



DURALIE COAL MINE Blast Management Plan

DURALIE COAL MINE BLAST MANAGEMENT PLAN



REVISION STATUS REGISTER

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DPIE Approval Date
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1 INTRODUCTION

1.1 DURALIE COAL MINE

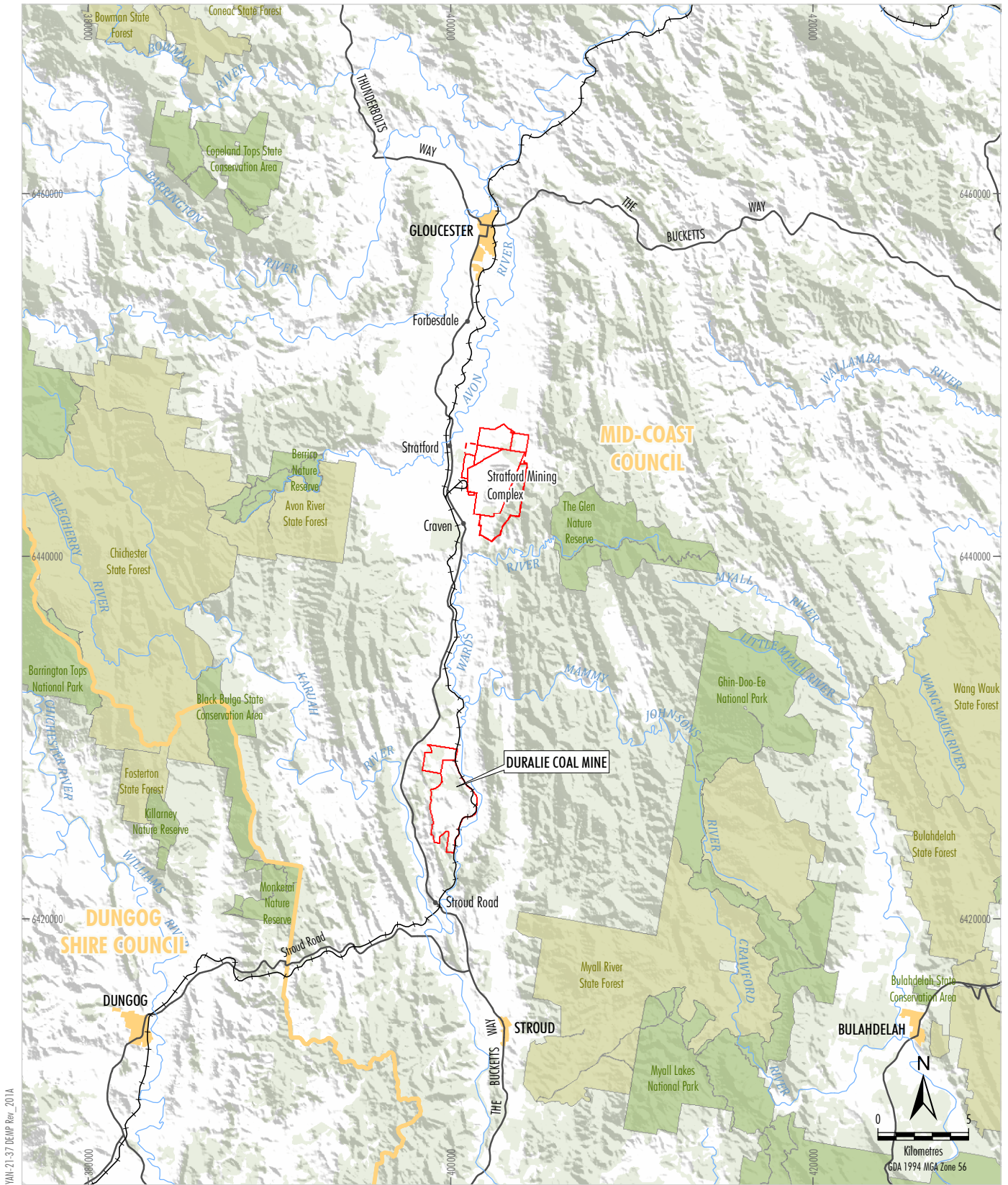
The Duralie Coal Mine (DCM) is situated approximately 35 kilometres (km) south of Gloucester in the Gloucester Valley, New South Wales (NSW) (Figure 1). Duralie Coal Pty Ltd (DCPL), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), owns and operates the DCM. The NSW Minister for Urban Affairs and Planning granted Development Consent for the DCM in August 1997 and coal production commenced in 2003.

The Duralie Extension Project (DEP) involves the extension and continuation of mine operations at the DCM. DCPL was granted approval for the DEP under section 75J of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 26 November 2010 (NSW Project Approval [08_0203]) and under sections 130 and 133 of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC) on 22 December 2010 (Commonwealth Approval [EPBC 2010/5396]). On 10 November 2011, the NSW Project Approval (08_0203) was amended by order of the Land and Environment Court of NSW. On 1 November 2012, the NSW Project Approval (08_0203) was modified to reflect approval of the Duralie Rail Hours Modification. On 5 December 2014, NSW Project Approval (08_0203) was modified to reflect approval of the Duralie Open Pit Modification. A copy of the consolidated NSW Project Approval (08_0203) and the Commonwealth Approval (EPBC 2010/5396) is available on the Duralie Coal website (<http://www.duraliecoal.com.au>).

The main activities associated with the approved DEP (as modified) include:

- continued development of open cut mining operations at the DCM to facilitate a total run-of-mine (ROM) coal production rate of up to approximately 3 million tonnes per annum (Mtpa), including:
 - extension of the existing approved open pit in the Weismantel Seam to the north-west (i.e. Weismantel open pit) within Mining Lease (ML) 1427 and ML 1646; and
 - open cut mining operations in the Clareval Seam (i.e. Clareval open pit) within ML 1427 and ML 1646;
- ongoing exploration activities within existing exploration tenements;
- progressive backfilling of the open pits with waste rock as mining develops, and continued and expanded placement of waste rock in out-of-pit waste rock emplacements;
- increased ROM coal rail transport movements on the North Coast Railway between the DCM and the Stratford Mining Complex (SMC) in line with increased ROM coal production;
- continued disposal of excess water through irrigation (including development of new irrigation areas within the existing ML 1427 and ML 1646) (refer below regarding status of irrigation at the DCM);
- construction of Auxiliary Dam No. 2 to relative level (RL) 100 metres (m) to provide 2,900 megalitres of on-site storage capacity to manage excess water on-site;
- progressive development of dewatering bores, pumps, dams, irrigation infrastructure and other water management equipment and structures;
- development of new haul roads and internal roads;
- upgrade of existing surface facilities and supporting infrastructure as required in line with increased ROM coal production;
- continued development of soil stockpiles, laydown areas and gravel/borrow pits;
- establishment of the permanent Coal Shaft Creek Diversion alignment adjacent to the existing DCM mining area;
- ongoing surface monitoring and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.

An aerial photograph of the DCM general arrangement and surrounds is provided in Figure 2.



