

LIDDELL

GLENCORE



Blast Management Plan

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1. Purpose

Liddell Coal Operations (LCO) is an established mining operation located approximately 25 kilometres north-west of Singleton in the Hunter Valley of New South Wales. The LCO site is divided by the boundary between the Singleton and Muswellbrook local government areas (LGAs) and is located in the Parish of Liddell, in the County of Durham.

LCO is operated and managed by Liddell Coal Operations Pty Limited, a wholly owned subsidiary of Glencore Coal Pty Limited (Glencore Coal), on behalf of a joint venture between Glencore Coal (67.5 percent %) and Mitsui Matsushima Australia (32.5%).

LCO received approval for the extension of Liddell Open Cut coal mining operations under the State Environmental Planning and Assessment Act 1979 (EPA Act) on 1 December 2014 (DA 305-11-01 Modification 5) and under the Commonwealth Environment Protection Biodiversity Conservation Act 1999 (EPBC Act) on 24 December 2014 (EPBC Approval 2013/6908). The purpose of this Blast Management Plan (BMP) is to provide a description of the measures to be implemented by LCO to manage blasting operations and to details the blast monitoring requirements associated with the operation. This BMP also provides a mechanism for assessing blast monitoring results against the relevant blast impact criteria.

2. Scope

This document also seeks to primarily satisfy condition 15A of Schedule 3 of the DA305-11-01 (as modified) and other related conditions. A summary of the approval requirements and where they are addressed within this document are provided in **Table 2-1**. LCO also holds Environmental Protection Licence 2094 (EPL 2094), with **Table 2-2** describing the relevant licence requirements.

The blast management strategies required for the Chain of Ponds Inn (conditions 5 and 15A(e)) and Newdell Zone Substation (conditions 15A (f)) are addressed in separate documents and should be read in conjunction with this plan.

Condition	Summary of Condition Requirement	Section(s)																						
4	The applicant shall ensure that blasts onsite do not exceed the criteria in Table 2: <i>Table 2: Blasting impact assessment criteria</i> <table><tr><th>Location</th><th>Airblast overpressure level (dB(Lin Peak))</th><th>Ground vibration (mm/s)</th><th>Allowable exceedance</th></tr><tr><td rowspan="2">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>120</td><td>10</td><td>0%</td></tr><tr><td rowspan="2">Newdell zone substation</td><td>-</td><td>20 (interim)</td><td>10% of the total number of blasts over a period of 12 months</td></tr><tr><td>-</td><td>25 (interim)</td><td>0%</td></tr><tr><td>Other public infrastructure</td><td>-</td><td>50</td><td>0%</td></tr></table>	Location	Airblast overpressure level (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance	Residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months	120	10	0%	Newdell zone substation	-	20 (interim)	10% of the total number of blasts over a period of 12 months	-	25 (interim)	0%	Other public infrastructure	-	50	0%	Tables 3.1 & 3.2
	Location	Airblast overpressure level (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance																				
	Residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months																				
		120	10	0%																				
	Newdell zone substation	-	20 (interim)	10% of the total number of blasts over a period of 12 months																				
		-	25 (interim)	0%																				
	Other public infrastructure	-	50	0%																				
However these criteria do not apply if the applicant has:																								

Condition	Summary of Condition Requirement	Section(s)
	a) A written agreement with the relevant owner to exceed these criteria, and has advised the Department in writing of the terms of this agreement; or b) In the event that the Applicant is unable to secure a written agreement with an infrastructure owner, demonstrated to the satisfaction of the Secretary that blasting can be carried out at levels in excess of the criteria without causing any damage to the infrastructure. <i>Notes:</i> <i>The interim criteria for the Newdell Zone Substation are based on consultation with the substation owner (Ausgrid). It is acknowledged that alternative criteria may be agreed as part of the blast management strategy for the substation (see condition 15A).</i> <i>An alternative limit for public infrastructure may be agreed to by the Secretary if it can be justified in accordance with the structural design methodology in AS2187.2-2006, or another methodology agreed to by the secretary.</i>	
9	The Applicant shall carry out blasting at the development only 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.	Section 4.1
10	The Applicant may carry out a maximum of: a) 3 blasts a day; and b) 8 blasts a week, averaged over a calendar year on the site. This condition does not apply to blasts that generate ground vibration of 0.5mm/s or less at any residence on privately-owned land, blast misfires or blasts required to ensure the safety of the mine, its workers or the general public. <i>Note: for the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.</i>	Section 4.1
11	During mining operations, the Applicant shall: Implement all reasonable and feasible management measures to: - Protect the safety of people and livestock in the area surrounding blasting operations; - Protect public or private infrastructure/property in the area surrounding blasting operations for blasting damage; and - Minimise the dust and fume emissions from blasting at the mine; b) Operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site; and Monitor and report on compliance with the relevant blasting conditions in this consent, to the satisfaction of the Secretary.	Section 4.1

