# BLAST MANAGEMENT PLAN

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# 1.0 INTRODUCTION

Maules Creek Coal Pty Ltd (MCC) is required to prepare a Blast Management Plan (BLMP) for the Maules Creek Coal Mine (MCCM) in accordance with Project Approval (PA) 10_0138 Condition 25. The MCC project involves the development of a 21 year open cut coal mining operation and associated infrastructure.

## 1.1 Background

The ownership of the Project currently lies with the Maules Creek Coal Joint Venture (MCCJV), which is 75% owned by Aston Coal 2 Pty Limited (a company 100% owned by Whitehaven Coal), 15% owned by Itochu Coal Resources Australia Maules Creek Pty Ltd (ICRA MC) and 10% owned by J-Power Australia (J-Power).

The Project is an open-cut coal mine located on the northwest slopes and plains of NSW in the Gunnedah Coal basin.

Land-use in the local area is dominated by agricultural operations and open cut mining, with rural residential holdings mainly located to the north and west of the Project. The Project boundary is situated on land largely occupied by the Leard State Forest (which has historically been predominantly utilised for forestry, recreation and more recently mining related activities). Various coal mines exist within close proximity to the Project including Boggabri Coal Mine, Tarrawonga Coal Mine and Goonbri Exploration Lease located to the southeast of the Project boundary.

There are several isolated rural residences associated with the surrounding farms within the vicinity of the Project, as well as the Fairfax Public School located in the Maules Creek Village. The surrounding terrain is gently undulating in the north, with steeper slopes emerging near ridgelines towards the central portion of the project. Much of the higher ground and steeper slopes retain moderately dense woodland cover, which forms part of the National Parks and State Forests occurring within the region.

## 1.2 Project Description

MCC submitted a Project Application to the NSW Department of Planning and Environment (DP&E) (formerly Department of Planning and Infrastructure (DP&I)) in August 2010 for a new Project Approval under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to enable the construction and operation of the MCCM. The application was supported by an Environmental Assessment (EA). Project Approval 10_0138 (PA 10_0138) was granted on 23 October 2012 by the Planning Assessment Commission under delegation of the then Minister for Planning and Infrastructure. The location of the MCCM project is presented in **Figure 1**.

The approval for the MCCM allows for the construction and operation of an open cut coal mine until 2034. In particular, the approvals allow for the following aspects and activities:

- Open cut mining operation extracting up to 13 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal to the Templemore Seam;
- Open cut mining fleet including excavator / shovels and fleet of haul trucks, dozers, graders and water carts utilising up to 470 permanent employees;
- Coal Handling and Preparation Plant (CHPP) with a throughput capacity of 13 Mtpa ROM coal;

- Tailings Drying Area;
- Rail spur, rail loop, associated load out facility and connection to the Werris Creek to Mungindi Railway Line;
- Water Management infrastructure including a water pipeline, pumping station and associated infrastructure for access to water from the Namoi River;
- Supporting power and communications infrastructure;
- Explosive magazine and storage areas;
- Mine Access Road; and
- Administration, workshop and related facilities.

## 1.3 Scope

This BLMP has been prepared in accordance with the requirements of PA 10_0138. The aim of this plan is to manage project specific and cumulative blast impacts associated with the operation of the MCCM. This BLMP is a requirement of Schedule 3, Condition 25 of PA 10_0138.

## 1.4 Objectives

The objectives of this BLMP are to:

- Ensure that operational blast ground vibration and overpressure from activities associated with the MCCM are minimised;
- Maintain compliance with those conditions of the Project Approval, Environment Protection Licence 20221 (EPL 20221) and relevant legislation relating to blasting;
- Provide a protocol for monitoring and evaluation of blast impacts on surrounding private residences and sensitive receivers;
- Manage MCCM specific and cumulative blast impacts associated with the mining operations; and
- Effectively communicate with the local community and regulators regarding blasting related activities to ensure that they are kept informed of these activities.

Approval requirements relating to the MCCM's blasting activities are addressed in **Section 2.0**.

