Marulan South Limestone Mine | SSD 7009

Air Quality and Greenhouse Gas Management Plan

Prepared for Boral Cement Limited | 12 August 2022

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Prepared for Boral Cement Limited
12 August 2022

PR163

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Date	12 August 2022	12 August 2022

DOCUMENT CONTROL

Revision	Date	Description	Prepared by	Reviewed by
0	17 January 2022	For Boral Cement Limited review	Todoroski Air Sciences	Element Environment and Boral Cement Limited
1	24 January 2022	For submission to EPA	Todoroski Air Sciences	Element Environment and Boral Cement Limited
2	18 February 2022	For submission to DPIE	Todoroski Air Sciences	Element Environment and Boral Cement Limited
3	4 May 2022	Revised version for submission to DPE	Todoroski Air Sciences	Element Environment and Boral Cement Limited
4	12 August 2022	Revised version for submission to DPE	Todoroski Air Sciences	Element Environment and 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, development 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. An Air Quality and Greenhouse Gas Management Plan (AQGHGMP) is required in accordance with CoC B31.

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

This AQGHGMP has been prepared by Todoroski Air Sciences on behalf of Boral.

This AQGHGMP has been prepared by Todoroski Air Sciences. Todoroski Air Sciences is a specialist air quality and environmental consultancy whose personnel are members of the Clean Air Society of Australia and New Zealand (CASANZ).

Todoroski Air Sciences have also prepared the Air Quality Impact Assessment for the Marulan South Limestone Mine Continued Operations (**Todoroski Air Sciences, 2019**).

Aleks Todoroski of Todoroski Air Sciences has been endorsed by the Planning Secretary as a suitably qualified and experienced person for the purpose of preparing this AQGHGMP.

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 Existing mining overview

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 Approved project overview

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. Blasting will continue to be restricted to daylight hours on weekdays, excluding public holidays.

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 AQGHGMP operates.

1.3.2 Alignment with other plans

This Air Quality and Greenhouse Gas Management Plan would align with the neighboring Peppertree Quarry Air Quality Management Plan (**Boral, 2020**).

1.4 Purpose and objectives

This AQGHGMP describes how Boral will manage and control air emissions and greenhouse gas emissions when operating the mine.

This AQGHGMP applies to all activities undertaken by the mine including extraction (drilling and blasting), loading and haulage of materials, stockpiling, processing (crushing, screening and conveying) and operation of the lime plant.

Specific objectives of the AQGHGMP are to:

- Ensure compliance with the air quality criteria and operating conditions of the CoC;
- Ensure best practice management is being employed to:
    - Minimise the development's' air quality impact;
    - Minimise the development's Scope 1 and 2 greenhouse gas emissions; and
    - Improved the development's energy efficiency; and,
- Ensure the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events.

The AQGHGMP 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 AQGHGMP and providing the necessary resources as required. The site Environmental Coordinator 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 dust emissions, and carrying out and/or coordinating the monitoring and reporting requirements of this plan.

Operations personnel (Technical Manager and Mine Production Manager) are responsible for adjusting mine operations as appropriate to minimise air quality impacts on site and neighbouring

properties and to minimise greenhouse gas emissions. Other site personnel are responsible for reporting excessive visible dust emissions and reporting them to the shift Supervisor.

1.6 Periodic review protocol

The AQGHGMP 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 AQGHGMP to the satisfaction of DPIE. Boral will continue to apply the approved AQGHGMP until approval of any such revised AQGHGMP.

1.7 Document structure

The structure of the AQGHGMP is outlined in Table 1.1.

Table 1.1 Structure of the AQGHGMP

Section	Content
1	Provides an overview of the project and objectives of the plan.
2	Outlines statutory requirements associated with the development consent, environmental protection license (EPL) and consultation undertaken to develop the plan.
3	Provides an overview of the existing environment and baseline ambient air quality data.
4	Outlines the applicable air quality criteria and performance indicators.
5	Outlines the air quality management and control measures.
6	Describes the air quality monitoring plan.
7	Outlines the environmental performance and improvement program.
8	Protocols for incident, non-compliance and complaint management.
9	Outlines the greenhouse gas management measures.
10	Provides references for this plan.

2 STATUTORY REQUIREMENTS

2.1 Development consent

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

Table 2.1 Management plan requirements

Condition No.		Condition requirement	Section reference
B26		The Applicant must ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.	Section 5
B27		The Applicant must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Table 3 at any residence on privately-owned land.	Section 4 & 5
B28		The air quality criteria in Table 3 do not apply if the Applicant has an agreement with the owner/s of the relevant residence or land to exceed the air quality criteria, and the Applicant has advised the Department in writing of the terms of this agreement.	Section 4
B29		Particulate matter emissions generated by the development must not exceed the criteria listed in Table 3 at any occupied residence on mine-owned land (including land owned by another mining or quarry company) unless:	Section 4
	(a)	the tenant and landowner (if the residence is owned by another mining or quarry company) have been notified of any health risks associated with such exceedances in accordance with the notification requirements under PART C of this consent;	Section 4
	(b)	the tenant of any land owned by the Applicant can terminate their tenancy agreement without penalty at any time, subject to giving 14 days' notice;	Section 4
	(c)	air quality monitoring is regularly undertaken to inform the tenant and landowner (if the residence is owned by another mining company) of the likely particulate matter emissions at the residence; and	Section 4
	(d)	data from this monitoring is presented to the tenant and landowner in an appropriate format for a medical practitioner to assist the tenant and landowner in making informed decisions on the health risks associated with occupying the property.	Section 4
B30		The Applicant must:	
	(a)	take all reasonable steps to: (i) minimise odour, fume and particulate matter (including PM10 and PM2.5) emissions of the development, paying particular attention to minimising wheel-generated haul road emissions; (ii) improve energy efficiency and reduce greenhouse gas emissions of the development; (iii) minimise any visible off-site air pollution generated by the development; and (iv) minimise the extent of potential dust generating surfaces exposed on the site at any given point in	Section 5 & 9

		time;	
	(b)	ensure that all 'non-road' mobile diesel equipment used in undertaking the development includes reasonable and feasible diesel emissions reduction technology;	Section 5
	(c)	operate an air quality management system to guide the day to day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this consent;	Section 6
	(d)	minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see Note c to Table 3 above);	Section 5 & 6
	(e)	use all reasonable efforts to co-ordinate air quality management on the site with the air quality management at Peppertree Quarry to minimise cumulative air quality impacts;	Section 6
	(f)	carry out regular air quality monitoring to determine whether the development is complying with the relevant conditions of this consent; and	Section 6
	(g)	regularly assess meteorological and air quality monitoring data, and modify operations on the site to ensure compliance with the relevant conditions of this consent.	Section 6
B31		The Applicant must prepare an Air Quality and Greenhouse Gas Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This plan
	(a)	be prepared by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	Section 1
	(b)	be prepared in consultation with the EPA;	Section 2.3
	(c)	describe the measures to be implemented to ensure:	
	(c)(i)	compliance with the air quality criteria and operating conditions of this consent;	Section 5
	(c)(ii)	best practice management is being employed to: • minimise the development's air quality impacts; • minimise the development's Scope 1 and 2 greenhouse gas emissions; and • improve the development's energy efficiency; and	Section 5
	(c)(iii)	the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events;	Section 5 & 6
	(d)	describe the air quality management system in detail; and	Section 6
	(e)	include an air quality monitoring program, undertaken in accordance with the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007), that:	Section 6
	(e)(i)	uses monitors to evaluate the performance of the development against the air quality criteria in this consent and to guide day to day planning of mining operations;	Section 6
	(e)(ii)	adequately supports the air quality management system; and	Section 6
	(e)(iii)	includes a protocol for identifying any air quality-related exceedance, incident or non-compliance and for notifying the Department and relevant stakeholders of these events.	Section 5
B32		The Air Quality and Greenhouse Gas Management Plan must be approved by the Planning Secretary within 3 months of the date of this consent, unless otherwise agreed by the Planning Secretary.	This plan
B33		The Applicant must implement the Air Quality and Greenhouse Gas Management Plan as approved by the Planning	Section 1.4