YAN-21-37 DEAP Rev. 201A



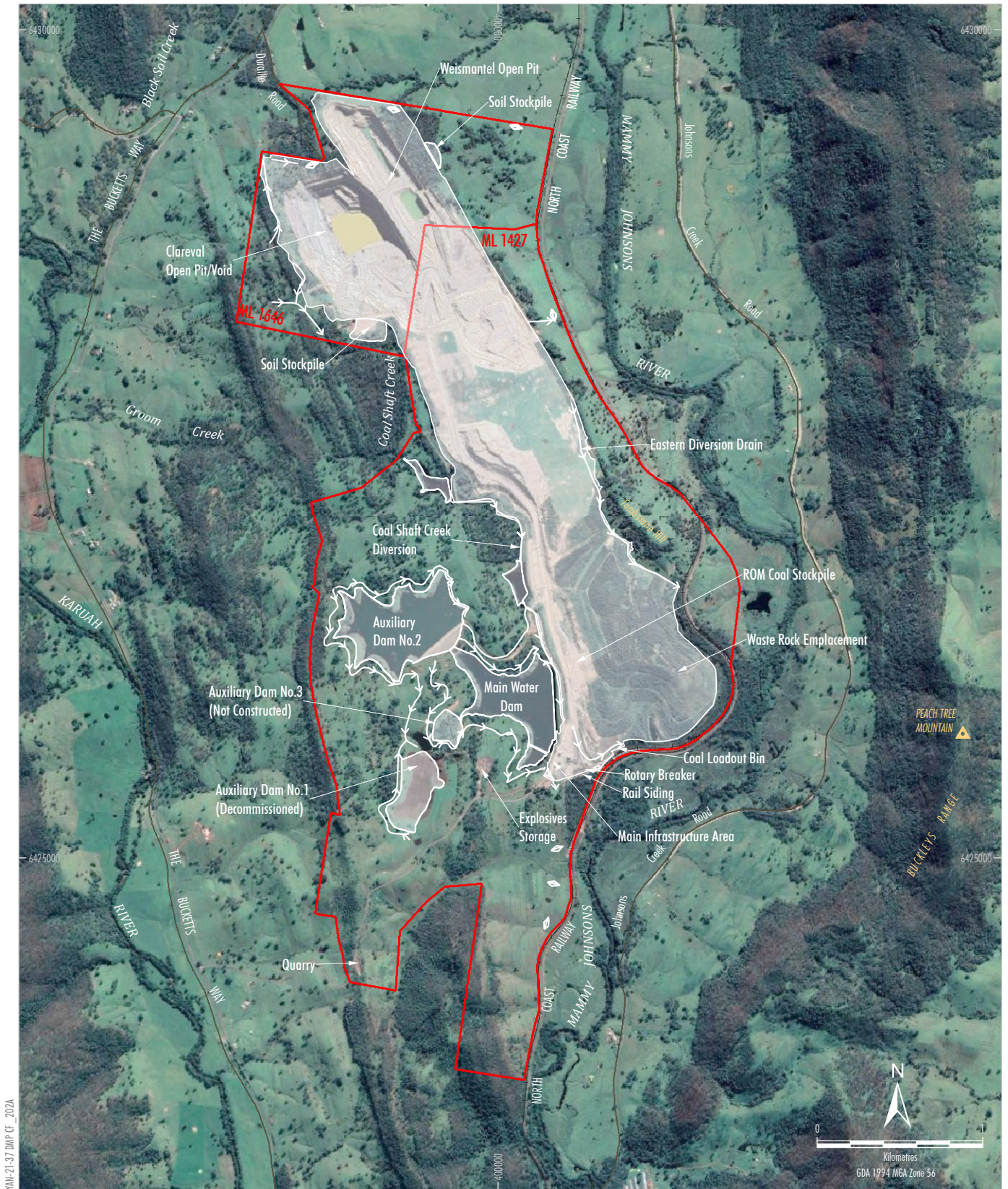
- LEGEND**
- Mining Lease Boundary
 - NSW State Forest
 - National Park, Nature Reserve or State Conservation Area
 - Local Government Area Boundary

Source: Geoscience Australia (2006);
NSW Department of Planning & Environment (2017)



DURALIE COAL MINE
Regional Location

Figure 1



YAN-21-37 DMP Cf 202A

- LEGEND**
- Mining Lease Boundary
 - Approximate Extent of Existing/Approved Surface Development
 - Existing/Approved First Flush Protocol Pump Back System
 - Existing/Approved Up-catchment Diversion System

Source: © NSW Spatial Services (2019)
 Orthophoto: Google Earth CENS/Airbus (2020)



Figure 2

The activities associated with the approved Duralie Open Pit Modification include:

- an increase in the maximum depth of the Clareval open pit;
- a minor increase in the extent of surface development of the DCM of approximately 2.5 hectares, resulting from:
 - a reduction in low wall angles of the Clareval open pit and the removal of a pillar between the Clareval and Weismantel open pits to improve geotechnical stability; and
 - associated relocation of the up-catchment diversion to the west of the Clareval open pit;
- revision of mining sequence (i.e. progression of mining in the Clareval and Weismantel open pits); and
- an increase in height of the waste rock emplacement (i.e. the backfilled open pit) from approximately 110 m Australian Height Datum (AHD) to approximately 135 m AHD.

Current Status of the DCM

Condition 5, Schedule 2 of Project Approval (08_0203) authorises mining operations to be carried at the DCM until 31 December 2021. Accordingly, DCPL is planning for the commencement of the mine closure phase (i.e. after the cessation of mining operations on 31 December 2021) and has revised this Blast Management Plan (BLMP) to reflect the current stage of operations and to describe anticipated mine closure activities and blast management at the DCM for the mine closure phase.

Operations at the DCM now reflect the transition towards mine closure:

- **Clareval Open Pit:** mining of the Clareval Open Pit has now been completed, and dewatering of the pit has ceased. Partial backfilling with waste rock mined from the Weismantel Open Pit has commenced, along with shaping of the pit area to its final landform design. Mining of the Clareval Open Pit was finalised to a shallower depth than the maximum approved depth as modelled in 2014 DCM Open Pit Modification.
- **Weismantel Open Pit:** mining of the Weismantel Open Pit will continue until 31 December 2021, however, will also not occur to the maximum approved depth as modelled in 2014 DCM Open Pit Modification. Progressive backfilling of completed areas of the Weismantel Open Pit has been undertaken.
- **DCM Water Management System Changes:**
 - Following the cessation of mining of the Clareval Open Pit (now final void) and the Clareval void becoming available as a water storage, Weismantel Open Pit dewatering is now preferentially transferred to the Clareval void and not stored within the Main Water Dam. As a result, all irrigation activities for the purpose of reducing the total site water inventory at the DCM have now ceased and the DCM's Irrigation Area irrigation system has been decommissioned and removed.
 - Decommissioning of other redundant water management structures has also commenced. Consistent with the approved DCM final landform design, Auxiliary Dam No. 1 has been dewatered, decommissioned and rehabilitated.
- **Vegetation Clearance:** No new disturbance areas (within approved surface disturbance areas) are proposed.
- **Closure Planning:** The DCM's Mine Closure Planning Program (described in the DCM Mining Operations Plan and Rehabilitation Management Plan [1 January 2020 – 31 December 2021]) includes preparation of a detailed final landform design and technical assessments and works that will be undertaken and implemented as the DCM progresses towards and commences the mine closure phase.
 - DCPL is progressively completing components of the Mine Closure Planning Program, with the various technical assessments currently being completed based on the refined final landform design. The outcomes from these reviews and Mine Closure Planning Program technical assessments and works will be incorporated into a DCM Closure Plan.

DCM Activities after Cessation of Mining Operations

Following the completion of mining operations on 31 December 2021, DCPL will undertake bulk rehabilitation earthworks, which may involve some blasting activities to achieve the final landform design and satisfy geotechnical requirements. Bulk rehabilitation earthworks are anticipated to occur during 2022 and 2023 and may involve infrequent blasting. Once bulk rehabilitation earthworks are complete, blasting activities at the DCM will cease. All major fleet will then be removed from site and the mine's workforce reduced to support post-closure activities.

After the cessation of blasting, the requirement to monitor the impact of blasting activities, and blast management measures as described in Section 3, will become redundant as the potential impact no longer exists. Accordingly, following the completion of rehabilitation earthworks, DCPL would seek the NSW Department of Planning, Industry and Environment's (DPIE's) agreement and approval of redundancy of this BLMP and associated conditions in Project Approval (08_0203).

1.2 PURPOSE AND SCOPE

This DCM Blast Management Strategy (BLMP) has been prepared by DCPL in accordance with Condition 16, Schedule 3 of Project Approval (08_0203).

This BLMP outlines procedures and strategies for blasting management to ensure compliance with blast overpressure and ground vibration limits and other conditions of NSW Project Approval (08_0203) administered by the DPIE and EPL 11701 issued by the NSW Environment Protection Authority (EPA) for the DCM. This BLMP also reflects relevant conditions of ML 1646 and ML 1427. This BLMP is relevant to the area of approved surface development (Figure 2) as described in the *Duralie Open Pit Modification Environmental Assessment* (DCPL, 2014) and the area within ML 1646 and ML 1427 (Figure 2).

The overall objectives of the BLMP are to:

- ensure the safety of members of the public during blasting;
- prevent damage to private or public property as a result of blasting;
- minimise any nuisance to the public as a result of blasting; and
- minimise blast fume potential.

This revision of the BLMP has been prepared by DCPL to describe the current status of operations at the DCM and anticipated changes to DCM activities after the cessation of mining on 31 December 2021. Other administrative updates have also been included to contemporise the plan.

