	<p><b>Operating Conditions</b></p> <p>The Proponent must:</p> <ul style="list-style-type: none"> <li>(a) implement best practice to manage potential blasting impacts associated with the project to: <ul style="list-style-type: none"> <li>• protect the safety of people and livestock in the surrounding area;</li> <li>• protect public or private infrastructure/property in the surrounding area from any damage; and</li> <li>• minimise the dust and fume emissions of any blasting;</li> </ul> </li> <li>(b) ensure that blasting on the site does not damage Aboriginal rock shelter sites, Anvil Rock and “The Book” rock formations;</li> <li>(c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site, to the satisfaction of the Secretary.</li> </ul>	<p><b>a) 3; 4.4.3</b> <b>b) 4.4.4</b> <b>c) 5.2</b></p>
<p><b>Schedule 3, Condition 16</b></p>	<p>The Proponent must not undertake blasting on site within 500 metres of any public road or any land outside the site not owned by the Proponent unless the Proponent has:</p> <ul style="list-style-type: none"> <li>(a) demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and</li> <li>(b) updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the infrastructure or land; or</li> <li>(c) a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised P&amp;I in writing of the terms of this agreement.</li> </ul>	<p><b>3.2.2</b> <b>Appendix C</b></p>

Condition No.	Condition	Section of Document
<p><b>Schedule 3, Condition 17</b></p>	<p>The Proponent must prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <ul style="list-style-type: none"> <li>(a) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this approval;</li> <li>(b) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and</li> <li>(c) include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions of this approval.</li> </ul>	<p><b>3; 4.4.3; 4; 5.5</b></p>
<p><b>Schedule 3, Condition 24</b></p>	<p>During the life of the project, the Proponent must ensure that there is a suitable meteorological station in the vicinity of the site that:</p> <ul style="list-style-type: none"> <li>(a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and</li> <li>(b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Secretary following consultation with the EPA.</li> </ul>	<p><b>4.2.2</b></p>
<p><b>Schedule 3, Condition 43</b></p>	<p>The Proponent must prepare and implement a detailed Conservation Management Strategy for all heritage items within the blast affectation area to the satisfaction of the Secretary. This strategy must:</p> <ul style="list-style-type: none"> <li>(a) be prepared in consultation with the relevant landowners and the NSW Heritage Office;</li> <li>(b) be submitted to the Secretary for approval prior to starting mining operations on site; and</li> <li>(c) include a: <ul style="list-style-type: none"> <li>• program for baseline dilapidation surveys of the heritage items;</li> <li>• program to monitor the effects of blasting on the heritage items; and</li> <li>• description of the measures that would be implemented to protect relevant heritage items (particularly Castle Hill) from the effects of blasting; and</li> <li>• description of the measures that would be implemented to protect Anvil Rock and 'The Book' rock formations from the effects of blasting.</li> </ul> </li> </ul> <p><i>Note: For the purposes of these conditions the blast affectation area includes all properties predicted to exceed the 5mm/sec ground vibration criteria.</i></p>	<p><b>Conservation Management Strategy</b></p>
<p><b>Schedule 4 Condition 3</b></p>	<p>As soon as practicable after obtaining monitoring results showing:</p> <ul style="list-style-type: none"> <li>(a) an exceedance of any relevant criteria in schedule 3, the Proponent must notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria.</li> </ul>	<p><b>5.5</b></p>

Condition No.	Condition	Section of Document
<p><b>Schedule 4</b> <b>Condition 4</b></p>	<p><b>Independent Review</b></p> <p>If a landowner considers the project to be exceeding the impact assessment criteria in schedule 3, except where this is predicted in the EA, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.</p> <p>If the Secretary is satisfied that an independent review is warranted, the Proponent must within 3 months of the Secretary advising that an independent review is warranted:</p> <ul style="list-style-type: none"> <li>(a) consult with the landowner to determine his/her concerns;</li> <li>(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to determine whether the project is complying with the relevant impact assessment criteria in schedule 3, and identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and</li> <li>(c) give the Secretary and landowner a copy of the independent review.</li> </ul>	<p><b>5.4</b></p>
<p><b>Schedule 4</b> <b>Condition 5</b></p>	<p>If the independent review determines that the project is complying with the relevant impact assessment criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.</p>	<p><b>5.4</b></p>
<p><b>Schedule 4</b> <b>Condition 6</b></p>	<p>If the independent review determines that the project is not complying with the relevant impact assessment criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent must:</p> <ul style="list-style-type: none"> <li>(a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and</li> <li>(b) conduct further monitoring to determine whether these measures ensure compliance; or</li> <li>(c) secure a written agreement with the landowner to allow exceedances of the criteria in schedule 3, to the satisfaction of the Secretary.</li> </ul> <p>If the additional monitoring referred to above subsequently determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.</p> <p>If the Proponent is unable to finalise an agreement with the landowner, then the Proponent or landowner may refer the matter to the Secretary for resolution.</p> <p>If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (see Appendix 8).</p> <p>If the measures referred to in (a) do not achieve compliance with the air quality and/or noise land acquisition criteria in schedule 3, and the Proponent cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then the Proponent must, upon receiving a written request from the landowner, acquire all or part of the landowner's land in accordance with the procedures in conditions 10-12 below.</p>	<p><b>5.4</b></p>