		Secretary.	
B34		Prior to the commencement of development under this consent, and for the life of the development, the Applicant must ensure that there is a suitable meteorological station operating in the vicinity of the site that:	Section 0
	(a)	complies with the requirements in the Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales (DEC, 2007); and	Section 0
	(b)	is capable of measuring meteorological conditions in accordance with the NSW Noise Policy for Industry (EPA, 2017), unless a suitable alternative is approved by the Planning Secretary following consultation with the EPA.	Section 0
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;	Section 3
	(b)	Details of:	
	(b)(i)	The relevant statutory requirements (including any relevant approval, licence or lease conditions);	Section 2 & 4
	(b)(ii)	Any relevant limits or performance measures and criteria; and	Section 4
	(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;	Section 4.3
	(c)	Any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Section 5
	(d)	A description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Section 5
	(e)	A program to monitor and report on the:	
	(e)(i)	Impacts and environmental performance of the development; and	Section 7
	(e)(ii)	Effectiveness of the management measures set out pursuant to condition D4(c);	Section 4.3 & 5.2
	(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 5.2
	(g)	A program to investigate and implement ways to improve the environmental performance of the development over time;	Sections 7.3
	(h)	A protocol for managing and reporting any:	
	(h)(i)	Complaint; or	Section 8.4
	(h)ii)	Failure to comply with other statutory requirements;	Section 8.2
	(i)	Public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Section 8
	(j)	A protocol for periodic review of the plan.	Section 7.3

2.2 Environment Protection Licence

Boral is the licensee of Environment Protection Licence (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 development consent, after which this plan will be updated in accordance with any relevant requirements of the EPL.

2.3 Consultation

CoC B31 (b) requires this plan be prepared in consultation with the EPA.

This plan was provided to the EPA for review and comment on 31 January 2022. The EPA advised by phone call on 8 February 2022 and in writing on 9 February 2022 (refer to Appendix A) that they do not review or endorse management plans. The EPA stated that it is their expectation that environmental plans are developed consistent with the consent, with any EPA recommended conditions of consent (if applicable) and in line with any relevant legislation or EPA policy, approved methods or guidelines. It is also the EPA's expectation that the development and application of any management plan ensures compliance with the requirements of the Environment Protection Licence for the premises (No. 944).

This plan has been prepared in accordance with the consent as outlined in Section 2.1.

The proposed air quality monitoring program (Section 6) has been prepared in accordance with NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2007).

This plan will be updated to reflect any relevant EPL conditions, once the EPL has been varied to align with the consent.

3 AIR QUALITY OVERVIEW/BASELINE

This section describes the existing baseline environment including the climate, meteorology and ambient air quality in the area surrounding the mine.

3.1 Local climatic conditions

Long term climatic data collected at the Bureau of Meteorology (BoM) weather station at Goulburn Airport Automatic Weather Station (AWS) were analysed to characterise the local climate in the proximity of the mine. The Goulburn Airport AWS is located approximately 25km west-southwest of the mine and is the nearest BoM weather station with available long-term climate statistics.

Table 3.1 and Figure 3.1 show climatic parameters that have been collected from the Goulburn Airport AWS over an 18 to 30-year period for the various meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 28.2 degrees Celsius (ºC) and July is the coldest month with a mean minimum temperature of 0.3ºC.

Rainfall peaks during the summer and the month of June, with an annual average rainfall of 543.6 millimetres (mm) over 67.8 days. The data show June is the wettest month with an average rainfall of 57.7 mm over 6.8 days and April is the driest month with an average rainfall of 25.0 mm over 3.7 days.

Relative humidity levels exhibit variability and seasonal flux across the year. Mean 9am relative humidity levels range from 65% in October and December to 88% in June. Mean 3pm relative humidity levels vary from 39% in December to 63% in June.

Wind speeds have a generally similar spread between the 9am and 3pm conditions. The mean 9am wind speeds range from 12.2 kilometres per hour (km/h) in March to 19.8 km/h in September. The mean 3pm wind speeds vary from 19.8 km/h in April to 26.5 km/h in August.

Table 3.1 Monthly climate statistics summary – Goulburn Airport AWS

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Temperature													
Mean max. temp. (ºC)	28.2	26.4	23.7	20.0	15.9	12.5	11.8	13.4	16.6	20.0	23.2	26.0	19.8
Mean min. temp. (ºC)	12.8	12.7	10.1	5.8	2.5	1.3	0.3	0.5	3.0	5.3	8.3	10.8	6.1
Rainfall													
Rainfall (mm)	49.5	57.0	44.6	25.0	33.0	57.7	31.7	43.5	44.0	50.4	54.6	54.8	543.6
No. of rain days (≥1mm)	5.0	5.3	5.6	3.7	4.5	6.8	6.1	6.3	6.7	6.4	6.0	5.4	67.8
9am conditions													
Mean temp. (ºC)	19.0	17.8	15.1	12.7	8.8	5.9	5.0	6.7	10.8	13.9	15.3	17.7	12.4
Mean R.H. (%)	69	78	81	78	85	88	87	81	72	65	69	65	76
Mean W.S. (km/h)	15.5	13.8	12.2	12.6	12.5	13.3	13.5	17.1	19.8	19.4	17.5	16.8	15.3
3pm conditions													
Mean temp. (ºC)	26.1	24.9	22.5	18.9	14.8	11.3	10.5	12.2	15.1	18.2	21.1	24.2	18.3
Mean R.H. (%)	41	45	46	46	54	63	61	52	50	46	45	39	49
Mean W.S. (km/h)	22.2	21.4	20.5	19.8	20.7	22.2	23.2	26.5	26.4	25.3	23.7	23.0	22.9

Source: **BoM (2021)**

R.H. – relative humidity, W.S. – wind speed.