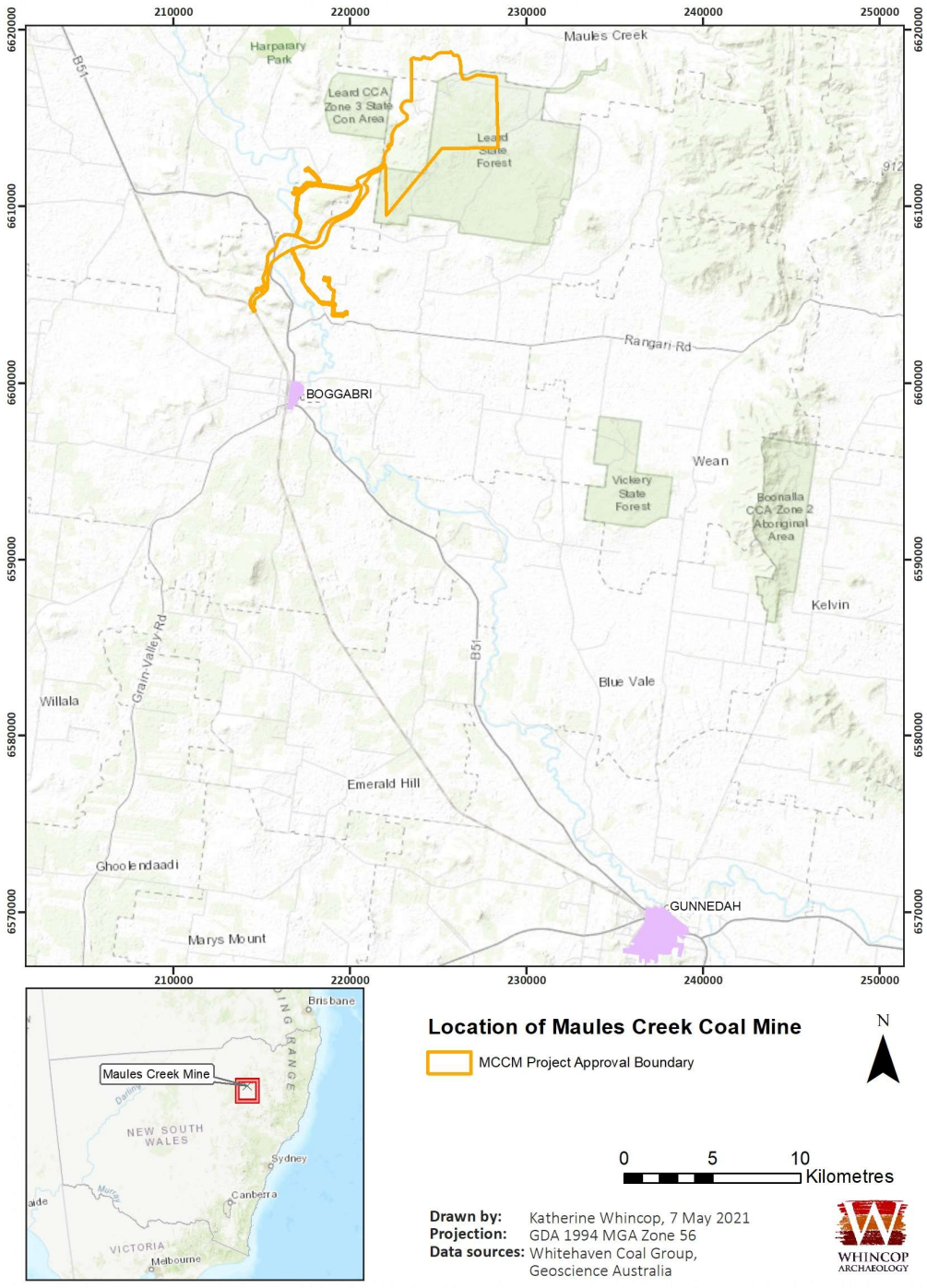


**Figure 1 Project Locality Plan**

# 2.0 STATUTORY REQUIREMENTS AND COMMITMENTS

This BLMP has been prepared to fulfil the requirements of relevant legislation, approval conditions, EPL conditions, EA commitments, relevant standards and guidelines.

## 2.1 Relevant Legislation

The *Protection of the Environment Operations Act 1997* (POEO Act) is the principal piece of legislation governing blast emissions in NSW. The POEO Act requires an EPL be held for mining operations such as the MCCM. Please refer to **Section 2.3**.

## 2.2 Project Approval Conditions

### 2.2.1 PA10_0138 – Blast Management Plan

This Blast Management Plan (BLMP) follows the management plan requirements specified in Schedule 3 Condition 25 of PA10_0138.

**Table 1 Blast Management Plan Requirements**

| Condition | Requirement | Where addressed |
|---|---|---|
| Sch 3, Cn 25 | *The proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This Plan must:* | This document |
| Sch 3, Cn 25 (a) | *be submitted to the secretary for approval prior to undertaking any blasting activities on the site;* | Section 0 |
| Sch 3, Cn 25 (b) | *be prepared in consultation with the EPA and interested members of the local community potentially affected by blasting operations;* | Section 4.3 |
| Sch 3, Cn 25 (c) | *propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site;* | Section **Error! Reference source not found.** |
| Sch 3, Cn 25 (d) | *describe the measures that would be implemented to ensure:* | Sections 3.0, 4.0, 6.0 |

| | | |
|---|---|---|
| | • *best management practice is being employed; and*<br>• *compliance with the relevant conditions of this approval* | |
| Sch 3, Cn 25 € | *include a road closure management plan for blasting within 500 metres of a public road, that has been prepared in consultation with Council;* | Section 5.4 |
| Sch 3, Cn 25 (f) | *include a specific blast fume management protocol to demonstrate how emissions will be minimised including risk management strategies if blast fumes are generated;* | Sections 3.4, 4.2 and 6.0 |
| Sch 3, Cn 25 (g) | *include a monitoring program for evaluating the performance of the project including:*<br>• *compliance with the applicable criteria; and*<br>• *minimising fume emissions from the site; and* | Section 4.0 |
| Sch 3, Cn 25 (h) | *include a Leard State Forest Mining Precinct Blast Management Strategy that has been prepared in consultation with the other mines within the Leard Forest Mining Precinct to minimise the cumulative blasting impacts of all the mines within the precinct* | Section 3.5 |

### 2.2.2 Blast Conditions

Schedule 3, Conditions 18 to 20 of PA 10_0138 provide the relevant blast criteria and other restrictions for the MCCM. The blast criteria are reproduced in **Table 2**

**Table 2 Blasting Criteria**

| Approval Condition | BLMP Reference |
|---|---|
| **Schedule 3** | |
| **Blasting** | |
| **Blasting Criteria** | |
| 18. The proponent shall ensure that the blasting on site does not cause exceedances of the criteria in Table 7. | Section 3.4.2 |

**Table 7: Blasting criteria**

| *Location* | *Airblast overpressure (dB (Lin Peak))* | *Ground Vibration (mm/s)* | *Allowable exceedance* |
|---|---|---|---|
| Residence on privately owned land | 120 | 10 | 0% |
| | 115 | 5 | 5% of the total number of blasts over a period of 12 months |
| All public infrastructure | - | 50 (or alternatively a specific limit determined to the satisfaction of the Planning Secretary by the structural design methodology in AS 2187.2-2006, or its latest version) | 0% |

However, these criteria do not apply if the Proponent has a written agreement with the relevant owner or infrastructure provider / owner, and the Proponent has advised the Department in writing of the terms of this agreement.

| | |
|---|---|
| **Blasting Hours** | |
| 19. The Proponent shall only carry out blasting on the site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Planning Secretary. | Section 3.2 |
| **Blasting Frequency** | |
| 20. The Proponent may carry out a maximum of:<br>(a) 1 blast a day; unless an additional blast is required following a blast misfire; and<br>(b) 4 blasts a week, averaged over a calendar year;<br>for the Project.<br>This condition does not apply to blasts that generate ground vibration of 0.5mm/s or less at any residence on privately-owned land, or to blasts required to ensure the safety of the mine or its workers.<br>*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.* | Section 3 0 |

### 2.2.3 Blast Control and Management

Schedule 3, Conditions 21 to 25 of PA 10_0138 describe the various blast management measures required; these are reproduced in **Table 3**

**Table 3 Blast Management Measures**

| Approval Condition | BLMP Reference |
|---|---|
| **Schedule 3** | |
| **Property Inspections** | |
| 21. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the 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 report updated, then within 2 months of receiving this request the Proponent shall:<br>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to;<br>• establish the baseline condition of any buildings and / or structures on the land, or update the previous property inspection report; and<br>• identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and / or structures; and<br>(b) give the landowner a copy of the new or updated property inspection report.<br>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution. | Section 6.3 |
| **Property investigations** | |
| 22. If the owner of any privately-owned land claims that the buildings and / or structures on his / her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim in writing from the landowner the Proponent shall:<br>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and<br>(b) give the landowner a copy of the property investigation report.<br>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Planning Secretary.<br>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution. | Section 6.3 |
| **Operating Conditions** | |
| 23. During mining operations on site, the Proponent shall:<br>(a) implement best management practice to:<br>• protect the safety of people and livestock in the surrounding area; | Section □ and 3.4.2 |

