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Marulan South Limestone Mine | SSD 7009

Blast Management Plan

Prepared for Boral Cement Limited | 14 November 2023

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SSD 7009 | BLAST MANAGEMENT PLAN

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14 November 2023

PR163

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3	14 November 2023	Updated BMT locations and trigger levels. Validation of results. Addition of crown lands permit for Condition B22, Replace Environmental Coordinator with Environmental Representative	Rod Linnett Muller Acoustic Consulting Pty Ltd	Boral Cement Limited

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1 INTRODUCTION

1.1 Background

Boral Cement Limited (Boral) owns and operates the Marulan South Limestone Mine (the mine), an open cut mine located in Marulan South, New South Wales (NSW). Limestone mining north of Bungonia Gorge began around 1830 with major developments emerging in the 1920s to supply limestone for cement manufacturing and steel making.

The limestone mine was opened in 1929 to supply limestone for cement, manufacturing and steel making. By 1953 two main pits (northern mine pit and southern mine pit) were well established and by the early 1970s the facets of the business included limestone for cement, steel making, agriculture, glass making, lime manufacturing, quicklime and hydrated lime.

The mine produces up to 3.38 million tonnes (Mt) of limestone-based products per year for the cement, steel, agricultural, construction and commercial markets.

Due to changes in the *NSW Mining Act 1992* (Mining Act) and the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act), a State significant development (SSD) consent under the EP&A Act was required to move mining operations beyond the area covered by the mining operations plan (MOP).

Two approvals are required for the mine:

- a consent for the Project (SSD 7009) under Part 4, Division 4.7 of the EP&A Act; and
- controlled action approval under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) for impacts on listed threatened species and communities (sections 18 and 18A of the Act).

An environmental impact statement (EIS) was prepared to accompany the application for SSD 7009 and addresses the requirements of State agencies under the EP&A Act and the Commonwealth Department of Agriculture, Water and the Environment. A response to submissions (RTS) report was subsequently prepared to consider and respond to agency and public submissions and provide clarification of project components where relevant.

Development consent (the consent) was granted by the Department of Planning, Industry and Environment (DPIE) on 19 August 2021, to continue mining limestone at a rate of up to 4 million tonnes per annum (Mtpa) for a period of up to 30 years (the Project).

To satisfy Condition of Consent (CoC) D5(i), the EIS, RTS, consent and other publicly available information related to the assessment and determination of SSD 7009 can be accessed on DPIE's Major Projects Planning Portal (https://www.planningportal.nsw.gov.au/major-projects/project/9691).

The consent requires the preparation and implementation of a number of management plans, strategies, protocols and procedures detailing environmental commitments, controls and performance objectives at the mine throughout its operational life. A Blast Management Plan (BMP) is required in accordance with CoC B11.

This plan incorporates the relevant management measures presented in the EIS, RTS and conditions of consent relating to noise**.** The BMP will continue to remain a dynamic document which will be updated as required over the life of mining operations until 31 August 2051.

This BMP has been prepared by Muller Acoustic Consulting Pty Ltd (MAC) on behalf of Boral. MAC are a member firm of the Association of Australasian Acoustic Consultants (AAAC). The author and reviewer are both members of the Australian Acoustical Society and hence, are considered suitably qualified and experienced and have been endorsed by the Planning Secretary.

1.2 Overview of Operations

1.2.1 Site Description

The Project site is in Marulan South, 10 km south-east of Marulan village and 35 km east of Goulburn. It is in the Goulburn Mulwaree Local Government Area (LGA).

The mine is separated from the Bungonia National Park (NP) and State Conservation Area to the south by Bungonia Creek and is separated from the Shoalhaven River and Morton NP to the east by Barbers Creek.

The Project site and surrounds are characterised by rolling hills of pasture interspersed with forest to the west, contrasting with the heavily wooded, deep gorges that begin abruptly to the east of the mine, forming part of the Great Escarpment and catchment of the Shoalhaven River.

Access is via Marulan South Road, which connects the mine and Boral's Peppertree Quarry with the Hume Highway approximately 9 km to the north-west. Boral's private rail line connects the mine and Peppertree Quarry with the Main Southern Railway approximately 6 km to the north.

The Project site covers historical and proposed future areas of disturbance and comprises two geographically separate areas:

- the existing mine including the proposed 30-year mine footprint and associated infrastructure; and
- the proposed Marulan Creek dam to be on Marulan Creek, within Boral landholdings approximately 2.5 km north of the mine entrance.

The Project site covers an area of 846.4 ha. The existing pre-SSD disturbance footprint is 341.5 ha with 256.5 ha of new disturbance associated with the proposed 30-year mine plan.

Most of the Project site is zoned RU1 - Primary Production under the Goulburn Mulwaree Local Environmental Plan (LEP) 2009. Mining and extractive industries are permissible in this zone with consent. The remaining area is zoned E3 - Environmental Management. Mining and extractive industries are prohibited in this zone. However, as agriculture is permitted in the E3 zone with consent, mining is also permitted in this zone under the Mining Sate Environmental Planning Policy with consent.

1.2.2 Overview of existing mining

The mine is sited on a high-grade limestone resource. Subject to market demand the mine has typically produced up to 3.38 Mt of limestone and up to 200,000 t of shale per annum.

The mine currently produces a range of limestone products for internal and external customers in the Southern Highlands/Tablelands, the Illawarra and Metropolitan Sydney markets for use primarily in cement and lime manufacture, steel making, agriculture and other commercial uses. Products produced at the mine are despatched by road and rail, with the majority despatched by rail.

Historically limestone mining was focused on the approximately 200-300 m wide Eastern Limestone and was split between a north pit and a south pit. A limestone wall (referred to by the mine as the 'centre ridge') rising almost to the original land surface, divided the two pits. The north and south pits were joined in 2016/2017 by mining the centre ridge to form a single contiguous pit, approximately 2 kilometres (km) in length. However, the north pit/south pit nomenclature remains important as current mining operation locations continue to be reported with respect to one or other of the old pits.

Limestone and shale are extracted using open-cut hard rock drill and blast techniques. Limestone is loaded using front end loaders and hauled either to stockpiles or the processing plant using haul trucks. Oversized material is stockpiled and reduced in size using a hydraulic hammer attached to an excavator.