Condition No.	Condition	Section of Document
<p><b>Schedule 4</b> <b>Condition 7</b></p>	<p>If the independent review determines that the relevant criteria in schedule 3 are being exceeded, but that more than one mine is responsible for this non-compliance, then the Proponent must, together with the relevant mine/s:</p> <ul style="list-style-type: none"> <li>(a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the relevant criteria are complied with; and</li> <li>(b) conduct further monitoring to determine whether these measures ensure compliance; or</li> <li>(c) secure a written agreement with the landowner and other relevant mines to allow exceedances of the criteria in schedule 3, to the satisfaction of the Secretary.</li> </ul> <p>If the additional monitoring referred to above subsequently determines that the projects are complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.</p> <p>If the Proponent is unable to finalise an agreement with the landowner and/or other mine/s, then the Proponent or landowner may refer the matter to the Secretary for resolution.</p> <p>If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (see Appendix 8).</p> <p>If the measures referred to in (a) do not achieve compliance with the air quality and/or noise land acquisition criteria in schedule 3, and the Proponent together with the relevant mine/s cannot secure a written agreement with the landowner to allow these exceedances within 3 months, then upon receiving a written request from the landowner, the Proponent must acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s, in accordance with the procedures in conditions 10-11 below.</p>	<p><b>5.4</b></p>
<p><b>Schedule 4</b> <b>Condition 8</b></p>	<p>If the landowner disputes the results of the independent review, either the Proponent or the landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process.</p>	<p><b>5.4</b></p>
<p><b>Schedule 4</b> <b>Condition 9</b></p>	<p>If, following the Independent Dispute Resolution Process, the Secretary decides that the Proponent must acquire all or part of the landowner's land, then the Proponent must acquire this land in accordance with the procedures in conditions 10-11 below.</p>	<p><b>5.4</b></p>
<p><b>Schedule 4</b> <b>Condition 10</b></p>	<p><b>Land Acquisition</b></p> <p>Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent must make a binding written offer to the landowner based on:</p> <ul style="list-style-type: none"> <li>(a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project the subject of the project application, having regard to the: <ul style="list-style-type: none"> <li>• existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and</li> <li>• presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the 'additional noise mitigation measures' in condition of schedule 3;</li> </ul> </li> </ul>	

Condition No.	Condition	Section of Document
<p><b>Schedule 4</b> <b>Condition 10</b> <b>(cont.)</b></p>	<p>(b) the reasonable costs associated with:</p> <ul style="list-style-type: none"> <li>• relocating within the Muswellbrook local government area, or to any other local government area determined by the Secretary;</li> <li>• obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and</li> </ul> <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>However, if at the end of this period, the Proponent and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution.</p> <p>Upon receiving such a request, the Secretary shall request the President of the NSW Division of the Australian Property Institute (API) to appoint a qualified independent valuer to:</p> <p>(a) consider submissions from both parties;</p> <p>(b) determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;</p> <p>(c) prepare a detailed report setting out the reasons for any determination; and</p> <p>(d) provide a copy of the report to both parties.</p> <p>Within 14 days of receiving the independent valuer's report, the Proponent must make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.</p> <p>However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Secretary shall determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report and the detailed report of the party that disputes the independent valuer's determination.</p> <p>Within 14 days of the Secretary's determination, the Proponent must make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination.</p> <p>If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Secretary determines otherwise.</p>	<p><b>5.4</b></p>
<p><b>Schedule 4</b> <b>Condition 11</b></p>	<p>The Proponent must pay all reasonable costs associated with the land acquisition process described in condition 10 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of Registrar-General.</p>	<p><b>5.4</b></p>