Condition	Summary of Condition Requirement	Section(s)
11A	The Applicant shall not undertake blasting onsite within 500m of any public road or any land outside the site that is not owned by the Applicant unless the Applicant has: a) Demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and b) Updated the Blast Management Plan to include specific measures that would be implemented while blasting is being carried out within 500m of infrastructure or land; or A written agreement with the relevant landowner to allow blasting to be carried out closer to the infrastructure or land, and the Applicant has advised the Department in writing of the terms of this agreement.	Section 4.3 & Appendix A
12	By the end of February 2015, the Applicant shall: a) Re-notify the landowner/occupier of any residence within 2km of the development that they are entitled to register an interest in being notified of the blasting schedule of the mine; and b) Re-notify the landowner/occupier of any residence within 2km of the development of the blasting schedule at the mine, if that landowner/occupier registers an interest in being so notified; to the satisfaction of the Secretary.	Section 5.4
13	By the end of February 2015, the applicant shall advise all landowners of privately-owned land within 2km of the development that they are entitled to a structural property inspection.	Section 5.4
14	If the Applicant receives a written request for a structural property inspection from any landowner of privately-owned land within 2km of the development, the Applicant shall within 3 months of receiving this request: a) Commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and Give the landowner a copy of the property inspection report.	Section 5.4
15	If any landowner of privately-owned land within 2km of the site claims that buildings and/or structures on his/her land have been damaged as a result of blasting at the development, the Applicant shall within 3 months of receiving this request: a) Commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to investigate the claim; and b) Give the landowner a copy of the property investigation report.	Section 5.4

Condition	Summary of Condition Requirement	Section(s)
	If this independent property investigation confirms the landowners claim, and both parties agree with these findings, then the Applicant shall repair the damages to the satisfaction of the Secretary. If the Applicant or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process (Appendix 4 of DA305-11-01).	
15A	The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary, this plan must: a) Be submitted to the Secretary for approval by the end of May 2015, unless otherwise agreed with the Secretary; b) Describe the measures that would be implemented to ensure compliance with the blasting criteria and operating conditions of this consent; c) Propose and justify any alternative ground vibration limits for any public infrastructure in the vicinity of the site (if required); Include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions;	This document

Table 2-1 – Summary of DA305-11-01 Blasting Requirements

Condition	Summary of Condition Requirement	Section(s)
L6.1	Blasting in or on the premises must only be carried out between the 0900 hours and 1700 hours, Monday to Saturday. Blasting in or on the premises must not take place on Sundays or Public Holidays without the prior approval of the EPA.	Section 4.1
L6.2 and L6.3	The airblast overpressure level from blasting operations in or on the premises must not exceed: a) 115dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and b) 120dB (Lin Peak) at any time.	Table 3.1
L6.4 and L6.5	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: a) 5mm/sec for more than 5% of the total number of blasts during each reporting period; and b) 10mm/sec at any time.	Tables 3.1 & 3.2

Condition	Summary of Condition Requirement	Section(s)
L6.6	Offensive blast fume must not be emitted from the premises. <i>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:</i> 1. <i>Are harmful to (or likely to be harmful to) a person that is outside the premises from which it is emitted or</i> <i>Interferes unreasonably with (or is likely to interfere unreasonably) the comfort or repose of a person who is outside the premises from which it is emitted.</i>	Section 4.1 & Appendix B
M8.1	To determine compliance with condition(s) L.4.2 – L4.3 a) Airblast overpressure and ground vibration levels must be measured and electronically recorded at the nearest residence or sensitive receiver for all blasts carried out in or on the premises; Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard As 2187.2-2006.	Section 5.1, 5.1.1 & 5.2
M8.2	The licensee must monitor all blasts carried out in or on the premises at or near the nearest residence or noise sensitive location (such as school or hospital) that is likely to be most affected by the blast and that is not owned by the licensee or subject of a private agreement between the owner of the residence or noise sensitive location and the licensee to alternative blasting limits.	Section 5.1.1
R1.8	The licensee must supply, with each Annual return, a Blast Monitoring Report which must include the following information relating to each blast carried out with the premises during the reporting period covered by the Annual Return: a) The date and time of the blast; b) The location of the blast on the premises; c) The blast monitoring results at each monitoring station; and d) An explanation for any missing blast monitoring results.	Section 5.1.1 & 6.2
R4.3	The licensee must report any exceedance of licence blasting limits to the EPA Hunter at hunter.region@epa.nsw.gov.au as soon as practicable after the exceedance becomes known to the licensee or to one of the licensee's employees or agents.	Section 5.3.1
R5.3	The results of the blast monitoring required by the licence must be submitted to the EPA, with each Annual Return, at the end of each reporting period. The monitoring results must identify any exceedance of licence limits.	Section 5.1.1 & 6.2

Table 2-2 – Summary of EPL 2094 Blasting Requirements

2.1 Objectives

The objectives of this BMP are to:

- Establish a blast monitoring system to assess the air blast and vibration impact on surrounding receivers;
- Detail the controls to be implemented to minimise blasting impacts from the site;
- Provide a protocol to assess monitoring results against blast impact assessment criteria to evaluate compliance;
- Manage blast related community complaints in a timely and effective manner; and
- Detail the procedure for reporting blast criteria exceedances to relevant stakeholders.

2.2 Roles and Responsibilities

Role	Accountabilities for this Role
Operations Manager	Provide adequate resources for the implementation of this BMP. Authorise the implementation of specific management measures to minimise blast impacts in accordance with this plan. The outcomes of monitoring are systematically evaluated as part of ongoing mine planning. Authorise internal and external reporting requirements as well as subsequent revisions of this BMP.
Environment & Community Manager	Oversee the implementation of the BMP. Coordinate blast monitoring in accordance with this BMP. Confirm the results of monitoring are systematically evaluated and reported to relevant personnel for consideration as part of ongoing mine planning. Notify regulatory authorities and affected landholders of any blasting related exceedance and undertake associated reporting. Comply with all internal and external reporting requirements. Copies of the BMP are available on the Liddell Coal Operations website. Coordinate periodic reviews of this BMP. Assist the Drill & Blast Engineer with investigations of blasting exceedances, incidents or complaints. Liaise with the Drill & Blast Engineer to coordinate the maintenance of the community hotline. Coordinate the implementation of the BMP, including liaison with the Drill & Blast Engineer to assess meteorological conditions prior to blasts. Coordinate the management of records and reporting of blast monitoring results. Manage blasting related complaints in accordance with the complaints management procedure.