Limestone processing facilities including primary and secondary crushing, screening, conveying and stockpiling plant and equipment are in the northern end of the north pit. Kiln stone grade limestone is also processed on site through the existing lime plant comprising kiln stone stockpiles, rotary lime kiln, hydration plant and associated auxiliary conveying, processing, storage, despatch plant and equipment. Overburden from stripping operations is emplaced in the Western Overburden Emplacement (WOE), west of the open cut pits.

1.2.3 Overview of approved project

Consent was granted for a 30-year mine plan accessing approximately 120 Mt of limestone down to a depth of 335 m. The mine footprint focuses on an expansion of the pit westwards to mine the Middle Limestone and to mine deeper into the Eastern Limestone. As the Middle Limestone lies approximately 70-150 m west of the Eastern Limestone, the 30-year mine plan avoids mining where practical the interburden between these two limestone units thereby creating a smaller second, north-south oriented west pit with a ridge remaining between. The north pit will also be expanded southwards, encompassing part of the south pit, leaving the remainder of the south pit for overburden emplacement and a visual barrier.

Limestone will be extracted at up to 4 Mtpa for 30 years until 31 August 2051. Clay shale will also continue to be extracted at up to 200,000 tonnes per annum (tpa). The limestone will be processed to create limestone and lime products including limestone aggregates and sand, hydrated lime and quick lime.

Existing infrastructure is being retained along with the following changes:

- relocation of a section of high voltage power line to accommodate a proposed overburden emplacement;
- realignment of a section of Marulan South Road, to accommodate a proposed overburden emplacement;
- relocation of the processing infrastructure and the stockpile and reclaim area at the northern end of the north pit to allow the northward expansion of the pit;
- development of a shared Road Sales Stockpile Area including a weighbridge and wheel wash to service both the mine and Peppertree Quarry; and
- construction of a 118 megalitre (ML) in-stream water supply dam on Marulan Creek.

Boral will transport up to 600,000 tpa of limestone and hard rock products along Marulan South Road to the Hume Highway, as well as 120,000 tpa of limestone products to the agricultural lime manufacturing facility.

The Project provides continued direct employment for 118 people on the mine site and 73 offsite. It will operate 24-hours per day, 7 days per week.

1.3 Environmental management framework

The mine operates in accordance with the Boral integrated Health Safety, Environment and Quality Management System (HSEQ MS) which establishes a strategic platform for regulatory compliance and continual improvement in environmental management. This framework is documented in GRP-HSEQ-1-01 Management System Framework and Operational Control. The Boral HSEQ MS is aligned with the international standard ISO-14001.

1.3.1 Environmental management system

CoC D1 requires the preparation of an Environmental Management Strategy (EMS) for the mine. The EMS provides the mine's strategic framework for environmental management under which the BMP operates.

1.3.2 Alignment with other plans

This BMP incorporates the findings of a Noise Impact Assessment Report (Wilkinson Murray Pty Limited, 2019 Report No. 14099-A Version F) that was undertaken as part of the Environmental Impact Statement (EIS) for the Marulan South Continued Operations State Significant Development (SSD) application to the Department of Planning, Industry and Environment (DPI&E), which included a Blasting Assessment of Airblast Overpressure and Ground Vibration for the Project, in accordance with the guidelines produced by the Australian and New Zealand Environment Council (ANZEC, 1990).

This BMP also interacts with the Peppertree Quarry Noise and Blasting Management Plan for meteorological monitoring forecasting and to avoid simultaneous blasting events.

1.4 Purpose and objectives

This BMP describes how Boral will manage and control blasting emissions when operating the mine and applies to all blasting activities undertaken by the mine. The specific objectives of the BMP are to:

- Describe the blast management system and the measures that will be implemented to ensure blasting emissions from mining operations comply with the blasting criteria in Table 2 of the consent and associated conditions.
- Identify any agreed alternative ground vibration limits for public or private infrastructure in the vicinity of the site (if relevant).
- Include a strategy to monitor, mitigate and manage the effects of blasting on heritage items.
- Include a blast monitoring system to provide data suitable to demonstrate compliance with the CoC and subsequent modifications.
- Evaluate blast emissions and reporting on compliance with the relevant CoC.
- Include a protocol for identifying any blast-related exceedance, incident or non-compliance and for notifying the Department, the EPA and relevant stakeholders of these events.
- Include public notification procedures to enable members of the public, particularly surrounding residents, to get up-to-date information on the proposed blasting schedule.
- Include a protocol for investigating and responding to blast-related complaints.

The BMP is prepared for a mixed audience of consent authorities, environmental regulators and site personal; the latter of which are responsible for implementing this plan as part of day-to-day operations.

1.5 Responsibility for implementation

The Site Manager carries ultimate responsibility for the implementation of this BMP and providing the necessary resources as required.

The site Environmental Representative is responsible for ensuring that the management and control measures outlined in this plan are implemented on site, investigating and responding to complaints associated with noise emissions, and carrying out and/or coordinating the monitoring and reporting requirements of this plan.

The site Environmental Representative is responsible for reporting exceedances of the criteria and complaints to the site Technical and Production Managers.

Operations personnel (Technical Manager and Mine Production Manager) are responsible for responding to confirmed exceedances of blasting criteria and adjusting mine operations as appropriate to minimise impacts on site and neighbouring properties.

Specific responsibilities are detailed in Table 1.1.

Table 1.1 Roles and Responsibilities

Role	Responsibility
Environmental Representative	▪ Assist in the development of the BMP. ▪ Ensuring that the management and control measures outlined in this plan are implemented on site. ▪ Co-ordinate all blast monitoring. ▪ Liaison with specialists to understand compliance. ▪ Key point of contact for all BMP-related communications and reporting. ▪ Investigating and responding to complaints associated with blasting. ▪ Reporting exceedances of the blasting criteria and complaints to the Site, Technical and Production managers. ▪ Assist implementing training, auditing and review of the BMP.
Technical Manager and Production Manager	▪ Implement the BMP. ▪ Adjusting mine operations as appropriate to minimise blasting impacts on site and neighbouring properties. ▪ Implementing the BMP blast management controls. ▪ Implementation of the contingency plan. ▪ Ensure all monitoring required under regulatory and environmental licences is undertaken.
Site Manager	▪ Accountability for compliance with the blast criteria and this BMP.

1.6 Document structure

The structure of the BMP is outlined in Table 1.2.

