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		Issue:	1.1
		Last Revision Date:	July 2021
		Date Printed:	6 August 2021
WHC PLN VCM BLAST MANAGEMENT PLAN			

# WHC\_PLN\_VCM\_BLAST MANAGEMENT PLAN

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# 1 INTRODUCTION

The Vickery Coal Mine (VCM) is located in the Gunnedah Coal Basin, approximately 25 kilometres (km) north of Gunnedah in New South Wales (NSW) (Figure 1-1). The VCM is operated by Vickery Coal Pty Limited (VCPL) (a wholly owned subsidiary of Whitehaven Coal Limited [WHC]).


Development Consent (SSD-7480) was granted to VCPL on 12 August 2020 by the NSW Independent Planning Commission as a delegate of the NSW Minister for Planning under section 75J of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). The Development Consent allows for the development of an open cut mine and associated infrastructure with a 25 year mine life, extracting run-of-mine (ROM) coal at up to 10 million tonnes per annum (Mtpa) and processing the coal, as well as coal from WHC's Tarrawonga Mine, at an on-site coal handling and processing plant (CHPP) for off-site transport by rail.

## 1.1 PURPOSE AND SCOPE

This Blast Management Plan (BLMP) has been prepared by WHC (with input from experienced and qualified blast experts [Wilkinson Murray]) as per the BLMP requirements of Condition B29, Schedule 2 of SSD-7480 shown in Table 1.

**Table 1 – Specific Blast Management Conditions**

VCM Development Consent (SSD-7480) Schedule 3		Relevant BLMP Section
B29.	<i>The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:</i>	-
(a)	<i>be prepared by a suitably qualified and experienced person/s;</i>	Section 1.1
(b)	<i>be prepared in consultation with the EPA;</i>	Section 1.2
(c)	<i>be submitted to the Planning Secretary for approval prior to carrying out any blasting operations on site under this consent;</i>	Section 1.2
(d)	<i>describe the blast management system and the measures that will be implemented to ensure compliance with the blasting criteria and conditions of this consent;</i>	Sections 4 and 7
(e)	<i>include a Blast Fume Management Strategy for:</i>	
(i)	<i>minimising blast fume emissions;</i>	Section 7.5.2
(ii)	<i>rating and recording blast fume events in accordance with Visual NOx Fume Rating Scale (AEISG, 2011), or equivalent monitoring technique; and</i>	Section 8 & Appendix B
(iii)	<i>reporting significant blast fume events to the Department and the EPA;</i>	Section 11.1
(f)	<i>include a Road Closure Management Plan for any blasting within 500 metres of a public road, that has been prepared in consultation with GSC and NSC and includes provisions for:</i>	
(i)	<i>minimising the duration of closures, both on a per event basis and weekly basis;</i>	Section 4.3
(ii)	<i>avoiding peak traffic periods as far as reasonable; and</i>	
(iii)	<i>co-ordinating closures with nearby mines to minimise the cumulative effect of road closures;</i>	
(g)	<i>identify any agreed alternative ground vibration limits for public or private infrastructure in the vicinity of the site (if relevant); and</i>	Section 7.3
(h)	<i>include a monitoring program for evaluating and reporting on compliance with the relevant conditions of this consent.</i>	Section 8

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VCM Development Consent (SSD-7480) Schedule 3	Relevant BLMP Section
B30. The Applicant must implement the Blast Management Plan as approved by the Planning Secretary.	Section 2.1

This BLMP has been prepared in accordance with the standard requirement for management plans listed in Condition E4, Schedule 2 of SSD-7480 (see Table 2). Table 2 presents these requirements and indicates where each is addressed within this BLMP.

**Table 2 – General Management Plan Requirements**

Condition E4, Schedule 2 VCM Development Consent (SSD-7480)	Relevant BLMP Section
E4. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include where relevant:	Entire Document
(a) summary of relevant background or baseline data;	Section 3.1
(b) details of:	-
(i) the relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2
(ii) any relevant limits or performance measures and criteria; and	Section 4
(iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Section 5
(c) any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Sections 5,6 and 7
(d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Sections 5,6 and 7
(e) a program to monitor and report on the:	Section 8
(i) impacts and environmental performance of the development; and	
(ii) effectiveness of the management measures set out pursuant to paragraph (d);	
(f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Section 9
(g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 10
(h) a protocol for managing and reporting any:	-
(i) incident, non-compliance or exceedance of any impact assessment criterion or performance measure;	Section 11.1 and 11.3
(ii) complaint; or	Section 11.2
(iii) failure to comply with other statutory requirements;	Section 11.3
(i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Section 10
(j) a protocol for periodic review of the plan.	Section 10.2
<b>Note:</b> The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	





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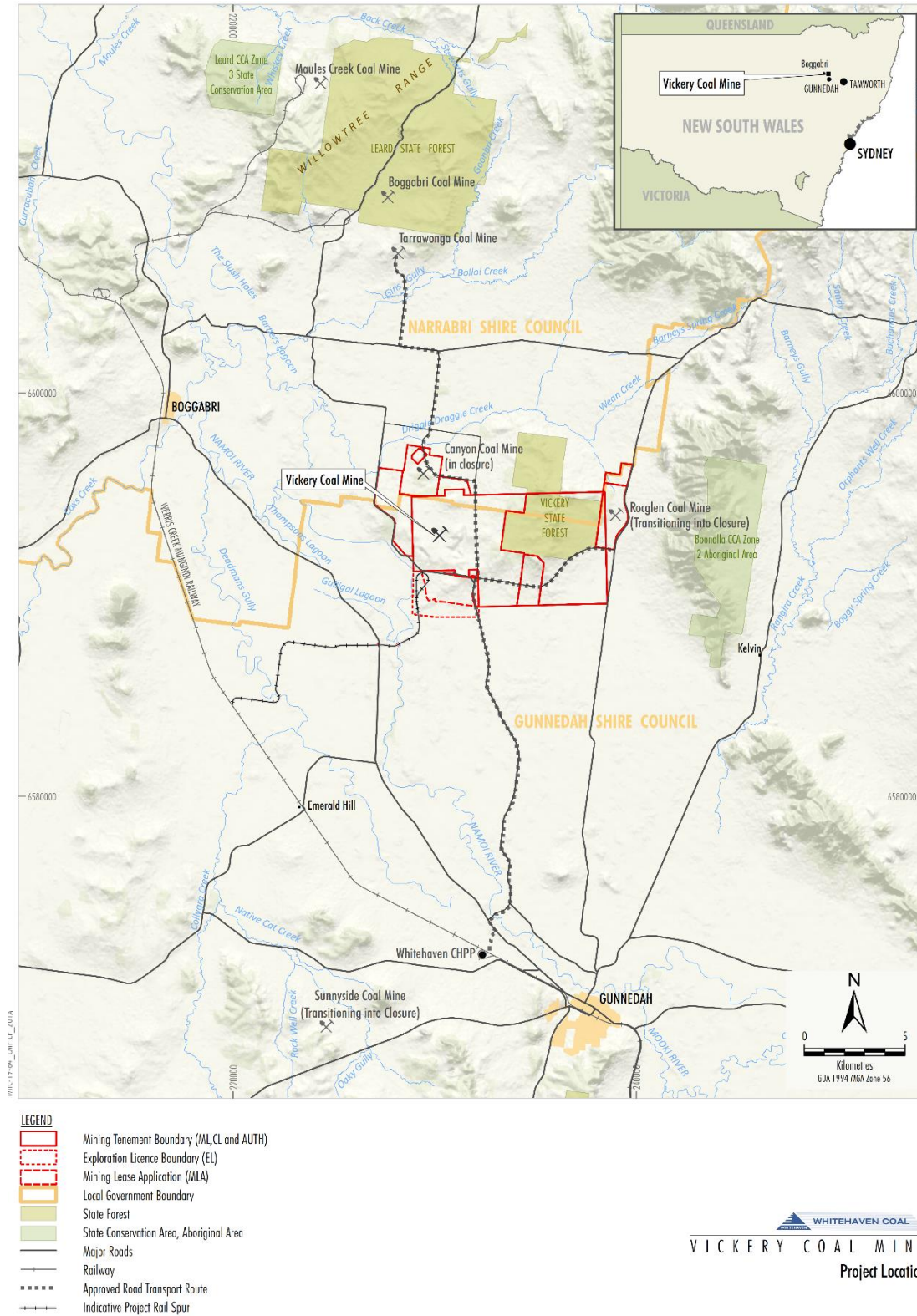



Figure 1-1

Figure 1-1 Regional Location

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On 11 December 2020, the Secretary of the Department of Planning, Infrastructure and Environment (DPIE) has approved the progressive submission of environmental management plans for the VCM in accordance with Condition A25(a), Schedule 2 of SSD-7480.