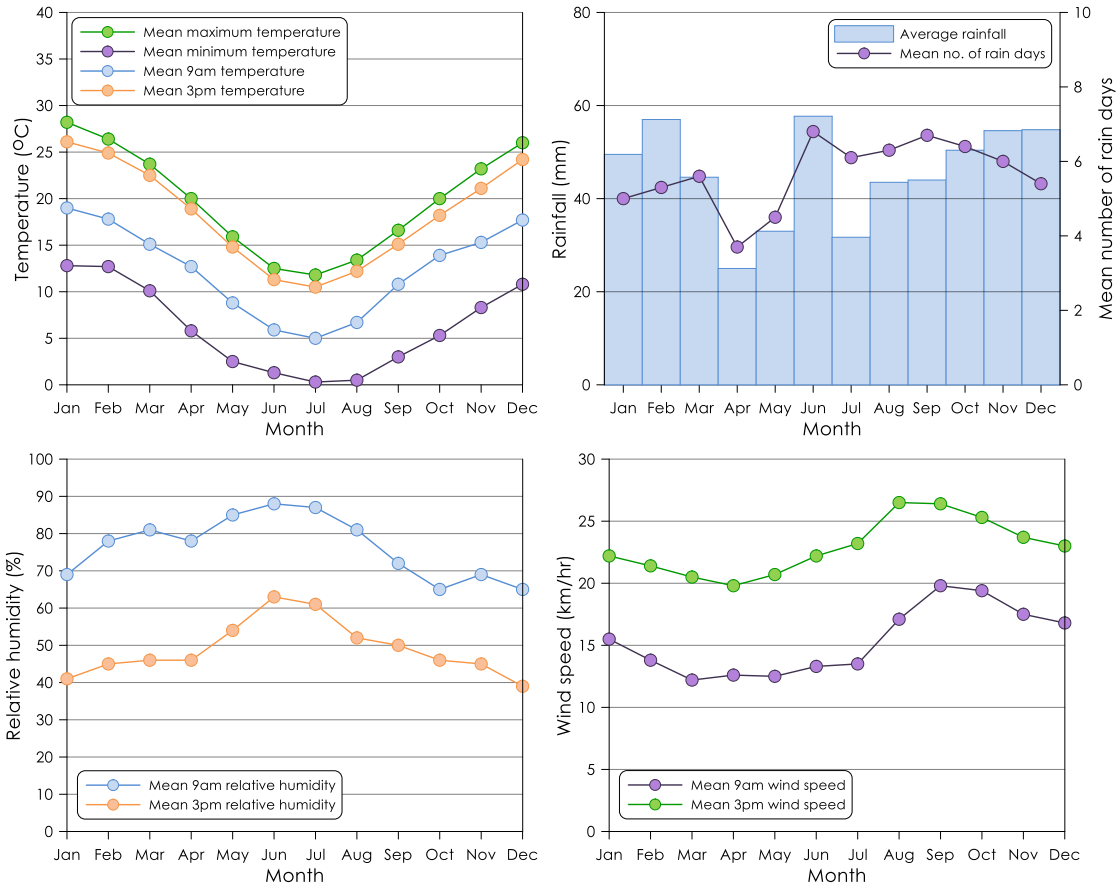

Figure 3.1 Monthly climate statistics summary – Goulburn Airport AWS

3.2 Local meteorological conditions

The mine operates a 10-metre (m) tall automatic weather station to assist with the environmental management of site operations. Annual and seasonal windroses prepared from data collected during the 2020 calendar period is presented in Figure 3.2.

The annual windroses indicate that the wind flow of the area is typically on a west to east axis with winds also originating from the north. The local features surrounding the mine weather station would influence the distribution of winds at the station. In summer, winds from the north and east are most frequent. The autumn windrose shows winds range from the east and west-southwest to north-northwest. During winter, winds from the west-southwest are most frequent. In spring the windrose shows winds greatest from the north.

Figure 3.2 Annual and seasonal windroses for the mine weather station (2020)

3.3 Local air quality monitoring

The main sources of air emissions in the local area include extractive industries, commercial and industrial operations, agricultural activities, emissions from local anthropogenic activities (such as motor vehicle exhaust, dust from dirt roads, and domestic wood heaters) and various other rural activities.

The air quality monitors operated by the mine include three dust deposition gauges and two High Volume Air Samplers (HVAS) measuring TSP and PM_{10}.

A summary of the results from the HVAS monitoring stations during 2015 to 2020 is presented in Table 3.2, Figure 3.3 and Figure 3.4. The monitoring results in Table 3.2 indicate that annual average PM_{10} levels are below the criterion of 25µg/m³ for all years except for 2018. The annual average TSP levels are below the criterion of 90µg/m³ for all years.

The maximum 24-hour average PM_{10} concentrations were on occasion above the criteria of 50µg/m³ during the monitoring period at the HVAS monitor. A review of Figure 3.3 and Figure 3.4 indicate a seasonal trend with higher PM_{10} and TSP concentrations in the spring and summer months with the warmer weather elevating the potential for drier ground and the occurrence of windblown dust, bushfires and plant pollen. Anomalously high PM_{10} and TSP concentrations recorded in late 2019 and early 2020 are attributed to drought conditions and severe bushfires affecting a large part of NSW.

Table 3.2 Summary of HVAS monitoring (µg/m³)

Year	HVAS – PM_{10}	Criterion	HVAS - TSP	Criterion
	Annual average			
2015	23.7	25	46.6	90
2016	16.8	25	38.8	90
2017	19.7	25	41.9	90
2018	26.0	25	54.5	90
2019	24.3	25	65.5	90
2020	21.6	25	56.0	90
	Maximum 24-hour average			
2015	158.3	50	-	-
2016	58.2	50	-	-
2017	80.9	50	-	-
2018	114.5	50	-	-
2019	124.2	50	-	-
2020	331.1	50	-	-

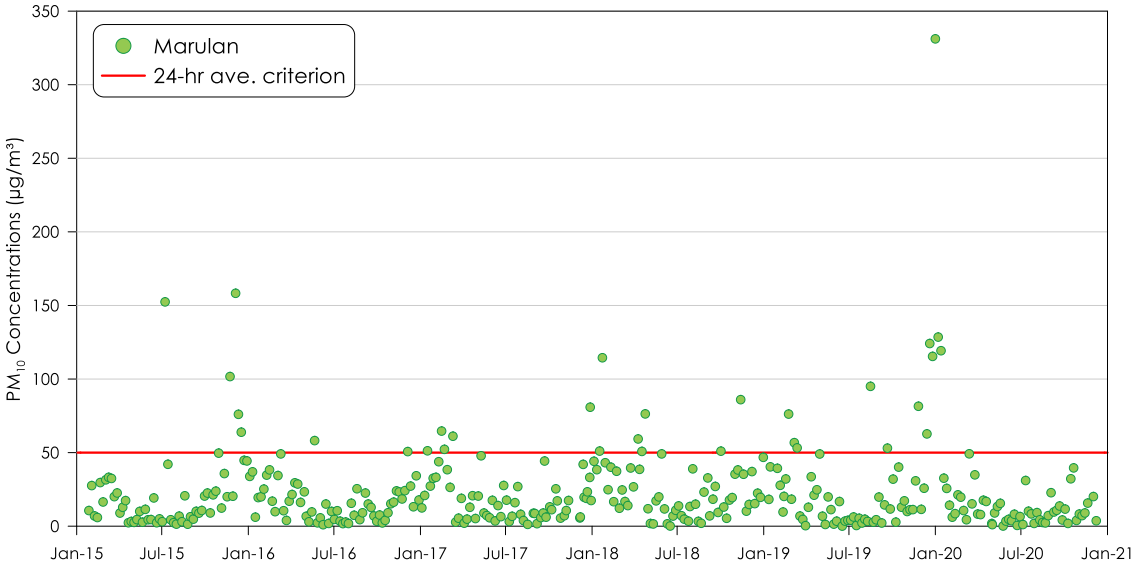

Figure 3.3 HVAS 24-hour average PM_{10} concentrations

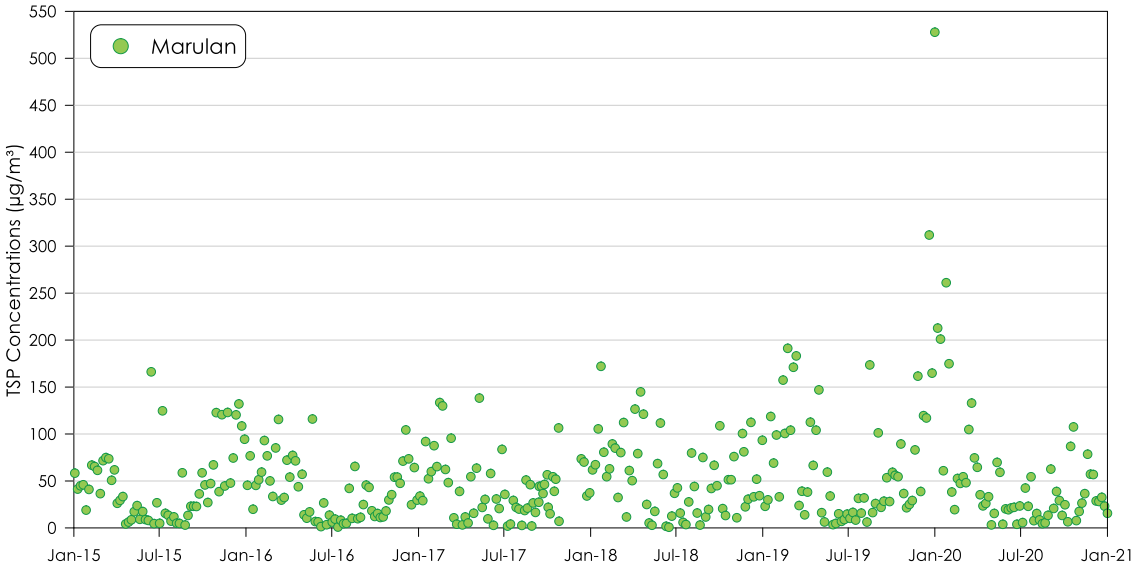

Figure 3.4 HVAS 24-hour average TSP concentrations

A summary of annual average dust deposition levels recorded at the mine during 2015 to 2020 is presented in Table 3.3. These gauges are generally located in close proximity to the mining activities which would influence the measured results and as such these would not be representative of the receptors locations further afield.