| Approval Condition | BLMP Reference |
|---|---|
| • protect public or private infrastructure/property in the surrounding area from any damage; and<br>• minimise the dust and fume emissions of any blasting; and<br>• minimise blasting impacts on heritage items in the vicinity of the site.<br>(b) coordinate the timing of blasting on site with the timing of blasting at other mines within the Leard Forest Mining Precinct to minimise the cumulative blasting impacts of these mines; and<br>(c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site,<br>to the satisfaction of the Planning Secretary. | |
| 24. The Proponent shall not undertake blasting on-site within 500 metres of:<br>(a) any public road without the approval of Council; or<br>(b) any land outside the site that is not owned by the Proponent, unless:<br>• the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement, or<br>• the Proponent has:<br>○ demonstrated to the satisfaction of the Planning Secretary that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and / or structures on the land; and<br>○ 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 land. | Section 4.3 |
| **Blast Management Plan** | |
| 25. The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Planning Secretary. This plan must:<br>(a) be submitted to the Planning Secretary for approval prior to undertaking any blasting activities on the site;<br>(b) be prepared in consultation with the EPA and interested members of the local community potentially affected by blasting operations;<br>(c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site;<br>(d) describe the measures that would be implemented to ensure<br>• best management practice is being employed; and<br>• compliance with the relevant conditions of this approval;<br>(e) include a road closure management plan for blasting within 500 meters of a public road, that has been prepared in consultation with Council;<br>(f) include a specific blast fume management protocol to demonstrate how emissions will be minimised including risk management strategies if blast fumes are generated;<br>(g) include a monitoring program for evaluating the performance of the project including:<br>• compliance with the applicable criteria; and | This document |

| Approval Condition | BLMP Reference |
|---|---|
| • minimising fume emissions from the site; and<br>*(h)* include a Leard Forest Mining Precinct Blast Management Strategy that has been prepared in consultation with the other mines within the Leard Forest Mining Precinct to minimise the cumulative blasting impacts of all the mines within the precinct.<br><br>*Note: The Leard Forest Mining Precinct Blast Management Strategy can be developed in stages and will need to be subject to ongoing review dependent upon the determination of and commencement of other mining projects in the area.* | See separate document "BTM Complex Blast Management Strategy" |

### 2.2.4 Statement of Commitments

Appendix 5 of PA 10_0138 provides a consolidated Statement of Commitments, which summarises the key management and mitigation measures for the MCCM. The commitment relevant to blasting is presented in **Table 4**

**Table 4 Statement of Commitments**

| PA 10_0138 Appendix 5 Statement of Commitments | |
|---|---|
| 4. The proponent will develop a staged EMS in consultation with relevant regulators (and the Aboriginal community where relevant) to the approval of DP&I [now DP&E] which shall comprise…<br>…Environmental Monitoring Program (incorporating air quality, noise, blasting, ecology, Aboriginal heritage, surface water and groundwater)… | Section 3.4.2 |

## 2.3 Environment Protection Licence

MCC is the licence holder of EPL 20221 for the MCCM premises. The EPL 20221 conditions relevant to blasting are presented below.

***L5 Blasting***

*L5.1 The airblast overpressure level from blasting operations in or on the premises must not exceed 120dB (Lin Peak) at any time at monitoring points 31, 32, 33, or 34 as defined in Condition P1.4 of this licence.*

*L5.2 The airblast overpressure level from blasting operations in or on the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period at any time and at monitoring points 31, 32, 33, or 34 as defined in Condition P1.4 of this licence.*

*L5.3 The ground vibration peak particle velocity from the blasting operations carried out in or on the premises must not exceed 10mm/sec at any time at monitoring points 31, 32, 33, or 34 as defined in Condition P1.4 of this licence.*

*L5.4 The ground vibration peak particle velocity from the blasting operations carried out in or on the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period at monitoring points 31, 32, 33, or 34 as defined in Condition P1.4 of this licence.*

*L5.5* *Blasting operations on the premises must only be carried out between the hours 9am to 5pm, Monday to Saturday, inclusive.*

*L5.6* *The hours of operation for blasting operations specified in condition L4.5 may be varied if the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.*

*L5.7* *Blasting at the premises is limited to 1 blast on each day on which blasting is permitted.*

*Note:* *Additional blasts are permitted where it is demonstrated to be necessary for safety reasons and the EPA and neighbours have been notified of the intended blast prior to the additional blast being fired.*

*Note:* *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.*

*Note:* *For the purpose 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.*

*L5.8* *Condition L4.7 does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately- owned land, or to blasts required to ensure the safety of the mine or its workers.*

*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.*

***O4 Other operating conditions***

***Blast Fume***

*O5.1* *Offensive blast fume must not be emitted from the premises.*

*Definition: Offensive blast fume means post-blast gases (whether visible or invisible, odorous or odourless) 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)* *are harmful to (or is likely to be harmful to) a person that is outside the premises from which it is emitted, or*

*(ii)* *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.*

*M7.1* To determine compliance with conditions L4.1 to L4.4 inclusive: a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring points 31, 32, 33 and 34 for the parameters specified in Column 1 of the table below and b) The licensee must use the units of measure, sampling method and sample at the frequency specified opposite in the other columns.

| ***Parameter*** | ***Units of measure*** | ***Frequency*** | ***Sample Method*** |
|---|---|---|---|
| *Airblast overpressure* | *DB (Linear Peak)* | *All Blasts* | *Australian Standard AS 2187.2-2006* |

| | | | |
|---|---|---|---|
| *Ground vibration peak particle velocity* | *millimeters/second* | *All Blasts* | *Australian Standard AS 2187.2-2006.* |

*R4.3 The licensee must report any exceedence of the licence blasting limits to the regional office of the EPA as soon as practicable after the exceedence becomes known to the licensee or to one of the licensee's employees or agents.*

## 2.4 Relevant Standards and Guidelines

Guidelines and standards applying to blasting for the MCCM include:

- ANZECC (1990) '*Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*';
- Australian Standard AS 2187.2 2006 '*Storage and Use of Explosives*'; and
- AEISG (2011) '*Code of Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting*' (Code of Practice).Blast Management Measures

Best practice blast management procedures will be implemented at the MCCM to achieve acceptable outcomes (in terms of rock fragmentation, ground vibration, overpressure, flyrock, dust and blast fume). The Maules Creek Coal Project Environmental Assessment (Maules Creek EA) (Hansen Bailey, 2011) predicted that blast ground vibration is likely to remain well below the criteria for all privately owned residences. Similarly, airblast overpressure is likely to be less than criteria for all privately owned residences.

Notwithstanding, best practice control of ground vibration, airblast overpressure, flyrock, dust and blast fume will be achieved through procedures and safeguards including:

- Comply with the relevant internal procedural documents prior to the commencement of any blast;
- Best practice blast design and drill and blast practice in accordance with Australian Standard AS 2187.2 2006 '*Storage and Use of Explosives*';
- Pre-blast assessment for each blast and review of blast exclusion zones (generally 500m or as required) and fume management zone at a separate distance, if required, past the blast exclusion zone based on risk and pre-blast assessment (referred to in section 3.3);
- Use of a predictive air quality management system;
- Management of blast fume in accordance with the *Code of Good Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting* (Australian Explosives Industry and Safety Group Inc., 2011); and
- Boggabri Coal, Tarrawonga Coal and Maules Creek Coal (BTM Complex) Blast Management Strategy (BMS) which addresses management of the cumulative blasting impacts of the adjacent mines.