The scope of this BLMP is specifically related to the VCM construction and initial mining activities. The construction and initial mining stage is anticipated to take approximately 30 months based on sequencing of the major construction activities, with the bulk of significant construction earthworks to occur within a 12 - 18 month period, and will include:

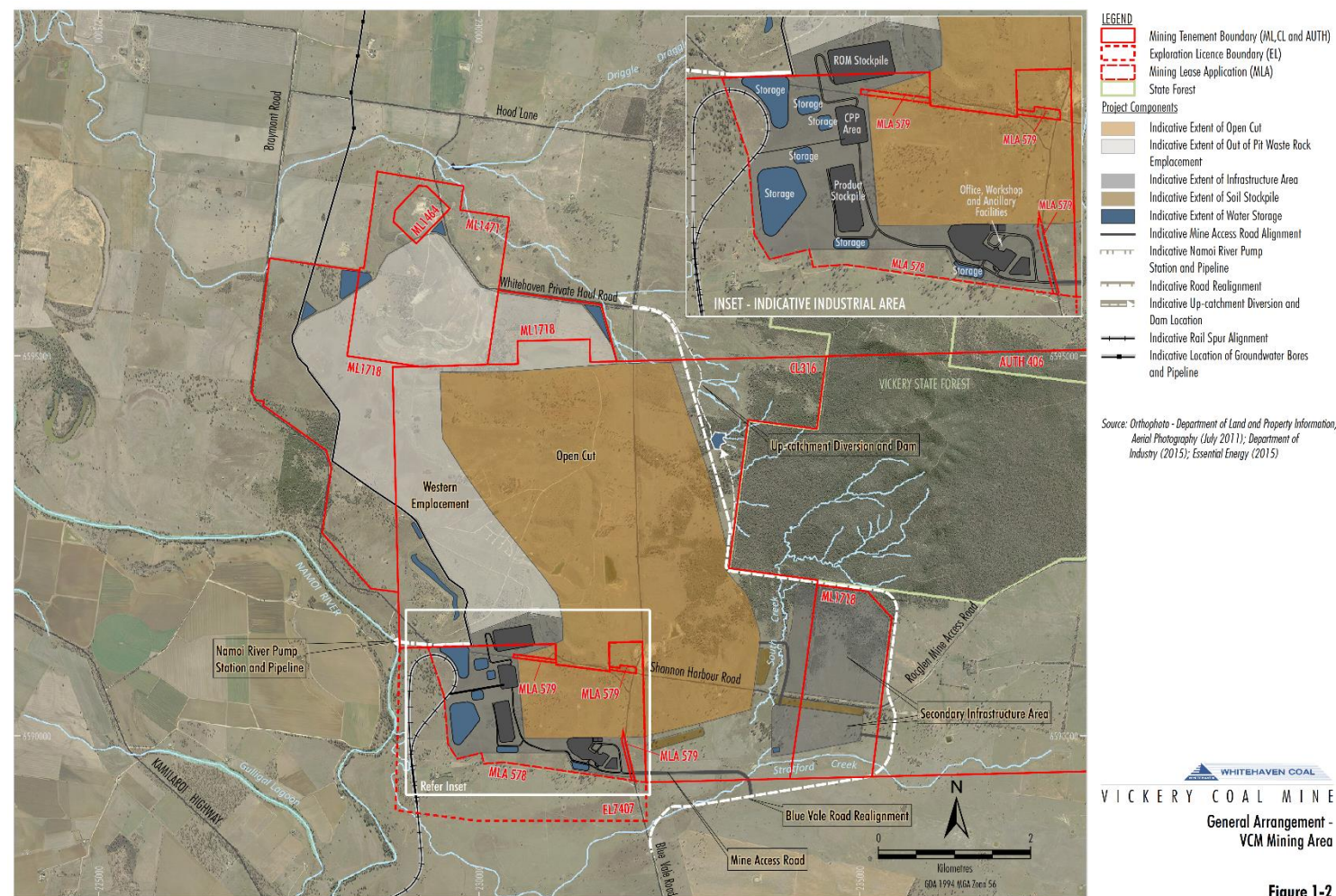
- construction of the CHPP;
- construction of the rail spur and loop and train load-out facility;
- construction of the mine industrial area (MIA);
- construction of ROM and product coal stockpile pads;
- initial development of the box cut;
- construction of temporary infrastructure facilities;
- construction of temporary ROM coal stockpiles;
- construction of workshops and offices;
- construction of water supply bores and Namoi River pump station and pipelines;
- construction of dams, sediment dams, up-catchment diversions, channels and other water management infrastructure;
- construction of soil stockpile areas;
- construction of access roads and internal roads;
- closure of a portion of Braymont Road;
- construction of connection to the existing 66 kilovolt (kV) powerline and construction of substations and power supply;
- construction of ancillary infrastructure including consumable storage areas, laydown areas, explosives storage facilities;
- ongoing exploration activities; and
- other associated minor infrastructure construction, use of other plant and other activities.

The general arrangement of the VCM is shown on Figures 1-2 and 1-3. The VCM layout at the end of the construction and initial mining stage is shown on Figure 1-4.

Earthworks associated with the development of the above infrastructure would include the excavation of waste rock, gravel and coal material from within the VCM open cut footprint. The earthworks would include the initial development of the box cut, with a small volume of ROM coal extracted for stockpile pad treatment, commissioning activities and transport to the Gunnedah CHPP. Additionally, a small volume of coal from WHC's other mines may be delivered to the VCM for stockpile pad treatment and CHPP commissioning activities.



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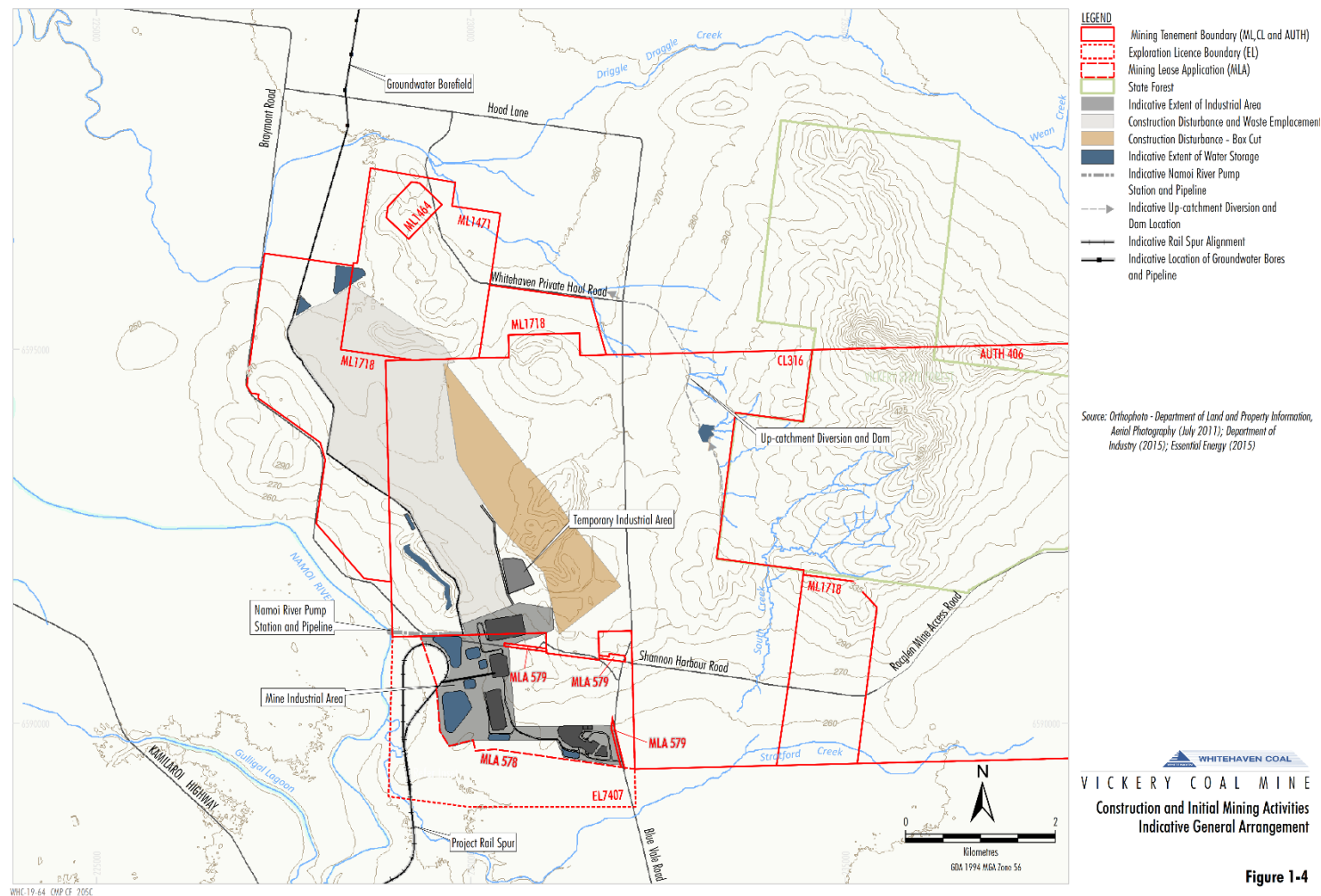
**Figure 1-2 Vickers Coal Mine General Arrangement**

**Figure 1-2**






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**Figure 1-4 Construction and initial mining Activities General Arrangement**

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## 1.2 Consultation

In accordance with Condition B29(b), Schedule 2 of SSD-7480, this BLMP has been prepared in consultation with the NSW Environment Protection Authority (EPA).