Table 3.3 Annual average dust deposition (g/m²/month)

Year	Site 1 Marulan Sub station	Site 2 Freddys Hill	Site 3 Store Paddock Hill
2015	3.2	3.1	4.0
2016	2.6	3.1	7.7
2017	3.8	2.9	5.1
2018	5.2	3.9	13.2
2019	3.8	3.4	11.7
2020	6.7	-	10.3

4 AIR QUALITY CRITERIA AND PERFORMANCE INDICATORS

4.1 Consent conditions

Table 4.1 presents the air quality impact assessment criteria as per CoC B27. Boral must ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do no cause exceedances of the criteria at any residence on privately-owned land.

Per CoC B28 the air quality criteria in Table 4.1 do not apply if Boral has an agreement with the owner/s of the relevant residence of land to exceed the air quality criteria, and Boral has advised the Department in writing of the terms of this agreement.

Table 4.1 Air quality criteria

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM_{10})	Annual	[a, c] 25 µg/m³
	24 hour	[b] 50 µg/m³
Particulate matter < 2.5 µm (PM_{10})	Annual	[a, c] 8 µg/m³
	24 hour	[b] 25 µg/m³
Total suspended particulates (TSP)	Annual	[a, c] 90 µg/m³

Notes:

[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
[b] Incremental impacts (i.e. incremental increase in concentrations due to the development on its own).
[c] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Planning Secretary.

4.1.1 Mine-owned land

Particulate matter emissions generated by the development must not exceed the criteria listed in Table 4.1 at any occupied residence on mine-owned land (including land owned by another mining or quarry company) unless:

- the tenant and landowner (if the residence is owned by another mining or quarry company) have been notified of any health risks associated with such exceedances in accordance with the notification requirements under PART C of the development consent;
- the tenant of any land owned by Boral can terminate their tenancy agreement without penalty at any time, subject to giving 14 days' notice;
- air quality monitoring is regularly undertaken to inform the tenant and landowner (if the residence is owned by another mining company) of the likely particulate matter emissions at the residence; and
- data from this monitoring is presented to the tenant and landowner in an appropriate format for a medical practitioner to assist the tenant and landowner in making informed decisions on the health risks associated with occupying the property.

4.2 EPL 994

EPL 944 includes pollutant concentration and load limits for stacks emissions from the kiln and lime hydration plant.

4.2.1 Concentration limits

Per EPL 944, the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in Table 4.2.

Table 4.2 Concentration limits

Location	Pollutant	Units of measure	100 percentile concentration limit
Kiln stack	Solid particles	mg/m^3	100
	Nitrogen Oxides	mg/m^3	2000
Lime hydration plant stack	Solid particles	mg/m^3	100

4.2.2 Load limits

Per EPL 944, the actual load of an assessable pollutant discharged from the premises during the reporting period must not exceed the load limit specified for the assessable pollutant in Table 4.3.

The actual load of an assessable pollutant must be calculated in accordance with the relevant load calculation protocol. The load calculation method used is source monitoring that is conducted annually.

Table 4.3 Load limits

Assessable pollutant	Load limit (kg)
Coarse Particulates (air)	8050.00
Fine particulates (air)	5050.00
Lead (air)	6.00
Mercury (air)	2.00
Nitrogen Oxides (air)	91680.00
Sulfur Oxides (air)	170.00

Note: Lead and Mercury load limits were derived from 5 years of annual returns and discussion with Boral. Load limits are to be reviewed in 2025.

4.3 Performance indicators

Table 4.4 presents the air quality related key performance indicators that will be used to assess the air quality performance of the development.

Table 4.4 Key performance indicators

Measure	Key performance indicator
Implementation of control measures	Quarterly environmental inspection checklist shows that all management practices listed in this plan were implemented.
Training	All site personnel have completed air quality training.

Measure	Key performance indicator
Visual monitoring	No excessive dust visible beyond the Project boundary.
Air quality complaints	No validated air quality complaints. Where a validated air quality complaint does occur, appropriate management actions are implemented following receipt of a complaint so that no further validated complaint is received from that complainant.
Stack testing	Stack concentrations do not exceed applicable EPL concentration limits.
Load limits	Pollutants discharged do not exceed EPL load limits.
Ambient monitoring	Pollutant concentrations do not exceed the relevant ambient air quality criteria.

5 AIR QUALITY MANAGEMENT AND CONTROL MEASURES

The activities at the site will generate some amount of dust, and other pollutant emissions, therefore it is prudent to take reasonable and practicable measures to prevent and minimise excessive generation of emissions which may affect the surrounding environment.

Boral will operate in line with best practice to minimise the generation of air emissions and ensure compliance with all air quality requirements. Boral will ensure that no offensive odours are emitted from the site.

Table 5.1 presents the construction and operational air quality control measures and management practices that will be implemented at the Project site. The air quality management system includes a range of proactive and reactive control measures and management practices.

All reasonable steps will be undertaken to minimise odour, fume and particulate matter (including PM_{10} and $PM_{2.5}$) emissions from the Project site with particular attention to minimising wheel-generated haul road emissions, improve energy efficiency and reduce greenhouse gas emissions of the Project, minimise any visible off-site air pollution generated by the Project, and minimise the extent of potential dust generating surfaces exposed on the site at any given point in time.

The effectiveness of air quality management and control measures will be assessed and continually improved through the review of this plan (refer to Section 7.3).

Table 5.1 Air quality control and management measures

Activity	Control and management measure
General	Training is provided to all site personnel on appropriate air quality control practices and the requirements per this plan.
	The meteorological forecast is used to assist with daily planning to minimise potential dust impacts due to adverse weather conditions. Daily planning for predicted adverse conditions may include additional frequency of dust suppression using the water cart on specific areas and postponing certain activities (e.g. blasting).
	Visual monitoring of activities is undertaken on continual basis to identify dust generation.
	Temporarily cease operations during periods of high visible dust migrating off site until conditions improve.
	Maintain an air quality complaints register.
	In the event of an air quality incident or non-compliance, the contingency plan is implemented.
Diesel powered plant and equipment	Engines of vehicles and plant are switched off when not in use.
	Plant and equipment are maintained and operated in a proper and efficient manner as per the manufactures specifications and documented in plant and equipment service/log books.
	Pollution reduction devices fitted to any vehicles and plant should be maintained and serviced according to manufactures specification.
	Where possible the use of vehicles and plant should be minimised by maximising utilisation of plant load capacity.
Materials handling and processing	Modify activities as needed under unfavorable wind conditions where excessive dust plumes are generated.
	Where possible, drop heights are minimized.
	Dust suppression will be applied as necessary where dozers are working and/or travelling.
	Material is wetted as is practicable prior to crushing if dust emissions are visible.