# 3.0 BLAST MANAGEMENT MEASURES

## 3.1 Blast Design

Blasts will be designed to meet best management practices (including the Australian Explosives Industry Safety Groups (AEISG) codes of practice) to ensure the blasting requirements in Schedule 3, Condition 18 and 23 of PA 10_0138 are met. A suitably qualified drill and blast engineer will consider the relevant MCC procedures, external guidelines and standards when developing and implementing blast designs.

To ensure compliance with regulatory limits, and to minimise the likelihood of significant blast impacts to neighbouring receivers, all blast designs will consider:

- The suitability of the planned blast location regarding proximity to roads and infrastructure, heritage items and adjoining non-mine owned land;
- Expected offsite ground vibration levels calculated based on a model, which utilises data from previous blasts;
- Expected offsite airblast overpressure levels calculated based on a model, which utilises data from previous blasts;
- Limiting the maximum instantaneous charge (MIC) as appropriate to minimise ground whilst ensuring the required rock breakage;
- The adequacy of stemming and suitability of material used;
- Appropriate initiation delays and detonation system;
- Dewatering requirements and selection of appropriate explosives types with regard to water resistance where dynamic or static water is present;
- Use of Blast hole liners where considered appropriate to mitigate ground conditions;
- Sleep time of the product to be loaded;
- Drilling accuracy and that adequate front row burden remains;
- Use of appropriate explosives considering ground conditions and potential fume risks;
- Reduction of powder factor or modification of the timing, size or depth of the blast if ground conditions require;
- Blasthole loading procedures; and

### 3.1.1 Drill and Blast Practices

To ensure blasts are carried out as designed, MCC employ appropriately qualified, licenced (where required) and experienced drill and blast personnel. Personnel receive adequate training to ensure their understanding of the following MCC drill and blast practices and associated issues that are implemented at MCCM.

- Drill report assessment;

- Preparation and management of blasting work areas including drainage, grading, barricading, isolation and exclusion of non-authorised personnel from blasting work areas;
- Safe transport and handling of explosives and blasting accessories;
- Security requirements in relation to explosives, blasting work areas and explosives magazines;
- Blasthole monitoring prior to loading;
- Explosive selection;
- Explosive loading procedures, including primer placement;
- Blasthole loading sequence;
- Recognition and management of critical risks such as hot blastholes ;
- Blasthole dewatering requirements;
- Detection, prevention and management of water inflow to blastholes ;
- Management of blastholes that may have slumped after being loaded;

Blasthole stemming;Sleep time;

- Blast exclusion zone determination and management, including searching and clearance procedures;
- Fume management zone determination;
- Blast guard posting;
- PPE - including personnel gas monitors;
- Changes to conditions after explosives loading;
- Blast initiation warning system;
- Blast initiation system and procedures;
- Post blast gases identification, rating and reporting;
- Detection and management of misfired explosives;
- Meteorological influences including rainfall predictions;
- Dispersion model of potential fume and dust generation;
- Emergency response and other safety considerations (refer 3.3.8);
- Modelling of each blast for ground vibration, airblast overpressure and potential for fume using check sheets; and
- Review blast designs to manage ground vibration and airblast overpressure wave front.

## 3.2 Blast Scheduling

Blasting activities for the MCCM are permitted to occur within the hours described in Schedule 3, Condition 19 of PA 10_0138.

Following an independent blast fume modelling assessment which identified that during the cooler months in Autumn and Winter in the late afternoon, there is a slightly higher potential under highly unfavourable weather conditions for blast fume to migrate off the mine site dependent on wind direction, MCC has implemented additional restrictions on blast scheduling. As such, during these months (March to August), where possible

MCC will schedule blasting to occur prior to pm. During Summer and Spring blasts will be scheduled to occur up until 5pm. Should a blast be required in the Autumn and Winter months after 4 pm MCC will:

- Assess the potential for fume generation with consideration to key items listed in 3.1.1. If it is considered likely that a level 3C (or higher) fume event could potentially leave the premises in the direction of a private receiver location, the blast will not be undertaken unless required for safety purposes;

If it is considered likely that a level 3C (or higher) fume could potentially leave the premises and a blast is required for safety purposes then MCC will:

- Notify potentially affected neighbouring residents regarding the potential of the level 3 event prior to blasting in accordance with Section 5.2; and
- Notify the DP&E and the EPA prior to blasting.

A blast schedule will be prepared to ensure:

- Cumulative impacts are minimised;
- Public notification is able to be achieved in a timely and efficient manner;
- Notification to site personnel is able to be achieved in a timely and efficient manner;
- Blasts are planned to occur in allowable hours; and
- No more than the weekly allowable number of blasts as described in Schedule 3, Condition 20 of PA 10_0138 are carried out (subject to the exception where blasts resulting in <0.5 mm/sec are not included in the total).

Variations to the planned schedule may be required in the event of unplanned factors such as, but not limited to, weather conditions (including approaching storms) and the need to load and/or fire at other times to avoid wet blast product and associated fume risk and misfires.

Blast scheduling will be informed by a predictive air quality management system, used to predict the optimum periods for blasting based on favourable weather conditions. This is aimed at preventing airblast overpressure greater than the relevant criteria at offsite receptor locations and directing any potential dust or fume away from neighbouring receptors.

Where a planned blast event is either 30 minutes prior or 60 minutes after the planned event, a new notification will be issued to local residents by Short Message Service (SMS) or phone call. Please refer to Section 5.2.

Further details of the predictive and real-time air quality management system are outlined in the BTM Complex Air Quality Management Strategy (AQMS).

### 3.2.1 Cumulative Blast Scheduling

Cumulative operational blasting will be monitored and managed using the communication protocol between the BTM Complex operations outlined in the BTM Complex BLMS. The BLMS satisfies the requirement for the Leard Forest Mining Precinct Blast Management Strategy which is required by Schedule 3, Condition 25 (h) of PA 10_013. The BLMS details the relevant cumulative blasting impact assessment criteria for each mine and outlines the management protocols that will be implemented within the BTM Complex to manage cumulative blast impacts.

Protocols described in the BLMS will be used with the BLMP to ensure that blasting is coordinated to avoid cumulative impacts on sensitive receivers.

The key management measure for the mitigation of cumulative blast impacts will be the scheduling of blasts to prevent overlap between blast timing on adjacent mines. The schedule will be developed to ensure blasts are fired with a minimum 15 minute time gap between them to reduce any potential cumulative impacts.