Role	Accountabilities for this Role
Technical Services Manager	Oversee the implementation of the BMP. Coordinate blast monitoring in accordance with this BMP. Confirm the results of monitoring are systematically evaluated and reported to relevant personnel for consideration as part of ongoing mine planning. Comply with all internal and external reporting requirements. Assist the Drill & Blast Engineer with investigations of blasting exceedances, incidents or complaints. Coordinate the implementation of the BMP, including liaison with the Drill & Blast Engineer to assess meteorological conditions prior to blasts. Coordinate the management of records and reporting of blast monitoring results.
Drill & Blast Engineer	Regularly review blast design parameters on the basis of blast monitoring records. Design and undertake blasts to comply with the requirements of this BMS, including the identification of meteorological blasting exclusion windows. Assess meteorological conditions prior to blasting to determine whether conditions are appropriate for blasting, in consultation with the ECM. Confirm that the blast monitoring network is active prior to blasting. Advise the ECM of the current blasting schedule, including changes to the schedule. Maintain records for blasts initiated. Assist the ECM with investigations into blasting exceedances, incidents or complaints.
Drill and Blast Supervisor	The drill and blast pattern is drilled in accordance with the blast design. The blast is loaded with the correct quantity and quality of explosive and stemmed in accordance with the blast design.
Shot Firer	Notify the Drill & Blast Engineer and Supervisor of any factors that may lead to non-compliance with this BMP. Load and fire blasts in accordance with the design supplied by the Drill & Blast Engineer.
Driller	Record drill status, including hole depths, pattern and relevant information.

Table 2-3 – Blast Management Plan Responsibilities

2.3 Definitions

The terminology utilised within this BMP is defined in **Table 2-4** below.

Term	Definition
Air blast / overpressure	An airborne shock wave resulting from detonation of explosives. An air blast may be caused by blasted material movement or the release of expanding gas into the air.
Blasting	Any activity involving the use of explosives for the purpose of producing an explosion to fragment rock.
Flyrock	Rock that is propelled outside of the blasting area through the air or along the ground as a result of detonation of explosives.
Ground vibration	The movement of the ground caused by the blast wave emanating from the blast.
Particle Velocity	A measure of ground vibration. Particle velocity describes the velocity at which a particle of ground vibrates when excited by a seismic wave.
Blast Exclusion window	The arc of prevailing wind direction calculated on an individual blast basis and designed to minimise the risk of adverse dust or fume impacts.

Table 2-4 – Terminology Utilised Within the BMP

2.4 Commitments

Commitment Number	Management Plan Commitment	Location in Document
1	LCO will advise DPIE in writing if any written agreements reached with relevant infrastructure and non mined owned residences regarding the revision if the criteria contained within Tables 3-1 and 3-2 .	3.1
2	Blasting at LCO will only occur on Monday to Saturday between 9.00am and 5.00pm. No blasting will be undertaken on Sundays, public holidays or at any other time, unless written approval has been obtained from the Secretary	4.1
3	Blasting will be undertaken at a maximum 3 blasts per day and no more than 8 blasts per week (average over a calendar year on the site). This total number of blasts does not apply to blasts that generate ground vibration of 0.5mm/s or less at any residence on privately-owned land, blast misfires or blasts required to ensure the safety of the mine, its workers or the general public. Note: this commitment 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; as per DA305-11-01.	4.1
4	Detailed design is undertaken for each blast in order to maximise the blast efficiency, minimise dust, fume, ground vibration and air blast, the potential for flyrock and to ensure compliance with site specific blasting conditions	4.1

Commitment Number	Management Plan Commitment	Location in Document
6	Blasting operations at LCO will be undertaken in accordance with LCO Meteorological Assessment, Blast Monitoring and Reporting Procedure	4.1
7	Monitoring of blasts over the life of the mine will be as specified in Section 5 at relevant blast sensitive locations	4.1
8	Training will be provided to relevant personnel on environmental obligations in relation to blasting controls	4.1
9	Periodic review of blast management procedures will be undertaken to evaluate performance and identify corrective action, if required	4.1
10	Carry out blasting in accordance with the Blast Management Strategy - Newdell Substation (LIDOC-90533967-3741) and the approved Blast Management Strategy - Chain of Ponds Inn (LIDOC-90533967-3636)	4.1
12	LCO will undertake blasting in accordance with the Communication of Blasting Including Sensitive Areas Procedure	4.2
14	LCO will report any blasting criteria exceedances to relevant authorities as per Section 6	5.3.1
15	The Annual Review prepared each year for LCO will include an assessment of blast monitoring results against the blast impact assessment criteria. In addition, any complaints relating to blasting undertaken at LCO, and the response actions taken	6.2
16	A summary of blast monitoring results will be presented at the biannual LCO Community Consultative Committee (CCC) meeting	6.2
17	All complaints received in relation to LCO's blasting activities will be responded to in accordance with the Environmental Management Strategy and the LCO Community Complaint and Enquiry Management Procedure (LCO SD PRO 0017) as per Section 6.3.	6.3
18	In the event that a complaint is received in relation to blasting impacts from the operation, an investigation will be undertaken in accordance with the Glencore Coal Assets Australia (GCAA) Protocol 10.05 Community Complaint Management (CAA HSEC PCL 0019)	6.3

Table 2-5 – Summary of EPL 2094 Blasting Requirements

3. Blast Impact Assessment Criteria

The EPA set guidelines for blasting based on human comfort. The guidelines have been adapted from the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines 'Technical Basis for Guidelines to minimise annoyance due to Blasting Overpressure and Ground Vibration' (ANZECC 1990). The ANZECC guidelines are based on human comfort levels and are much more stringent than those based on the potential for damage to structures. The guidelines prescribe fundamental criteria that have been applied for private residences and other sensitive locations.