2 STATUTORY REQUIREMENTS

2.1 NSW PROJECT APPROVAL CONDITIONS

The conditions of NSW Project Approval (08_0203) relevant to blasting and vibration and a description of where they are referenced in this BLMP are provided in Table 1. NSW Project Approval (08_0203) is available on the DCM website (<http://www.duraliecoal.com.au/>).

Table 1
NSW Project Approval Requirements Relevant to Blasting

NSW Project Approval Condition	Requirement	Section of BLMP																				
Blasting Criteria: Schedule 3, Condition 8	The Proponent shall ensure that the blasting on the site does not cause exceedances of the criteria in Table 4.	2.4, 5.1 and 3.4																				
	Table 4: Blasting criteria																					
	<table border="1"> <thead> <tr> <th>Location</th> <th>Airblast overpressure level (dB(Lin Peak))</th> <th>Ground vibration (mm/s)</th> <th>Allowable exceedence</th> </tr> </thead> <tbody> <tr> <td>Residence on privately owned land</td> <td>115</td> <td>5</td> <td>5% of the total number of blasts over a period of 12 months</td> </tr> <tr> <td>Residence on privately owned land</td> <td>120</td> <td>10</td> <td>0%</td> </tr> <tr> <td>Mammy Johnson's Grave</td> <td>-</td> <td>5</td> <td>0%</td> </tr> <tr> <td>Former Weismantel's Inn</td> <td>-</td> <td>10</td> <td>0%</td> </tr> </tbody> </table>		Location	Airblast overpressure level (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedence	Residence on privately owned land	115	5	5% of the total number of blasts over a period of 12 months	Residence on privately owned land	120	10	0%	Mammy Johnson's Grave	-	5	0%	Former Weismantel's Inn	-	10	0%
	Location		Airblast overpressure level (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedence																	
	Residence on privately owned land		115	5	5% of the total number of blasts over a period of 12 months																	
	Residence on privately owned land		120	10	0%																	
Mammy Johnson's Grave	-	5	0%																			
Former Weismantel's Inn	-	10	0%																			
However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.																						
Blasting Hours: Schedule 3, Condition 9	The Proponent shall only carry out blasting on 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 Secretary.	3.1																				
Blasting Frequency: Schedule 3, Condition 10	The Proponent shall not carry out more than: (a) 1 blast a day on site, unless an additional blast is required following a blast misfire; and (b) 3 blasts a week on site, averaged over any 12 month period.	3.1																				
Property Inspections: Schedule 3, Condition 11	If the Proponent receives a written request for 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: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to: <ul style="list-style-type: none"> • establish the baseline condition of the buildings and/or structures on the land, or update the previous property inspection report; • identify any 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 new or updated property inspection report.	3.2.3																				

Table 1 (Continued)
NSW Project Approval Requirements Relevant to Blasting

NSW Project Approval Condition	Requirement	Section of BLMP
Property Investigations: Schedule 3, Condition 12 (continued)	<p>If the owner of any privately-owned land claims that 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, the Proponent shall:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to investigate the claim; and</p> <p>(b) give the landowner a copy of the property investigation report.</p> <p>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.</p> <p>If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.</p>	3.2.4
Operating Conditions: Schedule 3, Condition 13	<p>The Proponent shall:</p> <p>(a) implement best blasting practice on site to;</p> <ul style="list-style-type: none"> • protect the safety of people and livestock in the surrounding area; and • protect public or private property in the surrounding area; and • minimise the dust and fume emissions from blasting on site; and <p>(b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site,</p> <p>to the satisfaction of the Secretary.</p>	4.1 & 4.2 4.2 3.6 & 3.7 3.2
Operating Conditions: Schedule 3, Condition 14	<p>The Proponent shall not carry out any blasting within 500 metres of:</p> <p>(a) a public road without the approval of Council; and</p> <p>(b) the North Coast Railway without the approval of ARTC.</p>	3.3.2 3.3.1
Operating Conditions: Schedule 3, Condition 15	<p>The Proponent shall not carry out any blasting within 500 metres of any privately-owned land or land not owned by the Proponent unless:</p> <p>(a) 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</p> <p>(b) the Proponent has:</p> <ul style="list-style-type: none"> • demonstrated to the satisfaction of the Secretary that the blasting can be carried out without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and • 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. 	3.2.2
Blast Management Plan: Schedule 3, Condition 16	<p>The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with EPA, and submitted to the Secretary for approval within 3 months of the date of this approval, unless otherwise agreed by the Secretary;</p> <p>(b) describe the blast mitigation measures that would be implemented to ensure compliance with conditions 8–15 of this Schedule;</p> <p>(c) describe the measures that would be implemented to ensure the public can get up-to-date information on the proposed blasting schedule on site or any road closures; and</p> <p>(d) include a blast monitoring program to evaluate the performance of the project.</p> <p><i>Note: The effectiveness of the Blast Management Plan is to be reviewed and audited in accordance with the requirements in Schedule 5. Following this review and audit the plan is to be revised to ensure it remains up to date (see Condition 4 of Schedule 5).</i></p>	2.5 3 3.2.1 5 7
Air Quality & Greenhouse Gas – Odour: Schedule 3, Condition 17	<p>The Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.</p>	3.6

Condition 2, Schedule 5 of NSW Project Approval (08_0203) outlines the requirements for management plans which are also applicable to this BLMP. Table 2 outlines these requirements and where they are addressed within this BLMP.

**Table 2
Management Plan Requirements**

NSW Project Approval Condition	Section of BLMP
2. <i>The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:</i>	
a) <i>detailed baseline data;</i>	2.6
b) <i>a description of:</i>	
• <i>the relevant statutory requirements (including any relevant approval, licence or lease conditions);</i>	2
• <i>any relevant limits or performance measures/criteria;</i>	2.4
• <i>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;</i>	
c) <i>a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</i>	3 & 4
d) <i>a program to monitor and report on the:</i>	5 & 9
• <i>impacts and environmental performance of the project;</i>	
• <i>effectiveness of any management measures (see (c) above);</i>	
e) <i>a contingency plan to manage any unpredicted impacts and their consequences;</i>	6
f) <i>a program to investigate and implement ways to improve the environmental performance of the project over time;</i>	7
g) <i>a protocol for managing and reporting any:</i>	9
• <i>incidents;</i>	
• <i>complaints;</i>	
• <i>non-compliances with statutory requirements; and</i>	
• <i>exceedences of the impact assessment criteria and/or performance criteria; and</i>	
h) <i>a protocol for periodic review of the plan.</i>	7.2

2.2 ENVIRONMENT PROTECTION LICENCE CONDITIONS

DCPL is the holder of Environment Protection Licence (EPL) No. 11701, issued under the *Protection of the Environment Operations Act 1997* (POEO Act). The licence authorises the carrying out of activities at ML 1427 (dated 6/4/98) and ML 1646 (dated 4/1/11). Table 3 details the conditions in EPL 11701 relevant to blasting and where they are addressed in this BLMP.

**Table 3
EPL Requirements Relevant to Blasting**

EPL Condition	Requirement	Section of BLMP
L5 Blasting	L5.1 <i>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 38, 39 or 40 in Condition P1.4.</i>	2.4 & 5.1
	L5.2 <i>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 38, 39 or 40 in Condition P1.4.</i>	
	L5.3 <i>The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: 5 mm/sec for more than 5% of the total number of blasts during each reporting period; at either monitoring point 38, 39 or 40 on Condition P1.4.</i>	