Table 1.2 Structure of the Blast Management Plan

Section	Content
1	Provides an overview of the project and objectives of the plan.
2	Outlines statutory requirements associated with the consent, Environmental Protection Licence (EPL) and consultation undertaken to develop the plan.
3	Outlines the blasting criteria the mine is required to meet, and the performance criteria used to assess the success of the management actions.
4	Outlines the blast management protocols in place for all blasting operations throughout the life of the operation.
5	Outlines the protocols to manage fume emissions from blasting.
6	Outlines the procedures and requirements of the blast monitoring system.
7	Outlines the procedures for evaluating the performance of the BMP review of procedures, and to facilitate improvement where required.
8	Outlines the procedures for responding unexpected incidents or impacts identified by the monitoring program, investigation of incidents and possible responsive actions. Outlines the procedures for reporting, notification, and complaints handling.
9	Reference Documents.

2 STATUTORY REQUIREMENTS

2.1 Development consent

This BMP has been prepared in accordance with the CoC. Table 2.1 and Table 2.2 presents the consent conditions relevant to the BMP and identifies where each condition has been addressed in this plan.

Table 2.1 General management plan requirements

Condition No.		General Conditions	Section
C5		If a landowner considers the development to be exceeding any relevant noise, blasting or air quality criterion in PART B of this consent, they may ask the Planning Secretary in writing for an independent review of the impacts of the development on their residence or land.	8.9
C6		If the Planning Secretary is not satisfied that an independent review is warranted, the Planning Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review.	8.9
C7		If the Planning Secretary is satisfied that an independent review is warranted, within 3 months, or other timeframe agreed by the Planning Secretary and the landowner, of the Planning Secretary's decision, the Applicant must	8.9
	(a)	commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to	8.9
	(a)(i)	consult with the landowner to determine their concerns	8.9
	(a)(ii)	conduct monitoring to determine whether the development is complying with the relevant criterion in PART B of this consent; and	8.9
	(a)(iii)	if the development is not complying with the relevant criterion, identify measures that could be implemented to ensure compliance with the relevant criterion; and	8.9
	(b)	give the Planning Secretary and landowner a copy of the independent review; and	8.9
	(c)	comply with any written requests made by the Planning Secretary to implement any findings of the review	8.9
D5		Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:	
	(a)	Summary of relevant background or baseline data;	N/A
	(b)	Details of	
	(b)(i)	The relevant statutory requirements (including any relevant approval, licence or lease conditions);	2
	(b)(ii)	Any relevant limits or performance measures and criteria; and	2.1, 2.2
	(b)(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;	3
	(c)	Any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	N/A
	(d)	A description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	4
	(e)	A program to monitor and report on the:	6.4 7
	(e)(i)	Impacts and environmental performance of the development; and	

	(e)(ii)	Effectiveness of the management measures set out pursuant to condition D4(c);	7
	(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;	8.7
	(g)	A program to investigate and implement ways to improve the environmental performance of the development over time;	7 7.3
	(h)	A protocol for managing and reporting any:	
	(h)(i)	Incident, non-compliance or exceedance of any impact assessment criterion or performance criterion	8.3
	(h)(i)	Complaint; or	8.8.1
	(h)ii)	Failure to comply with other statutory requirements;	8.2 8.5
	(i)	Public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	8.8
	(j)	A protocol for periodic review of the plan.	7.2
D6		The Applicant must ensure that management plans prepared for the development are consistent with the conditions of this consent and any EPL issued for the site.	2.2

Table 2.2 Blast management plan - specific requirements

Condition No.		Specific Conditions	Section Reference
B	11	The Applicant must ensure that blasting on the site does not cause exceedances of the criteria at the locations in Table 2.	3.1
B	12	The blasting criteria in Table 2 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.	3.1
B	13	The Applicant must only carry out blasting on the site between 9 am and 5 pm (Monday to Friday inclusive). No blasting is allowed on weekends, public holidays or any other time without the prior written approval of the Planning Secretary.	4.4
B	14	The Applicant may carry out a maximum of 1 single blast event per day.	4.4
B	15	Condition B14 does not apply to single blast events 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.	4.4
B	16	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 2 months of receiving this request the Applicant must: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to: (i) establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and (ii) identify measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and structures; and (b) give the landowner a copy of the new or updated property inspection report.	8.8.2 8.8.3
B	17	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.	8.8.2 8.8.3

Condition No.		Specific Conditions	Section Reference
B	18	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 2 months of receiving this written claim the Applicant must: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and (b) give the landowner a copy of the property investigation report.	8.8.2 8.8.3
B	19	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.	8.8.2 8.8.3
B	20	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.	8.8.2 8.8.3
B	21	The Applicant must: (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 blast-related dust and fume emissions; (b) ensure that blasting on the site does not damage heritage items, except in accordance with predictions in the document/s listed in condition A2(c), and develop specific measures to protect heritage items 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) 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 road closures, including notification via SMS message of the blasting schedule and any variations to that schedule; (e) use all reasonable efforts to co-ordinate the timing of blasting at the site with Peppertree Quarry to minimise cumulative blasting impacts; and (f) carry out regular blast monitoring to determine whether the development is complying with the relevant conditions of this consent.	4.3 4.1 5 6.2 8.8 4.3 6 6
B	22	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 Applicant has: (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 (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.	4.5

Condition No.		Specific Conditions	Section Reference
B	23	The Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: a. be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary; b. describe the blast management system and the measures that will be implemented to ensure compliance with the blasting criteria and conditions of this consent; c. include a Blast Fume Management Strategy for: i. minimising blast fume emissions; ii. rating and recording blast fume events; and iii. reporting significant blast fume events to the Department and the EPA; d. identify any agreed alternative ground vibration limits for public or private infrastructure in the vicinity of the site (if relevant); e. include a strategy to monitor, mitigate and manage the effects of blasting on heritage items[a]; f. include a monitoring program for evaluating and reporting on compliance with the relevant conditions of this consent; g. include a protocol for identifying any blast-related exceedance, incident or non-compliance and for notifying the Department, the EPA and relevant stakeholders of these events; h. include public notification procedures to enable members of the public, particularly surrounding residents, to get up-to-date information on the proposed blasting schedule; and i. include a protocol for investigating and responding to blast-related complaints.	1.1 3 4 6 4.2 3.1 n/a 6 8.3 8.4 8.5 8.6 4.3 8.8.1
B	24	The Applicant must not undertake any blasting under this consent until the Blast Management Plan is approved by the Planning Secretary.	2.1
B	25	The Applicant must implement the Blast Management Plan as approved by the Planning Secretary.	2.1

2.2 Environment protection licence

Boral is the licensee of EPL 944 for the “Marulan South Limestone Mine and Lime Plant” for 100,000-250,000 tpa of lime production and 2-5 Mtpa of minerals obtained by mining. EPL 944 will be amended to align with the consent, after which this plan will be updated in accordance with any relevant requirements of the EPL.