Blasting criteria applicable to mining operations at LCO are detailed in **Section 3.1** below (also refer to **Figure 3-1**). The Project Approval nominates blasting criteria for:

- Privately owned residences;
- Chain of Ponds Hotel (refer separate plan);
- Newdell Zone Substation (refer separate plan); and
- Other public/private infrastructure.

Section 3.1 details the process to be undertaken by LCO if amendment to impact assessment criteria is sought.

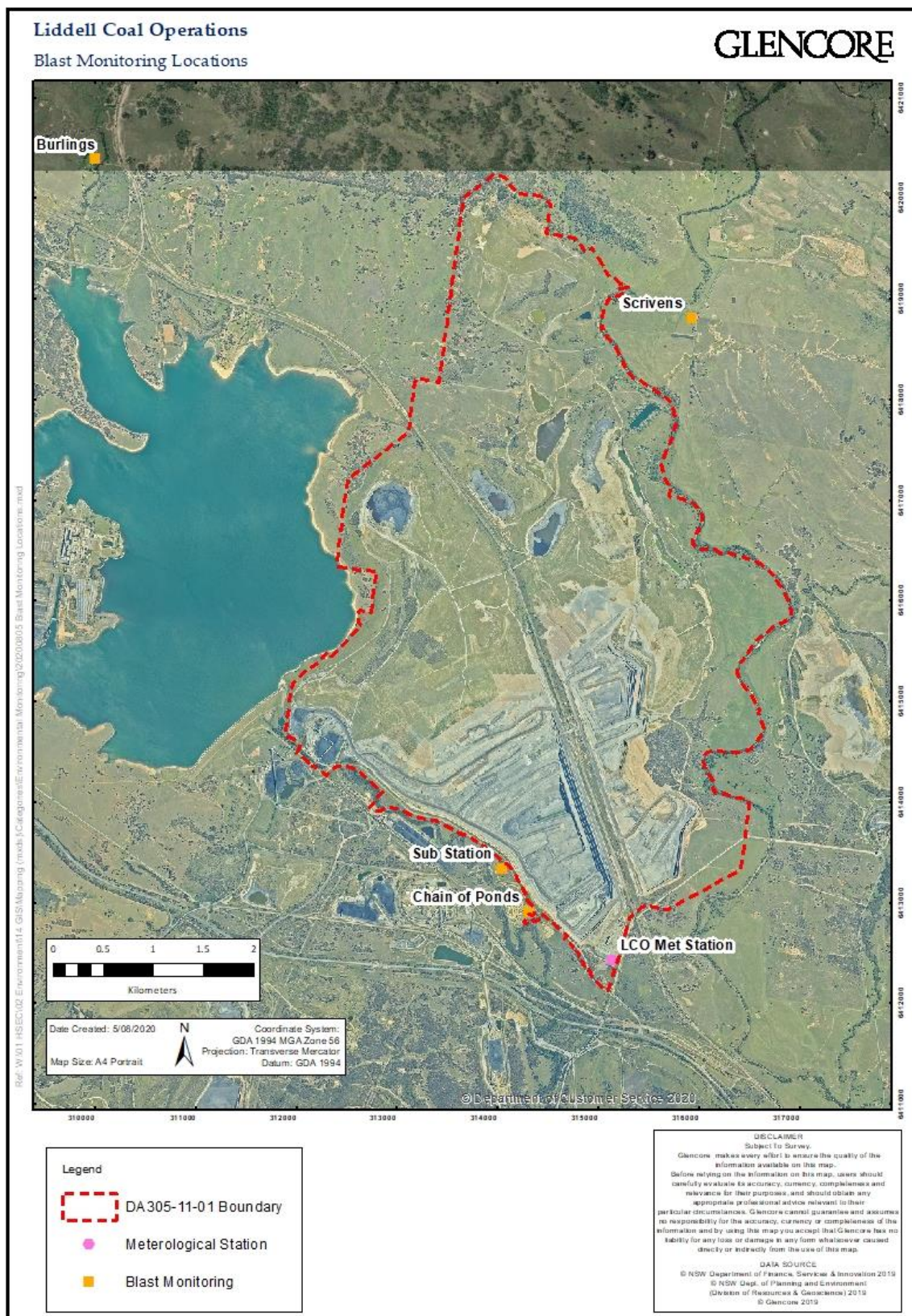


Figure 3-1 – Compliance Blast Monitoring Locations

3.1 Impact Assessment Criteria

The Project Approval specifies vibration criteria and overpressure criteria for a range of public and privately owned infrastructure. These criteria were developed in accordance with relevant guidelines, in consultation with the relevant service providers and in consideration of precedents set by other sites and regulatory agencies.

3.1.1 Non-mine Owned Residences

The Project Approval and EPL 2094 requires compliance with the following limits at residences on privately owned land (refer to **Table 3.1**).