Table 3 (continued)
EPL Requirements Relevant to Blasting

EPL Condition	Requirement	Section of BLMP										
L5 Blasting (continued)	L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: 10 mm/sec at any time; at either monitoring point 38, 39 or 40 in Condition P1.	2.4 & 5.1										
	L5.5 Blasting operations at the premises may only take place between 9:00am to 5:00pm Monday to Saturday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).	3.1										
	L5.6 Offensive blast fume must not be emitted from the premises. Definition: 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: 1. are harmful to (or likely to be harmful) a person that is outside the premises from which it is emitted, or 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.	3.6 & 5.3										
L6 Potentially offensive odour	L6.1 The licensee must not cause or permit the emission of offensive odour beyond the boundary of the premises. <i>Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.</i>	3.6 & 5.3										
M8 Blasting	M8.1 All blast shots must be recorded on video from a position allowing the collars of the shot, and where possible, any face, and/or toe, to be seen on the video. The licensee must retain a copy of this video for at least 12 months after the blast was initiated.	5.3										
	M8.2 To determine compliance with conditions L5.1, L5.2, L5.3 and L5.4: a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring points 38, 39 and 40 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.	2.4 & 5.1										
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Units of Measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Airblast Overpressure</td> <td>Decibels (Linear Peak)</td> <td>All Blasts</td> <td>Australian Standard AS 2187.2-2006</td> </tr> <tr> <td>Ground Vibration Peak Particle Velocity</td> <td>Millimetres/second</td> <td>All Blasts</td> <td>Australian Standard AS 2187.2-2006</td> </tr> </tbody> </table>		Parameter	Units of Measure	Frequency	Sampling Method	Airblast Overpressure	Decibels (Linear Peak)	All Blasts	Australian Standard AS 2187.2-2006	Ground Vibration Peak Particle Velocity	Millimetres/second
Parameter	Units of Measure	Frequency	Sampling Method									
Airblast Overpressure	Decibels (Linear Peak)	All Blasts	Australian Standard AS 2187.2-2006									
Ground Vibration Peak Particle Velocity	Millimetres/second	All Blasts	Australian Standard AS 2187.2-2006									

2.3 MINING LEASE CONDITIONS

Condition 10 of ML 1646 issued by the NSW Minister for Primary Industries on 4 January 2011 and Condition 26 of ML 1427 issued by the NSW Minister for Mineral Resources on 6th April 1998 relevant to blasting limits are provided in Table 4 below with reference to the relevant sections of this BLMP.

Table 4
Mining Lease Conditions Relevant to Blasting

Mining Lease Condition	Requirement	Section of BLMP
ML 1646 Condition 10. Blasting	(a) <u>Ground Vibration</u> The lease holder must ensure that the ground peak particle velocity generated by any blasting within the lease area does not exceed 10 mm/second and does not exceed 5 mm/second in more than 5% of the total number of blasts over a period of 12 months at any dwelling or occupied premises as the case may be, unless determined otherwise by the Department of Environment, Climate Change and Water.	2.4 & 5.1

Table 4 (continued)
Mining Lease Conditions Relevant to Blasting

Mining Lease Condition	Requirement	Section of BLMP
ML 1646 Condition 10. Blasting (continued)	(b) <u>Blast Overpressure</u> <i>The lease holder must ensure that the blast overpressure noise level generated by any blasting within the lease area does not exceed 120 dB (linear) and does not exceed 115 dB (linear) in than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises as the case may be, unless determined otherwise by the Department of Environment, Climate Change and Water.</i>	2.4 & 5.1
ML 1427 Condition 26 (Blasting)	26 <i>The lease holder shall monitor noise and vibration and institute controls, generally in accordance with the recommendations of Australian Standard AS-2187-1993 and ANZEC Guidelines.</i> (a) <i>Ground Vibration The lease holder shall design all blasts on the basis that the ground vibration peak particle velocity generated by any blasting within the subject area, shall not exceed the levels in or conditions of the EPA Licence for the mine, at any dwelling or occupied premises not owned by the lease holder, the holder of an authority under the Mining Act, or not subject to a valid agreement with the lease holder, with respect to the effects of blasting.</i> (b) <u>Blast Overpressure</u> <i>The lease holder shall design all blasts on the basis that the blast overpressure noise level generated by any blasting within the subject area, shall not exceed the levels in or conditions of the EPA Licence for the mine, at any dwelling or occupied premises not owned by the lease holder, the holder of an authority under the Mining Act, or not subject to a valid agreement with the lease holder, with respect to the effects of blasting.</i>	2.4 & 5.1 3 3

2.4 COMPLIANCE WITH BLASTING CRITERIA, STANDARDS AND GUIDELINES

Blasting at DCPL will be conducted in accordance with the following:

- The ground vibration peak particle velocity and Airblast overpressure criteria detailed in NSW Project Approval (08_0203) (Section 2.1), the EPL 11701 conditions relevant to blasting (Section 2.2) and the ML 1646 and ML 1427 conditions relevant to blasting (Section 2.3).
- Australian Standard (AS 2187.2:2006) Explosives: Storage and Use Part 2: Use of Explosives.
- The Australian & New Zealand Environment Conservation Council (ANZECC) Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (1990).
- Hours of blasting as set out in Condition 9 of NSW Project Approval (08_0203) and Condition L5.5 of EPL 11701.
- DCPL's Explosives Principal Control Plan (DCPL, 2016).
- Duralie Coal Mine Blast Fume Management Procedure (Refer Attachment 1).

2.5 CONSULTATION

In accordance with Condition 16(a), Schedule 3 of NSW Project Approval (08_0203), the BLMP is to be prepared in consultation with the EPA. This revised BLMP was provided to the EPA for consultation purposes in September 2021. The EPA requested that prior to cessation of blasting and blast monitoring, DCPL consult with the EPA. A record of consultation with the EPA for this BLMP is provided in Appendix A. On 16 December 2021, the DPIE (Planning and Assessment division) approved this revised BLMP. The DPIE's letter of approval is provided in Appendix B. The revision status of this BLMP is provided on the title page of the plan.

2.6 BASELINE DATA

A detailed description of baseline blasting data is provided in the *Duralie Extension Project Noise and Blasting Impact Assessment* (Heggies Australia, 2010) and *Duralie Open Pit Modification Noise and Blasting Assessment* (SLR, 2014) which are available on the Duralie Coal website (www.duraliecoal.com.au).

3 MANAGEMENT MEASURES

The blast management measures described in this section will continue to be undertaken until blasting activities at the DCM have been permanently ceased after the completion of bulk rehabilitation earthworks.

In addition to the DCPL's blast design and implementation methodologies, the following activities shall be undertaken to minimise any potential impacts of blasting at the DCM:

- Blast design addressing aspects including total charge size, instantaneous charge size, delay between blast hole explosive initiation, direction of initiation (taking into account potentially affected receivers), type and quantity of stemming material, geology, use of decking, provision for burden relief, etc.
- Evaluation of the potential for faceburst due to insufficient face burden.
- Evaluation of the overpressure enhancing potential offered by adverse prevailing weather conditions, particularly low, dense cloud cover, strong winds and temperature inversions. Blasting will not be undertaken if unacceptable environmental outcomes are anticipated.
- Evaluation of the potential for the generation of dust and/or fume (Sections 3.6 & 3.7).
- Evaluation of the potential for dust and/or fume to be carried to a nearby receiver as a consequence of receiver proximity, wind direction and wind strength.
- Evaluation of the potential for flyrock generation.
- Adequate preparation of bench surface to drain water away from blast holes.
- Adequate preparation of the blast surface (e.g. dozing/grading) to provide an even surface for drilling.
- Inspection of the blast surface to ensure that there is no significant geological weakness (e.g. fracturing from a previous blast) that may contribute to inadequate containment of explosive energy during blasting.
- Completion of a Blasting Checklist (Attachment 2) to evaluate the potential impacts of the blast.
- Quality control for supplied stemming gravel to ensure the material is acceptable in terms of size, rock type and angularity.
- Monitoring of the quantity of stemming gravel within each blast hole to ensure compliance with design.
- Maintaining the integrity of the stemming material such that it is not contaminated with foreign matter such as clay which may result in the explosive materials being insufficiently stemmed.
- Personnel involved in designing and undertaking blasting operations will be appropriately qualified and experienced to undertake their assigned tasks.
- External blasting expertise and specialised service providers will be utilised as required.

3.1 BLAST TIMING AND FREQUENCY

As per Condition L5.5 of EPL 11701, and Condition 9, Schedule 3 of NSW Project Approval (08_0203), blasting operations at the premises will only take place between 9:00am to 5:00pm Monday to Saturday. Where compelling safety reasons exist, the EPA may permit a blast to occur outside the abovementioned hours. Prior written (or electronic correspondence) notification of any such blast must be made to the EPA. No blasting will occur on Sundays, public holidays or any other time without the written approval of the Secretary of the DPIE, in accordance with NSW Project Approval (08_0203).

As per Condition 10, Schedule 3 of NSW Project Approval Condition (08_0203), there will be no more than three (3) blasts per week on site, averaged over any 12 month period. Only one (1) blast is to occur each day on site, unless an additional blast is required following a blast misfire.

As described in Section 1, after the cessation of mining operations on 31 December 2021, some blasting may occur at the DCM to achieve the final landform design and satisfy geotechnical requirements. These blasts would be infrequent and would continue to be conducted in accordance with the timing requirements as prescribed under EPL 11701 and Project Approval (08_0203) described above. Once bulk rehabilitation earthworks are complete, blasting would no longer occur at the DCM.