	Water sprayers used in the crusher system as far as is practicable if dust emissions are visible.
	Regular cleaning and collection of spilt material at transfer points.
	Adjust conveyor belt speeds to optimum level to minimise material loss.
	Dust extraction at key transfer points in the process.
	Maintain enclosures on conveyors and transfer points.
Drilling and blasting	All drill rigs equipped with dust suppression/filtration systems.
	Inspection of drill dust suppression systems to ensure they are fully operational before use.
	Blast holes are stemmed.
	Review meteorological conditions prior to and on the day of a blast, to ensure that wind speed and direction will not result in significant dust emissions or blast fume impacts on neighbouring residences.
	Cease drilling if dust mitigation systems are not operating as designed.
	Take care not to disturb drill cuttings.
Hauling	Haul routes are well defined and regularly maintained such as smoothing the surface and removing potholes or depressions.
	On-site travel distances are minimised as much as practicable.
	Watering of haul roads as required. Haul roads are watered such that the road surface has sufficient moisture to minimise on-road dust generation but not so much as to cause mud/dirt track out to occur.
	Road registered trucks, loaded with product for delivery to destinations other than Peppertree Quarry, to pass through a truck wash station before leaving the site.
	Training for haul truck operators to identify elevated dust levels from hauling activity and call for additional water suppression.
	All trucks travelling on site must adhere to relevant speed limits.
	All vehicle users/operators on site are educated through the induction system or operator training program about adherence to on-site speed limits.
	All loads of road registered trucks, loaded with product for delivery to destinations other than Peppertree Quarry, are covered as soon as practicable after loading, prior to leaving the site.
Wind erosion	The disturbance area is minimised.
	Exposed areas are rehabilitated (refer to the Rehabilitation Management Plan).
	Any stockpile spillage is cleaned up as soon practicable.
	Rehabilitation as soon as practical.
	Paved roads are regularly cleaned/swept.
Kiln and Hydration Plant	Visual monitoring of stack emissions.
	Baghouse filter installed on the kiln stack.
	Regular servicing and monitoring of baghouse filter as per manufacturers specification to ensure operating efficiency.
	Continuous particulate monitor installed on kiln stack.
	Maintain ancillary equipment to avoid process upsets.
	Annual stack emissions testing to verify performance.

5.1 Training

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

- General environmental awareness;
- The requirements of this AQGHGMP;
- Relevant legislation;

- Roles and responsibilities for air quality management and monitoring;
- Air quality mitigation, management and monitoring measures; and,
- Procedure to be implemented in the event of an incident (e.g. release of excessive dust emissions from site) and/or complaint.

5.2 Contingency plan

In the event that the air quality criteria or a performance indicator (refer to Section 4) has not been met, Boral will implement the contingency measures in **Table 5.2** to manage any unpredicted air quality impacts and their consequences to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible.

Table 5.2: Contingency measures

Measure	Key performance indicator	Contingency measure
Implementation of control measures	Quarterly environmental inspection checklist shows that all management practices listed in this plan are being implemented.	Rectify any issues identified during environmental inspection in accordance with this plan and contingency measures.
Training	All site personnel have completed air quality training.	Re-induct personnel if found to be insufficiently trained on air quality management measures.
Visual monitoring	No excessive dust visible beyond the Project boundary.	Implement the following if visual monitoring indicates a non-compliance with the indicators: 1. Identify the source of visible dust emissions. 2. Stop activity causing visible dust emissions. 3. Identify reason for visible dust emissions and confirm mitigation measures are implemented according to this plan. 4. If visible dust emissions continue, temporarily cease activity and investigate solutions to stop excessive visible dust emissions. 5. Implement the appropriate course of action to ensure excessive visible dust emissions does not reoccur.
Air quality complaints	No validated air quality complaints. Where a validated air quality complaint does occur, appropriate management actions are implemented following receipt of a complaint so that no further validated complaint is received from that complainant.	If complaints received, investigate complaints in accordance with Section 8.4 of this plan.
Stack testing	Stack concentrations do not exceed applicable EPL concentration limits.	If there is an exceedance of the applicable EPL concentration limits, notify relevant agencies in

		accordance with Section 8.1 of this plan.
Load limits	Pollutants discharged do not exceed EPL load limits.	If there is an exceedance of the applicable EPL load limits, notify relevant agencies in accordance with Section 8.2 of this plan.
Ambient monitoring	Pollutant concentrations do not exceed the relevant ambient air quality criteria.	If there is an exceedance of the relevant ambient air quality criteria, notify relevant agencies in accordance with Section 8.2 of this plan and affected land owners, tenants and CCC in accordance with Section 8.3 of this plan.

6 AIR QUALITY MONITORING

Boral uses air quality monitoring to evaluate the performance of the Project against the air quality criteria and to guide day to day planning of mining operations.

6.1 Stack testing

Annual stack testing is to be conducted for the kiln stack and lime hydration plant stack.

In accordance with the monitoring requirements outlined in EPL 994, the kiln stack is to be sampled for nitrogen oxides and solid particles and the lime hydration plant stack is to be sampled for solid particles. In addition, discharge parameters including diameter, volumetric flow rate, velocity and temperature are to be measured.

Velocity, volumetric flow rate and temperature are to be measured in accordance with Test Method 2, particulates are to be measured in accordance with Test Method 15 and oxides of nitrogen are to be measured in accordance with Test Method 11 of the NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2007).

The monitoring duration for each parameter is as specified by the relevant testing method/standard.

Records of stack testing results are to be kept for at least 4 years after the monitoring to which they relate took place. These records must include:

- the date(s) on which the sample was taken;
- the time(s) at which the sample was collected;
- the point at which the sample was taken; and
- the name of the person who collected the sample.

Annual stack testing is also conducted for assessable pollutants to calculate the load as identified in EPL 994. Assessable pollutants include coarse particulates, fine particulates, lead, mercury, nitrogen oxides and sulfur oxides. Methods for sampling the pollutants include: Other approved methods 9 for coarse particulates, Other approved methods 5 (or USEPA 201A) for fine particulates, Test Method 12 for lead and mercury, Test Method 11 for nitrogen oxides and Test Method 4 for sulfur oxides of the NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2007).

6.2 Meteorological monitoring

The Project is required under CoC B34 to ensure that there is a suitable meteorological station operating in the vicinity of the site for the life of the Project that:

- complies with the requirements in the NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2007); and
- is capable of measuring meteorological conditions in accordance with the NSW Noise Policy for Industry (EPA, 2017), unless a suitable alternative is approved by the Planning Secretary following consultation with the EPA.

The site operates a 10-metre (m) tall automatic weather station to assist with the environmental management of site operations. The on-site weather station continuously measures the parameters outlined in Table 6.1. Figure 6.1 presents the current location of the on-site weather station.

The weather station is to be relocated in the future to a suitable position west of the current location due to the progression of the project and the establishment of the Western Overburden Emplacement.

Table 6.1 Meteorological monitoring parameters

Parameter	Unit of measure	Sampling frequency	Averaging period
Temperature	°C	Continuous	1-hour
Relative humidity	%	Continuous	1-hour
Wind speed	m/s	Continuous	15-minute
Wind direction	Degrees	Continuous	15-minute
Standard deviation of wind direction	Degrees	Continuous	15-minute
Rainfall	mm	Continuous	15-minute