## 1.3 Structure of the Blast Management Plan

The remainder of this BLMP is structured as follows:

- Section 2      Outlines the relevant statutory requirements and policies relevant to this BLMP.
- Section 3      Describes the existing environment.
- Section 4      Describes the relevant blast criteria applicable to the VCM.
- Section 5      Describes the blast management performance indicators.
- Section 6      Describes the predicted blast impacts.
- Section 7      Describes the management and control measures to be implemented.
- Section 8      Describes the blast monitoring program.
- Section 9      Describes the contingency plans to manage unpredicted impacts.
- Section 10     Describes the program to review and report on the effectiveness of management measures and improvement of environmental performance.
- Section 11     Describes the procedures for the management and reporting of incidents, complaints and non-compliances with statutory requirements.
- Section 12     Lists the references cited in this BLMP.

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## 2 RELEVANT STATUTORY REQUIREMENTS AND POLICIES

WHC's statutory obligations relevant to blast management are contained in:

- the conditions of Development Consent SSD-7480;
- the relevant licences and permits, including conditions attached to mining leases; and
- other relevant legislation.

Obligations relevant to this BLMP are described below.

### 2.1 DEVELOPMENT CONSENT SSD-7480

The conditions of SSD-7480 relevant to the content and structure of this BLMP are described below. A comprehensive list of all conditions in SSD-7480 relevant to blasting is provided in Appendix A. In accordance with Condition B30, the Blast Management Plan will be implemented as approved by the Planning Secretary.

#### 2.1.1 Blast Management Plan Requirements Development Consent (SSD-7480)

Condition B28, Schedule 2 of SSD-7480 requires the preparation of a BLMP (refer to Table 1).

#### 2.1.2 General Management Plan Requirements

This BLMP has been prepared in accordance with the standard requirement for management plans listed in Condition E4, Schedule 2 of SSD-7480 (see Table 2).

### 2.2 LICENSES, PERMITS AND LEASES


In addition to the requirements of SSD-7480, activities associated with the VCM will be undertaken in accordance with the following licences, permits and leases:

- Coal Lease (CL) 316, Mining Leases (ML) 1718, 1471, 1464 and MLA 578.
- VCM Construction Mining Operations Plan.
- Environment Protection Licence (EPL) No. 21283.
- Mining and workplace health and safety related approvals.

### 2.3 OTHER LEGISLATION


In addition to the statutory obligations described above, the following NSW acts, Regulations and policies may be applicable to the conduct of the VCM:

- *Explosives Act, 2003*;
- *Explosives Regulation, 2013*;
- *Roads Act, 1993*;

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- *Work Health and Safety Act, 2011;*
- *Work Health and Safety Regulation, 2011;*
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013; and*
- *Work Health and Safety (Mines and Petroleum Sites) Regulation, 2014.*



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### 3 EXISTING ENVIRONMENT

#### 3.1 BASELINE DATA

As no blasting has been undertaken in the vicinity of the mine site for the VCM, there is no existing blast overpressure or ground vibration data.

#### 3.2 METEOROLOGICAL CONDITIONS

WHC operates an on-site meteorological monitoring station at the VCM (Figure 3-1) that records 15 minute averages of wind speed and direction, temperature, rainfall and relative humidity.

Annual wind roses generated for the on-site meteorological monitoring station present wind speed and direction as a percentage of time for 2014 to 2019 (Figure 3-2).

The prevailing wind direction for the on-site weather station is from the south-east quadrant with annual average wind speeds of approximately 3 metres per second. Winds from the west north-west are prevalent in spring. Lighter winds from the north-east quadrant are prevalent in winter.

#### 3.3 RELEVANT RECEPTORS

Potentially sensitive features in the vicinity of the VCM are shown on Figure 3-1 and include:

- heritage sites (including a grinding groove site [AHIMS 20-4-0009] indicated by B-01 and the Kurrumbede Homestead [B-02]);
- residences on privately-owned land and tenants of mine-owned dwellings; and
- public roads (including Shannon Harbour Road, Braymont Road and Blue Vale Road).

A description of relevant heritage sites is provided in the VCM Historic Heritage Management Plan and Aboriginal Cultural Heritage Management Plan.