3 BLASTING CRITERIA AND PERFORMANCE INDICATORS

3.1 Operational blasting criteria

The operational blast emissions criteria (CoC B11) are shown in Table 3.1.

Table 3.1 Operational blasting emissions criteria

Assessment Location	Airblast Overpressure dBZ(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 financial year)
Commercial Receiver	133	25	0%
Electricity Transmission Lines	N/A	50	0%
Public Roads	N/A	100	0%
All Other Infrastructure	N/A	50[1]	0%

Note 1: or a limit determined by the structural design methodology in AS2187.2 – 2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Planning Secretary.

The blasting emissions criteria shown in Table 3.1 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or infrastructure to exceed the blasting emissions criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

3.2 Blast management objectives and performance criteria

The BMP provides the framework and guidance for mining activities to be conducted in a manner where appropriate control measures are implemented to minimise the potential for adverse blasting impacts and meet the compliance requirements of the consent. The performance criteria outlined in Table 3.2 will be used to assess the success of the management actions.

Table 3.2 Blast management objectives and performance criteria

Objective	Performance Criteria
Compliance with regulatory requirements including consent and EPL	No non compliances
Implement reasonable and feasible blast design practices to minimise blasting emissions from the Project	All blast management controls in the BMP are in place
Provided data suitable to demonstrate compliance with the consent	Monitoring undertaken as per the BMP
Ensure blast emissions levels are below relevant criteria at the nearest residences	Review of regular monitoring data including complaints All management controls in the BMP are in place

4 BLASTING MITIGATION MEASURES

The mine is committed to minimising impact on neighbour's amenity from blasting emissions. A comprehensive blast management protocol is in place for all blasting conducted by Boral throughout the life of the operation incorporating the following aspects.

4.1 Blast design

Blasts are designed to minimise (within practical limits) fumes, the occurrence of fly-rock and to eliminate unconfined explosives related air-blast i.e. face blowouts and rifling from the blast-hole collars.

Single-hole (delayed) initiation will be used with signal tube technology connecting each blast-hole and also being used to fire the blast. Stemming is used to produce reliable, controlled blasts.

Boral will review and approve all proposed blast designs and depending on sensitivity of location of the blast, review factors such as blast vibration. Blasts are designed to achieve maximum efficiency in terms of explosives used. Emissions are minimised when efficiency is maximised.

Individual blast design records shall be maintained to assist in the design and optimisation of future events, planning and control of blasting emissions and to provide a traceable system of documentation in case of accident or complaint. This is completed as part of the Boral Blast Management plan.

The blasting contractor shall record the blast parameters for each blast and include the location co-ordinates (East, North, RL) of the blast site and the maximum instantaneous charge (MIC) to be detonated in any eight millisecond (ms) interval.

For the purposes of blast emission monitoring, the mine shall maintain a record of the Blast Design and monitoring Airblast Overpressure and Ground Vibration for each blast event in a suitable format guided by the requirements of AS 2187.2-1993.

To maximise the benefits of the blast monitoring process, the significant design parameters, emission levels and meteorological data shall be collated on a concise Blast Emissions Summary Record. The record shall form the basis for updating the blast emission site laws for vibration and air-blast at appropriate interval.

4.1.1 Explosive loading, initiation hook-up and firing

To ensure correct hook up and explosive loading the following measures from Orica's guidelines are implemented prior to blasting:

- Blast-hole depths are determined to within ±200 mm and recorded on the driller's log;
- Bulk explosive loading equipment is selected to offer a loading accuracy of ±10% of product, if required; and
- Column rise of the explosive product is measured and checked against design with corrective options in place to manage variations.

4.2 Avoidance of concurrent blasts with adjoining operations

Marulan South Limestone Mine operations are in daily contact with the adjacent Boral Peppertree Quarry operations to prevent the possibility of blasting concurrently. Blasts are planned several days in advance and notified to the Limestone management via email. The mine usually blasts more than once per week in the early afternoon whereas Peppertree Quarry tends to blast once a week in the late afternoon.

4.3 Notifying landowners or occupiers of blasts

Prior to commencing under the new DA, Boral contacted affected landowners or occupiers within two kilometres of the pit seeking expressions of interest in being notified of future blasts. This invitation has also been permanently posted on the mine's website.

https://www.boral.com.au/locations/boral-marulan-south-operations

Those who register an interest will be notified of the expected time of firing by email or other appropriate method. As part of this consultation, boral will also notify the landholder of their right to request a baseline survey of their property. Boral will ensure that the CCC will be notified of the blasting schedule.

4.4 Operational hours

Blasting is conducted between the hours of 9am and 5pm Monday to Friday with no blasting occurring on weekends, public holidays or at any other time without the prior written approval of the Planning Secretary. If blasting is delayed due to circumstances such as adverse weather conditions, the shot will be left overnight and blasted the next day within the allowable hours. Only one blast per day is allowed in accordance with CoC B14. Barricading and security measures will be put in place to prevent access to the blast area until the blast is fired.

Condition B14 does not apply to single blast events 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.

4.5 Infrastructure

Blasting must not be undertaken within 500 metres of any infrastructure, public road or any land outside the site not owned by Boral unless:

- a written agreement is in place with the relevant infrastructure owner or landowner to allow blasting to be carried out within 500m of the infrastructure, and the Department has been advised in writing of the terms of this agreement; or
- demonstration that the blasting can be carried out at closer proximity without compromising the safety of people or livestock or damaging public roads, other buildings and structures, and the BMP has been updated to include specific mitigation measures to be implemented while blasting is being carried out within 500 metres of the infrastructure, public road or any land outside the site not owned by Boral.
- There is potential for blasting to occur within 500 metres of Crown Land (Lot 7300-7302 of DP1149129 and Lot 134 DP750029) in the south eastern area of the mine. In terms of Condition of Consent B22(a) a permit from the Department of Planning and Environment (Crown Lands) granted by the Minister Crown Land /Management Act 2016 has been provided, allowing Boral to use and/or occupy crown land for inspection purposes prior to blasting activity to ensure members of the public are not at risk. This permit has been submitted to the DPE through the DPE Portal and will be updated as necessary from time to time.