Condition No.	Condition	Section of Document
<p><b>Schedule 5</b> <b>Condition 2</b></p>	<p><b>Adaptive Management</b></p> <p>The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&amp;A Act or EP&amp;A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:</p> <p>(a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;</p> <p>(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to P&amp;I describing those options and any preferred remediation measures or other course of action; and</p> <p>(c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.</p>	<p><b>3; 4.4.3; 4.4.4; 5.5</b></p>
<p><b>Schedule 5</b> <b>Condition 3</b></p>	<p>The Proponent must ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</p> <p>(d) detailed baseline data (where available);</p> <p>(e) a description of:</p> <ul style="list-style-type: none"> <li>• the relevant statutory requirements (including any relevant approval, licence or lease conditions);</li> <li>• any relevant limits or performance measures/criteria;</li> <li>• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;</li> </ul> <p>(f) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p> <p>(g) a program to monitor and report on the:</p> <ul style="list-style-type: none"> <li>• impacts and environmental performance of the project;</li> <li>• effectiveness of any management measures (see c above);</li> </ul> <p>(h) a program to investigate and implement ways to improve the environmental performance of the project over time;</p> <p>(i) a protocol for managing and reporting any:</p> <ul style="list-style-type: none"> <li>• incidents;</li> <li>• complaints;</li> <li>• non-compliances with statutory requirements; and</li> <li>• exceedances of the impact assessment criteria and/or performance criteria; and</li> </ul> <p>a protocol for periodic review of the plan.</p>	<p><b>2; 3; 4; 5; Appendix C</b></p>

Table B-2 – EPL Conditions

Condition Number	Condition	Section of Document												
<p><b>P1.4</b></p>	<p>The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or setting of limits for the emission of noise from the point.</p> <p style="text-align: center;"><b>Noise</b></p> <table border="1" data-bbox="352 517 1273 1541"> <thead> <tr> <th data-bbox="352 517 564 595">EPA identification no.</th> <th data-bbox="564 517 831 595">Type of monitoring point</th> <th data-bbox="831 517 1273 595">Location Description</th> </tr> </thead> <tbody> <tr> <td data-bbox="352 595 564 898">16</td> <td data-bbox="564 595 831 898">Air blast overpressure &amp; ground vibration peak particle velocity monitoring</td> <td data-bbox="831 595 1273 898">Defined as "Monitoring Point 16 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986</td> </tr> <tr> <td data-bbox="352 898 564 1200">21</td> <td data-bbox="564 898 831 1200">Air blast overpressure &amp; ground vibration peak particle velocity monitoring</td> <td data-bbox="831 898 1273 1200">Defined as "Monitoring Point 21 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986</td> </tr> <tr> <td data-bbox="352 1200 564 1541">32</td> <td data-bbox="564 1200 831 1541">Air blast overpressure &amp; ground vibration peak particle velocity monitoring</td> <td data-bbox="831 1200 1273 1541">Defined as "Monitoring Point 32 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986</td> </tr> </tbody> </table>	EPA identification no.	Type of monitoring point	Location Description	16	Air blast overpressure & ground vibration peak particle velocity monitoring	Defined as "Monitoring Point 16 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986	21	Air blast overpressure & ground vibration peak particle velocity monitoring	Defined as "Monitoring Point 21 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986	32	Air blast overpressure & ground vibration peak particle velocity monitoring	Defined as "Monitoring Point 32 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986	<p><b>4.2</b></p>
EPA identification no.	Type of monitoring point	Location Description												
16	Air blast overpressure & ground vibration peak particle velocity monitoring	Defined as "Monitoring Point 16 in plan titled "Mangoola Coal EPL 12894 - HRSTS discharge point, air quality, blast, surface water and groundwater monitoring locations" dated 2/10/2018. EPA Reference Doc18/739986												
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<p><b>L4.1</b></p>	<p>The airblast overpressure level from blasting operations in or on the premises must not exceed: 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; at either monitoring point 16, 21 or 32 in Condition P1.4.</p>	<p><b>2; 4.2</b></p>												
<p><b>L4.2</b></p>	<p>The airblast overpressure level from blasting operations in or on the premises must not exceed: 120 dB (Lin Peak) at any time; at either monitoring point 16, 21 or 32 in Condition P1.4.</p>	<p><b>2; 4.2</b></p>												
<p><b>L4.3</b></p>	<p>The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: 5 mm/second for more than 5% of the total number of blasts during each reporting period; at either monitoring point 16, 21 or 32 in Condition P1.4.</p>	<p><b>2; 4.2</b></p>												