## 3.3 Pre-Blast Assessment

Prior to each blast, a pre-blast assessment, including a risk and level for fume production, will be undertaken to ensure meteorological conditions are suitable and to determine the blast exclusion zone and fume management zone, if required. This pre-blast assessment will include consideration of the outputs of the predictive air dispersion modelling system **(Section 3.4**). Records of each pre-blast assessment will be retained. Meteorological conditions will be reviewed (wind speed, wind direction, cloud cover and possible temperature inversion conditions) to ensure the forecast model is accurate and meteorological conditions are suitable before approval to blast. An internal checklist has been designed to facilitate this process which is included in Appendix B of the Blast Fume Management Procedure.

### 3.3.1 Unfavourable Weather Conditions

The following outlines unfavourable/adverse weather conditions and the site response to those conditions.

When the site automatic weather station (AWS) records wind direction from the north (270° through to 90°) and wind speed greater than 8 m/s over successive readings, blasting will not occur unless required for safety reasons. Blasting will not occur when the AWS records wind direction from the south (90° through to 270°) and wind speed greater than 6 m/s over successive readings, unless required for safety reasons. If prior to the blast, a very low wind speed (< 1.5 m/s) is detected, further consideration will be given to other meteorological factors including the presence of inversions. If it is considered likely that a level 3C (or higher) fume event could potentially leave site in the direction of a private receiver, then blasting will be rescheduled unless required for safety reasons. If blasting is required due to safety reasons MCC will notify potentially affected neighbouring residents (Section 5.2), DP&E and the EPA (see *Regulator Consultation*). Review of weather records during blasts has occurred in developing the specific conditions outlined above. MCC will review blast performance, and associated weather conditions, following blasts and generation of fume rated level 3, or higher.

### 3.3.2 Management of Flyrock

Management of flyrock is achieved by appropriate controls at the blast design stage, including adequate stemming, suitability of material used and adequate front row burden. Prior to each blast, a blast exclusion zone will be determined to ensure protection to people and livestock, with an appropriate margin of safety added to the anticipated flyrock range.

### 3.3.3 Public Safety

A blast exclusion zone and sentry procedure will take into account the location of mine personnel on the lease at the time of detonation. Sentries, warning signs and warning barriers will be utilised on access roadways to address public safety when conducting blasts in proximity to forest areas.

Additional information concerning blast fume safety management is provided in **Section 3.4.2** and detail of the road closure practice is provided in **Section 5.3**.

### 3.3.4 Blast Impact on Heritage Features

Sites at MCCM include aboriginal heritage sites and historic (non-aboriginal) heritage sites. Several measures will be implemented for the management of the protected sensitive Aboriginal archaeological and historical sites including identification during blast planning, consideration to flyrock , predictive ground vibration modelling and visual monitoring of significant sites within close proximity. Annual inspections are also undertaken of heritage sites in accordance with relevant management plans and monitoring of any grinding groove site or rock shelters that are identified within 500 metres of proposed blasting. Management measures are described in the MCC Aboriginal Archaeology and Cultural Heritage Management Plan and Historic Heritage Management Plan.

### 3.3.5 Air Vibrations (Overpressure) Management

Noise (the audible part of the air vibration spectrum) and airblast (the remaining sub-audible part of the air vibration spectrum) generation can be controlled by ensuring that all, or nearly all, of the explosion energy is consumed in fragmenting and displacing the overburden by the time the gases vent (via the broken burden rock and/or ejected stemming material) into the atmosphere. Blast events are designed to meet the relevant airblast overpressure and ground vibration criteria.

This objective will be met by ensuring that:

- Where practicable, the blast face is orientated away from or at an oblique angle to nearby residences;
- Blasthole spacing is implemented in accordance with blast design;
- The burden distance and stemming length are carefully selected and then implemented precisely;
- Appropriate materials (e.g. 20 mm aggregate) are used for stemming;
- Charges are initiated in the correct sequence and with inter-row delays that provide good progressive release of burden;
- The maximum weight of explosive detonated in a given delay period (the Maximum Instantaneous Charge - MIC) is limited to conservative and proven levels; and
- Conducting blasting during suitable meteorological conditions as described in **Sections 3.2 and 3.3**.1

### 3.3.6 Ground Vibration Management

When a confined explosive charge detonates, some of the liberated energy is manifested as seismic energy (i.e. as ground vibrations). The magnitude of ground vibrations depends upon:

- The MIC for the blast;
- The distance between the blast and a residence or sensitive structure; and
- The characteristics of the intervening material (rock, soils, geological structures, etc.) through which the ground vibration wave propagates.

Ground vibration is managed by ensuring:

- The minimum practicable weight of explosive detonates at an instant (i.e. minimising the MIC) by using the appropriate delay periods between blastholes; and

- Most of the energy liberated by the charge(s) on a given delay number is consumed in providing good fragmentation, adequate displacement and/or a loose, easily excavated material, rather than in creating ground vibrations (i.e. by ensuring that the effective burden distance and sub-drill are not too large).

### 3.3.7 Dust Management

The application of best practice control measures to reduce particulate matter emissions from blasting at MCCM are described in further detail in this management plan and are summarised below:

- No blasting during adverse weather condition, unless for safety reasons;
- Blasts conducted during the day;
- Advising local residents of blasting times;
- Gravel stemming blastholes ;
- A defined blast protocol in operation; and
- Coordination with surrounding mines.

The pre-blast assessment includes considerations of meteorological conditions to ensure suitability for blasting to occur and to minimise the potential for offsite dust impacts. Consideration is also provided to the blast size and location during the planning process.

Potential dust impacts from blasting will be managed through implementing the pre-blast assessment process outlined in **Section 3.3**.

### 3.3.8 Safety Management

The MCCM's project approval and EPL recognises additional blasts may be necessary to ensure the safety of the mine or its workers. Blasting may also be necessary during unfavourable weather conditions to ensure the safety of the mine or its workers.

Where blasting is required on a given day in addition to that allowed by the project approval and EPL, or during unfavourable weather conditions, MCC will utilise the Whitehaven risk management system to document and assess the level of risk of undertaking the blast. The risk assessment includes consideration to environmental impacts, health exposure and potential consequence to community stakeholders.

Following this assessment approval will be gained from the General Manager or delegate on the site at the time.

Notification will be provided to DP&E and EPA prior to the intended blast, MCC will notify potentially affected neighbouring residents in accordance with Section 5.2.

## 3.4 Blast Fume Management

To ensure compliance with Condition O5.1 of EPL 20221, as detailed in **Section 2.3**, the blast fume management procedures outlined in **Sections 3.4.1 and 3.4.2** have been implemented at MCCM.

An assessment of the potential air quality impacts of blast fume from MCCM operations was undertaken by Todoroski Air Sciences (2015). This assessment reviewed local topography, prevailing meteorological conditions and conservatively modelled potential blast fume emissions from site over a one year period. The results of the Todoroski assessment indicated that there were no impacts to private residences or offsite exceedances of $NO_x$ criteria, with the exception of potential risks for blasts occurring after 4:00pm (particularly in the autumn and winter months during poor inversion conditions). MCCM has implemented additional restrictions as outlined in Section 3.2 and also described in the BFMP Appendix A to minimise any potential risk for significant offsite blast fume impacts at private residential locations.