4.6 Training

All personnel involved in the drilling and blasting operations are adequately trained to ensure that people are up to date with the most current product technology and blasting techniques and blast fume awareness.

5 BLAST FUME MANAGEMENT

The use of ammonium nitrate based explosives under variable conditions can lead to unwanted explosive reactions and the generation of oxides of nitrogen (NOx), a combination of post blast gases which are predominantly nitrogen dioxide (NO_2), but may also include small amounts of nitrous oxide, nitric oxide (NO), carbon monoxide and carbon dioxide. The two main gases, NO and NO_2 are often found as by-products in the post-blast gases of ammonium nitrate-based explosives. Nitric oxide is unstable in air and readily oxidises to nitrogen dioxide. A cloud of NO_2 can range from yellow to dark red/purple in colour depending on the concentration and size of the gas cloud. These gases are potentially harmful to humans and livestock.

The key contributing factors associated with the generation of blast fume are:

- Explosive formulation and quality assurance.
- Geological conditions.
- Blast design considerations.
- Explosive product selection.
- Contamination of explosives in the blast hole.
- On-bench practices, including sleep time.
- Weather.
- Post-blast fume management.

Strategies for the management of each of these contributing factors are detailed in Table 5.1.

Table 5.1 Aspects, risks, impacts and management controls for fume mitigation

Aspect	Indicators	Management Measure	Responsibility	
			Mining Operations	Drill/Blast Contractor
Explosive Formulation & Quality	Poor blast performance e.g. incomplete detonation of explosive leading to fume generation.	Ensure precursors have batch traceability and quality control documentation with tolerances for each batch held at manufacturing facilities.		x
	Incomplete detonation of the explosive column. Oxygen imbalance	Recording bench conditions and variations to blast design and communicating to all affected parties. Information that will be recorded includes: • incorrectly drilled holes; • missing holes; • collapsed/slumping holes; • density & amount of product loaded; • presence of water (surface and sub-surface); and • depth of holes	x	
		Review as-loaded data versus design to look for inconsistencies.	x	x
Quality Assurance	Failure to conduct quality tests	Quality check all raw materials used in the precursors for compatibility, including visual inspections of bulk and initiating explosives.		x
		QA sheets for delivery can be obtained from relevant suppliers.		x
		Diesel quantities are tracked on every blast and recorded in blast packs.		x
Product Rotation	Product past used by date.	Raw materials to be consumed as per the stock rotation process, initiating explosives will be managed as per magazine management rules and checked during stock take.		x
		AN prill to be consumed as per the stock rotation process. This minimises the effects of weather and deterioration.		x
Delivery System	Failure to conduct quality tests	Bi-monthly calibration of metering systems, undertaking density and visual checks during mixing of raw materials		x
Contractor	Failure to conduct quality tests	Auditing schedule to ensure compliance of storage and procedures.		x
		Boral to undertake regular audit of blasting operations and systems	x	

Aspect	Indicators	Management Measure	Responsibility	
			Mining Operations	Drill/Blast Contractor
Geology	Fume issues from blasts in areas known to contain weak/soft strata	Modifying blast design and/or explosive product selection to suit conditions, methodology should be to reduce the explosive density/energy in soft strata	x	x
		Planning schedule should also consider the size of the blast and where appropriate the extent of the blast boundaries	x	x
		Drill logs to be reviewed to map areas of concern, e.g. soft/broken/faulted ground	x	x
		Load sheets to contain specific instructions on loading so there is no overloading/over powering in blast holes	x	x
	Slumped blast holes & explosive column dislocation	Design blast geometry and timing to promote adequate movement and relief	x	
		Ensure primer is positioned in the column of explosive as per contractor procedures		x
		Holes to be primed as per manufacturers specifications, further priming to be used in areas of faulting		x
Blast Design	Incomplete detonation of the explosives column Desensitisation of adjacent columns Minimal or uncontrolled movement in blast	Selecting suitable explosives and accessories for the hole depth, diameter, moisture level, ground hardness and density. Products selected will be capable of mitigating against the presence of wet holes/extreme weather events (where appropriate)	x	x
		Selecting initiating devices that are suitable to initiate and maintain the detonation, compatible with the explosives and used in accordance with explosive manufacturer's recommendations	x	x
		Design blast geometry and timing to promote adequate movement and relief Optimise loading and timing around back and side walls to promote relief	x	x
		Shotfirer to inspect hole locations prior to loading & D&B Engineer to check as drilled data to ensure pattern is drilled to design	x	x
	Hole cratering or flyrock	Use appropriate/proven stemming heights, stemming will ideally be crushed aggregate	x	
		Utilise face scans to optimise face burden design	x	
		Optimise loading and timing around back and side walls to promote relief	x	

Aspect	Indicators	Management Measure	Responsibility	
			Mining Operations	Drill/Blast Contractor
Product Selection	Repeated significant fume events/poor blast performance Incomplete detonation of the explosives column Desensitisation of adjacent columns	Selecting suitable explosives and accessories for the hole depth, diameter, moisture level, ground hardness and density. Products selected will be capable of mitigating against the presence of wet holes/extreme weather events (where appropriate)	x	x
		Explosives technical data sheets to be followed when selecting appropriate explosives, if the technical data sheets cannot be adhered to then the design needs to be risk assessed with all appropriate parties. Consent by Boral's, Site Manager would need to be given prior to loading/firing	x	x
Contamination	Fume from product contamination Slumping blast holes	Shotfirer to inspect sleeping shots daily (N/A		x
		Holes with damp walls or water within the blast hole will be treated as 'wet' and will require appropriate bulk explosives	x	x
		Holes adjoining 'wet' hole will also be treated as being wet to mitigate impact of potential runoff or subsurface water		x
		Discharged water run-off to be kept away from blast holes as per blasting contractor procedure	x	x
	Cratering and fly rock	Stemming should be free from contamination and free flowing to allow accurate and controlled loading into the blast holes. Stemming should be stored so that there is minimised risk of contamination caused by larger rock/fines/clay.		x
On bench practices	Repeated significant fume events/poor blast performance	Ensuring all personnel involved in on bench activities are appropriately qualified and experienced and have a comprehensive understanding around the factors that can lead to the generation of blast fume		x
		Appropriate supervision/management of blasts crews		x
		As loaded data to be recorded and reviewed for compliance		x
		On bench quality control testing will carried out for every load of product and recorded on load sheets		x
		Bench preparation sign off prior to loading	x	x
		Adequate bunding and drainage in place prior to drilling and loading	x	x