<b>L4.4</b>	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: 10 mm/second at any time; at either monitoring point 16, 21 or 32 in Condition P1.4.	<b>2; 4.2</b>
<b>L4.5</b>	Blasting in or on the premises must only be carried out between 09:00 hours and 17:00 hours, Monday to Saturday. Blasting in or on the premises must not take place on Sundays or Public Holidays without the prior approval of the EPA.	<b>2; 4.2</b>
<b>L4.6</b>	<p>Offensive blast fume must not be emitted from the premises.</p> <p>Definition:</p> <p><i>Offensive blast fume means post-blast gases from the detonation of explosives at the premises that by reason of their nature, duration, character or quality, or the time at which they are emitted, or any other circumstances:</i></p> <ol style="list-style-type: none"> <li>1. are harmful to (or likely to be harmful to) a person that is outside the premises from which it is emitted, or</li> <li>2. interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted.</li> </ol>	<b>3; 4.2 and Appendix D</b>
<b>M7.1</b>	<p>To determine compliance with conditions L4.1, L4.2, L4.3 and L4.4:</p> <ol style="list-style-type: none"> <li>a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring points 16, 21 or 32 for the parameters specified in Column 1 of the table below; and</li> <li>b) The licensee must use the units of measure, sampling method, and sample at the frequency specified opposite in the other columns.</li> </ol>	<b>4.1; 4.2</b>
<b>R2.2</b>	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.	<b>5.1</b>
<b>R4.1</b>	<p><b>Reporting of Blast Monitoring</b></p> <p>The licensee must supply, with each Annual Return, a Blast Monitoring Report which must include the following information relating to each blast carried out within the premises during the reporting period covered by the Annual Return:</p> <ol style="list-style-type: none"> <li>a) the date and time of the blast;</li> <li>b) the location of the blast on the premises;</li> <li>c) the blast monitoring results at each blast monitoring station; and</li> <li>d) an explanation for any missing blast monitoring results.</li> </ol>	<b>5.1</b>
<b>R4.2</b>	<p><b>Reporting exceedance of blasting limits</b></p> <p>The licensee must report any exceedance of the licence blasting limits to the Environment Line on 131 555 as soon as practicable after the exceedance becomes known to the licensee or to one of the licensee's employees or agents.</p>	<b>5.5</b>

## Appendix C - Mangoola Mining Procedure- Closing Public Roads Approval

Procedure available on company website.



Tue 18/10/2016 11:56 AM

Imelda Williams <Imelda.Williams@muswellbrook.nsw.gov.au>

RE: Revised Mangoola Mining Procedure for Closing Public Roads

To Piggford, Chloe (Mangoola - AU)

Cc Lane, Nathan (Mangoola - AU)

Hello Chloe,

I refer to your recent request for the approval of the revised Mangoola Mining Procedure-Closing Public Roads. Your request was reported to the September meeting of the Local Traffic Committee Meeting with the following recommendation approved at the October 2016 Ordinary Meeting of Council:

*RECOMMENDED that Council use its delegated authority to approve the temporary closure of Wybong Road for blasting purposes in accordance with the document "Mangoola Mining Procedure- Closing Public Roads " (Man Min Pro 0047)*

Any new signage to be installed in the road reserve must be undertaken under S138 of the Roads Act approval. I have attached the link to Council's website for the S.138 permit as required.

<https://muswellbrook.nsw.gov.au/index.php/permits/s138-permits>

Should you require any further clarification then please phone to discuss.

Kind regards

**Imelda Williams**  
Technical Officer  
Traffic & Road Status  
Direct: 02 6549 3782  
Fax: 02 6549 3701  
[www.muswellbrook.nsw.gov.au](http://www.muswellbrook.nsw.gov.au)



Please consider the environment before printing this email.

## Appendix D - Blast Fume Management Procedure

The Blast Fume Management Procedure is published on the Mangoola Coal website - <https://www.mangoolamine.com.au/en/publications/Pages/management-plans.aspx>