

Boral Cement Limited

Berrima Cement Works

Annual Environmental Management Review

Development Consents	Development Consent No. 401-11-2002-i (Kiln 6)
Addressed:	Development Consent No. 85-4-2005-i (Mill 7)
Review Period:	1 May 2019 - 30 April 2020
Approved By:	Environmental Manager - Cement

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1 ANNUAL REVIEW INFORMATION

Table 1 AEMR authorisation

Name of operation	Berrima Cement Works
Name of operator	Boral Cement Limited
Development consent no.	Development Consent No. 401-11-2002-i (Kiln 6)
	Development Consent No. 85-4-2005-i (Mill 7)
Name of holder of development consents	Boral Cement Limited
AEMR start date	1 May 2019
AEMR end date	30 April 2020

I, Greg Johnson, certify that this audit report is a true and accurate record of the compliance status of the Berrima Cement Works for the period 1 May 2019 to 30 April 2020 and that I am authorised to make this statement on behalf of Boral Cement Limited.

Note.

- a) The AEMR is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual \$250,000.
- b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/ information/ documents – maximum penalty 2 years imprisonment of \$22,000, or both).

Name of authorised reporting officer	Greg Johnson
Title of authorising reporting officer	Environmental Sustainability Manager, Boral Cement
Signature of authorised reporting officer	MO

Date

24 June 2020

2 STATEMENT OF COMPLIANCE

This annual environmental management review (AEMR) summarises compliance with the following development consents applicable to the Berrima Cement Works (the Works):

- Development Consent No. DA 401-11-2002-i approved in 2003 to upgrade and increase the capacity of Kiln 6 at the Works; and
- Development Consent No. DA 85-4-2005-i approved in 2005 for the establishment and operation of a new cement mill (Mill 7).

It has been prepared in accordance with the *Post-approval requirements for State significant mining developments Annual Review Guideline* (NSW Government 2015) (the Guideline).

The compliance status of the Works is shown in Table 2.

Table 2: Statement of compliance

Were all conditions of the relevant development consents complied with?			
Development Consent No. No. 401-11-2002-i (Kiln 6)	No		
Development Consent No. No. 85-4-2005-i (Mill 7)	YES		

Table 3 summarises non-compliances with the development consents, based on the key in Table 4.

Table 3 Non-compliances

Relevant approval	Condition	Condition summary	Complia nce status	Comment	Where addressed in AEMR?
Air Quality Discharge	1.6	The applicant shall ensure that all necessary licences, permits & approvals are obtained & kept up to date throughout the life of the cement works. No condition of this consent removes the obligation for the Applicant to obtain, renew or comply with such licences	Low	1 relating to HVAS monitoring equipment failure to run & 1 relating to a dust release	7 Incidents and Non- compliances

Table 4 Compliance status key for Table 3

Risk level	Code	Description
High	Non- compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non- compliant	 Non-compliance with: potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur.
Low	Non- compliant	 Non-compliance with: potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur.
Administrative non- compliance	Non- compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (eg submitting a report to government later than required under approval conditions).

3 INTRODUCTION

3.1 Overview

Boral Cement Limited (Boral Cement) operates the Works off Taylor Road, New Berrima, in the Wingecarribee Local Government Area (LGA) (Figure 1). The Works was built in 1929 and has operated continuously ever since predominantly on the basis of continuing use rights and two development consents issued under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

The Works produces cement products (cement and clinker) for sale in NSW, the ACT and for export. The Works has approval to produce up to 1.56 million tonnes per annum (tpa) of cement products which has historically represented approximately 60% of cement sold for building and construction in NSW. Cement products are transported to domestic customers (both internal to Boral companies or external), by train and truck and international customers through Port Kembla. Clinker is also transported to Boral Cement's Maldon Cement Works by rail which also produces cement products, including premixed dry concrete.

The Works operates 24 hours per day, 365, six days per year, including various maintenance periods.

Operational infrastructure includes one kiln (Kiln 6) and two cement mills (Mill 6 and 7), and storage and stockpiling facilities.

The main raw material inputs to the production of cement and clinker are limestone, sourced from Boral Cement's Marulan South Limestone Mine (transported via rail), and shale, sourced both on site at a shale quarry or from off-site, steel slag from BlueScope Steel in Port Kembla and granulated blast furnace slag from Japan.

The limestone, shale and slag are blended together, ground into a fine powder (also known as a meal) and fused at a very high temperatures (up to 1,500 degrees Celsius ($^{\circ}$ C)) in the kiln (Kiln 6). The fused material is called clinker.