Aspect	Indicators	Management Measure	Responsibility	
			Mining Operations	Drill/Blast Contractor
		Understand technical specifications of explosive products, blast crew training and manage blast schedule with loading, weather and sleep times being considered	x	x
		Scheduling sequence to minimise the delay between drilling and loading of the blast and sleep time of the explosives	x	x
Weather	Fume cloud is generated and is carried by wind towards a public area or private residence Water in blast hole limits detonation of explosive resulting in excessive fume	Assessing weather conditions prior to firing each shot.		x
		Use local weather to guide the scheduling of blast preparation activities	x	
Post blast fume management		Any excessive fume events will require an investigation to determine contributing factors and develop corrective actions.	x	

5.1 Incident response

It is unlikely that exposure to blast fume in a well-ventilated environment will cause impacts to human health, however NOx gases are still considered a potential threat and will be managed accordingly. Generally, NOx plumes generated during blasting will dissipate to background levels in a relatively short time. Dissipation is highly dependent on local atmospheric conditions.

5.2 Exposure prevention

In cases where a NOx plume does not dissipate and has the potential to result in human exposure, the following actions will be taken:

- No personnel will be permitted to enter the plume.
- Personnel will be instructed to move away from the path of the plume.
- If indoors, personnel will be instructed to close all windows and doors, stay inside and cease operating air conditioning units if possible.
- If in a vehicle, personnel will stay inside and use recirculated air conditioning if possible.

5.2.1 Following exposure

If a person has been exposed to NOx gases, medical attention will be provided as soon as it is safe to do so (i.e. once the fume cloud has cleared). The possibility of delayed and life-threatening pulmonary oedema dictates that:

- Any person exposed to a visible plume of NOx, and/or any person experiencing sudden acute effects of coughing, shortness of breath or irritation of the mucous membranes of the eyes, nose or throat following post-blast NOx events will be examined by a medical practitioner without delay, even if no NOx smell was noticed or symptoms are mild.
- The treating medical practitioner will be informed of the potential NOx exposure.

In accordance with the requirements of the Australian Explosives Industry Safety Group (AEISG) Code of Good Practice, information will be provided to the medical practitioner as per Appendix 8.1.

5.3 Notification of fume incidents

In accordance with the consent and the EPL, Boral will provide verbal and written notification to relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment.

6 BLAST MONITORING

6.1 Introduction

All blasts at the mine are monitored. Currently the mine has a blast monitor located near the Mine Managers Residence, situated to the west of Marulan South Road. An additional blast monitor will be installed to the north west of the mine (refer Figure 6.1).

In addition to the two mine specific blast monitors, additional monitoring from the Peppertree Quarry blast monitoring system is also available. This system measures blasts at five locations which are shown in Figure 6.1 and described in Table 6.1.

The blast monitoring system for the mine is proposed to be like the Peppertree Quarry blast monitoring system which comprises remote monitors that are in continuous operation with results being able to be reviewed online through a restricted access website.

Blasting reports will be prepared and made available after each blast.

Table 6.1 Marulan South Limestone Mine & Peppertree Quarry Blast Monitoring Locations

Monitoring Station	Entry Address	Station Description	Managed by
MB1 'Substation'	Marulan South Road	Between MSL and Receiver R9	Marulan South Limestone
PB1	Long Point Road 1.8km from closest blast	Residence on opposite side of Barbers Creek gorge	Peppertree Quarry
PB2	Rail Line 970m from closest blast	At the points to the north of the site	Peppertree Quarry
PB3	Gas Pipeline 680m from closest blast	Adjacent to ramp up to the TLO	Peppertree Quarry
PB4	643 Marulan South Road 1.6km from closest blast	Limestone Managers House	Peppertree Quarry
PB5	Turkey Farm 950m from closest blast	Adjacent to high voltage corridor and boundary fence	Peppertree Quarry

Figure 6.1 Blast Monitoring Locations

6.2 Instrumentation requirements

Table 6.2 presents the general instrumentation specification for blast monitoring equipment.

Table 6.2 General instrumentation specification for blast monitoring equipment

Specification	Seismic	Air Blast
Sample Rate	Minimum 1024 samples per second per channel	
Frequency Response	2 Hz to 250 Hz (3 dB points)	
Resolution	0.016 mm/s	0.1 dB
Range	0.1 mm/s to 254 mm/s	88 dB to 148 dB
Accuracy	3% at 15 Hz	0.2 dB at 30 Hz
Communications Link	Keyboard and modem	
Recording Mode	Full waveform recording and archiving	

6.3 Blast monitoring locations and trigger levels

The locations of permanent blast monitoring terminal (BMT) are provided in Figure 6.1. PB4 (643 Marulan South Road) is situated between the nearest receiver (R8) to the north and the mine; similarly MB1 ('Substation') is situated between the nearest receiver (R9) to the north-west and the mine. The trigger level at each BMT equivalent to the blasting criteria for receivers R8 and R9 (Table 3.1) are presented in Table 6.3.

Table 6.3 Blast monitoring trigger levels

ID	Type of Monitoring	Frequency of Monitoring	Trigger Levels	
			Airblast Overpressure dBZ(peak)	Ground Vibration mm/s
PB4 643 Marulan South Road	Unattended	Continuous	122[1,2] 117[1,3]	10[1,2] 5[1,3]
MB1 'Substation'	Unattended	Continuous	127[1,2] 122[1,3]	12[1,2] 7[1,3]

Note 1: Equivalent to consent criteria at R9.

Note 2: 0% allowable exceedance of the total number of blasts over a financial year.

Note 3: 5% allowable exceedance of the total number of blasts over a financial year.