While the potential for offsite fume has been assessed as low, the following sections have been prepared to provide a protocol for the mitigation and management of post-blast fumes from blasting operations and are based on the AEISG (2011) Code of Practice. This provides the basis on which to make blasting decisions to minimise the incidence and severity of post-blast fume events at the MCCM.

### 3.4.1 Blast Fume Prevention

Blast fume generation is the result of a less than optimal chemical reaction of ammonium nitrate explosives during the blasting process. This results in the release of a mixture of gases, the primary gases of concern being nitric oxide (NO) and nitrogen dioxide ($NO_2$), collectively known as oxides of nitrogen ($NO_x$). Excessive fume generation can be the result of water and explosive mixing in the blasthole (geological and/or meteorological influences), the quality of explosive product supplied, appropriateness of the explosives for the ground conditions or contamination of the explosive product during loading and/or on bench.

Blast fume prevention measures that will be implemented are:

- Formulation of explosive products to an appropriate oxygen balance to reduce the likelihood of fume generation. MCC will work with the manufacturer and/or supplier to ensure products are authorised and come with appropriate quality control systems to ensure specifications are met;
- Geology: Where clay or other unfavourable geological conditions are identified, explosive product selection will be modified to suit conditions. When blasting in soft ground, or areas with a history of producing blast fume, increased blast clearance may also be required to ensure the safety of personnel;
- Inspecting the holes prior to loading to ensure that mitigation measures are implemented where there is:
  - Dynamic water or wet holes, and/or
  - Broken or cracked ground;
- Sleep Time: All blasts will be designed and planned to be fired within 7 days of first being loaded. Approval from the Operations Manager is needed for shots requiring longer sleep times. The prevailing and forecast weather conditions as well as the Fume Risk rating and manufacturers recommendations will be taken into account when considering blast sleep time; and
- Consideration of meteorological conditions in blast scheduling. For example a water resistant product would be considered if significant rainfall was forecast between the commencement of loading and the firing of the shot.

Additionally, to minimise the likelihood of post-blast fume, the following measures will be undertaken:

- Blast sequences will be designed to minimise blasting without a free face;
- Using hole liners when the Drill and Blast Engineer and Shotfirer consider it appropriate to mitigate ground conditions and/or wet holes;
- Explosive product will be selected with consideration of the likelihood of moisture in the blasthole (including the presence of clay strata); and
- Shotfirer procedures will include QAQC measures to avoid product contamination during blasthole loading, this may include blastholes being “dipped” for depth and to detect the presence or absence of water, all results will be recorded.

The predictive and real-time air quality management system described in the BTM AQMS will be used to assist in predicting any blast plume path and possible dispersion of potential blast fume using inputs from the sites meteorological station. The drill and blast engineer will consider the predictive outputs of the system when scheduling blasting to minimise, where practicable, the risk of offsite impacts if a fume event were to occur.

### 3.4.2 Blast Fume Management Procedure

The Blast Fume Management Procedure (BFMP), attached as **Appendix A**, will be used to determine how fume emissions from blasting will be minimised and to outline how issues of public safety will be managed. Additional information on monitoring and reporting of blast fume impact is described in the BFMP.

The health and safety risks from blast fumes and information for treatment by medical staff are outlined within BFMP.

## 3.5 Cumulative Blast Management Strategy

MCCM along with Boggabri Coal Mine and Tarawonga Coal Mine have developed the BTM Complex Blast Management Strategy in order to minimise cumulative blasting impacts. The Blast Strategy forms part of this management plan as required by PA10_0138 Sch 3, Cn 25(h). The most recent version of this strategy is available on the Maules Creek Coal Mine website.

# 4.0 MONITORING AND REPORTING

Monitoring of airblast overpressure, ground vibration and blast fume is required under Schedule 3, Condition 25 (g) of PA 10_0138. Blast fume monitoring undertaken at the MCCM is described in the BFMP (**Appendix A**).

## 4.1 Monitoring of Blast Ground Vibration and Airblast Overpressure

Blasting generates noise (i.e. overpressure or airblast) and ground vibration, which may be detectable at residential receptor locations. Ground vibration levels also have the potential to impact infrastructure and heritage features in proximity to the site.

Blast monitoring units capable of recording airblast overpressure and ground vibration in accordance with the requirements of *Australian Standard AS 2187.2-2006 'Explosives—Storage and use Part 2: Use of explosives'* will be used at the locations listed in Table 5 below and shown on MCC Blast Monitoring Locations The location numbers are as identified in **Figure 2** of the MCCM Environmental Assessment.

**Table 5 Blast Monitoring Unit Locations**

| Location ID | Location No |
|---|---|
| BM1 | 80 |
| BM2 | 115 |
| BM3 | 108 |
| BM4 | 236 |

In accordance with Schedule 3, Condition 18 of PA 10_0138, blasting must not exceed the relevant criteria for airblast overpressure (dB (Lin Peak)) and Ground Vibration (mm/s) at any residence on privately owned land. The blast monitoring locations above are representative of residences on privately owned land and as such, will be used to assess compliance with blasting criteria. The permanent blast monitor locations may be reviewed and relocated based on community complaints or following landownership changes.

Temporary blast monitors will be used to record ground vibration at any non-mine owned infrastructure where blast design indicates 50 mm/second, or an otherwise agreed criterion, might be approached.

Similarly, temporary blast monitoring locations, if required for complaint monitoring, may be utilised at or near residences. These temporary locations will be positioned as near to the identified location, on the mine side of the property, to accurately reflect the blast impacts at the location of concern.

## 4.2 Blast Fume Monitoring and Reporting

Blast fume monitoring will be undertaken for every blast. The results of the blast will be recorded and any incident of fume will be ranked. Reporting will comply with Part 5.7 of the *Protection of the Environment Operations Act 1997* (NSW) where fume could cause or threaten material harm to the environment outside of the premise boundary.

Additionally the Department of Planning and Environment and the NSW EPA will be notified of any level 3C or higher fume event leaving the premises. Fume is rated on the scale contained in the Australian Explosives

Industry and Safety Group Inc. – *Code of Good Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting*.

## 4.3 Reporting

### 4.3.1 Scheduled Reporting

MCC's environmental performance is reported a number of ways. External reporting includes:

- An Annual Review (AR);
- Monthly updates of monitoring results on the Whitehaven website; and
- Community Consultative Committee (CCC) meetings.

### 4.3.2 Exceedance Reporting

In the event it is determined that an exceedance of a blast criterion has occurred, at the earliest opportunity (as soon as practicable) MCC will notify to DP&E and the EPA. In accordance with Schedule 4, Condition 3 (a) of PA 10_0138, affected landowners will also be notified (in writing) of the exceedance.