3.2 BLASTING AND LOCAL RESIDENCES

3.2.1 Notification of Blasting and/or Road Closure

A “Blasting Hotline” (02 6538 4213) has been established to provide the public with up-to-date information on the blasting schedule and road closures at the mine.

The existence of the “Hotline” is promoted on the DCM’s website and by advertising within the Dungog Chronicle and the Gloucester Advocate on two occasions each year. The “Hotline” is also featured within the “Pink Pages” local telephone directory issued by each local newspaper as well as in the Sensis White Pages Directory (Newcastle and Kempsey Directory areas).

DCPL has provided an initial blast notification, by post, to each landowner whose property lies within the 500 m Blast Zone (Figure 3) of current operations.

Where doubt exists as to whether the blast notification has been received and a written agreement for blasting cannot be established, DCPL will also attempt to contact the landholder by any listed or known phone contact. In the event that this phone contact is unsuccessful, an inspection of this property will take place (Section 3.2.3).

Where there are known user(s) of an infrequently used road subject to road closure such as Duralie Road – for example a local landowner – such a road user would be informed by notice at the property gate or a telephone call of the proposed blast/road closure if they wished to be so advised.

The procedure for closing a public road for blasting is described in Section 3.3.2.

3.2.2 Interaction with Private Landholders

A 500 m Blasting Zone for all persons (with the exception of those persons permitted by the shot firer to be within the 500 m Blast Zone for the purposes of blast management) will be established for all blasts.

The outer limits of the 500 m Blast Zone for approved operations is shown on Figure 3. The 500 m Blast Zone includes one privately owned property (Figure 3), which is a vacant landholding without a private residence.

The following process will be followed for all blasts fired where any vacant landholding is within the 500 m blast zone:

- Inspection of the vacant property within the 500 m Blast Zone (Figure 3) will be conducted in accordance with the inspection measures described below.
- Inspections will occur twice, once in the morning of the day of the scheduled blast and one just prior to the blast (within an hour).



WAV-21-37 DMP BlastMP_2038

LEGEND

- Mining Lease Boundary
- Approximate Extent of Existing/Approved Surface Development
- Privately Owned Land
- Council Owned Land

Source: © NSW Spatial Services (2019)
 Orthophoto: Google Earth CENS/Airbus (2020)



DURALIE COAL MINE
 500 m Blast Zone

Figure 3

General Inspection – Morning of the Scheduled Blast

DCM personnel will drive Duralie Road viewing the property frontage and access points for signs of recent visitation to private lands. DCM personnel will:

- inspect access points including gates for recent tyre marks;
- check for signs of disturbance of any accumulated vegetation across areas of access;
- check for recent disturbance of gates; and
- inspect the property for activity.

Detailed Inspection of Unattended Lands – One Hour prior to Blasting

1. Closure of Duralie Road (by NSW Roads and Maritime Services' qualified personnel) at least 1 hour prior to the blast. This prevents access to private lands, after closure is confirmed a detailed inspection shall commence.
2. DCM personnel will drive or walk, as appropriate, the actual boundaries of the lands subject to blasting and inspect the lands with binoculars if required. Visual inspection will take place where clear lines of sight are available for the relevant property.
3. DCM personnel will conduct a thorough visual inspection of the property to check for livestock and persons, in addition DCM personnel will stop and listen for activity. The current vacant private land within the 500 m blast zone (Figure 3) has clear lines of sight such that a comprehensive inspection of all aspects of the property is possible from various viewpoints along the property boundary.
4. DCM personnel will attempt to identify any changes on the property and any evidence of occupation or recent activity such as mowing, slashing, maintenance, new vehicles, burning off or mail build-up.
5. Once the boundaries have been checked, mine personnel will relocate to sentry viewing areas which overlook private lands

In the event that DCM personnel determine that someone is/may be present on the non-DCPL owned land, the following measures will be undertaken:

1. Should livestock or persons be detected on private lands within the 500m Blast Zone then the DCM personnel shall report to the shot-firer and the blast shall be postponed.
2. The DCM personnel shall not make contact with any persons on private lands.
3. The shot-firer shall report to the DCM Manager of Mining Engineering of the presence of persons or livestock on the private lands.
4. Blasting will be postponed until such a time that it is confirmed that the persons are notified and a suitable determined blast time can be agreed. If this is not possible, blasting measures will be implemented which will ensure the safety of people and livestock on the land are not compromised.

The measures could include reduction of maximum instantaneous charge size, increased charge delay and flushing prepared blast holes to neutralize primers and boosters. The type of measure will be determined by DCM Management and the DCM Manager of Mining Engineering and will account for location of the proposed blast within the pit and distance to the relevant private landholding.

3.2.3 Property Inspections

If DCPL receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or have a previous property inspection report updated, then within 2 months of receiving this request, DCPL will:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary of the DPIE, to:
 - establish the baseline condition of the 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 project on these buildings and/or structures; and
- (b) give the landowner a copy of the new or updated property inspection report.

In addition, DCPL facilitates routine property inspections of privately-owned dwellings with selection taking into account location relative to current or future operations, history of past inspection and concern regarding building damage (e.g. observed cracking) expressed by the owner amongst other factors.

3.2.4 Property Investigations

If the owner of any privately-owned land claims that 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, DCPL will:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary of the DPIE, to investigate the claim; and
- (b) give the landowner 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 DCPL will repair the damages to the satisfaction of the Secretary of the DPIE.

If DCPL or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary of the DPIE for resolution.

3.2.5 Property Purchase

DCPL will conduct annual checks of the ownership of properties within two kilometres of the mine using current land tenure records. In the event that non-company owned land is under new ownership, the notification and inspection procedures described in Section 3.2.2 will be enacted with the new owner and fresh attempts to develop a written agreement for blasting will be undertaken.

3.3 BLASTING WITHIN 500 M OF PUBLIC INFRASTRUCTURE

3.3.1 Blasting within 500 m of the North Coast Railway Line

Permission has been obtained from the Australian Rail Track Corporation (ARTC) for blasting within 500 m of the North Coast Railway Line (Figure 3). A protocol for blasting within 500 m of the North Coast Railway Line with concurrence of ARTC was previously established by the mining contractor, Henry Walker Elton Contracting (HWE), prior to blasting occurring within that area.

The current protocol is for ARTC to be notified with a minimum of twenty-four (24) hours advanced warning of the intention to fire a blast within 400 m of the North Coast Railway Line. A sentry is placed to observe the railway line for rail traffic and communications made with the shot-firer. In the event that rail traffic is observed on the rail line the blast is delayed and then detonated when the rail line is clear of traffic.

3.3.2 Blasting within 500 m of a Public Road

Sentries will be employed in the event of road closure and for the inspection of non-company owned land (Section 3.2.2). The location of these sentries will be determined by the Drill and Blast Engineer, with the agreement of the shot firer and the Mining Supervisor (Open Cut Examiner [OCE]), and will ensure adequate visibility of all non-company owned lands and roadways within the 500 m Blast Zone.

Sentries will also be employed at the DCM to ensure that the 500 m Blast Zone is maintained until the shot firer deems it is safe to re-enter the 500 m Blast Zone. The location of sentries will be determined by the Drill and Blast Engineer, the shot firer and the Mining Supervisor (OCE) before each blast.

Duralie Road is the only public road that is subject to road closure when blasting occurs. Permission has been obtained from the Great Lakes Council (GLC) (now the MidCoast Council [MCC]) for blasting within 500 m of the Duralie Road. When closure of this road is necessary a dedicated road closure process is employed. This road closure process addresses:

- MCC notification;
- notification to potentially impacted private property owners;
- traffic control in accordance with NSW Roads and Maritime Services' requirements; and
- blast sentry locations.