6.4 Validation

Wind can have a significant impact on the measurement of blast overpressure noise levels, which are the high-pressure waves generated by explosive events.

High winds can introduce unwanted noise and interference. Wind-induced vibrations and turbulence can be picked up by the microphone, affecting the accuracy of overpressure measurements. This interference can lead to false or distorted readings, making it challenging to assess the true blast overpressure noise levels.

Wind blowing across the microphone's diaphragm can generate a distinct noise that can overlap with and mask the blast overpressure noise. This can obscure the measurement of the actual noise levels produced by the blast event, making it difficult to obtain reliable data.

Where monitoring results show an exceedance of any blasting criterion in Table 3.1 or equivalent trigger levels in Table 6.3, results must be validated prior to determining whether results are an exceedance or was caused by the blast or an external influence, which is most likely to be the occurrence of high winds in the area.

6.5 Blast monitoring reports

Where an exceedance is detected and validated, the blast monitoring report will be prepared within 72 hours of a blast where possible, entered into the blast records and be available for internal review or distribution. Results are reported annually as required by Schedule 2, Part D, Condition D11 of the development consent.

7 ENVIRONMENTAL PERFORMANCE REVIEW AND IMPROVEMENT PROGRAM

7.1 Performance evaluation

The performance of the Project is to be evaluated against the key performance criteria outlined in Section 3.1. Table 7.1 indicates the evaluation schedule for each key performance criteria.

Where performance criteria are not being met, the contingency plan in Section 8.7 is to be implemented.

Table 7.1 Key performance criteria

Key performance indicator	Performance evaluation schedule
No non compliances	Annual
All blast management controls in the BMP are in place	Continuous
Review of regular blast monitoring data and complaints	Continuous
Monitoring undertaken as per the BMP	Every Blast

7.2 Annual review and compliance reporting

In accordance with CoC D11, by the end of July each year after the commencement of development, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. The review must:

- Include a comprehensive review of any incidents, (refer Section 8.3), monitoring results and complaints records of the development over the previous financial year, including a comparison of these records against the:
    - Relevant statutory requirements, limits or performance measures/ criteria;
    - Requirements of any plan or program required under this consent; and,
    - Monitoring results of previous years;
- Evaluate and report on:
    - The effectiveness of the blast management systems; and
    - Compliance with the performance measures, criteria and operating conditions of the CoC
- Identify 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.

The findings of the annual review will inform the blast performance of the mine and identify any areas of improvement to ensure the mine can operate with minimal blast impacts to the surrounding area.

7.3 Continuous improvement

The BMP is to be reviewed in terms of Condition D5(j) of the development consent.

To improve the environmental performance of the Project, cater for future modifications or comply with regulator direction, it may be necessary to revise this BMP to the satisfaction of DPIE. Boral will continue to apply the approved BMP until the approval of the revised BMP.

Each year following the annual review outlined in Section 7.2 and every three years after the independent environmental audit detailed in CoC D13, Boral will review this BMP and update it if necessary, with findings of the annual review and independent environmental audit, to promote continuous improvement. This review includes:

- A description of any changes to site operations with potential for blast impacts;
- A review of blast monitoring data trends;
- A review of incidents and non-compliances;
- A review of blast complaint records for the year;
- Identification of any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;
- A description of measures to be implemented to improve the blast performance of the mine.

If changes are required to the BMP it will be resubmitted to the Planning Secretary for approval within six weeks of the review. The most recent version of this BMP as approved by the Planning Secretary is to be implemented.

7.4 Training and awareness

All employees and contractors working on-site will undergo training relating to blast management including:

- General environmental awareness;
- The requirements of this BMP;
- Relevant legislation;
- Roles and responsibilities for blast management and monitoring;
- Blast mitigation, management and monitoring measures; and
- Procedure to be implemented in the event of a blast exceedance, incident and/or complaint.

8 INCIDENT, NON-COMPLIANCE, AND COMPLAINT MANAGEMENT AND REPORTING PROTOCOL

8.1 Introduction

The objective of this section is to provide procedures for responding to impacts identified by the monitoring program and by routine monitoring of the blast management controls. It also addresses CoC D5(f) to provide a contingency plan for taking action in the unlikely event that an unforeseen incident occurs at the site (e.g. failure of blast control equipment or procedures). Responding to identified impacts will be the responsibility of the Site Manager or delegate.

8.2 Regulatory compliance

Boral will undertake the following to achieve compliance with all blasting criteria and management requirements detailed in the consent, the EPL and this BMP:

- regular review of blast design procedures;
- regular review of weather forecasting as necessary to predict noise-enhancing meteorological conditions (for airblast overpressure) and to minimise fume or dust drift; and
- regular review of blast monitoring results.

8.3 Incident reporting

In accordance with CoC D9 Boral will immediately notify the Department and any other relevant agencies after it becomes aware of an incident resulting in unauthorised blast impacts. The notification will be in writing through the Department's Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.

The development consent defines an 'incident' 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".

Material harm is defined as:

"*harm to the environment that:*

involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial, or

results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)

This definition excludes "harm" that is authorised under either this consent or any other statutory approval"

In accordance with EPL 944, notifications of environmental harm must be made by telephoning the Environment Line service on 131 555. Boral must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred. Boral or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the *Protection of the Environment Operations Act 1997*.

8.4 Non-compliance reporting

The consent defines a 'non-compliance' as:

"An occurrence, set of circumstances or development that is a breach of this consent".

In accordance with CoC D10 Boral will, within seven days of becoming aware of a blasting non-compliance, notify DPIE of the non-compliance once the blast results are validated. The notification will be in writing through the Department's Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.

The Site Manager (or delegate) is responsible for reporting blasting exceedances or incidents to the DPIE.

Note that a non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

8.5 Blast incident response

Adverse blasting impacts are likely to be associated with malfunction of the site's engineering controls, incorrect blast planning or operational procedures.

Once it is identified that a blast incident has occurred, the following actions will be taken:

- Operations that caused the blast incident are to be stopped if necessary until appropriate control systems can be implemented or repaired.
- DPIE and EPA will be notified of the incident and potential impact/potential impact immediately once an incident has been identified (as outlined in Section 8.3).
- An investigation will be undertaken to establish the root cause.
- Subject to the findings of the investigation actions will be taken to repair, replace or change the identified cause of the incident. These actions will be completed by appropriately qualified personnel or consultants.
- The identified cause of the incident and the selected response will be formally documented in an incident response report.
- Training will be undertaken if changes are required to procedures or operations.