An exceedance occurs when the criteria in  are exceeded.

**Table 6 PA 10_0138 Blasting Criteria**

| Location | Airblast (dB(Lin peak)) | Ground Vibration (mm/s) | Allowable Exceedance |
|---|---|---|---|
| Residence on privately owned land | 120 | 10 | 0 % |
| | 115 | 5 | 5% of the total number of blasts over a period of 12 months |
| All public infrastructure | - | 50 (or alternatively a specific limit determined to the satisfaction of the DG & relevant guidelines) | 0 % |

However, these criteria do not apply if the Proponent has a written agreement with the relevant owner or infrastructure provider/owner, and the Proponent has advised DP&E in writing of the terms of this agreement.

In accordance with Schedule 5, Condition 8 of PA 10_0138, MCC will, within seven days of exceedance date, notify DP&E and other relevant agencies. MCC will submit a written report that:

- Describes the date, time, and nature of the exceedance;
- Identifies the cause (or likely cause) of the exceedance;
- Describes what action has been taken to date; and
- Describes the proposed measures to address the exceedance.

# 5.0 CONSULTATION

## 5.1 Neighbouring Mines

Coordination of blast schedules with other mines will be as per procedures in the BTM Complex Blast Management Strategy.

The key management measure for the mitigation of cumulative blast impacts will be scheduling of blasts to ensure each mine fires their blast at separate times. MCC will send notification of scheduled blasts to the neighbouring mines the day prior to the scheduled time. If there is no conflict regarding the scheduled blast times, there will be no further correspondence. If there are conflicting blast times between the mines, a revised schedule for firing the blasts will be agreed upon. The schedule will be developed to ensure blasts are fired with a minimum of 15 minute time gap between them to reduce any potential cumulative impacts.

If a late change to the blasting schedule is required, consultation will occur with other mines to confirm no overlap with the new blasting schedule prior to notification of new blast time.

## 5.2 Community Consultation

Community consultation has occurred during the development of this BLMP, including the original version of this document. In accordance with the requirements of Schedule 3 Condition 25 of PA_0138, this included consultation with '*interested members of the local community potentially affected by blasting operations*'. Consultation methods included presentation to the Community Consultative Committee by MCC personnel. Review comments and input from stakeholders have been considered within the development of this plan.

Notification to the general public of blasting activities will occur via the company website (www.whitehavencoal.com.au). Additionally, the schedule blast may be distributed via e-mail to organisations and individuals if this is their preference. It should be noted that the scheduled blasts may be varied depending on external factors including variable weather, which may require a blast to be delayed or brought forward.

Further to this, MCC has set up an SMS system to contact local residents the day prior to the planned blast event. On the day of a blast event, where a planned blast event is either 30 minutes prior or 60 minutes after the planned event, a new notification will be issued to local residents by SMS or phone call to enable notification of the rescheduled blast time. If required relevant residents as requested can be contacted by telephone prior to each blast in order to provide notification and to maintain good working relationships. A list of residents to be notified has been determined through consultation with the relevant residents and the MCC Community Consultative Committee. The list will be maintained and updated following a request by relevant stakeholders with any change of contact details or additional relevant residents.

SMS notifications are also sent to selected MCC staff for the purpose of verifying that the SMS messages have been sent out to residents and that there has not been any faults in the delivery of the SMS. In the event a SMS is not delivered a second SMS is sent to that resident. If the second SMS is unable to be delivered a phone call will be made in an attempt to contact the resident to advise of an upcoming blast event. The Whitehaven Coal company website also displays the timing of blast events occurring at Maules Creek Coal.

If MCC expect a fume event or offsite dust impacts to occur and are required to blast due to safety reasons, positive communication with potentially affected receivers will take place prior to blasting. MCC will identify the potential path of the plume and contact those people that could be affected. Further detail is provided in the BFMP (**Appendix A**).

Notification of blasting events that require road closures will be via the above channels (part of the weekly schedule information), and in accordance with the Road Closure Management Plan.

## 5.3 Regulator Consultation

In accordance with the requirements of Schedule 3, Condition 25 of PA_0138 the BLMP has been prepared in consultation with DP&E and the EPA. Engagement has also occurred with local landholders.

Notification and consultation with DP&E and EPA when:

- Blasting after 3pm (**Section 3.2**)
- Blasting is required in unfavourable conditions (**Section 3.3.1**)
- Blasting if predicted Level 3C fume will leave the premises (**Section 3.3.1**)
- Blasting in addition to approval requirements (**Section 3.3.8**)
- Exceedance of criteria or licence (**Section 0**)

## 5.4 Road Closure

Schedule 3, Condition 25 (e) of PA 10_0138 requires this BLMP include '*a road closure management plan for blasting within 500 metres of a public road*'. This aims to ensure public safety, primarily as protection against flyrock , but also to prevent exposure to fume and dust.

No blasting activities are planned to occur within 500 m of a public road for the initial years of the MCCM. The most eastern part of the approved open cut mining area is anticipated to encroach within 500 m of the Leard Forest Road, which is currently a public road. The southern section of the Leard Forest Road has been closed to the public by Boggabri Coal and is no longer a through road.

As such, the measures described below will not be required for the term of this plan. However in the instance that blasting activities may be required within 500 m of a public road, the following requirements will be addressed.

If any blast is planned to be within 500 m of a public road, then a road closure is required in accordance with a Road Closure Management Plan that is to be developed in consultation with Narrabri Shire Council.

Road closure will only be performed by personnel trained and qualified in traffic control. These people will wear appropriate high visibility clothing and have direct communication with the shotfirers to minimise delay and, to advise of any blast exclusion zone breach.

All signage placement and associated traffic control procedures will be in accordance with a plan approved by Narrabri Shire Council for that section of road.

A safety check will be made to ensure the road is clear of debris after blasting and prior to road re-opening. If required, a grader will be on standby to remove any larger debris and small debris will be removed by hand.

## 5.5 Non MCC Owned Land

In accordance with Schedule 3, Condition 24 of PA 10_0138, as outlined in **Section 2.2.3**, prior to undertaking blasting on-site within 500 m of any land outside the site that is not owned by MCC, MCC must:

- Receive a written agreement from the relevant landowner to allow blasting to be carried out closer to the land and advise the DP&E in writing of the terms of this agreement;
- Demonstrate to the satisfaction of the Secretary that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and
- Include in the Blast Management Plan specific measures (detailed below) to be implemented while blasting is being carried out within 500 m of land.

Blasting activities are planned to occur within 500 m of land outside the site that is not owned by MCC, notably this will be limited to land owned by an adjacent coal mine and the Forestry Corporation of NSW. As required by PA 10_0138 MCC will seek written agreements from the relevant landowner to commencing blasting operations within 500 m of their land and notify the DP&E of these agreements. Given that the affected lands are not residential sites, the additional impacts of blasting within 500 m of these lands is expected to be negligible, when compared with blasting at other areas within the MCCM.