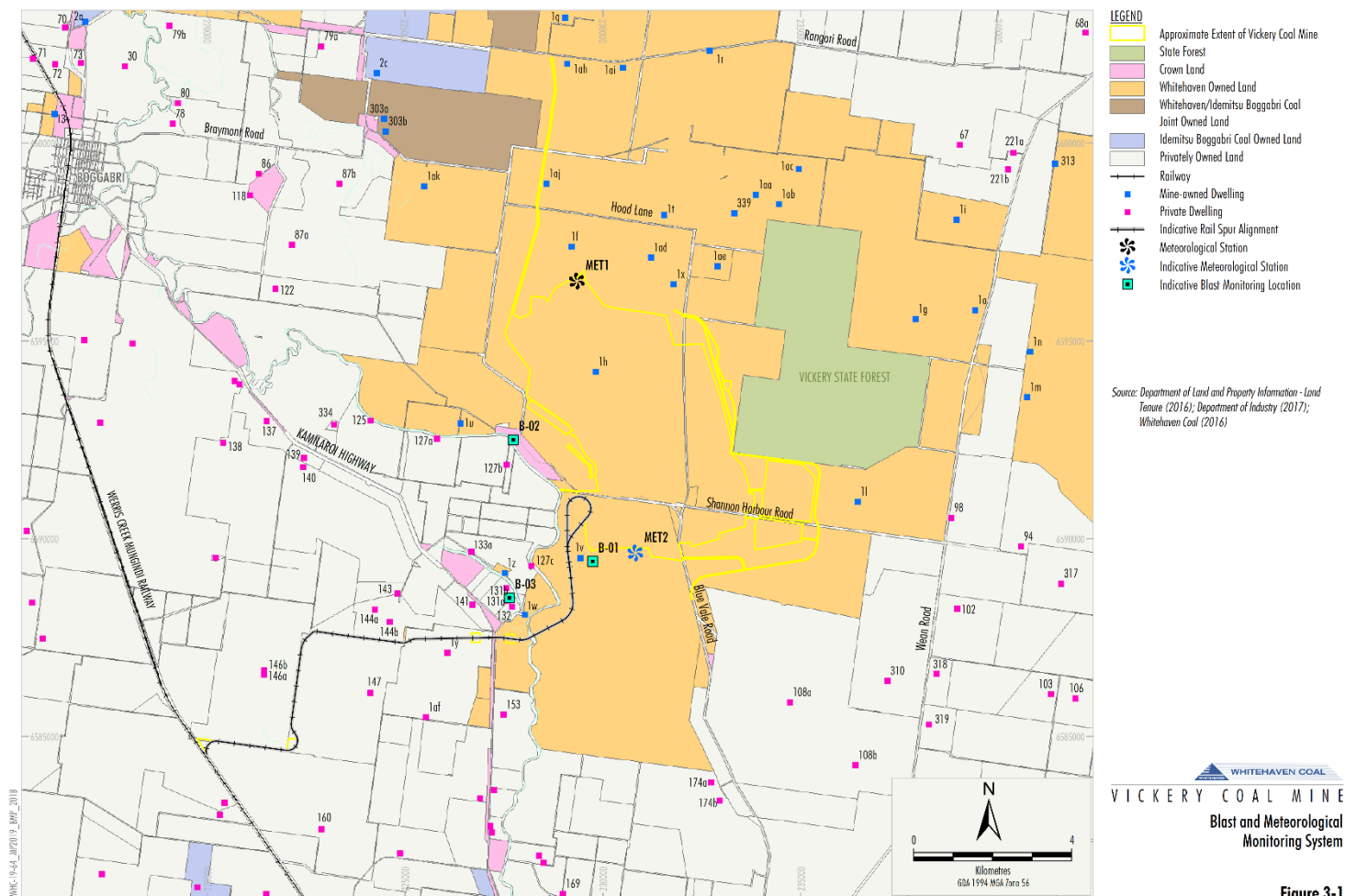


Figure 3-1

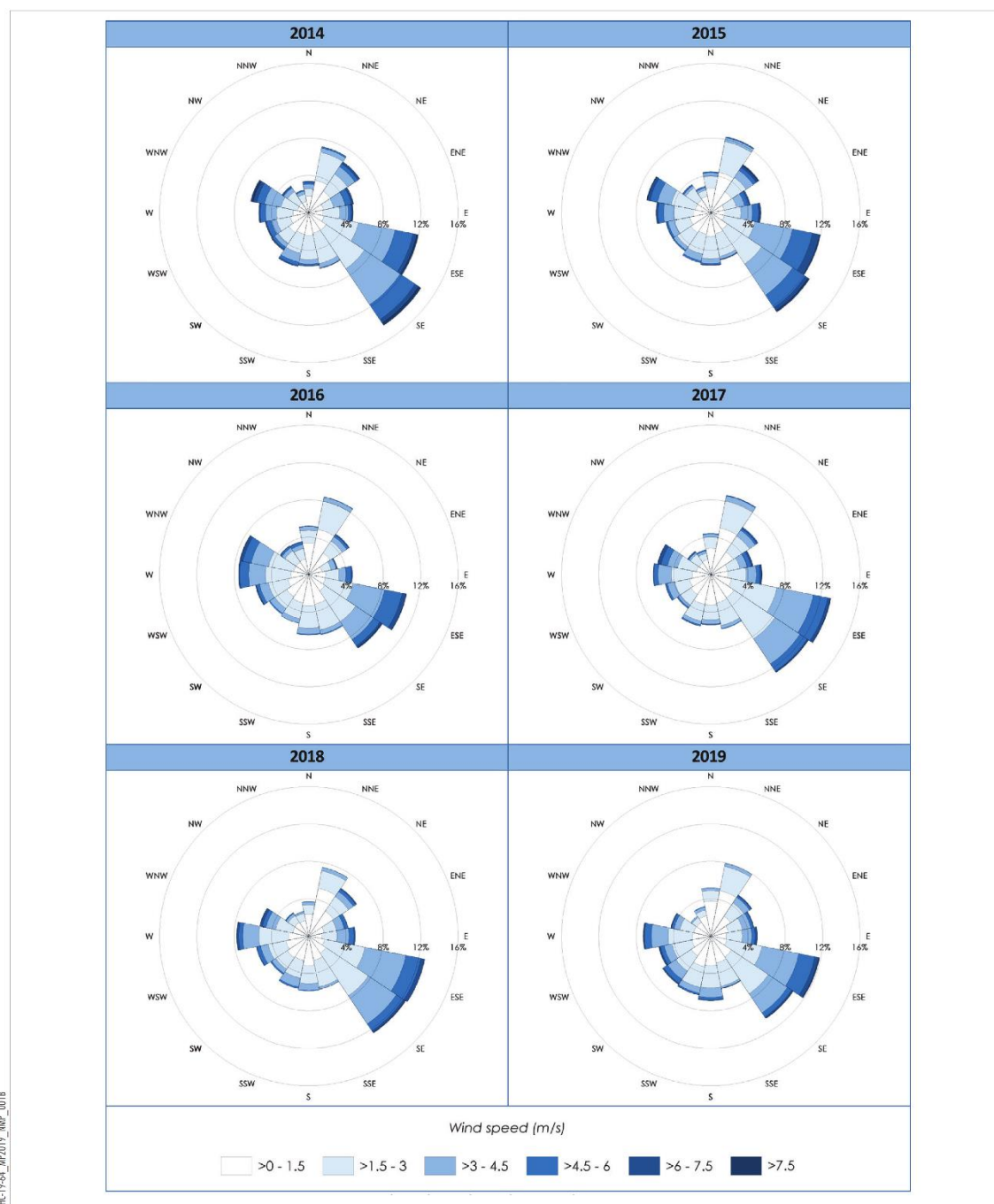
Figure 3-1 Blast and Meteorological Monitoring System



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Source: Todoroski Air Sciences (2020)

WHITEHAVEN COAL  
VICKERY COAL MINE  
Wind Roses  
2014 to 2019  
(Canyon Weather Station)

**Figure 3-2 Annual Wind-Rose Data**

**Figure 3-2**  
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## 4 BLAST CRITERIA

### 4.1 DEVELOPMENT CONSENT SSD-7480

Blasting criteria, blasting hours, blasting frequency, property inspections, property investigations and operating conditions are provided in Conditions B17 to B30, Schedule 2 of SSD-7480 (refer to Appendix A).

#### 4.1.1 Blast Criteria

Condition B17, Schedule 2 of SSD-7480 requires that WHC must ensure that blasting at the mine site does not cause exceedances of the criteria listed in Table 3.

**Table 3 – Blasting Criteria**

Location	Airblast overpressure (dB[Lin Peak])	Ground Vibration (mm/s)	Allowable exceedance
<i>Residence on privately-owned land</i>	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
<i>Kurrumbede Homestead</i>	133	10	0%
<i>All other public infrastructure</i>	-	50 <sup>1</sup>	0%

dB(Lin Peak) = linear decibels (peak)

mm/s = millimetres per second


<sup>1</sup> or a limit determined by the structural design methodology in AS 2187.2 2006, or its latest version, to the satisfaction of the Secretary

The Vickery Coal Mine will comply with Condition B17. However, these criteria do not apply if WHC has a written agreement with the relevant landowner or infrastructure owner/provider, and has advised the Secretary in writing of the terms of this agreement. To comply with Condition B18, the Department will be advised of agreements in writing where applicable.

Airblast and vibration criteria relevant to other heritage sites are detailed in Section 4.3.

#### 4.1.2 Blasting Hours

Condition B19, Schedule 2 of SSD-7480 states WHC must only carry out blasting at the mine site between 9.00 am and 5.00 pm Monday to Saturday, inclusive. No blasting is allowed on Sundays, public holidays or at any other time without the written approval of the Secretary. This condition does not apply to blasts required to ensure the safety of the mine, its workers or the general public. Blast frequency limitations do not apply to blasts that generate ground vibration of 0.5mm/s, or less, at any residence on privately-owned land, or to blast misfires of blasts required to ensure the safety of the mine, its workers or the general public.

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### 4.1.3 Blasting Frequency

Unless otherwise agreed with the Secretary, WHC will carry out a maximum of:

- 1 blast per day; and
- 5 blasts per week, averaged over a calendar year.

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.


The extent of compliance with the blasting frequency limits will be measured by compliance with the requirement of Condition B20, Schedule 2 of SSD-7480 considering however that Condition B21 states:

*B21. Condition B20 does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blast misfires or blasts required to ensure the safety of the mine, its workers or the general public.*

## 4.2 OPERATING CONDITIONS

Condition B27, Schedule 2 of SSD-7480 requires that WHC:

- (a) *take all reasonable steps to:*
  - (i) *ensure the safety of people and livestock from blasting impacts of the development;*
  - (ii) *protect public and private infrastructure and property in the vicinity of the site from blasting damage associated with the development; and*
  - (iii) *minimise the dust and fume emissions of any blasting;*
- (b) *ensure that blasting on the site does not damage heritage items<sup>a</sup>, including Aboriginal grinding groove site 20-04-0009 and the Kurrumbede Homestead, except in accordance with the predictions in the document/s listed in condition A2(c), and develop specific measures to protect heritage items outside the approved disturbance areas from any blasting damage associated with the development;*
- (c) *operate a comprehensive blast management system that uses a combination of meteorological forecasts and predictive blast modelling to guide the planning of blasts to minimise blasting impacts;*
- (d) *minimise the frequency and duration of any public road closures for blasting, and use all reasonable efforts to avoid road closures during peak traffic periods;*
- (e) *operate a suitable system to enable interested members of the public to get up-to-date information on the proposed blasting schedule on the site and any associated public road closures, including notification via SMS message of the blasting schedule and associated road closures for that day and any variations to that schedule and closures;*
- (f) *use all reasonable efforts to co-ordinate the timing of blasting at the site with nearby mines to minimise cumulative blasting impacts; and*

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- (g) *carry out regular blast monitoring to determine whether the development is complying with the relevant conditions of this consent.*

There will be no blasts during the construction and initial mining period within 500 metres (m) of public roads, and as such a Road Closure Management Plan is not required for this BLMP.

#### 4.3 **HERITAGE SITES**

There are no regulatory criteria nominated in Australia for the assessment of damage to items of heritage significance from vibration and airblast due to blasting.

Based on literature, nominated vibration and airblast criteria for the relevant heritage sites are detailed in Table 4 (consistent with those used in the *Vickery Extension Project Noise and Blasting Assessment* [Wilkinson Murray, 2018]).

**Table 4 – Nominated Heritage Site Blasting Criteria**

Heritage Site	Blast Site Location Identification	Airblast overpressure (dB)	Ground Vibration (mm/s)
Grinding Groove Site (AHIMS 20-4-0009)	B-02	N/A	80
Kurrumbede Homestead <sup>1</sup>	B-01	133	10


<sup>1</sup> *Criteria for the Kurrumbede Home are consistent with Table 6 of SSD-7480.*

Prior to commencing blasting operations, a suitably qualified structural engineer would be commissioned to inspect the condition of the main residence of the Kurrumbede Homestead and associated outbuildings, in accordance with Condition B72, Schedule 2 of SSD-7480, to confirm blasting criteria, advise measures to minimise impacts due to blasting and recommend works to protect the structural integrity of the buildings.

#### 4.4 **OTHER LICENSE CONDITIONS**

Blasting criteria and other blast related conditions stipulated in CL 316, ML1718, ML1471, ML 1464 and MLA 578 and in EPL 21283 are consistent with those prescribed in SSD-7480.