3.4 BLASTING AT SITES OF SIGNIFICANCE

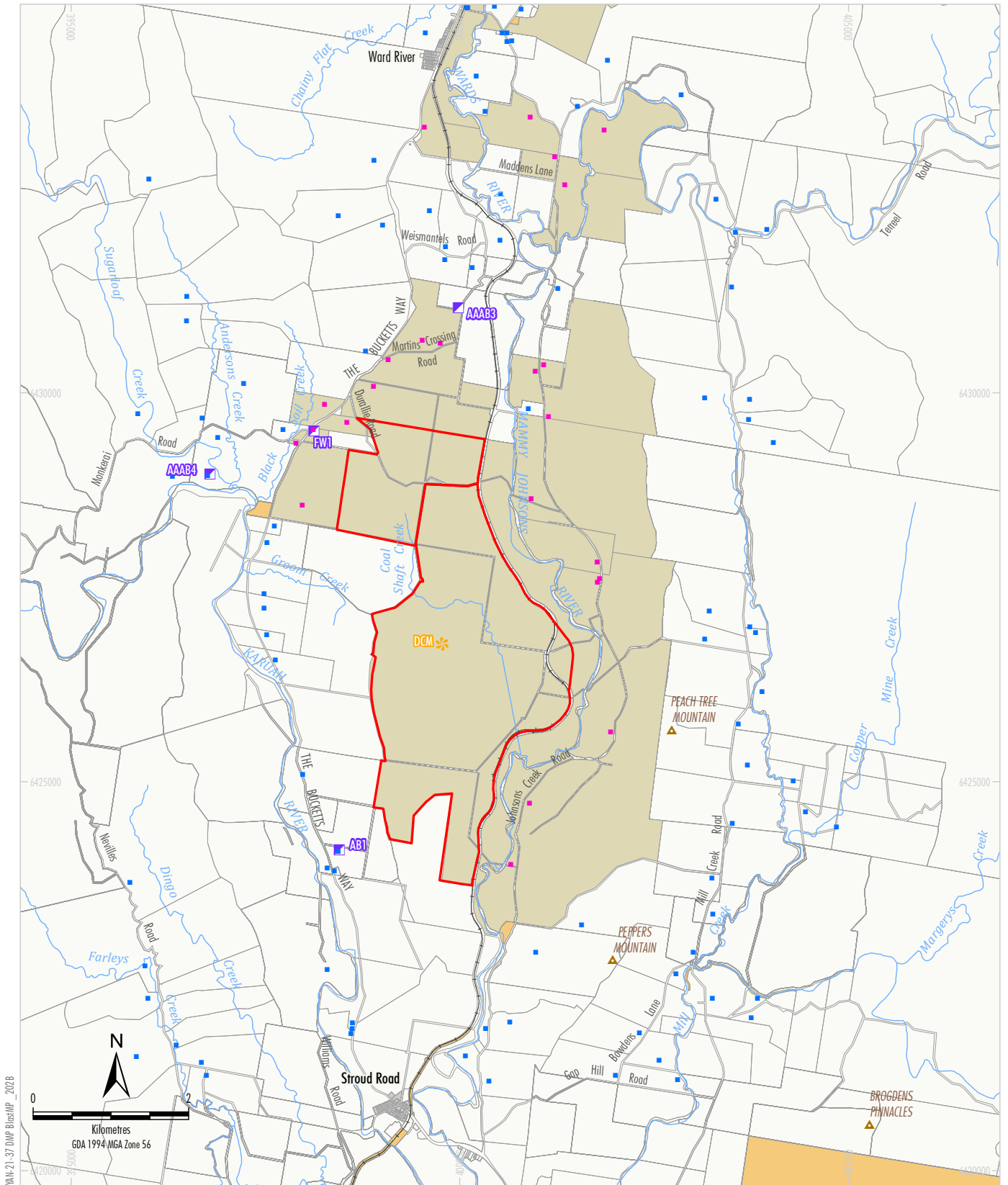
3.4.1 Mammy Johnsons Grave

No blasting under this BLMP will occur within 3,000 m of Mammy Johnsons Grave. Blast design utilised at the DCM provides for a Maximum Instantaneous Charge (MIC) within the range 400 – 1,500 kilograms. At this charge range there is negligible potential for blasting to exceed the NSW Project Approval limit of five (5) millimetres per second (mm/s) ground vibration at this location (Section 2.1).

In order to validate the above anticipated blasting impacts at Mammy Johnsons Grave, a series of ten consecutive blasting events was monitored at the grave site. A report evaluating results from this monitoring sequence was prepared and provided to the former Department of Planning and Industry (DP&I) on 8 March 2012. In consultation with former DP&I it was determined this report provided sufficient evidence that there is negligible potential to exceed the NSW Project Approval blasting criteria at Mammy Johnson's Grave and no further blast monitoring is required to be conducted at Mammy Johnson's Grave.

3.4.2 The Former Weismantel's Inn

A blast monitor has been situated at the former Weismantel's Inn to measure ground vibration and all blasts are monitored at this location (blast monitor FWI) (Figure 4). Project Approval (08_0203) requires that ground vibration peak particle velocity from blasting must not exceed 10 mm/s at the former Weismantel's Inn (Section 2.1). Blast monitoring results to date indicate that ground vibration from blasting activities at the DCM have not exceeded 5 mm/s.



YAM-21-37 DMP BlastMP - 2028

Source: © NSW Spatial Services (2020)

- LEGEND**
- Mining Lease Boundary
 - Yancoal - Owned Land
 - Private Landholders
 - Crown Land
 - Urban Development
 - Dwelling - Yancoal Owned
 - Dwelling - Privately Owned
 - ✱ Meteorological Station
 - Blast Monitoring Site



DURALIE COAL MINE
Blast Monitoring Sites

Note: The Duralie Coal Mine blast monitoring program will become redundant following the completion of bulk rehabilitation earthworks (anticipated by end 2023).

Figure 4

3.5 BLASTING AND RISK OF INDUCED GEOLOGICAL FRACTURING

Blasting management practices (including the use of pre-split shots) will be utilised to minimise the risk of induced geological fracturing which could increase the potential for local ground waters to migrate to Mammy Johnsons River, particularly upon cessation of mining. Such practices would also serve to minimise the risk of water resources associated with the Mammy Johnsons River reporting directly to the mine workings.

3.6 FUME MANAGEMENT

The management of blast fume is described in detail in the DCM Blast Fume Management Procedure (Attachment 1). The most effective way to manage fume is to eliminate the possibility of fume being generated. The elimination of fume requires the concerted action by all entities involved in the blasting activity. This requires an understanding of the factors known to affect the generation of post blast (NO_x) fume within any blast process.

A risk assessment for the potential of fume generation from blasting is conducted for each blast based on historical and current observations. The risk assessment will involve the likelihood of fume generation as a result of the following parameters:

- historic fume location;
- presence of clay;
- presence of loose/broken ground;
- heavily rain affected;
- product selection;
- rain ingress; and
- groundwater/dynamic water.

Each of the parameters outlined above is assigned a score which corresponds to the likelihood of fume generation (1=rare to 5=almost certain). The score assigned to each of the parameters is then multiplied by the full time weighting of each parameter. The sum of the resulting scores then determines the overall likelihood of fume generation.

The outcome of the risk assessment determines the guidelines for blast design, product selection and other pre-blast considerations, further detail is provided in Attachment 1. An example risk assessment matrix is shown in Table 5.

Table 5
Example Fume Likelihood Risk Assessment Matrix

Fume Likelihood	Score	Likelihood	Weight (%)
Historic fume location	1	Rare	30
Presence of clay	1	Rare	5
Presence of broken ground	3	Possible	5
Heavily rain affected	3	Possible	15
Product selection	2	Unlikely	30
Rain ingress	2	Unlikely	5
Dynamic ground water	1	Rare	10
Fume Likelihood	2	Unlikely	

5	Almost certain	Use AquaMax 270 or ThrowMax 240 & reduce sleep time to < 3days, load to allow firing at short notice
4	Likely	Use AquaMax 270 or ThrowMax 240 & reduce sleep time to < 3days, load to allow firing at short notice
3	Possible	Use AquaMax 270 or ThrowMax 240 & if major slumping occurs use AquaMax 270 & fire within 5 days
2	Unlikely	Use AquaMax 270 or ThrowMax 240 & if major slumping occurs use AquaMax 270 & fire within 8 days
1	Rare	Use AquaMax 270 or ThrowMax 240 & if major slumping occurs use AquaMax 270 & fire within 8 days

Where particular circumstances are known to increase the likelihood of a blast producing unacceptable fumes and/or odours (e.g.: prevailing wind direction indicating that any potentially generated fume will be carried to a potential receiver), control measures will be implemented to avoid those operational circumstances where practicable.

In the interest of the minimisation of fume generation to the greatest extent possible, the type of explosive used at the DCM has been limited to heavy ammonium nitrate fuel oil (HANFO), which contains an increased amount of water resistant emulsion.