Location	Vibration Criterion	Air Blast Criterion (dB Linear peak)	Allowable Exceedance
Non-mine owned residences	5mm/s	115dBL	5% of the total number of blasts over a period of 12months
	10mm/s	120dBL	0%

Table 3-1 – Impact Assessment Criterion at Non-Mine Owned Residences

These limits do not apply if LCO has a written agreement with the owner/s to exceed these criteria and has advised DPIE in writing of the terms of the agreement.

3.1.2 Infrastructure

The impact assessment criteria for private and publicly owned structures in proximity to LCO are included in **Table 3-2**.

Location	Vibration Criterion	Air Blast Criterion (dB Linear peak)	Allowable Exceedance
Newdell Zone Substation ¹	20mm/s	-	10% of the total number of blasts over a period of 12months
	25mm/s	-	0%
Other Public Infrastructure	50		0%

Table 3-2 – Impact Assessment Criterion at Non-Mine Owned Residences

These limits do not apply if LCO has a written agreement with the infrastructure owner/s to exceed these criteria and has advised DPIE in writing of the terms of the agreement. In accordance with DA305-11-01 Schedule 3 Condition 4(a), On 15th May 2019, Liddell Coal Operations wrote to the Department advising of alternate vibration criteria for ARTC infrastructure and the Main Northern Line as agreed by ARTC on 10th May 2019. The revised criterion is documented in **Appendix A**.

In the event that LCO is unable to secure a written agreement with an infrastructure owner, demonstrated to the satisfaction of the Secretary that blasting can be carried out at levels in excess of the criteria without causing any damage to the infrastructure.

4. Blast Management Controls

In order to mitigate any potential impacts from blasting activities, a number of controls will be implemented throughout the life of the operation. These controls are detailed in **Section 4.1**.

4.1 Operational Controls

Liddell Coal Operations will implement the following blast management practices over the life of the project:

- Blasting at LCO will only occur on Monday to Saturday between 9.00 am and 5.00pm. No blasting will be undertaken on Sundays, public holidays or at any other time, unless written approval has been obtained from the Secretary;
- Blasting will be undertaken at a maximum 3 blasts per day and no more than 8 blasts per week (average over a calendar year on the site). However this total number of blasts does not apply to blasts that generate ground vibration of 0.5mm/s or less at any residence on privately owned land, blast misfires or blasts required to ensure the safety of the mine, its workers or the general public;
- Detailed design is undertaken for each blast in order to maximise the blast efficiency, minimise dust, fume, ground vibration and air blast, the potential for flyrock and to ensure compliance with site specific blasting conditions. A post blast fume procedure (**LIDOC-90533967-1415**) is utilised at LCO and is included in **Appendix B**;
- Use of initiation systems that minimise overpressure;
- Use of adequate stemming (type and quantity) to maximise confinement of explosive charged for the management of flyrock and overpressure;
- Blasts will be undertaken in accordance with the LCO Pre-Blasting assessment (**LIDOC-90533967-104**) included as **Appendix C** including:
 - Undertaking meteorological assessments prior to blasting to ensure weather conditions are acceptable. Wind speed and direction will be assessed against site criteria that have been developed to identify unfavourable conditions for sensitive receivers. The meteorological assessment should also give consideration to the presence of temperature inversions exacerbating air blast impacts. Temperature inversions are more common in winter, and due to the distance of sensitive receivers from the mining area and firing times being generally in the afternoon, this is a low risk for LCO;
 - Notify neighbouring mines, relevant authorities, neighbouring properties, infrastructure owners and internal contacts prior to blasting;
 - Updating the LCO Blast Hotline (a freecall service accessible to the public to obtain up to date blasting information); and
 - Documentation of the date, location of blast holes and quantity of explosive used each day, and the maximum instantaneous charge (Max MIC).
- Detailed monitoring of blasts over the life of the mine at relevant blast sensitive locations (refer Section 5);
- No blasting will take place outside of land owned by LCO, unless a written agreement with the landowner has been obtained and the DP&E has been advised, in accordance with Condition 11A.(c) of Schedule 3;

- Training will be provided to relevant personnel on environmental obligations in relation to blasting controls;
- Periodic review of blast management procedures will be undertaken to evaluate performance and identify corrective action, if required;
- Carry out blasting in accordance with the Blast Management Strategy for Newdell Substation and the approved Blast Management Strategy for Chain of Ponds Inn; and
- Evaluating new technology and alternative blasting methodologies via a continual improvement mechanisms.

4.2 Blasting in Sensitive Areas

There are a number of sensitive areas surrounding LCO's operation which require specific management during blasting. Liddell Coal Operations will undertake all blasting in accordance with *LIDOC-90533967-103: Communication of Blasting Including Sensitive Areas* which details the requirements of agreements with relevant land/infrastructure owners and management of these sensitive areas. This procedure is available in **Appendix A**.

These sensitive areas include:

- Main Northern Railway Line;
- Public section of the Old New England Highway controlled by Singleton Council;
- Ausgrid 132Kv Power Lines and Newdell Substation;
- Hunter Valley Operations owned lands, particularly the Hunter Valley Loading Point (HVLP), Chain of Ponds Inn complex; Singleton Motorcycle Club grounds; and Upper Hunter Radio Controlled Off-road Club grounds. It is noted that the mining has progressed such that blasting operations are now undertaken outside 500m of the HVLP. Hunter Valley Operations have advised that blast monitoring is no longer required at this location, however notification is still required.

4.3 Road Closure Management

Blasting within 500m of the public section of the Old New England Highway requires closure during blasting events. LCO have developed a Road Closure Procedure *LIDOC-90533967-234* in consultation with Singleton Council for road closures of the Old New England Highway. The Road Closure procedure has been included in **Appendix D**. The procedure will be updated in consultation with Singleton Council as required.