Clinker is either stored ready for reclamation or distribution to customers by road and rail transport, or is mixed with gypsum into one of two cement mills (Mill 6 and 7), where it is crushed to produce cement. It is then fed into cement silos from where it is despatched by either road tanker or rail tanker/wagon for delivery to Boral Cement's customers (internal Boral customers or external).

Refer to the process flow diagrams in Figure 2 and Figure 3.

Cement manufacture is an energy intensive process due to the high temperatures required for the production of clinker. Up to 225,000 tonnes per year of coal is generally used to heat the kiln. Up until 2013 coal was sourced from the nearby Medway Colliery (also known as the Berrima Colliery) but since the colliery's closure, coal has been sourced from mines in the Illawarra area. The Works also has approval to use other standard fuels such as natural gas, fuel oil, diesel and coke fines to heat the kiln. With the exception of diesel, which is used to start up the kiln, none of these standard fuels are currently being used.

The Works has approval to use 30,000 tpa of non-standard fuels in the kiln, including 10,000 tpa of Hi Cal 50 (carbon anode dust), 20,000 tpa of AKF 1 (liquid oily residues) and 30,000 tpa of AKF 5 (used tyres). Boral Cement received approval to use of additional of non-standard fuels (also referred to as solid waste derived fuels (SWDF)) as an energy source at the Works in October 2016. SWDFs used include wood waste and refuse derived fuel (RDF) which are combustible materials recovered and processed from waste streams, such as papers, cardboards, packaging, and construction and demolition materials. The consent for Kiln 6 now allows the use of up to 100,000 tpa of AKF5, wood waste and RDF.

Commencing in August 2018 the Works commenced the use of SWDFs, with a Proof of Performance Trial undertaken as required as per the consent. The PoPT six monthly report was approved by both the EPA and the Secretary on 23/04/2019 which permitted the continued use of SWDFs upto 40% of total fuel.

The Works supports a direct workforce of 130 employees, a further 20 in engineering and procurement, as well as many indirect jobs in the region through logistics, contractors and suppliers.

The Works is located on a 149 hectare (ha) site immediately south of the village of New Berrima and approximately 2.5 km east of the Hume Highway. The village of New Berrima was initially developed by Boral Cement's predecessors to provide housing for employees of the Works.

The Works is the most physically dominating feature of the New Berrima area, being roughly equivalent in size to the adjacent village, with the tallest structure on the site being a pre-heater tower, which is approximately 85 m high. The closest residential dwellings in the village of New Berrima are approximately 650 m north of Kiln 6.

The site is zoned IN3 Heavy Industrial in the Wingecarribee Local Environmental Plan 2010.



Figure 1 Location and monitoring points



Figure 2 Process flow diagram



Source: Boral (2017)

Figure 3 Process flow diagram incorporating receipt of materials and dispatch of products

3.2 Key personnel

Details of key personnel who are responsible for environmental management at the Works are provided in Table 5.

Name	Role	Phone number	Email address
Dean Beltrame	Operations Manager (NSW) Boral Cement	(02) 4860 2222	dean.beltrame@boral.com.au
Greg Johnson	Environment and Sustainability Manager - Boral Cement	0401 893 420	greg.johnson@boral.com.au

Table 5 Key personnel responsible for environmental management

3.3 Approvals

The Works operates under a combination of continuing use rights and two development consents under the EP&A Act. It also operates under an environment protection licence (EPL) issued under the NSW *Protection of the Environment Operations Act 1997* (POEO Act).

Water used at the Works is drawn from the Wingecarribee River which is regulated by five mining purpose leases (MPLs) issued under the NSW *Mining Act 1906*. In addition, one MPL regulates the provision of power to the Works.

Shale used at the Works is extracted from a quarry on the site which is regulated under a mining lease (ML) issued under the NSW *Mining Act 1992*.

3.3.1Consents

The Works operates under a combination of continuing use rights and the following two development consents approved by the NSW Minister for Planning:

- Development Consent No. DA 401-11-2002-i approved in 2003 to upgrade and increase the capacity of Kiln 6 at the Works; and
- Development Consent No. DA 85-4-2005-i approved in 2005 for the establishment and operation of a new cement mill (Mill 7).

Continuing existing use rights are available to the Works given it commenced operations in 1929, before any planning approvals were required.

The development consent for Mill 7 has never been modified.

Subsequent modifications to the development consent for Kiln 6, approved by delegates of the NSW Minister for Planning, have allowed the trialling and use of certain non-standard fuels, the use of alternative 'low cost' raw materials in the manufacture of clinker (such as granulated blast furnace slag), the use of rail for coal deliveries, and the stockpiling of coal on the site. Table 6 outlines the various modifications to the development consent.