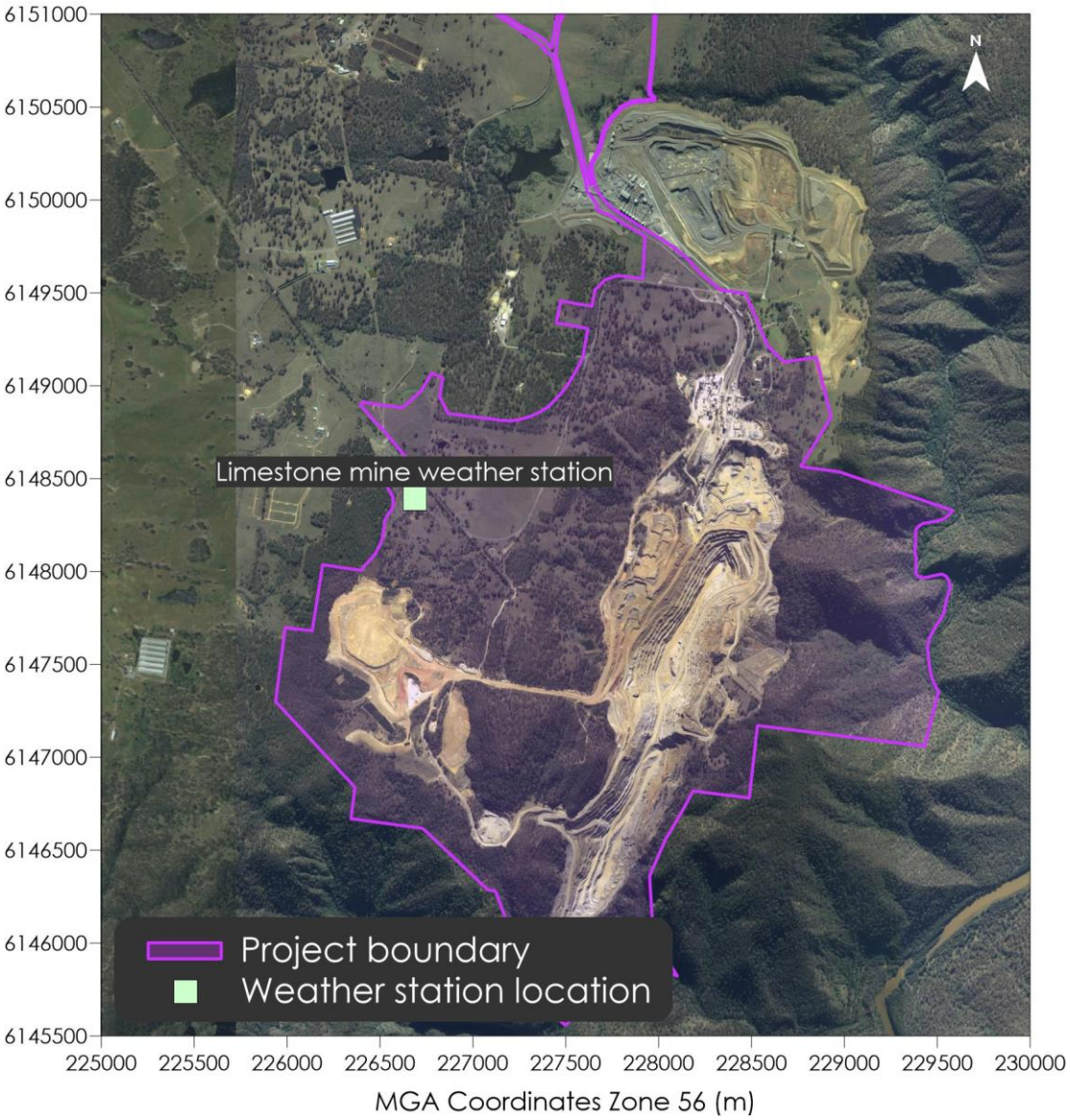

Figure 6.1 On-site weather station location

6.3 Ambient air quality monitoring

The air quality monitors operated as part of the mine air quality monitoring network include three High Volume Air Samplers (HVAS) measuring either TSP, PM_{10} and $PM_{2.5}$ and are shared with the Peppertree Quarry.

High Volume Air Samplers (HVAS) are used to measure TSP, PM_{10} and $PM_{2.5}$ concentrations in the ambient air per AM-15 or AM-18 of NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2007). HVAS monitoring is conducted approximately every 6 days for a 24-hour monitoring period. A NATA accredited analytical laboratory then conducts gravimetric analysis of the filter papers to determine the respective TSP, PM_{10} and $PM_{2.5}$ level.

In addition to this the mine also operates three dust deposition gauges.

Deposited dust is assessed as insoluble solids as defined by Standards Australia AS/NZS 3580.10.1:2016: "Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric Method" (AM-19 of NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2007)). The sampling period for a dust gauge is approximately a month (30 days ±2). A NATA accredited analytical laboratory then conducts gravimetric analysis of the material collected in the gauge to determine the total insoluble matter in g/m^2/month.

The ambient air quality monitors operated by the Peppertree Quarry include three dust deposition gauges and a real-time dust monitor. The real-time monitor is a light scattering laser photometer monitor (or equivalent), powered by solar panels capable of being deployed at different locations as required.

A real-time monitor will be obtained by the mine. The real-time monitor would be similar to the one operated by Peppertree Quarry. The monitor would be portable and can be moved as required for operational air quality management purposes. The monitor would be positioned to enable a quantifiable assessment of the relative particulate contribution downwind from the operations.

The real-time dust levels would form part of the air quality management system for the mine.

Prior to installation, the real-time monitor will be calibrated against the existing HVAS monitors.

Table 6.2 outlines the ambient air quality monitoring locations for the mine. Figure 6.2 presents the location of the ambient air quality monitoring network and the potential monitoring zones for the real-time monitors.

Table 6.2 Ambient air quality monitoring locations

Monitoring site ID	Type	Averaging period	Sampling period
Limestone Mine			
Sub Station	Dust Gauge	1-month	30 +/- 2 days
Freddie's Hill	Dust Gauge	1-month	30 +/- 2 days
Store Paddock	Dust Gauge	1-month	30 +/- 2 days
RT Dust 2	Real-time dust	10-minute	Continuous
Shared Limestone Mine and Peppertree Quarry			
HVAS – $PM_{2.5}$	HVAS – $PM_{2.5}$	24-hour	Every six days
HVAS – PM_{10}	HVAS - PM_{10}	24-hour	Every six days
HVAS - TSP	HVAS - TSP	24-hour	Every six days

Peppertree Quarry			
D1	Dust Gauge	1-month	30 +/- 2 days
D2	Dust Gauge	1-month	30 +/- 2 days
D3	Dust Gauge	1-month	30 +/- 2 days
RT Dust 1	Real-time dust	10-minute	Continuous