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## 5 PERFORMANCE INDICATORS

The following blast related performance indicators will be used to assess the performance of the VCM:

- results of monitoring are compliant with the blasting criteria in Section 4;
- no blasting occurs outside of the period 9.00 am to 5.00 pm Monday to Saturday, inclusive (unless authorised by the Secretary);
- no injuries to the public or livestock occur as a result of blasting;
- no damage to public or private infrastructure/property occur as a result of blasting; and
- complaints are minimised and appropriate management actions are implemented following receipt of a complaint.

Section 9 details the Contingency Plan to be implemented to manage any unpredicted impacts.

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## 6 BLAST IMPACTS AND PREDICTIONS

Blasting has the potential to result in the following hazards which may present a risk to public safety or property damage, if inappropriately managed:

- airblast overpressure exceedances;
- excessive ground vibration;
- flyrock, post-blast dust and debris;
- fumes; and
- misfires.

### 6.1 AIRBLAST OVERPRESSURE

Blasting generates a transient air pressure greater than the surrounding atmospheric pressure, known as overpressure. Overpressure has the potential to damage buildings and infrastructure.

### 6.2 GROUND VIBRATION

Energy released after a blast event can result in vibration of the ground which has the potential to damage buildings and infrastructure.

### 6.3 FLYROCK, DUST AND DEBRIS

Flyrock is any rock material ejected from the blast site by the force of the blast. Flyrock has the potential to damage buildings and infrastructure and poses a potential risk to public, personnel and livestock safety.


The amount of dust and debris emitted from the blast site post-blast depends on several factors including the blast design and the rock material being blasted. The dust and debris pose a potential risk to public and personnel safety.

### 6.4 FUMES

Blasting has the potential to generate gases (fumes) from the use of ammonium nitrate-based explosives which commonly include nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>) and are known as the Oxides of Nitrogen or NO<sub>x</sub>.


### 6.5 MISFIRES

A blast misfire can occur when one or more holes in a blast pattern fail to initiate, which results in a blast event which is different to the blast design.

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## 6.6 **BLAST PREDICTIONS**

The EIS Noise and Blasting Assessment (Wilkinson Murray, 2018), identified no exceedances of vibration and airblast criteria are predicted to occur at any privately-owned receiver, and no exceedances of the nominated airblast and vibration criteria are predicted at either the grinding groove site (AHIMS 20-4-0009) or the Kurrumbede Homestead. Blasts would be conducted using blasting protocols that would be developed using site-specific blast monitoring data gathered during the construction and initial mining stage.

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## 7 BLAST MANAGEMENT AND CONTROL MEASURES

WHC will implement best management practice to protect the safety of people and livestock, protect public or private infrastructure/property from blasting damage and minimise dust and fume emissions in accordance with Condition B27(b), Schedule 2 of SSD-7480.

The effectiveness of blast management and control measures at the VCM will be assessed and continually improved through monitoring (Section 8).

### 7.1 PUBLIC SAFETY AND LIVESTOCK

#### 7.1.1 Public Roads

There will be no blasts during the construction and initial mining period within 500 m of public roads, and as such a Road Closure Management Plan is not necessary for this BLMP. Flyrock, fume and dust would be managed through appropriate blast design and site specific blasting protocols in order to minimise risk to the public using Blue Vale Road and Braymont Road. Please refer to sections 7.5.1 to 7.5.4.

#### 7.1.2 Private Landowners

The nearest private residence is located approximately 2.8 km away from the location of construction and initial mining blasting.


As described in Section 7.5.3, private landholders and residents in the pre-blast notification register will be notified prior to blasting.

In accordance with EPL 21283, construction and initial mining blasting will be designed so that overpressure and ground vibration levels do not exceed the specified criteria at all privately-owned buildings. Flyrock, dust and fumes would be managed through appropriate blast design in order to minimise flyrock risk to nearby residential receivers and livestock.

Potential impacts from dust and fumes would be managed in accordance with the VCM BLMP.

#### 7.1.3 Livestock

Studies have been undertaken by Casaday and Lehmann (1967) and Heggies Australia Pty Ltd (Heggies) (2006), into the effects of vibration on livestock animals. The study by Casaday and Lehmann (1967) found that cattle were affected by sonic booms, measuring between 125 dB to 136 dB and recommended that a conservative criterion of 125 dB be adopted for the purposes of assessment of livestock impacts. The study by Heggies (2006) found that cattle are commonly exposed to vibration levels in excess of 200 mm/s during road transportation with no adverse effects on cattle health. It was consequently presumed that there would only be an effect on cattle health at vibration levels well in excess of 200 mm/s.

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Based on these two studies, WHC would adopt the following blasting performance criteria for livestock:

- 125 dB(Lin Peak) airblast overpressure (Casaday and Lehmann, 1967); and
- 200 mm/s ground vibration (Heggies, 2006).

These performance criteria are higher than those specified within conditions described in Section 4.1.1.

Flyrock would be managed through appropriate blast design in order to minimise flyrock risk to nearby livestock. Please refer to sections 7.5.1 to 7.53.

## 7.2 **RESIDENTIAL LOCATIONS**

Reductions in Maximum Instantaneous Charge (MIC) in some areas of the open cut pit are proposed to achieve compliance with the human comfort airblast criterion for some privately-owned receivers.

As described in Section 7.5.3 private landholders and residents on the pre-blast notification register will be notified prior to blasting.

### 7.2.1 **Property Inspections and Investigations**

In accordance with Condition D4, Schedule 2 of SSD-7480, all owners of privately-owned land within 3 km of the approved open cut at the VCM (property IDs 127, 132 and 133) have been notified in writing that they are entitled to a property inspection to establish the baseline condition of any buildings and/or structures, or to have a previous property inspection updated.


To date, no written requests for a property inspection have been received by WHC prior to construction and therefore no property inspection reports have been prepared, nor any other specific measures identified to minimise the potential blasting impacts of the VCM on such buildings and/or structures (as required by Condition B22, Schedule 2 of SSD-7480).

Should any owners of privately-owned land claim that buildings and/or structures on their land have been damaged as a result of a blast event at the VCM, an investigation will be conducted by a suitably qualified, experienced and independent person whose appointment has been approved by both parties. If there is a dispute over the selection of the suitably qualified, experienced and independent person, the matter will be referred to the Planning Secretary for resolution.

The investigation will be commissioned within two months of the claim and a copy of the independent property investigation report provided by WHC to the landowner upon its completion.

If the independent property investigation report confirms the landowners claim, and both parties agree with these findings, WHC will repair the damages to the satisfaction of the Secretary.

However, if the landowner or WHC disagrees with the findings of the independent property investigation report, then either party may refer the matter to the Secretary for resolution.

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### 7.3 **PUBLIC INFRASTRUCTURE**

Condition B17, Schedule 2 of SSD-7480 includes ground vibration criteria of 50 mm/s for public infrastructure (e.g. roadways and electrical infrastructure) (or a limit determined by the structural design methodology in Australian Standard (AS) 2187.2:2006 *Explosives – Storage and Use – Part 2: Use of Explosives*, or its latest version, to the satisfaction of the Secretary). In accordance with SSD-7480, WHC will comply with this limit unless a written agreement is established with the relevant infrastructure owner. The Department will be advised of any relevant agreements.

Blast vibration monitoring will be undertaken at a representative location when blasting is within 500 m of public infrastructure, unless otherwise agreed with the relevant infrastructure owner, however as noted within Section 4.2 there is not anticipated to be any blasts during the construction and initial mining period within 500 metres (m) of public roads.

### 7.4 **HERITAGE SITES**

#### 7.4.1 **Historic Heritage**

Historic heritage sites will be managed in accordance with blasting criteria.

Prior to the commencement of blasting operations, the Kurrumbede Homestead would be inspected by a structural engineer to confirm the nominated airblast and vibration criteria (refer Section 4.3).

The predicted airblast and vibration levels at the Kurrumbede Homestead are below the nominated criteria in Table 4. Notwithstanding, airblast and vibration monitoring will be undertaken in proximity to Homestead and used as a guide to blast design (i.e. blast designs will be revised if actual airblast/vibration levels approach criteria).


#### 7.4.2 **Aboriginal Heritage**

Aboriginal heritage sites will be managed in accordance with the VCM Aboriginal Cultural Heritage Management Plan.

During the construction and initial mining period predicted vibration levels at the grinding groove site (AHIMS 20-4-0009) are below the nominated criteria (refer Section 4.3). Notwithstanding, vibration monitoring of the grinding groove site will be undertaken at the grinding groove site (AHIMS 20-4-0009) and used as a guide to inform blast design (i.e. blast designs will be revised if actual airblast/vibration levels approach criteria).

Other site types present within the VCM area include isolated finds and artefact scatters. These site types are not considered to be susceptible to impacts from blasting (as these sites do not have an inherent structural component).



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## 7.5 **BLASTING CONTROLS / PROCEDURES**

WHC will design and manage blast events during the construction and initial mining period to meet all relevant statutory requirements to protect the safety of the public and livestock in the surrounding area and minimise the risk of impacts to residential locations, infrastructure and heritage sites.