5. Blast Monitoring

As detailed in **Section 4.1**, LCO will monitor blasts as mining progresses in accordance with the existing blast monitoring system.

The blast monitoring program to be implemented by LCO is detailed in **Section 5.1**.

5.1 Blast Monitoring Program

The BMP incorporates real time monitoring at locations shown in Figure 1, which is consistent with criteria specified in **Tables 3.1** and **3.2**.

To ensure compliance with Statutory Approvals, monitoring or modelling of blasts will be undertaken. Initial blasting impacts on locations including Chain of Ponds Inn and Newdell Substation will be determined through the use of detailed predictive modelling, which has been developed based on extensive blast monitoring and detailed blast design in accordance with the approved Blast Management Strategy Chain of Ponds Inn and the Blast Management Strategy Newdell Zone Substation.

Results obtained from the blast monitoring program are utilised to inform the detailed design of blasts and modification of blast designs as necessary.

Blast monitoring instrumentation is installed, calibrated and maintained in accordance with both AS2187.2 – 2006 and the manufacturer's specifications.

5.1.1 Blast Data

Management and monitoring of blasts will be undertaken in accordance with the procedure **LIDOC-90533967-2877: Meteorological Assessment, Blast Monitoring and Reporting** which ensures the required receivers are appropriately monitored. Blasting records will be maintained in accordance with statutory conditions, refer **Section 6.5**.

The procedure **LIDOC-90533967-2877** includes the following information:

- Notifying neighbouring landholders and infrastructure owners prior to blasting;
- Undertaking meteorological assessments prior to blasting to ensure weather conditions are acceptable; and
- Reviewing that blast monitors are functioning.
- Data collected from the monitoring of each blast will include:
 - Measured vibration;
 - Measured overpressure;
 - Maximum instantaneous charge;
 - Fume rating
 - Distance from blast to monitoring location;
 - Number of holes;
 - Blast type;
 - Meteorological conditions; and
 - Video footage.

5.1.2 Meteorological Monitoring

LCO has a meteorological station in operation on site. The LCO weather station consists of logged meteorological parameters including:

- Wind Speed;
- Wind Direction;
- Sigma-theta;
- Temperature; and
- Rainfall;

Meteorological based constraints on blasting are in use at LCO. As discussed in **Section 5.1.1 LIDOC-90533967-2877** has been established so that the implications of adverse meteorological conditions are considered prior to blasting. The adverse meteorological conditions may have the potential to exacerbate dust, fume and overpressure impacts.

A weather forecast assessment is made on a daily basis and constraints are determined based on wind speed and direction in accordance with the ***Meteorological Assessment, Blast Monitoring and Reporting Procedure***. Constraints with regard to wind speed and direction will be reviewed on an as required basis and modified where appropriate.

5.2 Monitoring Standards

Meteorological monitoring is also to be undertaken in accordance with *Approved methods for sampling and analysis of air pollutants in NSW* (EPA, 2001), which refers to the Australian Standard AS2923 – 1987 (Guide for measurement of horizontal wind for air quality applications).

LCO will undertake blast monitoring in accordance with the policies, principles, regulation and guidelines contained within:

- ***Protection of the Environment Operations Act 1997 (PoEO Act) administered by EPA;***
- ***Environmental Planning & Assessment Act 1979 (EP&A Act) administered by the DP&E; and***
- ***ANZECC 'Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration'.***

5.3 Compliance Assessment Protocols

5.3.1 Incident/Exceedance Reporting

In accordance with EPL 2094, LCO is required to report any exceedance of licence blasting limits to EPA Hunter as soon as practical after the exceedance become known. Additionally in accordance with Condition 11 of Schedule 5 of DA305-11-01, LCO will notify the DPIE and any other relevant agencies of the incident; and will provide the DPIE and any relevant agencies with a detailed report on the incident within 7 days.

The report will include the following information:

- Date, time and nature of the exceedance/incident;
- Identify the likely cause of the exceedance/incident
- Describe what action has been taken to date; and
- Describe proposed measures to address the exceedance/incident.

LCO will also implement mitigating measures for future blasts as necessary and monitor future blasts for effectiveness and improvement opportunities.

In accordance with Condition 2 of Schedule 4 of DA 305-11-01, LCO will provide notification to the Secretary and affected landholders and or existing or future tenants of obtaining monitoring results showing an exceedance accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria as per Table 3.1 and 3.2.

5.4 Property Inspections and Investigations

LCO undertook notifications to landowners within 2km of the project in accordance with Schedule 3 Conditions 12 and 13 on the 9th February 2015.

5.4.1 Property Inspections

In accordance with Condition 14 of Schedule 3 of the Development Consent, should LCO receive a written request from the owner of any privately owned land within two kilometres of the development, LCO will within three months of this request, commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:

- Inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
- Give the landowner a copy of the property inspection report.

5.4.2 Property Investigations

In accordance with Condition 15 of Schedule 3 of the Development Consent, if any landowner of privately-owned land within two kilometres of the site claims that buildings and/or structures on their land have been damaged as a result of blasting at LCO, within three months of receiving this request LCO will:

- Commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary to investigate the claim; and
- Give the landowner a copy of the property investigation report.

If the independent property investigation confirms the landowners claim, and both parties agree with these findings, then LCO shall repair the damages to the satisfaction of the Secretary.

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

If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process as per Appendix 4 of the Development Consent.

5.5 Independent Review Process

In accordance with the requirements of the Development Consent, all private landowners within two kilometres of LCO are entitled to a structural property inspection, as per Condition 1 of Schedule 4 of the Development Consent.