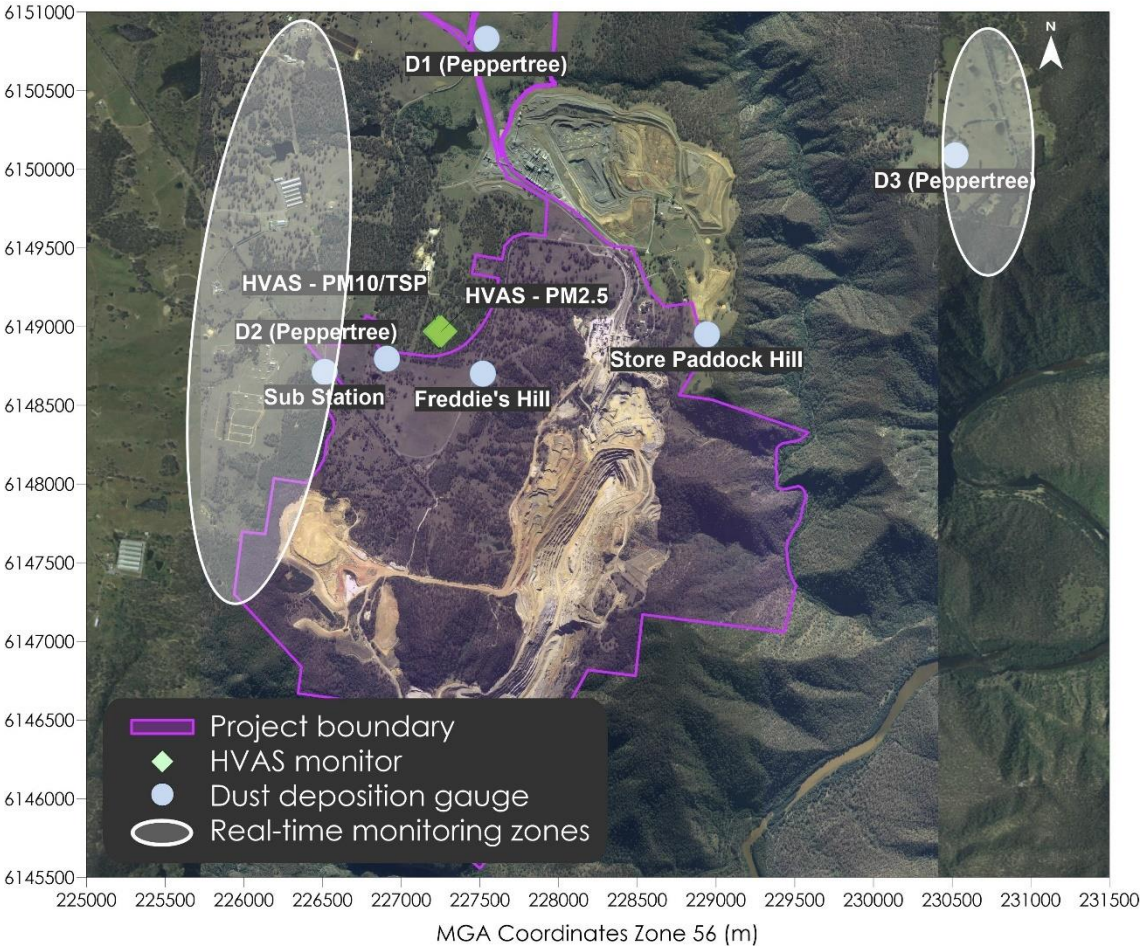

Figure 6.2 Ambient air quality monitoring network

Records of ambient air quality results are to be kept for at least 4 years after the monitoring to which they relate took place. These records must include:

- the date(s) on which the sample was taken;
- the time(s) at which the sample was collected;
- the point at which the sample was taken; and
- the name of the person who collected the sample.

6.4 Air quality management system

The mine will operate an air quality management system to guide the day-to-day planning of mining operations. The air quality management systems incorporates both proactive and reactive air quality mitigation measures to minimise the potential for dust impacts.

Proactive mitigation measures include reviewing the daily weather forecast and the planned activities and making proactive operational adjustments. This will help prevent the need for reactive controls due to excessive dust levels. This may include identifying periods of hot dry weather which may require additional controls such as watering of the haul roads and ensuring

sufficient water is available, or periods when high winds are forecast and schedule activity to occur at an alternative location in the pit to minimise the impact of or avoid these conditions.

The reactive dust mitigation strategies include utilising the high dust concentration alarms associated with the real-time air quality monitoring network and visual monitoring to inform reactive management.

Table 6.3 presents a Trigger Action Response Plan (TARP) which provides suggested dust trigger levels to alert staff of the potential for dust impacts to arise and sets out the corresponding response if the trigger is reached.

The suggested dust trigger levels will be refined and modified on an ongoing basis as the actual performance is confirmed, operational experience increases and as the operations change over time. Consideration of the prevailing winds and dispersion conditions is paramount in this method of analysis and it is anticipated that as operator experience with the operations and surrounding influences develops, more appropriate trigger levels would be developed over time.

Reactive controls may include operational measures such as rescheduling certain activities to periods of favourable meteorological conditions, conducting certain activities in alternative areas (e.g. hauling and placing overburden in overburden emplacements further from receptors), applying additional dust suppression, and in extreme cases, may require all dust generating activities to cease. Appropriate actions should take into account the type of dust source (i.e. wind sensitive or wind insensitive) and the prevailing meteorological conditions in undertaking dust mitigating action.

Table 6.3 Trigger Action Response Plan

Trigger level	Trigger	Response
1 – Alert level	1-hour average PM_{10} >50 µg/m^3 where monitor is downwind of activity	Check forecast for that day. Identify potential operational risk areas. Notify on-site managers to be on alert. Reschedule certain activities to periods of favourable meteorological conditions.
2 – Remedial action level	1-hour average PM_{10} >150 µg/m^3 where monitor is downwind of activity	Increase watering. Visual observation of dusty activity, apply additional control as necessary. Relocate certain activities in alternative areas (e.g. emplace overburden at locations away from receptors).
3 – Action level	1-hour average PM_{10} >150 µg/m^3 where monitor is downwind of activity for 3 consecutive hours	Cease some or all dust generating activities when the elevated dust concentrations are not caused by an external regional pollution event such as bushfires, prescribed burning, dust storms or fire incidents and cannot be overcome by level 1 or 2 actions.

Visual monitoring of dust emissions will be carried out on a continual basis by personnel at the mine in line with the *Dust Assessment Handbook* (**NSW EPA, 2019**) (developed and published in 2019 by the NSW EPA in consultation with the mining industry and the DPIE). The visual assessment tools (see **Figure 6.3** and **Figure 6.4** for examples) can be applied to the mine and

will assist equipment operators and site supervisors to identify when to consider operational changes to minimise dust.

Should visual monitoring observe dust emissions that have the potential to disperse outside of the site boundaries, mining activities will be reviewed and mitigation measures will be implemented.

Mitigation measures may include:

- Increased use of controls such as water carts;
- Review and modification/ reduction of mining operations;
- Ceasing works temporarily.

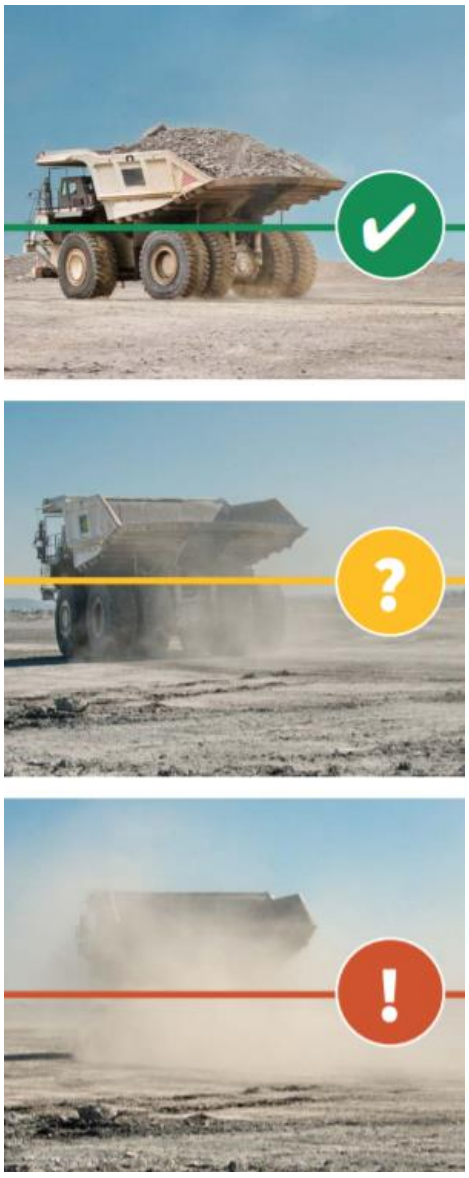

Figure 6.3: Visual assessment tool for hauling

Factors to consider when assessing if excavator loading of trucks requires operational changes:

Weather conditions

During periods of strong wind there is an increased potential for dust from excavator loading to be transported offsite. During calm conditions dust generated from this activity is more likely to settle back within the mine site.

Location

Dust generated from elevated benches is more likely to be transported offsite than from benches deep within the pit.

Proximity to site boundary

Dust generated from excavator operations located near the mine site boundary is more likely to be transported offsite than dust from excavator operations in the centre of the mine site.

Proximity of the emission to sensitive receptors

Dust generated from excavator operations close to neighbouring properties is more likely to cause a nuisance than dust from excavator operations that are remote from residences.

Duration of the emission

Persistent emissions of dust from excavator loading operations increase the risk of problem dust leaving the mine site.

Occupational safety

Some dust minimisation techniques may increase occupational safety risks.