Blast management procedures will include:


- training all relevant personnel on blast-related obligations;
- use of risk assessments prior to blasting to review factors such as pre-blast weather conditions, geological conditions, ground conditions, location of the blast relative to previous blasts which may have triggered fume events, blasting product selection and presence of groundwater;
- where possible, use all reasonable efforts will be undertaken to co-ordinate the timing of blasting at the VCM with nearby mines to minimise cumulative blasting impacts including notification of planned blast time to other operations, and receiving notification (via electronic or verbal notification) of planned blast times from other mine sites;
- formulation of explosive products to an appropriate oxygen balance to reduce the likelihood of fumes;
- use of appropriate blast loading, initiation and detonation systems;
- minimising the time between drilling and loading, and loading and shooting of the blast;
- use of adequate burden and stemming to confine explosives;
- designing all blasts to enable compliance with relevant overpressure and ground vibration criteria with consideration to meteorological weather conditions and predictive blast result modelling;
- monitoring of all blasts (refer Section 8);
- implementation of procedures to mitigate potential fumes for all blast events during the construction and initial mining stage (refer to Section 7.5.2);
- calibration of site-specific blast models over time, using monitored data from previous blasting, to enable refinement and assessment for future blast events (refer Section 7.5.1);
- periodic review of blasting procedures to evaluate performance (refer Section 10); and
- evaluation of new technology and available blasting methodologies.

### 7.5.1 **Pre-blast Assessments**

Prior to each blast event during construction and initial mining, a pre-blast assessment will be prepared.

The pre-blast assessment will consider:

- establishment of a minimum blast exclusion zone for public roads and infrastructure;

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- assessment of meteorological conditions (e.g. wind speed and direction) prior to the blast to identify all personnel, publicly accessible areas, private landholders, residential locations, infrastructure and heritage sites that may be affected;
- design of the blast (e.g. correct explosive product for the conditions); and
- notification to all relevant external stakeholders (including those on the pre-blast notification register) prior to blasting (refer to Section 7.5.3).

### 7.5.2 Dust and Fumes Strategy

Strategies to minimise dust and fumes associated with blasts at the VCM include:

- blasting will be conducted between 9.00 am and 5.00 pm when dispersion conditions are favourable, unless otherwise required for safety reasons;
- blasting during adverse weather conditions will be avoided and meteorological forecasting of conditions prior to loading;
- minimising the time between drilling and loading, and loading and firing of the blast optimisation of blast sequencing
- explosive product will be selected with consideration of the likelihood of moisture down hole (including the presence of clay strata);
- shotfirer procedures will include measures to avoid product contamination during hole loading;
- blast hole stemming will be used to minimise venting of gases; and
- coarse stemming will be used (i.e. drill fines would not be used).

Fume emissions will be managed in accordance with the Code of Practice: Prevention and Management of Blast Generated NO<sub>x</sub> Gases in Surface Blasting (Australian Explosives Industry and Safety Group Inc., 2011).


### 7.5.3 Adverse Weather Conditions

The following criteria outlines unfavourable weather conditions:

- Blasting will be postponed when the site weather station records wind direction from the north-east (20° through to 70°) and wind speed greater than 8 m/s over successive readings.
- If it is considered likely that a level 3C (or higher) fume event (refer Appendix B) could potentially leave site in the direction of a private receiver, then blasting will be rescheduled unless required for safety reasons.


### 7.5.4 System to Notify Public of Blast Schedule

Up-to-date information on the blasting schedule will be made publicly available on the WHC website ([www.whitehavencoal.com.au](http://www.whitehavencoal.com.au)).

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All private landholders and tenants of mine-owned residences within 2 km of the VCM approved open cut extent, as well any private landholder living in the vicinity of the VCM that registers an interest in being informed of the blasting schedule, will be included in a pre-blast notification register (including contact details for notification via SMS, telephone, email or otherwise agreed method).

Private landholder and residents on the pre-blast notification register will be notified prior to all blasts and will be re-notified if a blast event is rescheduled by more than two hours.


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## 8 BLAST MONITORING PROGRAM

To assess compliance with the relevant criteria, the following monitoring will be undertaken for each blast:

- Overpressure and vibration monitoring at a location representative of the closest privately-owned residence to the blast site (i.e. monitor relocated as required to a location representative of privately-owned residences to the southwest of the VCM, such as 131a subject to landholder agreement).
- Overpressure and vibration monitoring at the Kurrumbede Homestead and vibration monitoring at the grinding groove site (AHIMS 20-4-0009).
- Vibration monitoring in close proximity to construction and initial mining blasting as an indicator for potential impacts at the nearest public infrastructure to monitor compliance with the blast criterion in Section 7.3. Following cessation of construction and initial mining blasting, these monitors would be relocated to a location representative of privately-owned residences for monitoring during operational blasting.
- Visual monitoring for blast fumes will be undertaken for fume level, colour and extent on a scale between 0 - 5, based on the AEISG Code of Practice (refer Appendix B).
- Meteorological monitoring of on-site weather conditions at the licenced meteorological monitoring locations.

The VCM blast and meteorological monitoring system for the construction and initial mining period is shown in Figure 3-1. Blast monitoring locations are appropriate for the construction and initial mining phase. Consideration of the locations has been made in relation to prominent wind direction, vectors of nearby receivers and activities proposed. Monitoring locations will be reviewed upon the phasing out of construction activities and will be described in future revisions of the BLMP.

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## 9 CONTINGENCY PLAN

In the event blast management criteria (detailed in Section 4) may not have been met or a performance indicator is considered to have been exceeded, WHC will implement the following Contingency Plan for the VCM:


- The Environmental Superintendent or authorised delegate will report the incident in accordance with Section 11.3.
- WHC will apply adaptive management (Section 9.1)
- WHC will identify the appropriate course of action with respect to the identified impact(s), in consultation with technical specialists, DPIE and any other relevant agencies, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 9.2.
- WHC will, in the event there is a dispute over the proposed remedial course of action or if the actions conflict with current approvals, submit the appropriate course of action to the Secretary for approval.
- WHC will implement the approved course of action to the satisfaction of the Secretary.

### 9.1 ADAPTIVE MANAGEMENT

In accordance with Condition E3, Schedule 2 of SSD-7480 WHC will assess and manage risks to comply with the criteria and/or performance measures outlined in Schedule 2 of SSD-7480.

Where any exceedance of these criteria and/or performance measures occurs, at the earliest opportunity WHC will:

- take all reasonable and feasible measures to ensure that the non-compliance does not recur;
- consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Secretary describing those options and preferred remediation measures or other courses of action; and
- implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.


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## 9.2 **POTENTIAL CONTINGENCY MEASURES**

Potential contingency measures will be reviewed during revisions of this BLMP (such as that required prior to commencement of operational activities). Key potential contingency measures to be implemented (following exceedance of blasting criteria) may include:

- WHC will notify (in writing) the affected landholders and tenants of the exceedance of SSD-7480 criteria at the earliest opportunity and provide them with regular blast monitoring results, if requested.
- WHC will undertake an investigation, in the event that the SSD-7480 at the Kurrumbede Homestead, grinding groove site (AHIMS 20-4-0009).
- WHC will re-evaluate blast designs (e.g. VCM-specific scaled distance equations) to mitigate the potential for future exceedances of blast criteria, if blast monitoring results indicate this is required.



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## 10 REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

### 10.1 ANNUAL REVIEW

In accordance with Condition E9, Schedule 2 of SSD-7480, WHC will review the environmental performance of the VCM for the previous calendar year and report results within the Annual Review to the satisfaction of the Secretary.

In relation to blast management, the Annual Review will (where relevant):

- describe the development that was carried out in the relevant calendar year, and the development that is proposed to be carried out during the following calendar year;
- include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes 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 EIS;
- identify any non-compliance 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 development;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next reporting year to improve the environmental performance of the development.


The Annual Review will be made publicly available on the WHC website in accordance with Condition E14, Schedule 2 of SSD-7480.

### 10.2 BLAST MANAGEMENT PLAN REVISION

In accordance with Condition E5, Schedule 2 of SSD-7480, this BLMP will be reviewed, and if necessary revised (to the satisfaction of the Secretary), within three months of the submission of:

- an Annual Review (Condition E9, Schedule 2);
- an Independent Environmental Audit (Condition E10, Schedule 2);
- an incident report (Condition E7, Schedule 2); or
- any modification to the conditions of SSD-7480 (unless the conditions require otherwise).

The reviews would be undertaken to ensure the BLMP is updated on a regular basis and to incorporate potential measures to improve the environmental performance of the VCM.

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The revision status of this BLMP is indicated on the final page of each copy. The approved BLMP will be made publicly available on the WHC website to ensure information is kept up to date, in accordance with Condition E14, Schedule 2 of SSD-7480.

### **10.3 INDEPENDENT ENVIRONMENTAL AUDIT**

In accordance with Condition E10, Schedule 2 of the SSD-7480, an Independent Environmental Audit (IEA) of the VCM will be conducted. This will be undertaken by a suitably qualified, experienced and independent auditor whose appointment has been endorsed by the Secretary.