Table 6 Approvals for Kiln 6

Application	Description	Date approved
DA 401-11- 2002-i	Upgrade of Kiln 6 to allow for burning of non-standard fuels, installation of continuous monitoring equipment, increase in Kiln 6 output, upgrade of coal mill capacity and intermittent use of Kiln 5.	12 May 2003
MOD 1	Use of non-standard fuels, including used tyres, liquid oil residues and spent aluminium electrode carbon.	26 September 2005
MOD 2	Removal of prohibition on the acceptance of materials classified as hazardous waste under the EPA's waste guidelines.	22 September 2006
MOD 3	Small scale trial use of tyre chips over a six month period.	13 February 2007
MOD 4	Increase in usage of coal fines from 1.5 tonnes per hour (tph) to 10 tph.	8 May 2008
MOD 5	Approval to use rail for coal deliveries.	31 August 2009
MOD 6	Stockpiling of coal from Berrima Colliery for sale and transport to Port Kembla.Note: As part of MOD 9, conditions relating to MOD 6 (the stockpiling of coal from Berrima Colliery for sale and transport to Port Kembla) were deleted.	20 June 2012
MOD 7	Trial and use of granulated blast furnace slag as a raw material additive, not exceeding 150,000 tpa.	16 April 2012
MOD 8	Administrative changes to align consent and EPL conditions.	5 August 2012
MOD 9	The use of up to 100,000 tpa of SWDF as a non-standard fuel for Kiln 6, including the construction of a fuel storage and kiln feeding system, and the deletion of conditions relating to MOD 6.	5 October 2016
MOD 10	SWDF Fuel storage shed extension	11 April 2019
MOD 11	Use of HiCal 50 during start-up conditions	25 October 2019
MOD 12	Isotainer handling and whole of site noise limit.	7 April 2020

3.3.2Licenses

The Works operates under EPL 1968 issued by the EPA which has been subject to numerous variations. The EPL permits the following scheduled activities listed in Schedule 1 of the POEO Act:

- cement or lime works;
- extractive activities; and
- resource recovery.

On 18 December 2019, the EPL was amended to reflect the outcome of the Proof of Performance Trials to limit SWDF to 40% until further performance testing is undertaken at a higher rate. The amendment also included changes from MOD 11 which permitted HiCal 50 during start up conditions and to finalise the whole of site noise PRP and setting a single whole of site noise limit. This whole of site noise limit was then used to amend the consent noise limit during the MOD 12 assessment process.

The Works also operates under a ML and six MPLs as summarised in Table 7.

Table 7 Mining leases

Mining title	Purpose	Expiry date
ML 1723	Extraction of blue shale from the quarry and rehabilitation of previously disturbed land.	18 December 2036
MPL 559	Water supply access.	20 September 2028
MPL 592	Water supply access.	20 September 2028
MPL 622	Water supply access.	20 September 2028
MPL 623	Water supply access.	20 September 2028
MPL 628	Power supply.	20 September 2028
MPL 654	Water supply access.	20 September 2028

The Annual Mining Lease Review for these licences is due annually for the previous Calendar year at the end of February. The 2019 report was submitted to the Resources Regulator in February 2020, RR reference MAAG0006609.

3.4 Operations summary

Table 8 provides a summary of production at the Works for the 2019/20 reporting period (May 2019 and April 2020) compared to the previous 3 reporting periods.

Table 8 Production summary (annual financial year)

Material	Approval limit	16/17 FY	17/18 FY	18/19 Reporting Period	19/20 Reporting Period
Limestone used	Nil	1,918,289 t	1,873,921c	2,008,50	1,803,196
Shale used	Nil	308,199 t	278,720	201,990	142,586
Slag used	Nil	123,128 t	71,676	113,510	129,640
Other Raw Materials					153,150
Gypsum used	Nil	76,864 t	82,901	81,250	70,276
Coal used	Nil	222,586 t	225,891	208,610	184,446
SWDFs used	100,000 t	Nil	Nil	21,870	28,997
Clinker production	1,560,000 t	1,484,700 t	1,470,989	1,443,830	1,314,466
Cement production	1,560,000 t	1,185,461 t	1,264,081	1,209,500	1,104,195

Coal is predominantly used as a fuel for the kiln at the Works. However, small amounts of diesel are used during kiln start-ups.

The Works is approved to produce up to 1.56 Mtpa of cement products. In the 2019/20 reporting period the Works produced 1,314,466 tonnes of clinker. Of this clinker, 1,104,195 tonnes of cement was produced.

Boral continued the use of SWDFs during the 2019/20 reporting period, continuing on from the successful Proof of Performance Trails in 2018/19. A total of 28997t of SWDF was consumed during the reporting periods, an increase of approximately 7000t on 2018/19.