3.7 MANAGEMENT OF DUST FROM BLASTING

Where particular circumstances are known to increase the likelihood of a blast producing unacceptable amounts of dust (e.g. prevailing wind direction indicating that any potentially generated dust will be carried to a potential receiver), control measures will be implemented to avoid those operational circumstances where practicable. As described in Section 6.1.1 of the DCM Air Quality and Greenhouse Gas Management Plan, proactive management measures may include:

- Fine material collected during drilling will not be used for blast stemming.
- Adequate stemming will be used at all times.
- When practicable DCPL will consider options for benches to be watered prior to loading a blast if unacceptable levels of dust are being generated.
- Blasting will only occur following an assessment of weather conditions by the Environment and Community Superintendent to ensure that wind speed and direction will not result in excess dust emissions from the site towards adjacent residences. No blasting will occur in the open cut when wind speeds exceed an average of 10 m/s over a 15 minute period.

3.8 MAINTENANCE OF BLAST ZONE POST BLASTING

The 500 m Blast Zone (Figure 3) will be maintained following the completion of the blast until a thorough inspection of the blast site can be completed by the shot firer. Once this inspection of the blast site has been completed and the shot firer is satisfied that the site is safe (i.e. no misfires have occurred), the shot firer will allow the re-establishment of access to the 500 m Blast Zone and normal operations to resume.

4 SAFETY

The blasting safety procedures described in this section will continue to be undertaken until blasting activities at the DCM have been permanently ceased after the completion of bulk rehabilitation earthworks.

4.1 PROTECTION OF LIVESTOCK

Consistent with the procedures described in Section 3.2.2, livestock agisted on mine owned land will be removed from areas which may be affected by flyrock, dust or blast fume. The owners of livestock grazing on land not owned by the mine will be advised of any impending blast that has the potential to injure their livestock in order that they may relocate their animals beyond the area of blast affectation.

4.2 PROTECTION OF PERSONS DURING BLASTING

The DCM Explosives Principal Control Plan (DCPL, 2016) addresses personal safety requirements during blasting.

A 500 m Blast Zone for all persons (with the exception of those persons permitted by the shot firer to be within the 500 m Blast Zone for the purposes of blast management) will be established for all blasts (Figure 3). The 500 m Blast Zone can also be varied at the discretion of the shot firer, Mining Supervisor or Mine Manager when considered appropriate. The 500 m Blast Zone will be maintained by placing sentries at points of entry to the blast affected area.

In cases where a portion of the 500 m Blast Zone lies within privately owned land refer Section 3.2.2.

4.3 SAFETY OF AIRCRAFT

A visual inspection of air space in the vicinity of blast area will be undertaken by the shot firer prior to initiating the blast. If there is any perceived risk to aircraft in the area of the mine as a result of blasting, the blast will be delayed until the aircraft has left the blast area.

5 BLAST MONITORING PROGRAM

The blast monitoring program described in this section will continue to be undertaken until blasting activities at the DCM have been permanently ceased after the completion of bulk rehabilitation earthworks.

5.1 MONITORING METHODS AND PROGRAM

Blast monitoring will be conducted to confirm compliance with the blasting limits/criteria defined in Sections 2.1 to 2.3 and will use a blasting seismograph which meets the standards specified in the Australian Standard Explosive Code (AS2187.2 – 2006).

Measurements of airblast overpressure and ground vibration for all blasts are measured at the monitoring locations indicated in Figure 4:

- a) Land owned by E and V Shultz shown as blast monitoring site AB1, Bucketts Way;
- b) Land owned by A Fisher-Webster shown as blast monitoring site AAAB3, Martins Crossing Road;
- c) Land owned by P Moylan shown as blast monitoring site AAAB4, Monkerai Road; and
- d) Former Weismantel's Inn shown as blast monitoring site FWI (Ground vibration only).

Note that all EPL licensed monitoring locations:

- are subject to permission to monitor being given by the property owner; and
- may be altered or supplemented on the basis of blasting results over time and/or community feedback. Any alteration to an EPL designated monitoring location would first require a relevant EPL variation.

Instrumentation used to measure the airblast overpressure and ground vibration levels are inspected and calibrated routinely to ensure the requirements of Australian Standard AS 2187.2 – 2006.

Blast monitoring program results are included within the Annual Review which is available on the DCM website (<http://www.duraliecoal.com.au/>). Monitoring results will be kept for a minimum of four (4) years.

5.2 VIDEO MONITORING OF BLASTS

In accordance with EPL 11701 Condition M8.1, all blast shots at the DCM are recorded on video, from a position which allows the collars of the shot, and where possible, any face, and/or toe, to be seen on the video. All videos will be a minimum duration of 1 minute following the blast and will capture any post blast fume until the fume dissipates, leaves the site or leaves the view of the camera. As required by Condition M8.1, DCPL retains a copy of each video for at least 12 months after the blast was initiated.

5.3 MONITORING OF FUME

The level and rating of blast fume generation will be monitored for each blast by the shot firer as described in the DCM Blast Fume Management Procedure (Attachment 1). The fume characteristics for all blasts will be recorded, rated and reported using the rating system in Appendices 2 and 3 of the Australian Explosives Industry and Safety Group Inc. Code of Practice titled "Prevention and Management of NO_x Gases in Surface Blasting, Edition 2, August 2011". In situations where fume has been generated, an assessment will be made of the extent to which the fume has travelled as well as its dispersion time. Both will be recorded along with the level of fume generated.

5.4 MONITORING PROGRAM FOR FLYROCK DISTRIBUTION

As outlined in Section 3.8, following each blast, the shot firer will inspect the blast site to determine whether all explosive has satisfactorily detonated and whether it is safe for work to resume in the area. During this inspection a visual assessment will be made of flyrock distribution in the immediate area.

When blasting occurs in a location where there is a potential for flyrock to reach the North Coast Railway Line, an inspection of the railway line will be conducted following the blast to determine whether flyrock has reached the railway line. If the railway line has been affected by flyrock, the rock will be removed in order to make the railway line safe.

Where blasting occurs in a location where there is a potential for flyrock to reach a public road, an inspection of the road will be undertaken immediately after the blast to ascertain whether flyrock has reached the road. If flyrock is on the road it will be removed before the road is re-opened.

Similarly, where blasting occurs in a location where there is a potential for flyrock to reach a private property, an inspection of the private property, with the land owners consent, will be undertaken immediately after the blast to ascertain whether flyrock has reached the private property. If flyrock is on the private property it will be removed, with the land owners consent.

6 BLASTING PROTOCOLS & CONTINGENCY PLAN

The requirements for implementation of the protocols, investigation and notification procedures described in this section will cease once blasting activities cease at the DCM. Blasting activities at the DCM will cease following the completion of bulk rehabilitation earthworks, which are anticipated to be completed in 2023.

An Incident Investigation will be required when any one of the following incidents arises following blasting:

- Monitoring indicates an exceedance of the blasting limits/criteria stated within the conditions of NSW Project Approval (08_0203), ML 1646 or ML 1427 or EPL 11701 (Sections 2.1 to 2.3);
- Breach of any other Licence, Lease or Project Approval condition relating to blasting;
- Generation of blast fume;
- Receipt of a complaint from a member of the public or a public authority following blasting; and
- Evidence of structural damage to nearby privately or publicly owned structures attributable to blasting.

6.1 CONTINGENCY PLAN

In the event of any of the above incidents, DCPL will implement the following Contingency Plan:

- report any non-compliant blast (in terms of monitored results) to EPA, DPIE and NSW Resources Regulator as per the notification procedures outlined in Section 6.2;
- record the blasting related complaint on the DCM Complaint Register and conduct appropriate follow up as per DCM complaint management procedures; and/or
- commission a dilapidation survey utilising a DPIE approved structural engineer where structural damage of privately or publicly-owned structures potentially attributable to blasting has been reported to DCPL. This survey is to ascertain the cause of the damage and to evaluate possible remedial works should the damage be deemed due to blasting; and/or
- review and assess the blast design and implementation procedures to determine the likely cause of the incident and to identify appropriate mitigation measures:
 - review of the blast design to identify possible explanations for the non-compliance (i.e. whether suitable blast controls were implemented in the blast design and were implemented correctly); and
 - review of the blast monitoring results and meteorological data to identify whether meteorological conditions may have contributed to the problem.