The standard management measures for mitigating blasting impacts outlined in **Section 3.0** will continue to be implemented for blasts within 500 m of land outside the site that is not owned by MCC. The 500 m exclusion zone will be extended into the adjacent land. In situations where the 500 m exclusion zone extends into an adjacent mining lease the establishment of an exclusion zone in that area will be managed by the mining operator of the lease. MCC will provide notification of planned blasts to the affected landowner/s on the day prior to the blast and will provide the adjacent landowners with a site contact to enable prompt communication of activities on their land that could potentially be impacted by MCC blasting. This communication will enable blasting to be proactively planned for times when there is no or limited activity occurring on the adjacent land, limiting any potential disruption to the adjacent landowner/s.

# 6.0 RESPONSE PROCEDURES

## 6.1 Complaint Response Protocol

MCC maintains a 24-hour complaints hotline (1800 WHAVEN, 1800 942 836) to respond to any complaints from neighbouring residents or interested stakeholders. The complaints hotline is advertised in the local media and is available on the Whitehaven website and in community newsletters. Complainants will be contacted as soon as possible to gather additional information and respond to community concerns.

Records of complaints will be maintained in the complaints register database and kept on file for a period of no less than five years.

In the event of a community complaint about blasting, all relevant information pertaining to the time of alleged blast nuisance is to be gathered as follows:

- Blast location and details;
- Meteorological conditions at the time of the blast; and
- Data from nearest blast monitors.

Using the above data, an assessment is to be made as to the validity of the complaint.

If there is any claim that property has been damaged then, as per Schedule 3, Condition 22 of PA 10_0138, an inspection is required as follows:

> "…*within 2 months of receiving this claim in writing from the landowner the Proponent shall:*
>
> *(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim; and*
>
> *(b) give the landowner a copy of the property investigation report.*"

Disputes regarding the selection of a suitably qualified inspector, or the inspection findings, will be referred to the Planning Secretary of DP&E for resolution.

## 6.2 Emergency Response

In the event that a significant blast fume event of Level 3C or higher classification is observed or predicted, using the rating scale from the AEISG (2011) Code of Practice, to leave the site, a response will be triggered, in accordance with MCC Pollution Incident Response Management Plan (PIRMP). Attempts will be made to contact neighbouring residents in the predicted path of the plume. Communication to relevant stakeholder and regulatory agencies will be conducted in accordance with the PIRMP.

Should an individual be exposed to blast fume, that individual should seek immediate medical advice and treatment (refer to the Blast Fume Management Procedure (**Appendix A**)).

## 6.3 Property Inspections

In accordance with Schedule 3, Condition 21 of PA 10_0138, MCC will, upon written request from the owner of any privately-owned land within 2 km of the approved open cut mining pit on site, complete a property inspection to establish baseline conditions for all buildings and structures or to have a previous property inspection report updated, then within 2 months of receiving this request, MCC shall commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to:

- establish the baseline condition of any buildings and/or structures on the land, or update the previous property inspection report; and
- identify any measures that should be implemented to minimise the potential blasting impacts of the MCCM on these buildings and/or structures.

MCCM will provide the landowner a copy of the new or updated property inspection report. In accordance with Schedule 3, Condition 21 of PA 10_0138, if the owner of any privately-owned land claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim in writing from the landholder, MCC shall commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, to investigate the claim, and provide the landowner with a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Secretary.

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

# 7.0 DOCUMENT REVIEW AND CONTINUOUS IMPROVEMENT

In accordance with Schedule 5, Condition 5 of PA 10_0138, this BLMP will be reviewed within 3 months of any AR, incident report, audit or modification of the conditions of the approval. Should this review identify any requirement to change the BLMP, this document will be updated in accordance with the approval.

Additionally, this BLMP will be reviewed and revised in accordance with a requirement issued under Schedule 2, Condition 4 of PA 10_0138.

| Edition | Rev. | Comments | Author | Authorised By | Date |
|---|---|---|---|---|---|
| 1 | 0 | Issued to DPI for Approval | Manaia Rehu | Craig Simmons | May 2013 |
| 1 | 1 | Issued for DPI Approval | PEL | Daniel Martin | Nov 2013 |
| 1 | 2 | Issued for Consultation | Daniel Martin | Daniel Martin | Jun 2014 |
| 1 | 3 | Issued for DPI Approval | Daniel Martin | Daniel Martin | July 2014 |
| 1 | 4 | 2015 Revision | Gary Gray | Craig Simmons | August 2015 |
| 2 | 0 | Incorporate fume management, and regulatory comments | Craig Simmons | Matthew Sparkes | September 2015 |
| 2 | 1 | Incorporate EPA & DP&E | MCC | MCC | March 2016 & February 2017 |
| 2 | 2 | Address DP&E comments | MCC | MCC | September 2017 |
| 2 | 3 | Address DP&E comments | MCC | MCC | 2018 |
| 3 | 1 | MOD 8 & IEA | Terrock | MCC | May 2022 |

## 8.0 ROLES AND RESPONSIBILITIES

The roles and responsibilities of MCC staff in respect of this BLMP are presented in the Blast Fume Management Plan Appendix F.

# 9.0 REFERENCES

ANZECC (1990). *Technical Basis For Guidelines To Minimise Annoyance Due To Blasting Overpressure And Ground Vibration*.

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# 10.0 GLOSSARY

**Blast fume** – a mixture of gases generated as a result of a less than optimal chemical reaction of ammonium nitrate explosives during the blasting process. The critical gases of concern in blast fume are the oxides of nitrogen ($NO_x$), being nitric oxide (NO) and nitrogen dioxide ($NO_2$). Blast fume gases will present as yellow to orange to dark red (depending on concentration) due to the presence of $NO_2$ in the post-blast gases.

**Blast ground vibration** – The transfer of energy through the ground measurable as acceleration, velocity and displacement. Particle velocity has been found to correlate best to structural damage resulting from blasting whereas human response is best quantified by acceleration. However, particle velocity is commonly measured during blasting and is the relevant measure for this project.

**Blast exclusion zone** - a distance of generally 500m, or as required, around the blast to ensure safety of equipment and operational personnel.

**Post-blast fume management zone** - an exclusion zone that may be pre-determined if required, which is generally outside the blast exclusion zone, to ensure adequate distance for dispersion of post-blast gases.

**Overpressure** (airblast) – noise from a blast, containing mostly low frequency energy and typically has a very distinct pressure change pattern (n-wave).

**dB (Lin)** – Unweighted noise level in decibels (dB); used to quantify airblast overpressure.

# APPENDIX A BLAST FUME MANAGEMENT PROCEDURE

# APPENDIX B BLAST MONITORING LOCATIONS