3.5 Environmental management

The Guideline requires that AEMRs focus on the environmental outcomes of a reporting period that are intended by the relevant approval. As such, this AEMR addresses the outcomes of the relevant conditions of the development consents rather than focus on management plans and monitoring data. Notwithstanding this, addressing environmental outcomes is a result of analysing monitoring data, and this has been undertaken in this AMER, particularly for key environmental areas at the Works, including air quality and noise.

Berrima Cement Works – Operational Environmental Management Plan (Boral 2018) (OEMP) and subordinate plans received their three yearly review and were revised in accordance with conditions 6.3A and 6.4A of DA 401-11-2002-i. The OEMP was submitted to DPE for approval on 5 April 2018, and received approval in a letter dated 21 May 2018.

Boral under took a review of the OEMP, and the sites Air Quality Management Plan & Noise Management Plan in April 2020 to reflect the recent Mod 11 and 12 to the consent and changes to the EPL completed by the EPA on 18 December 2019. These were submitted to the Department on 5 June 2020.

4 ACTIONS REQUIRED FROM PREVIOUS AEMR

The 2019 AEMR was submitted to the DPIE on 29 June 2019 with no actions identified by the DPIE after submission.

Table 9 DPIE requested actions from previous AEMR

Action required from previous AEMRs	Action taken	Where discussed in AEMR
Nil	-	-

5 ENVIRONMENTAL PERFORMANCE

5.1 Overview

This section reports performance against the environmental performance conditions in Development Consent No. 401-11-2002-i (Kiln 6) and Development Consent No. 85-4-2005-i (Mill 7). It is divided into sections based on the environmental matters in the consents and comprises a conditions table and Boral's reporting against the conditions.

5.2 Noise

The consent requirements for noise for Kiln 6 are in conditions 3.1 to 3.3 of Development Consent No. 401-11-2002-i and for Mill 7 in conditions 2.1 to 2.6 of Development Consent No. 85-4-2005-i, which are replicated in Table 10. Noise was monitored and reported against the Kiln 6 and Mill 7 contribution criteria in September- November 2019 (see Appendix A – *Berrima Cement Plant – Annual Environmental Noise Assessment November 2019* (Recognition Research 2019)), with performance described in Table 11.

Boral manages noise on site in accordance with the *Berrima Cement Works – Noise Management Plan* (Boral 2018, updated April 2020), which describes the monitoring points, frequency and criteria.

The Executive Summary of the Annual Noise Assessment noted the following:

'The Boral Cement Berrima works has noise limit conditions on two major projects, which are No.6 Kiln Upgrade and No.7 Cement Mill (from 2002 and 2007 respectively). Sound levels at the plant and in the residential community affected by the noise emissions from the total site have been measured regularly since 2002 and since the completion of each of these projects.

Monitoring of both site source sound levels and residential receiver sound levels on an annual basis since 2008 has confirmed that both of the projects are in compliance with their noise limit conditions.

An annual review of the noise emissions from these projects is the subject of this report and includes sound levels measured at the Cement Plant and in the adjoining residential area of New Berrima.

Previous rural residential receiver locations to the east and south-east of the site included in the approval conditions for the Projects no longer exist and are no longer included in the assessment.

Discussions with the NSW EPA since 2011 have sought to include noise limit conditions for the whole site (rather than just the two projects) but these conditions have yet to be finalised. A recommended noise objective for a nominated monitoring site has been proposed inside but close to the plant boundary where noise emissions from sources other than the Cement Plant are not significant; residential receiver locations are affected by other noise sources such as road traffic.

The annual environmental noise assessment evaluates noise emission from the Cement Plant by the following methods:

• comparative measurements at the same locations around major plant sources of noise which have been assessed previously as in compliance with the limit conditions;

• calculation of the contribution sound levels at residential receiver locations from those source emission locations which are higher than in the past and comparison with a contribution objective;

• monitoring of sound levels in residential receiver locations with unattended monitoring over long term periods of two weeks and attended monitoring in day, evening and night-time to compare with long-term averages from previous years.

The findings of this 2019 annual environmental noise assessment are that the two projects are considered to be in compliance with their noise limit conditions at the nearest residential receiver locations.

It is also the finding of this assessment that the long-term average statistical sound levels have not increased and indicate that the Cement Plant is not increasing its emissions.

From the measurements at the proposed in-plant annual environmental noise monitoring location in the Store Yard, it is also considered that the plant is achieving its proposed objectives of 56 dBA for long-term LA90.period and 58 dBA LA90.15-minutes (unaffected by transient noise sources).'