The IEA will assess the environmental performance of the VCM and review the adequacy of this BLMP. If necessary, appropriate measures or actions to improve the environmental performance of the VCM in regards to management of blasting will be recommended. A copy of the final IEA report, response to recommendations and the proposed time period for implementation where applicable, will be submitted to the Department and any other relevant agency that requests a copy.

Within 1 year of the commencement of development and every 3 years thereafter, WHC shall commission an IEA of the VCM. The IEA and WHC's response to recommendations in the Audit, will be made publicly available on WHC's website as per Condition E14, Schedule 2 of SSD-7480.

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## 11 REPORTING PROCEDURES

In accordance with Condition E4(h), Schedule 2 of SSD-7480, WHC has developed a protocol for managing and reporting the following:

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

These protocols are described in the VCM's Environmental Management Strategy (EMS).

In accordance with Condition E14, Schedule 2 of SSD-7480, WHC will provide regular reporting on the environmental performance of the VCM on the WHC website.

### 11.1 INCIDENT AND NON-COMPLIANCE REPORTING

An incident is defined as an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. A non-compliance is defined as an occurrence, set of circumstances or development that is a breach of the condition of SSD-7480 (refer Section 11.3).


In the event that review of monitoring data indicates an incident has occurred, the incident will be reported in accordance with Condition E7, Schedule 2 of SSD-7480 and relevant conditions of EPL 21283 and MLA 578. WHC will immediately notify the Department and any other relevant agencies.

In the unlikely event that a blast produces a fume event that rates at Level 3C or higher and the fume migrates off site, notification will be provided to relevant agencies, emergency and community contacts in accordance with the PIRMP.


The notification will be provided to the Department in writing via [compliance@planning.nsw.gov.au](mailto:compliance@planning.nsw.gov.au) and will identify the VCM (including the development application number and name) and set out the location and nature of the incident.

Within seven days of the date of the incident, WHC will provide the Secretary and any other relevant agencies with a report on the incident. The report will include details required within the approval, including:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe reasonable and feasible options to address the incident and identify the preferred option to address the incident (Section 9.1).

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In accordance with Condition D6, as soon as practical and no longer than 7 days after obtaining monitoring results showing an exceedance of blasting criterion in Part B of SSD-7480, the details of the exceedance will be provided to the affected landowners tenants and the CCC.

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## 11.2 **COMPLAINTS**

WHC will maintain a Community Complaints Line and online contact via the WHC website ([www.whitehavencoal.com.au](http://www.whitehavencoal.com.au)) for the sole purpose of receiving community complaints, or enquires. The Community Complaints Line number will be available on the website. The Community Complaints Line will be staffed 24 hours a day, seven days a week during construction and operations. WHC will respond to callers on the next business day.

Detailed records of each complaint are kept in WHC's record management systems.

In accordance with Condition E14(ix), Schedule 2 of SSD-7480, a complaints register will be made available on the WHC website during the construction and operational stages of the VCM. The complaints register will include:

- the date and time of the complaint;
- the method by which engagement was made;
- any personal details provided or, if no such details were provided, a note to that effect;
- the nature of the complaint; and
- any actions (if any required) taken by WHC in relation to the complaint.

Investigations into complaints will generally commence within 24 hours of receipt, or as soon as practical. The cause of the complaint will be analysed and actions to attempt to address the complaint taken as soon as reasonably possible. In complex cases where resolution will take more than 48 hours, WHC will commit to updating the community member.

## 11.3 **NON-COMPLIANCE WITH STATUTORY REQUIREMENTS**


A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of the VCM's EMS and is described below.

Compliance with all approvals, plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with WHC and the VCM.

A VCM representative will undertake required inspections during the construction and initial mining period and initiate directions to address any actions identified, if required, and areas of actual or potential non-compliance.

As described in Section 11.1, WHC will report incidents in accordance with Condition E7, Schedule 2 of SSD-7480 and dependent on the incident and potential environmental harm, in accordance with the protocol for industry notification of pollution incidents under Part 5.7 of the PoEO Act.

WHC will notify the Secretary and any other relevant agencies within seven days of becoming aware of a non-compliance in accordance with Condition E8, Schedule 2 of SSD-7480. The notification will set out the condition/s of SSD-7480 which the VCM is non-compliant with, why it is non-compliant and what actions have or will be taken to address.

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A review of compliance with all conditions in SSD-7480 and all other applicable approvals and licences will be included within each Annual Review (Section 10.1). Additionally, in accordance with Condition E10, Schedule 2 of SSD-7480, an IEA (Section 10.3) would be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary to assess whether WHC is complying with the requirements SSD-7480, and any other relevant approval and tenement conditions.

#### **11.4 INDEPENDENT REVIEW**


In accordance with Condition D8, Schedule 8 of SSD 7480, if a privately-owned landholder considered the VCM to be exceeding any relevant blast criteria, they may ask the Secretary in writing for an independent review of the impacts of the VCM on their residence and/or land.

The landholder will be notified in writing within 21 days of the request for a review if the Panning Secretary is not satisfied that an independent review is warranted, including reasons for that decision.

Condition D10, Schedule 2 of SSD-7480 requires that, if the Secretary is satisfied that an independent review is warranted, within three months of the decision, or other timeframe as agreed by the Secretary, WHC must:

- commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to;
  - consult with the landowner to determine their concerns;
  - conduct monitoring to determine whether the development is complying with the relevant criterion in Schedule 2 of SSD-7480; and
  - if the development is not complying with the relevant criterion, identify measures that could be implemented to ensure compliance with the relevant criterion;
- give the Secretary and landowner a copy of the independent review; and
- comply with any written requests made by the Secretary to implement any findings of the review.



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## 12 REFERENCES

Australian and New Zealand Environment Council (1990) *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration.*


Australian Explosives Industry and Safety Group Inc (2011) *Code of Practice Prevention and Management of Blast Generated NOx Gases in Surface Blasting.*

Casaday and Lehmann (1967) Responses of farm animals to sonic booms.

Heggies Australia Pty Ltd (2006) *Report on Vibrational Effects in Transported Cattle.*  
Appendix D of the Albion Park Quarry Extension Revised Blast Management Plan.


Whitehaven Coal Limited (2018) *Vickery Extension Project Environmental Impact Statement.*

Wilkinson Murray (2018) *Vickery Extension Project Noise and Blasting Assessment.*


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## Appendix A Blast Related Conditions Development Consent SSD-7480


VCM Development Consent (SSD-7480)				BLMP Section
Blasting				-
Blasting Criteria				-
B17. The Applicant must ensure that blasting on the site does not cause exceedances of the criteria at the locations <sup>a</sup> in Table 6.				Section 4.1.1
Table 6: Blasting criteria				
Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance	
Residence on privately-owned land	120	10	0%	
	115	5	5% of the total number of blasts over a calendar year	
Kurrumbede <sup>b</sup>	133	10	0%	
All other public infrastructure		50 (or a limit determined by the structural design methodology in AS 2187.2 - 2006, or other alternative limit for public infrastructure, to the satisfaction of the Planning Secretary)	0%	
Notes:				
<sup>a</sup> The locations referred to in Table 6 are shown in Appendix 1 and Appendix 5.				
<sup>b</sup> Unless a more appropriate criterion is established by the structural engineer's findings in condition B72 and agreed to by the Planning Secretary.				
B18. The blasting criteria in Table 6 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or infrastructure to exceed the blasting criteria, and the Applicant has advised the Department in writing of the terms of this agreement.				Section 4.1.1
Blasting Hours				-
B19. The Applicant must only carry out blasting on the site between 9 am and 5 pm (Monday to Saturday inclusive). No blasting is allowed on Sundays, public holidays or any other time without the prior written approval of the Planning Secretary.				Section 4.1.2
Blasting Frequency				-
B20. The Applicant may carry out a maximum of:				Section 4.1.3
(a) 1 single blast event <sup>a</sup> a day; and				
(b) 5 single blast events <sup>a</sup> a week, averaged over a calendar year.				
B21. Condition B20 does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blast misfires or blasts required to ensure the safety of the mine, its workers or the general public.				Section 4.1.3
Note: <sup>a</sup> Within conditions 20 and B21, a 'single blast event' means a blast which involves either a single detonation or a number of individual blasts fired in quick succession in a discrete area of the development. Should an additional blast be required after a blast misfire, this additional blast and the blast misfire are counted as a single blast event.				
Property Inspections				-