8.6 Notification of exceedances

An exceedance is where a validated emission has exceeded a criterion (or equivalent trigger level at a BMT) but does not immediately result in a non-compliance. In the context of blasting emissions, airblast overpressure is required to meet 115dBZ (or equivalent trigger level) for 95% of blasts and not to exceed 120dBA (or equivalent trigger level) at any time. Similarly vibration is required to be below 5mm/s (or equivalent trigger level) for 95% of blasts and must not exceed 10mm/s (or equivalent trigger level) at any time.

Hence, where a blast emission exceeds the 95% criteria (or equivalent trigger level), but does not exceed the maximum criteria (or equivalent trigger level), this is determined to be an exceedance until a blast emission results in more than 5% of blasts exceeding the 95% criteria (or equivalent trigger level), and then, that emission would be a non-compliance. In accordance with CoC C3, as soon as practicable and no longer than 7 days after obtaining monitoring results showing an exceedance of any blasting criterion in Table 3.1 or equivalent trigger levels in Table 6.3. Boral must provide the details of the exceedance to any affected landowners, tenants and the CCC including the percentage of blast emissions that have exceeded the 95% criteria (or equivalent trigger level).

8.7 Contingency Plan

Exceedances of the blast criteria may occur due to activities at the mine or due to the surrounding environmental conditions and other activities. Exceedances are identified from results of the blast monitoring system and verified to be as a result of the mine operation activity.

Should an exceedance be identified, the following actions will be taken:

- An investigation will be undertaken to establish the root cause of the exceedance. This will include checking weather conditions at the time of the exceedance and mine operations, Peppertree Quarry operations and any other possible factors.
- Subject to the findings of the investigation, actions will be taken to minimise any reoccurrence of the exceedance.
- The identified cause of the impact and the selected response will be formally documented in an incident response report.
- Additional blast management training will be provided to educate relevant personnel of any changes to existing blast controls to minimise the reoccurrence of activities that have potential to result in an exceedance of the blast criteria.

Should an exceedance result in a non-compliance the Department, affected residents and EPA will be notified within seven days of its verification.

8.8 Community communication

Boral will ensure that the local community is kept informed by way of periodic newsletters, leaflets, local newspaper advertisements and the mine web page, including details of the blasting hotline. Community Consultative Committee (CCC) meetings are used to inform the committee of blast results and to advise of any variation to the monitoring programs.

On request, interested members of the community can be informed of blasting, either by email, SMS (or other suitable means) prior to each blast (CoC B21(d)).

8.8.1 Complaints protocol

In the first instance, after receiving a complaint, the Environment Representative will check the results from the blast monitoring system to validate the blast results, obtain operations records and weather conditions at the time of the complaint prior to attending the location of the complaint to confirm the source (airblast overpressure or ground vibration).

Investigations into the complaint will be undertaken and findings reported to the complainant.

Boral will record details of all complaints in a Complaints Register (Sequence) which will include the following details where available:

- The date and time of the complaint;
- The method by which the complaint was made;

- Any personal details of the complainant which were provided by the complainants or, if no such details were provided, a note to that effect;
- The nature of the complaint;
- The action taken by Boral in relation to the complaint, including any follow-up contact with the complainant; and,
- If no action was taken by Boral, the reasons why no action was taken.

The overarching complaints protocol for the mine, which provides further details on how all complaints will be received, recorded, handled and responded to is described in the EMS.

8.8.2 Property inspections

As per condition B16, Boral will commission a suitably qualified, experienced and independent person to establish the baseline condition of any buildings and other structures on the land, identify measures that may minimise potential blasting impacts or update the previous property inspection report upon written request from any private land owner within 2 kilometres of any approved open cut mining pit.

The inspector will be a suitably qualified, experienced and independent person acceptable to both parties. Where there is dispute or disagreement over the selection of the suitably qualified, experienced and independent person, either party may refer the matter to the Planning Secretary for resolution.

Boral will provide a copy of the property inspection report to the landowner on completion.

8.8.3 Property investigations

As per condition B18, on receipt of a claim (in writing) to damage to buildings or structures from any private land owner within 2 kilometres of any approved open cut mining pit and where the Planning Secretary deems an investigation is required, Boral will commission a suitably qualified, experienced and independent person to assess the reported damage.

The inspector will be a suitably qualified, experienced and independent person acceptable to both parties. Where there is dispute or disagreement over the selection of the suitably qualified, experienced and independent person, either party may refer the matter to the Planning Secretary for resolution.

Boral will provide a copy of the property investigation report to the landowner on completion.

8.9 Independent review

In accordance with CoC C5, if a landowner considers the development to be exceeding any relevant blasting criterion, they may ask the Planning Secretary in writing for an independent review of the impacts of the development on their residence or land.

In accordance with CoC C6, if the Planning Secretary is not satisfied that an independent review is warranted, the Planning Secretary will notify the landowner in writing of that decision, and the reasons for that decision, within 21 days of the request for a review.

In accordance with CoC C7, if the Planning Secretary is satisfied that an independent review is warranted, within 3 months, or other timeframe agreed by the Planning Secretary and the landowner, of the Planning Secretary's decision, Boral must:

(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Planning Secretary, to:

(i) consult with the landowner to determine their concerns;

(ii) conduct monitoring to determine whether the development is complying with the relevant blasting criterion; and

(iii) if the development is not complying with the relevant blasting criterion, identify measures that could be implemented to ensure compliance with the relevant criterion; and

(b) give the Planning Secretary and landowner a copy of the independent review; and

(c) comply with any written requests made by the Planning Secretary to implement any findings of the review.

9 REFERENCES

Environmental Protection Licence (EPL No. 944) version dated 24-Dec-2020.

The Marulan South Limestone Mine Continued Operations Project - Environmental Impact Statement prepared by Element Environment, dated March 2019. (EIS 2019)

The Development Consent for SSD 7009 issued 19 August 2021 for the Marulan South Limestone Mine Continued Operations Project.

Standards Australia AS2187.2-2006 (AS2187.2, 2006) - Explosives - Storage and Use Part 2: Use of Explosives

Australia and New Zealand Environment Council (ANZEC) Guideline - Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (ANZEC Guideline, 1990), September 1990

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