In December 2019, the NSW EPA accepted the findings of the PRP and the proposed whole of site noise monitoring point. The new whole of site noise limits and location were subsequently included in the Kiln 6 MOD 12 on 7 April 2020 as part of the Isotainer Handling Modification. Subject to capital availability, it is envisaged that the proposed Isotainer Handling area will be prepared during and the handling of Isotainers will commence during the 2020-2021 reporting period.

Source	Sound Power Level – dB(A)	Sound Pressure Level dB(A)		dB(A)
		Objective	Measured 2005	Measured 2019
Coal Mill and Clinkor				Coal mill wall vent 88 @ 1m,
cooler fans	117	100 @ 3m	93 @ 2m	Courtyard cooler fans 87 to 99 @ 1m
	103	92 @ 1m		82 to 86 @ 1m
New Radicon Cooler			81 @ 1m West 80 @ 2m East	Area Average 85 @ 1m
				E side 77 @ 2.4m E
New Pre-heater fan FA249	97	89 @ 1m	77 @ 2m	81 to 84 @ 1m
New Baghouse fan FA250	102	94 @ 1m	82 @ 2m	82 to 86 @ 1m
Dow Mill 7 Building	117	100.0.0	Vents 83 to 86	Vents 78 to 83 @ 1m
Naw Will 7 Duilding	117	100 @ 511	@ 1m	Roof 81 to 90 @1m

Figure 4 Kiln 6 – Plant Items and Objective Sound Power Levels and Sound Pressure Levels required to achieve compliance with objective sound levels

Receiver	Source	Predicted sound level – dB(A)			
	Weather Condition	Wind 0 m/s Lapse 0°C/100m	Wind 3 m/s Lapse 0°C/100m	Wind 2 m/s Lapse 3°C/100m	
Adelaide	Mill Room northern wall	23	29	29	
Street	BE Tower northern	22	25	26	
	Compressor room	<u>15</u>	<u>20</u>	<u>21</u>	
	Total	26	31	31	
Argyle	Western wall Mill room	17	28	28	
Street	Western Roll door Mill room	14	25	26	
	Western Wall vents	13	19	20	
	Vestern Wall BE	10	17	17	
	Tower Western Roll door	<u>9</u>	<u>16</u>	<u>16</u>	
	compressor room	21	30	31	
	Total				

Figure 5 Cement Mill 7 predicted contribution levels at receivers for 2007 sound levels

Table 10: Noise conditions

Number	Condition
	Construction activities associated with the cement works upgrade shall only be carried out: a) between 7:00 am and 6:00 pm, Monday to Friday inclusive, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site;
K3.1 Noise	b) between 7:00 am and 1:00 pm on Saturdays, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site;
	c) at no time on Sundays or public holidays, during periods when the cement works is shutdown, and construction noise is audible at the boundary of the site;
	d) at any time during periods in which the cement works is in operation; and
	e) at any time if construction noise is inaudible at the boundary of the site.
K3.1A	The Development shall be constructed with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (Department of Environment and Climate Change, 2009). All feasible and reasonable noise mitigation measures shall be implemented and any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the CEMP.
	Note: The Interim Construction Noise Guideline identifies 'particularly annoying' activities that require the addition of 5dB(A) to the predicted level before comparing to the construction NML
K3.1B	Where Feasible and Reasonable, operation noise mitigation measures shall be implemented at the start of Construction (or at other times during construction) to minimise construction noise impacts.
	Construction activities associated with the cement works upgrade shall only be carried out:
	a) between 7:00 am and 6:00 pm, Monday to Friday inclusive, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site;
M2.1 Noise	b) between 7:00 am and 1:00 pm on Saturdays, during periods in which the cement works is shut-down, and construction noise is audible at the boundary of the site;
Impacts	c) at no time on Sundays or public holidays, during periods when the cement works is shut-down, and construction noise is audible at the boundary of the site;
	d) at any time during periods in which the cement works is in operation; and
	e) at any time if construction noise is inaudible at the boundary of the site.
K3.2 Operationa l Noise	Subject to compliance with the requirements of this consent, the cement works upgrade may be operated 24 hours per day, 7 days per week.

Noise generated at the site must not exceed the noise limits at the times and location specified in Table 2 below. Former Limits

Table 2 – Maximum Allowable Noise Contribution Limit (dB(A))

Receiver Location	Day ^a	Evening ^b	Night ^c
	LAeq(15 minute)	LAeq(15 minute)	LAeq(15 minute)
4 Melbourne Street	37	37	37
Chelsey Park Farm	30	30	30
Candowie Farm	37	37	37

New Limits (MOD 12) 7 April 2020

K3.3

K3.3A

Table 2 – Maximum Allowable Noise Limit (dB(A))

Location	Day ^a Evening ^b		Night ^c	
	LA90(15 minute)	LA90(15 minute)	L _{A90(15 minute)}	
The Noise Compliance Point (Point 20) – Store Yard Close	58	58	58	

a. Day is defined as the period from 7:00am to 6:00pm Monday to Saturday and 8:00am to 6:00pm on Sundays and public holidays.

b. Evening is defined as the period from 6:00pm to 10:00pm.

c. Night is defined as the period from 10:00pm to 7:00am Monday to Saturday and 10:00pm to 8:00am on Sundays and public holidays.