In the event that a landowner considers LCO to be exceeding blast criteria at their property, the landowner may request an independent review of the blast impacts at the property. The independent review will be conducted in accordance with the procedure described in Conditions 4, 5 and 6 of Schedule 4 of the Development Consent. The procedure is summarised as follows:

- a) LCO receives a request from a landowner for an independent review of the blast impacts at the residence.
- b) LCO provides the Secretary of DPE with a copy of this request.
- c) If the Secretary is satisfied that the request is warranted, LCO shall within two months of the Secretary decision, commission a suitably qualified, experienced and independent expert whose appointment has been approved by the Secretary to undertake an independent review.

- d) The independent review would involve consultation with the landowner, and include blast monitoring over a suitable period of time and over a suitable range of meteorological conditions.
- e) A copy of the results of the independent review would be provided to the landowner and the Secretary of the DPE by LCO.
- f) Depending on the results of the independent review, a number of actions could be pursued in accordance with the Development Consent Conditions. These actions are summarised as follows:
 - If the independent review finds exceedances of blast criteria due to LCO, LCO will take reasonable and feasible measures to reduce blast impacts and/or will come to an agreement with the landowner.
 - If the independent review finds that exceedances of blast criteria are in part due to LCO and in part due to another source other than LCO, then actions by LCO and other mine(s) shall be as directed by the Secretary of DPE.
 - If the independent review finds that exceedances of blast criteria are due in whole to a source other than LCO, then no further action is required by LCO.

If measures taken do not achieve compliance with blast criteria and LCO cannot secure a written agreement with the landowner within three months, then LCO or the landowner may refer the matter to the Secretary for resolution.

6. Reporting and Review

6.1 Internal Reporting

The LCO Environment and Community Manager will report to the Operations Manager the results of investigations of any complaints and any exceedances of the blast overpressure or vibration assessment criteria (refer Section 3.)

If a non-compliance with the blast impact assessment criteria is identified, an internal report detailing the circumstances of the non compliance and resulting actions will be developed and submitted to GCAA.

External reporting of the non-compliance will be undertaken in accordance with Section 5.3.1 and Section 6.2.

6.2 External Reporting

A summary of all blast monitoring results will be made publically available on the LCO website in accordance with Condition 9, Schedule 5 of the Development Consent. In accordance with the Protection of the Environment Legislation Amendment Act 2011, LCO will also provide monitoring data on its website within 14 days of obtaining the data. LCO will also supply, with each Environment Protection Licence (EPL) Annual Return, a Blast Monitoring Report as per condition R1.8 and R5.3 of EPL 2094.

LCO will provide up to date information regarding the proposed blasting schedule via the process outlined below:

- Notify neighbouring landholders;
- Contact through the Community Response Line;

- Notifying sensitive receivers using the processes discussed in Section 4.2.

Additionally, the Annual Review prepared each year will include an assessment of blast monitoring results against the blast impact assessment criteria. In addition, any complaints relating to blasting undertaken at LCO, and the response actions taken, will be reported in the Annual Review.

A summary of blast monitoring results will also be presented at the biannual LCO Community Consultative Committee meetings.

Any exceedance of blast monitoring criteria will be reported in accordance with Section 5.3.1.

6.3 Complaints Response

All complaints received in relation to LCO's blasting activities will be responded to in accordance with the Environmental Management Strategy and the ***LCO Community Complaint and Enquiry Management Procedure (LIDOC-90533967-798)***. LCO will maintain a centralised location to record communications details of relevant external stakeholders and procedures for stakeholder contact

Complaints or enquires can be received through a number of sources including but not limited to LCO's Community Response Line (CRL), enquiry email or through direct personal communication.

The CRL is advertised on the LCO website and in local newspapers on a regular basis. The contact line will be in operation 24 hours per day, seven days a week. Complaints will be recorded and investigated by the Environment and Community Manager. An initial response to the complainant will be made as soon as practicable.

Where applicable, and agreed by the complainant, monitoring will be arranged at or near the complainant's residence. The complainant is to be advised of these arrangements once made.

In the event that a complaint is received in relation to blast impacts from the operation, an investigation will be undertaken in accordance with the ***GCAA Protocol 10.05 Community Complaint Management (GCAA-625378177-10296)***.

Follow up correspondence with the complainant will be made explaining the outcome of complaint investigations.

6.4 Corrective Action

Table 6.1 summarises the potential blasting related issues that may arise and the appropriate corrective action to be taken.

Issue	Corrective Action
Exceedance of Development Consent and Environment Protection Licence Criteria for air blast or ground vibration criteria	Investigation of exceedance, undertaking mitigating measures for future blasting where applicable. Report exceedance to DPIE, EPA and senior management where required, refer Section 5.3.1.
Community Complaints	Investigation of complaint, undertake mitigating measures where applicable and provide feedback to complainant. Report complaint to senior management. Provide feedback to mine planning and production personnel where relevant, refer Section 6.3.

Issue	Corrective Action
Private property/infrastructure damage as a result of blasting operations	Investigation of issue in accordance with Condition 15 of Schedule 3 of the Development Consent. Report issue to senior management, refer to Section 5.4 and Section 5.5.

Table 6-1 – Corrective Action

6.5 Monitoring Records

In accordance with EPL 2094 conditions and as per LCO document control procedures, monitoring records will be maintained onsite for at least four years.

6.6 Review

The BMP is to be reviewed in accordance with DA 305-11-01 Schedule 5 Condition 10 or as otherwise directed by the DPE. The review process is to reflect changes in environmental legislation and guidelines and changes in technology or operational procedures.