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VCM Development Consent (SSD-7480)	BLMP Section
<p><b>B22.</b> If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on the site for a property inspection to establish the baseline condition of any buildings and structures on their land, or to have a previous property inspection updated, then within two months of receiving this request the Applicant must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:</p> <p>(i) establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and</p> <p>(ii) identify measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and structures; and</p> <p>(b) give the landowner a copy of the new or updated property inspection report.</p>	Section 7.2.1
<p><b>B23.</b> If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Planning Secretary for resolution.</p>	Section 7.2.1
<p><b>Property Investigations</b></p>	-
<p><b>B24.</b> If the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on the site or any other landowner where the Planning Secretary is satisfied an investigation is warranted, claims in writing that buildings or structures on their land have been damaged as a result of blasting on the site, then within two months of receiving this written claim the Applicant must:</p> <p>(a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and</p> <p>(b) give the landowner a copy of the property investigation report.</p>	Section 7.2.1
<p><b>B25.</b> If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant must repair the damage to the satisfaction of the Planning Secretary.</p>	Section 7.2.1
<p><b>B26.</b> If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution.</p>	Section 7.2.1
<p><b>Blast Operating Conditions</b></p>	-
<p><b>B27.</b> The Applicant must:</p> <p>(a) take all reasonable steps to:</p> <p>(i) ensure the safety of people and livestock from blasting impacts of the development;</p> <p>(ii) protect public and private infrastructure and property in the vicinity of the site from blasting damage associated with the development; and</p> <p>(iii) minimise the dust and fume emissions of any blasting;</p> <p>(b) ensure that blasting on the site does not damage heritage items<sup>a</sup>, including Aboriginal grinding groove site 20-04-0009 and the Kurrumbede Homestead, except in accordance with the predictions in the document/s listed in condition A2(c), and develop specific measures to protect heritage items outside the approved disturbance areas from any blasting damage associated with the development;</p> <p>(c) operate a comprehensive blast management system that uses a combination of meteorological forecasts and predictive blast modelling to guide the planning of blasts to minimise blasting impacts;</p> <p>(d) minimise the frequency and duration of any public road closures for blasting, and use all reasonable efforts to avoid road closures during peak traffic periods;</p> <p>(e) operate a suitable system to enable interested members of the public to get up-to-date information on the proposed blasting schedule on the site and any associated public road closures, including notification via SMS message of the blasting schedule and associated road closures for that day and any variations to that schedule and closures;</p> <p>(f) use all reasonable efforts to co-ordinate the timing of blasting at the site with nearby mines to minimise cumulative blasting impacts; and</p>	<p>-</p> <p>Section 7</p> <p>Section 7.4</p> <p>Sections 7.5 and 8</p> <p>Section 7.1.1</p> <p>Section 7.5.3</p> <p>Section 7.5</p>

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<p>(g) carry out regular blast monitoring to determine whether the development is complying with the relevant conditions of this consent.</p> <p><b>Note:</b> <sup>a</sup> The locations of the heritage items referred to in paragraph (b) are shown in Appendix 5.</p>	Section 8
<p>B28. The Applicant must not undertake blasting on the site within 500 metres of any public road or any land outside the site not owned by the Applicant, unless the blast generates ground vibration of 0.5 mm/s or less, or the Applicant has:</p>	Sections 4.3 and 7
<p>(a) a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the public road or land, and the Applicant has advised the Department in writing of the terms of this agreement; or</p>	
<p>(b) demonstrated, to the satisfaction of the Planning Secretary, that the blasting can be carried out closer to the public road or land without compromising the safety of people or livestock or damaging the road or other buildings and structures, and updated the Blast Management Plan to include specific mitigation measures to be implemented while blasting is being carried out within 500 metres of the road or land.</p>	
<b>Blast Management Plan</b>	-
<p>B29. The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:</p>	-
<p>(a) be prepared by a suitably qualified and experienced person/s;</p>	Section 1.1
<p>(b) be prepared in consultation with the EPA;</p>	Section 1.2
<p>(c) be submitted to the Planning Secretary for approval prior to carrying out any blasting operations on site under this consent;</p>	Section 1.2
<p>(d) describe the blast management system and the measures that will be implemented to ensure compliance with the blasting criteria and conditions of this consent;</p>	Sections 4 and 7
<p>(e) include a Blast Fume Management Strategy for:</p>	
<p>(i) minimising blast fume emissions;</p>	Section 7.5.2
<p>(ii) rating and recording blast fume events in accordance with Visual NOx Fume Rating Scale (AEISG, 2011), or equivalent monitoring technique; and</p>	Section 8 & Appendix B
<p>(iii) reporting significant blast fume events to the Department and the EPA;</p>	Section 11.1
<p>(f) include a Road Closure Management Plan for any blasting within 500 metres of a public road, that has been prepared in consultation with GSC and NSC and includes provisions for:</p>	Section 4.3
<p>(i) minimising the duration of closures, both on a per event basis and weekly basis;</p>	
<p>(ii) avoiding peak traffic periods as far as reasonable; and</p>	
<p>(iii) co-ordinating closures with nearby mines to minimise the cumulative effect of road closures;</p>	
<p>(g) identify any agreed alternative ground vibration limits for public or private infrastructure in the vicinity of the site (if relevant); and</p>	Section 7.3
<p>(h) include a monitoring program for evaluating and reporting on compliance with the relevant conditions of this consent.</p>	Section 8
<p>B30. The Applicant must implement the Blast Management Plan as approved by the Planning Secretary.</p>	Section 2.1
<b>Historic Heritage</b>	-
<p>B72. Prior to commencing blasting operations on the site, the Applicant must commission a suitably qualified structural engineering to inspect the condition of the main residence at the Kurrumbede Homestead Complex to confirm measures to minimise damage due to blasting criteria and recommend works to protect the structural integrity of the homestead.</p>	Sections 4.3 and 7.4.1
<b>Management Plan Requirements</b>	-
<p>E4. Management plans required under this consent must be prepared in accordance with relevant guidelines, and include where relevant:</p>	Entire Document
<p>(a) summary of relevant background or baseline data;</p>	Section 3.1
<p>(b) details of:</p>	-

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(i)	<i>the relevant statutory requirements (including any relevant approval, licence or lease conditions);</i>	Section 2
(ii)	<i>any relevant limits or performance measures and criteria; and</i>	Section 4
(iii)	<i>the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</i>	Section 5
(c)	<i>any relevant commitments or recommendations identified in the document/s listed in condition A2(c);</i>	Sections 6 and 7
(d)	<i>a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;</i>	Sections 5,6 and 7
(e)	<i>a program to monitor and report on the:</i>	Section 8
(i)	<i>impacts and environmental performance of the development; and</i>	
(ii)	<i>effectiveness of the management measures set out pursuant to paragraph (d);</i>	
(f)	<i>a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;</i>	Section 9
(g)	<i>a program to investigate and implement ways to improve the environmental performance of the development over time;</i>	Section 10
(h)	<i>a protocol for managing and reporting any:</i>	-
(i)	<i>incident, non-compliance or exceedance of any impact assessment criterion or performance measure;</i>	Section 11.1 and 11.3
(ii)	<i>complaint; or</i>	Section 11.2
(iii)	<i>failure to comply with other statutory requirements;</i>	Section 11.3
(i)	<i>public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and</i>	Section 10
(j)	<i>a protocol for periodic review of the plan.</i>	Section 10.2
<b>Note:</b> <i>The Planning Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i>		










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### Appendix B Blast Fume Rating System

Level	Typical Appearance
<b>Level 0</b> No NO <sub>x</sub> gas	
<b>Level 1</b> Slight NO <sub>x</sub> gas	
1A Localised	
1B Medium	
1C Extensive	
<b>Level 2</b> Minor yellow/orange gas	
2A Localised	
2B Medium	
2C Extensive	
<b>Level 3</b> Orange gas	
3A Localised	
3B Medium	
3C Extensive	
<b>Level 4</b> Orange/red gas	
4A Localised	
4B Medium	
4C Extensive	
<b>Level 5</b> Red/purple gas	
5A Localised	
5B Medium	
5C Extensive	

(Source: AEISG, 2011)









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Assessing the amount of NO<sub>x</sub> gases produced from a blast will depend on the distance the observer is from the blast and the prevailing weather conditions. The intensity of the NO<sub>x</sub> gases produced in a blast should be measured on a simple scale from 0 to 5 based on the table above. The extent of the NO<sub>x</sub> gases also needs to be assessed and this should be done on a simple scale from A to C where:


A = Localised (i.e. NO<sub>x</sub> gases localised across only a few blast holes)

B = Medium (i.e. NO<sub>x</sub> gases from up to 50% of blast holes in the shot)

C = Extensive (i.e. extensive generation of NO<sub>x</sub> gases across the whole blast).


Level	Colour	Pantone Number
Level 0 No NO <sub>x</sub> gas		Warm Grey 1C (RGB 244, 222, 217)
Level 1 Slight NO <sub>x</sub> gas		Pantone 155C (RGB 244, 219, 170)
Level 2 Minor yellow/orange gas		Pantone 157C (RGB 237, 160, 79)
Level 3 Orange gas		Pantone 158C (RGB 232, 117, 17)
Level 4 Orange/red gas		Pantone 1525C (RGB 181, 84, 0)
Level 5 Red/purple gases		Pantone 161C (RGB 99, 58, 17)

(Source: AEISG, 2011)

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## Appendix C Consultation Log

Date	Consultee	Comment
26/11/20	EPA	Administrative items, detail on monitoring locations and adverse weather conditions.
June- July 21	DPIE	DPIE comments received for review

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#### Document History

Edition	Rev.	Comments	Date
1	0	Initial draft following consultation as first submitted	18/12/20
1	1	DPIE feedback incorporated	June-July 2021