Note: Noise contributions specified in Table 2 are to be interpreted as contributions from the new and upgraded components forming part of cement works upgrade only and not as noise limits for the site as a whole. (Footnote: 2 Incorporates EPA General Terms of Approval (L6.1 and L6.2)

Any new or upgrade development projects the subject of any modification to this consent must give consideration to the Project Specific Noise Levels identified in the document titled 'PRP-7 Response – Identifying Environmental Noise Objectives For Berrima Cement Plant' dated 27 March 2018, prepared by Recognition Research.

K3.4 All vehicles associated with the isotainer loading operations at the site must use a broad-band type reversing alarm instead of tonal beeper reversing alarm.

K3.5 The locomotive of the train transporting isotainers to the site must be relocated to the eastern end of the train as soon as practically possible after arrival during daytime to avoid such movements in evening or night-time periods.

K3.6 The applicant must implement best practice technology with respect to the isotainer reach stacker to reduce LAmax noise events.

M2.2 Subject to compliance with the requirements of this consent, the cement works upgrade may be operated 24 hours per day, 7 days per week.

²The Applicant shall design, construct, operate and maintain all new and upgraded components forming part of the cement works upgrade to ensure that for each receiver location listed in Table 1 below, the noise level at each receiver location does not exceed the maximum allowable noise contribution limit at the receiver location specified.

	Table 1 – Maximum Allo	wable Noise Contribut	ion Limit (dB(A))		
	Receiver Location	Day ^a	Evening ^b	Night ^c	
		LAeq(16 minute)	LAeq(16 minute)	L _{Aeq(16 minute)}	
	Adelaide Street, near Taylor Avenue, New Berrima	43	43	40	
	Argyle Street, near Taylor Avenue, New Berrima	43	43	40	
	Candowie Farm House	43	43	40	
	a. Day is defined as the pe	riod from 7.00am to 6.0	00pm Monday to Saturd	ay and 8.00am to 6.00p	m on Sundays and public holidays.
	b. Evening is defined as the	e period from 6.00pm to	o 10.00pm.		
	c. Night is defined as the p	eriod from 10.00[pm to	7.00am Monday to Sate	urday and 10.00pm to 8.	00am on Sundays and public holidays.
	Note: Noise contributions s works upgrade only and no	specified in Table 1 are t t as noise limits for the	to be interpreted as con site as a whole. (Footno	tributions from the new ote: 2 Incorporates EPA	and upgraded components forming part of cen General Terms of Approval (L4.1 and L4.2))
	³ The maximum allowable r	oise contributions ident	tified in condition 2.3 ap	ply under all meteorolog	ical conditions, except:
Mo 4	a) during wind speeds grea	ater than 3ms-1 measur	ed at 10 metres above	ground level; or	
M2.4	b) during temperature inver (Footnote: 3 Incorporates a	rsion conditions of grea an EPA General Term o	ter than 3oC/100m and f Approval (L4.4))	wind speeds of greater	than 2ms-1 measured at 10 metres above grou
	⁴ For the purpose of assess	ment of noise contribut	ions specified under co	ndition 2.3, noise from th	ne cement works upgrade shall be:
M2.5	a) measured at the most at where the dwelling is more	fected point on or within than 30m from the pro	n the receptor site boun perty boundary; and	dary or at the most affe	cted point within 30m of the dwelling (rural situa
0	b) where applicable, subject	ct to the modification fac	ctors provided in Sectio	n 4 of the New South W	ales Industrial Noise Policy (EPA, 2000).
	(Footnote: 4 Incorporates a	an EPA General Term o	f Approval (L4.3))		
	Notwithstanding condition	2.5 of this consent, sho	ould direct measuremen	t of noise from the site b	e impractical, the Applicant may employ an alt

Note: (K = Kiln 6, M = Mill 7)