Figure 6.4 Visual assessment tool for loading

7 ENVIRONMENTAL PERFORMANCE REVIEW AND IMPROVEMENT PROGRAM

7.1 Performance evaluation

The performance of the Project is to be evaluated against the key performance indicators outlined in Section 4.3. Table 7.1 indicates the evaluation schedule for each key performance indicator.

Where performance indicators are not being met, the contingency plan in Section 5.2 is to be implemented.

Table 7.1 Key performance indicators

Key performance indicator	Performance evaluation schedule
All site personnel have completed air quality training	Annual
No excessive dust visible beyond boundary	Continuous
No validated air quality complaints	As required
Stack concentrations do not exceed applicable EPL concentration limits	Annual
Pollutants discharged do not exceed EPL load limits	Annual
Pollutant concentrations do not exceed the relevant ambient air quality criteria	Table 4.1

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:

- Included a comprehensive review of the air quality 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 air quality 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 impacts as presented in the Air Quality Impact Assessment for the Marulan South Limestone Mine Continued Operations (**Todoroski Air Sciences, 2019**) and the actual impacts of the development as measured and, analysis the potential cause of any significant discrepancies.

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

7.3 Continuous improvement

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 AQGHGMP 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 air quality impacts;
- A review of air quality monitoring data trends;
- A review of incidents and non-compliances;
- A review of air quality 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 air quality performance of the mine.

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

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

8.1 Incident reporting

An incident is defined in the CoC 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”.

An air quality incident may involve a failure of air pollution control equipment and or management measures at the mine resulting in an excessive release of air emissions.

The Planning Secretary is to be notified in writing via the Major Projects Website immediately after Boral becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development) and set out the location and nature of the incident.

Per 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.

8.2 Non-compliance reporting

Non-compliance is defined in the CoC as “an occurrence, set of circumstances or development that is a breach of this consent”.

An air quality non-compliance would be where air quality monitoring indicates an exceedance of the air quality criteria in the CoC.

Within seven days of becoming aware of a non-compliance, Boral must notify the Department of the non-compliance. The notification must 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 the development 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.

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

8.3 Notification of exceedances

As soon as practicable and no longer than 7 days after obtaining monitoring results showing an exceedance of any air quality criterion in Table 4.1, Boral must provide the details of the exceedance to any affected landowners, tenants and the CCC.

For any exceedance of any air quality criterion in Table 4.1, Boral must also provide to any affected land owners and/or tenants a copy of the fact sheet entitled “Mine Dust and You” (NSW Health, 2017).

8.4 Complaints protocol

Air quality complaints received by Boral will be recorded in a Complaints Register 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 record of a complaint may be kept for at least four years after the complaint was made.

Boral must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in EPL 944.

Through the community consultation committee, the complaints line telephone number will be communicated for purposes of anyone wishing to register a complaint.

9 GREENHOUSE GAS MANAGEMENT MEASURES

The National Greenhouse Accounts (NGA) Factors document published by the Department of the Environment and Energy defines three scopes (Scope 1, 2 and 3) for different emission categories based on whether the emissions generated are from "direct" or "indirect" sources.

Scope 1 emissions encompass the direct sources from the Project defined as:

> *"...from sources within the boundary of an organisation as a result of that organisation's activities"* (**Department of Industry, Science, Energy and Resources, 2020**).

Scope 2 and 3 emissions occur due to the indirect sources from the Project as:

> *"...emissions generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation"* (**Department of Industry, Science, Energy and Resources, 2020**).

Scope 1 and 2 emissions are associated with activities occurring at the mine. Scope 3 emissions arise from various sources indirectly associated with the operation of the mine and beyond the control of the mine and not considered further in this plan.

In accordance with Condition B30 of CoC, Boral will implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site.

9.1 Emission sources

Scope 1 and 2 GHG emission sources identified from the operation of the mine are the on-site combustion of diesel fuel, electricity, natural gas and sub-bituminous coal and from the production of lime.

Figure 9.1 presents a breakdown of the greenhouse gas emissions associated with the operation of the mine (**Edge Environment, 2018**).

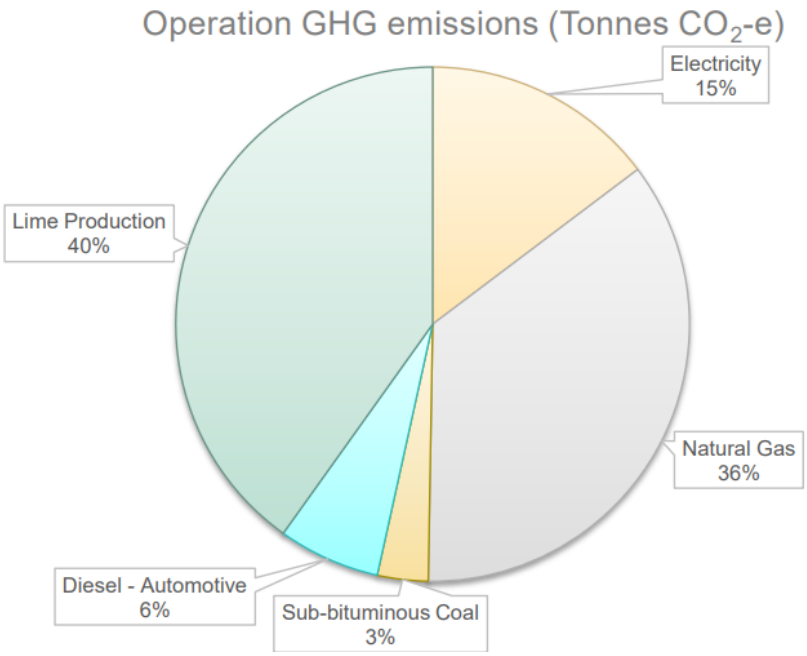

Figure 9.1 Greenhouse gas emissions breakdown by operation

9.2 Management of greenhouse emissions

The current GHG reduction strategies at the mine include the following initiatives:

- A program to reduce idling time for heavy mobile equipment through timer based automatic shut off of the engines;
- Replacement of lighting throughout site with energy efficient lighting;
- Energy efficiency improvements in fixed crushing equipment have reduced the operating hours from 96 per week to 62 over the course of the last four years;
- Training programs for operators of heavy equipment, particularly front end loaders and haul trucks, to minimise movement of equipment in the loading area in an attempt to reduce fuel consumption by between 5-11%, and improve loading times with the added benefit of idling time reduction; and,
- Full planned maintenance program for all plant, fixed and mobile to maintain level of efficiency and serviceability.

The mine will also investigate the use of various mitigation measures to further minimise the generation of Scope 1 and Scope 2 GHG emissions including:

- Investigating ways to reduce energy consumption during project planning phases and reviewing energy efficient alternatives;
- Increased use of day/night sensors for lighting control;
- Monitoring the consumption of fuel and regularly maintaining diesel powered equipment to ensure operational efficiency;
- Use locally sourced construction materials to reduce emissions associated with transport;
- Recycle/compost waste wherever possible
- Maximise efficiency through logistical planning.
- Monitoring the total site electricity consumption and investigating avenues to minimise this requirement;
- Considering the energy and fuel efficiency of new mobile and fixed equipment prior to purchase;
- Existing on-site vehicles and mobile equipment are fitted with exhaust controls which satisfy the NSW EPA emission requirements and are properly maintained;
- Existing on-site vehicles and mobile equipment that do not meet these requirements are phased out;
- Use of alternate fuels for the lime kiln to transition from natural gas and coal to solid waste derived fuels (like that used at Berrima site);
- Pit design optimisation and driver training to reduce fuel usage of haul trucks;
- Transition site to renewable electricity sources either by onsite generation or via power purchase agreements; and,
- Investigate use of carbon capture technology for kiln emissions.

Under the National Greenhouse and Energy Reporting scheme requirements, relevant sources of greenhouse gas emissions and energy consumption are measured and reported on an annual basis.

10 REFERENCES

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APPENDIX A

EPA Consultation

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