6.2 NOTIFICATION PROCEDURES

In the event that monitoring indicates an exceedance of NSW Project Approval (08_0203), EPL or ML blasting limits/criteria detailed in Sections 2.1 to 2.3, the following notification procedures will be implemented:

- The exceedance of the blasting criteria will be reported to the Operations Manager and Environment & Community Superintendent (or delegate) within 24 hours of assessment completion.
- DCPL will report the exceedance of the blasting criteria to the EPA and the DPIE as soon as practicable (i.e. within 24 hours of assessment completion).

DCPL will provide written details of the incident to the EPA and the DPIE within 7 days of the date on which the incident occurred as required by Condition R2.2 of EPL 11701 and Condition 6 of NSW Project Approval (08_0203).

6.2.1 Blast Fume

In accordance with the DCM's Pollution Incident Response Management Plan (PIRMP) and DCM Blast Fume Management Procedure (Attachment 1), DCPL is required to notify the relevant regulatory authorities including the EPA and DPIE of any blast producing post-blast fume that rates 3 at its highest extent and leaves the site, or any blast that rates 4 and 5.

In this event, an investigation process will be undertaken to identify any possible mitigation measures which may be implemented to minimise the potential for ongoing fume generation as a result of blasting. The investigation process will be undertaken in accordance with Sections 5 and 6 of the Australian Explosives Industry Safety Group (AEISG) Code of Practice; "Prevention And Management Of Blast Generated NOx Gases In Surface Blasting" and is summarised in Section 3.7 of the DCM Blast Fume Management Procedure. As required by Condition R2.2 of EPL 11701, DCPL will provide written details of the incident to the EPA with 7 days of the date on which the incident occurred.

Any reasonable and feasible control measure which may prevent the ongoing generation of fume at the DCM which arises as a result of the investigation process will be implemented.

7 ANNUAL REVIEW AND IMPROVEMENT OF BLMP

7.1 ANNUAL REVIEW

In accordance with Condition 3, Schedule 5 of NSW Project Approval (08_0203), DCPL will prepare an Annual Review of the environmental performance of the DCM by the end of December each year. Annual Reviews are made publicly available on the DCPL website, in accordance with Condition 10, Schedule 5 of NSW Project Approval (08_0203).

The Annual Review will specifically address the following aspects of Condition 3, Schedule 5 of Project Approval (08_0203), which are directly relevant to blast management:

- include a comprehensive review of the monitoring results and complaint records for the DCM over the past year, including a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria;
 - monitoring results of previous years; and
 - relevant predictions in the EA;
- identify any exceedence of criteria over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the DCM;
- identify any discrepancies between the predicted and actual impacts of the DCM, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the DCM.

This BLMP will be reviewed within three months of the submission of an Annual Review, and revised where appropriate, as described in Section 7.2 below.

7.2 BLAST MANAGEMENT PLAN REVIEW

In accordance with Condition 4, Schedule 5 of NSW Project Approval (08_0203), this BLMP will be reviewed, and if necessary revised to the satisfaction of the Director-General of the DPIE within three months of the submission of:

- an Annual Review, in accordance with Condition 3, Schedule 5 of NSW Project Approval (08_0203);
- an incident report, in accordance with Condition 6, Schedule 5 of NSW Project Approval (08_0203);
- an audit, in accordance with Condition 8, Schedule 5 of NSW Project Approval (08_0203); or
- any modification to the conditions of NSW Project Approval (08_0203).

In addition, the BLMP will be revised to the satisfaction of the Director-General of the DPIE if necessary, to ensure the plan is updated on a regular basis and to incorporate any recommended measures to improve environmental performance.

This BLMP is publicly available on DCM's website, in accordance with Condition 10, Schedule 5 of NSW Project Approval (08_0203). A hard copy is also kept at the DCM.

8 ROLES AND RESPONSIBILITIES

Table 6 details the DCM staff responsibilities relevant to implementation of this BLMP.

Table 6
BLMP Implementation Responsibilities

Role	Responsibility
Operations Manager	Provide adequate resources to implement the requirements of the BLMP.
	Notify Yancoal corporate of blast and blast fume incidents (as defined in Section 6).
Technical Services Manager	Provide adequate resources so this BLMP is communicated to all personnel involved in the blasting process. Approves blast designs and signs off all blasts.
Mining Supervisor (Open Cut Examiner)	Ensure all employees fully comply with this BLMP and the Blast Fume Management Procedure. Ensure adequate training and assessment of employees undertaking blast activities. Ensure any person exposed to NOx gases seeks medical attention immediately as per the Blast Fume Management Procedure .
Drill and Blast Engineer	Assist in relevant reviews of this BLMP.
	Design blasts to comply with relevant blast limits/criteria and to minimise blast fume. Provide geological information for blast design and management of blast fume.
	Assess all post blast fume according to AEISG Rating Scale, and record results according to Blast Fume Management Procedure (Attachment 1).
Environment and Community Superintendent	Notify relevant authorities and potentially affected external stakeholders of pollution incidents.
	Coordinate the response to blast and blast fume incidents and initiate the Pollution Incident Response protocol where required.
	Prepare reports relating to blast and blast fume incidents.
	Provide all employees and contractors adequate training in environmental awareness, legal responsibilities, and pollution incident response.
	Coordinate relevant reviews of the BLMP.
Environment and Community Advisor	Assist with the response to blast and blast fume incidents.
	Assist with the reporting of blast and blast fume incidents.

8.1 TRAINING

The DCM site induction informs all employees, contractors and visitors about general blast procedures and restrictions at the DCM and on blast fume generation and the potential impacts of blast fumes. DCM blast crew are trained on blast product selection, blast design, industry standards and guidelines and blast fume management. Blast fume management training includes:

- Health impacts of NOx gases.
- Potential causes of blast fume.
- Fume mitigation and management measures.
- Blast fume rating and post blast assessment procedures.
- Incident investigation and contingency plan procedures.
- Notification procedures associated with post-blast fume events.

9 REPORTING PROTOCOLS

In accordance with Condition 2 (g), Schedule 5 of NSW Project Approval (08_0203), DCPL has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

The management of incidents is described in the DCM Pollution Incident Response Management Plan (PIRMP). The management of complaints and non-compliances is described in detail in the DCM Environmental Management Strategy. The management of exceedances of performance criteria relevant to blasting is detailed in Section 6 of this BLMP. The DCM PIRMP and Environmental Management Strategy are available on the DCM's website.

10 REFERENCES

- ANZECC (1990) *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration*. Australian and New Zealand Environment Council, Canberra.
- DCPL (2014) *Duralie Open Pit Modification Environmental Assessment*.
- DCPL (2016) *Duralie Coal Mine Explosives Principal Control Plan*.
- Heggies Australia (2010) *Duralie Extension Project Noise and Blasting Impact Assessment*.
- SLR (2014) *Duralie Open Pit Modification Noise and Blasting Assessment*.

11 DEFINITIONS

ANFO	A mixture of ammonium nitrate and fuel oil with or without a dye colouring agent (Definition from AS2187.0).
Dry Holes	Blast hole with no greater than 0.5 metres of water, which can be bagged off using a gas bag.
BEZ	Blast Exclusion Zone.
Dust	Airborne particulate matter ranging in diameter from 10 to 50 microns.
Dynamic Water	Water that is in motion (i.e. flowing water)
NO _x (Oxides of Nitrogen)	A multiple combinations of oxides of nitrogen (N ₂ O ₂ , NO, NO ₂ , N ₂ O ₃ , N ₂ O ₄ , N ₂ O ₅) with nitrogen dioxide (NO ₂) being the principle hazardous nitrous fume.
Post Blast Fume	Gases generated by the detonation of explosives during blasting.
OCE	Open Cut Examiner
Precursor	A material resulting from a chemical or physical change when two or more substances consisting of fuels and oxidisers are mixed is intended to be used exclusively in the production of an explosive. (Definition from AEMSC Code of Good Practice Precursors for Explosives.)
Sleep Time	The time between explosives being loaded into a blast hole and their initiation (Definition from AS2187.0)
Wet holes	Blast holes containing dynamic or static water.

ATTACHMENT 1

DURALIE COAL MINE BLAST FUME MANAGEMENT PROCEDURE

ATTACHMENT 2
DCM BLASTING CHECKLISTS

APPENDIX A

RECORD OF CONSULTATION WITH EPA

APPENDIX B

DPIE LETTER OF APPROVAL OF BLMP