Table 11: Response to noise conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.1	Construction of the SWDF extension only took place during the hours specified in this condition.	Construction is a short-term activity which cannot be used to establish trends.	The noise management measures in the CEMP were, and will continue to be, implemented whenever construction activity is undertaken at the SWDF facility.
K3.1A	The noise management measures in the CEMP were, and will continue to be, implemented during construction of the SWDF extension. No construction related noise complaints were received during the reporting period.	Construction is a short-term activity which cannot be used to establish trends.	The noise management measures in the CEMP were, and will continue to be, implemented whenever construction activity is undertaken at the SWDF facility.
K3.1B	The noise management measures in the CEMP were, and will continue to be, implemented during construction of the SWDF extension. No construction related noise complaints were received during the reporting period.	Construction is a short-term activity which cannot be used to establish trends.	The noise management measures in the CEMP were, and will continue to be, implemented whenever construction activity is undertaken at the SWDF facility.
K3.2	The noise assessment and annual monitoring demonstrated that Kiln 6 operated within the objectives required to achieve contribution criteria during the reporting period and should be allowed to continue operating 24 hours/day, 7 days/week.	Over all, the sound levels associated with Kiln 6 Upgrade sources were considered to not exceed the contribution objectives at the nearest residential receivers to the northern and southern sides of the plant, apart from those associated with the new kiln shell cooler fans on the central pedestal of Kiln 6. Some closer location measured sound levels had increased but these were calculated to not exceed the objectives at the residential locations for the Kiln 6 Upgrade items. More distant measurements of the total emissions from the Kiln 6 area on the roof of the Control Building had not increased significantly from previous measurements, which also indicated compliance with the objectives for the Project.	Existing management measures effectively contain noise levels below contribution criteria. However, Boral will consider the recommendations to review the new kiln shed cooling fans and the grate cooler fan courtyard FA201 to 207.
K3.3	The noise assessment demonstrated that Kiln 6 operated within the objectives required to achieve contribution criteria at the residential locations during the reporting period.	The Store Yard Close location had period average LA90.period sound levels of 53 dBA in daytime and night and 52 dBA in evening, which is less than the new limit of 58 dBA. These are the same as in 2018 for	

		night-time and higher by 1 dB for daytime and lower by 1 dB for evening.	
K3.3A	New Condition. No new MOD application since inclusion	N/A	N/A
K3.4	New Condition. Isotainer loading operations have not yet commenced.	N/A	N/A
K3.5	New Condition. Isotainer loading operations have not yet commenced.	N/A	N/A
K3.6	New Condition. Isotainer loading operations have not yet commenced.	N/A	N/A
M2.1	Extension work on the SWDF facility only took place during the hours specified in this condition.	Construction is a short-term activity which can not be used to establish trends.	The noise management measures in the CEMP were, and will continue to be, implemented whenever construction activity is undertaken at the SWDF facility.
M2.2	The noise assessment predicted and monitoring confirmed that Mill 7 operated within the contribution criteria during the reporting period and should be allowed to continue operating 24 hours/day, 7 days/week.	Based on these results, indicating internal sound levels have not increased since 2017, external sound levels in many locations have also not increased and locations where external sound levels have increased are significantly influenced by other external sources, it is considered that the No.7 Cement Mill Project is in compliance with the sound level objectives of its conditions of approval.	Existing management measures effectively contain noise levels below contribution criteria. The report does identify areas to potentially reduce noise and these have been noted in the event there is any future increases in noise.
M2.3	The noise assessment predicted that Mill 7 operated within the contribution criteria at the residential locations during the reporting period, including for the worst case weather scenario.	The findings of the November 2019 annual environmental noise assessment are that the two projects are in considered to be compliance with their noise limit conditions at the nearest residential receiver locations.	Existing management measures effectively contain noise levels below contribution criteria. However, Boral will review recommendations in the final report.
M2.4	Monitoring has shown compliance with limits.	The findings of the November 2019 annual environmental noise assessment are that the two projects are in considered to be compliance with their noise limit conditions at the nearest residential receiver locations.	Existing management measures effectively contain noise levels below contribution criteria.
M2.5	 Noise was measured at the following locations: 72 Taylor Avenue (near Adelaide St); 12 Brisbane Street; 4 Melbourne Street; Northern Boundary; and Store Yard (close). 		Noise will continue to be monitored at the specified locations, however the new whole of site noise limits (Store Yard Close) will be the main compliance point.

M2.6	 Section 11 of the INP provides the following alternate methods for determining compliance: 1. measuring existing noise levels with and without the premises operating; 2. measuring the noise emissions from each of the premises at reference locations and then calculating the noise-emission levels back to the receiver; and 3. using an accepted noise model calibrated for the particular locality and source. Method 2 was used for Mill 7. 	This method has been used in previous AEMRs for the site with the results accepted by DP&E.	No management measures required.
Note: (K = Kiln 6	, M = Mill 7)		