In accordance with the Development Consent, by December 2015 and every three years thereafter, LCO will commission an Independent Environmental Audit to the satisfaction of the DPIE. The audit will include an assessment of the adequacy of the BMP. Where necessary, following the audit, the BMP will be updated and action taken to improve blasting performance and blasting management practices.

7. Document Information

7.1 Related Documents

Related documents, listed in **Table 7-1** below, are *documents* directly related to or referenced from within this document.

Number	Title
GCAA-625378177-9975	11.12 Blast Management Protocol
LIDOC-90533967-797	Environmental Management Strategy
LIDOC-90533967-145	Explosives Management Plan
LIDOC-90533967-3636	Blast Management Strategy – Chain of Ponds Inn
LIDOC-90533967-3741	Blast Management Strategy – Newdell Zone Substation
LIDOC-90533967-2877	Meteorological Assessment, Blast Monitoring and Reporting
LIDOC-90533967-103	Communication of Blasting Including Sensitive Areas
LIDOC-90533967-2340	Road Closure Procedure
LIDOC-90533967-798	Community Complaint and Enquiry Management Procedure

Table 7-1 – Related documents

7.2 Reference Information

Reference information, listed in **Table 7-2** below, is *information* that is directly referred to for the development of this document.

Reference	Title
Legislation	Work Health and Safety (Mines and Petroleum Sites) Act 2013
	Work Health and Safety (Mines and Petroleum Sites Regulations 2014
	Work Health and Safety (Mines and Petroleum Sites) Amendment Act 2014
	Work Health and Safety Act 2011
	Work Health and Safety Regulation 2011
	Environmental Planning and Assessment Act 1979
	Environmental Planning and Assessment Regulation 2000
	Protection of the Environment Legislation Amendment Act 2011
	Explosives Act 2003
	Explosive Regulation 2013
Australian Standard	AS2187.2 :2006 Explosives – Storage and use, Part 2 - Use of Explosives
Approvals	Development Consent DA-305-11-01
	EPA Environment Protection Licence 2094

Table 7-2 – Reference information

7.3 Change Information

Full details of the document history are recorded in the document control register, by version. A summary of the current change is provided in **Table 7-3** below.

Version	Date	Review Team	Change Details
1.0	25 May 2015	L Barben B de Somer D Brogan	New document to meet approval conditions of DA-305-11-01
2.0	08/09/2015	L Barben, B de Somer	Update Appendix D with current approval
3.0	17/9/2015	H Simms, S Pope (IT)	Updated graphics due to publication error

Version	Date	Review Team	Change Details
4.0	06/01/2016	B de Somer, D Brogan	Updates to address comments from NSW DPE. Changes made in Section 4.1, Appendix A, B, C & D. DPE Approval letter added.
5.0	October 2016		Document migration to new SharePoint.
6.0	11/7/2018	B de Somer, J Young	Updated Commitments Table. Updated Appendix B & C with recent procedure versions. Added referenced document – Meteorological Assessment, Blast Monitoring and Reporting Procedure, Appendix F.
	16/10/2018	B de Somer, J Young	Updated Appendix E with DPE approval letter dated 4/10/2018. H Simms – transferred to current template.
7.0	28/06/2019	B de Somer, H Frazer	Reviewed post approval of Modification 7 and updated Appendix B.
8.0	05/01/2021	B de Somer, L Depczynski	Full review. Update EPL reporting requirements in Section 5 and 6. Update Section 4.2 noting blasting operations have moved outside 500m of the Hunter Valley Loading Point. Updated versions of Appendix A, B, C, D
9.0			

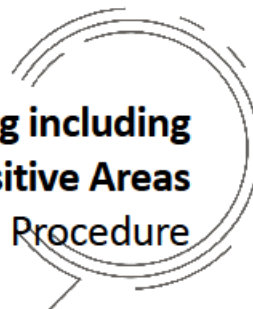
Table 7-3 – Change information

Appendix A - Communication of Blasting Including Sensitive Areas

LIDDELL
GLENCORE



Communication of Blasting including Sensitive Areas Procedure



Number: LIDOC-90533967-103
Owner: Drill & Blast Engineer

Status: Approved
Version: 10.0

Effective: 22/04/2020
Review: 22/04/2023

Uncontrolled unless viewed on the intranet



Note

Double click procedure above to access PDF copy of procedure

Appendix B - Post Blast Fume Procedure

LIDDELL
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Procedure

Post Blast Fume

Document Number: LIDOC-90533967-1415

Status: Approved

Version: 7.0

Effective: 03/02/2020

Review: 03/02/2023

Owner: Environment & Community Manager

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Note

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Appendix C - Meteorological Assessment, Blast Monitoring and Reporting

LIDDELL
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Meteorological Assessment, Blast Monitoring and Reporting Procedure



Number: LIDOC-90533967-2877
Owner: Senior Mining Engineer

Status: Approved
Version: 12.0

Effective: 16/07/2020
Review: 16/07/2023

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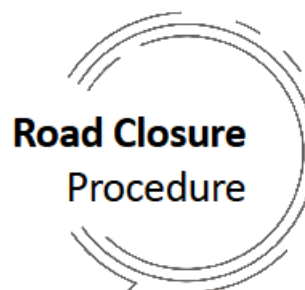


Note

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Appendix D - Road Closure Procedure

LIDDELL
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Number: LIDOC-90533967-234
Owner: Pit Services Superintendent

Status: Approved
Version: 10.0

Effective: 11/08/2020
Review: 31/08/2020

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Note

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