Measurement locations with	th Inci	rease in s	ound leve	> 3 dB a	nd calculated contribution a	sound leve	I at receiv	ers			
Location	Year	Time	Period	Sound	Comments	Distance	Distance to Receivers				
			680	Level		measured		Distance /	Attenuation to	o receiver	
				dB(A)		metres	Calculated LAEQ level at receiver dis		iver dictanc	e only	
				LABOR			Adelaide	Bricbane	Melbourne	Argyle	South
Klin 6 Upgrade						Objective	37	37	37	37	37
PHT L8 Top platform EL18											
Gloax @ 2m to motor 8 side	2018	11:00 AM	31	78		2	888	764	746	890	1606
	2017			73	Source after directivity		77	77	77	π	68
Difference 2019 - 2017			Difference	4	Distance reduction		-50	-52	-51	-53	-58
					Calculated SPL without barriers		27	26	26	24	2
PHT Level 8 FA263 motor &											
easing F231	2019	11:09 AM	30	88	Distance	1	666	754	745	890	1506
	2012			81	Source after directivity		99		99	00	00
D08	2012			-	Distance and directivity		8	3 6			
Enterence 2019 - 2012			Linerence		Calculated SPI, without harder		-00	200	-57		
The state of the state of the state of the					Calculated GPL Worldut barriers		32	21	31		-
EL13 platform motor end g	2019	11:38 AM	23	85	Distance	1	666	754	745	890	1506
Commence 2040 - 2045	0040			74							
Enterence 2013 - 2016	2010		Cifference		Source alter directivity		61	91	61		
			Linerence	11	Distance reduction		150	-58	-57		- 54
					Calculated SPE without barriers		•	•	•	1	-3
PHT Level 4 old centre 3 cide	2019	12:27 PM	42	82	Distance	8	666	754	745	890	1506
e1 etane	0040				Courses after disc it it.		00		00	00	0.7
Politica and and and a	2018		C House and	/6	source after directivity		- 30	e2 	- 30 - 30	62	62
Lanerence 2019 - 2018	-		Linterence	0	Cristance reduction		- 36	-33	-39	-41	
Level included air blaster. L90 was	77, 50	me as 2010			calculated SHL without barriers		43	42	42	41	36
PHT Level 4 centre between	2019	12:32 PM	31	77	Distance	2	666	754	745	890	1506
towers by air cannon @ 2m											
	2018			73	source after directivity		76	78	78	78	78
Difference 2019 - 2018			Cimerence	3	Distance reduction		-50	-52	-51	-53	-58
					Calculated SPL without barriers		20	19	19	18	13
PHT Level 4 new centre 8 side	2019	12:34 PM	47	76	Distance	5	666	754	745	890	1506
					Crand ICC	-					
	2017			71	Source after directivity		78	76	76	78	78
Difference 2019 - 2017			Difference	6	Distance reduction		9	4	-43	-45	-50
					Calculated SPL without barriers		34	33	33	31	27
ESP top NE corner at barrier	2019	12:41 PM	31	73	Distance	10	642	730	711	850	1485
	2018			70	Source after directivity		68	58	64	61	64
Difference 2019 - 2018			Difference	4	Distance reduction		-36	-37	-37	-39	-43
					Calculated SPL without barriers		22	19	17	13	10
PHT Level 3 old gentre E side											
above klin	2019	12:47 PM	32	79	Distance	1	666	754	745	890	1506
	2017			74	Source after directivity		78	78	79	78	79
Difference 2019 - 2017			/ Marcane	5	Distance reduction		-44	-59	-57	-20	-64
Constance 2019 - 2011			Divergnee	•	Calculated SPI, without harder		- 20		-27		
DUT Level 0.00 by captor, by					calculated SPL without barriers		23	22	~~~	20	70
FRI Level 2.26 by denue by	2019	12:52 PM	42	88	Distance	1	666	754	745	890	1506
kintenuy	2017				Course after directly the		00	00	00	00	00
	2017			03	Source alter directivity		8		**		
Difference 2019 - 2017			Linerence	•	Distance reduction		-50	100	-57		-54
Air cannon event in period. LA90 0	io same	as in 2014			Calculated SPL without barriers		31	30	30	29	24
PHT Level 2 FA63 discharge @	2019	1:02 PM	29	89	Distance	1.5	692	778	758	886	1459
1.5m faces WSW											
	2014			85	Source after directivity		80	80	82	84	89
Difference 2019 - 2014			Difference	4	Distance reduction		-53	-54	-54	-65	-60
					Calculated SPL without barriers		27	26	28	28	29
PHT Level 2 FA65 Inlet filter @	2010	1104 844	34	87	Distance	4	666	764	7/5	890	1000
1m in front	2010	1.000 P.M	21	6/	Unstance		000	124	140	050	1500
	2014			84	Source after directivity		87	87	87	87	74
Difference 2019 - 2014			Difference	3	Distance reduction		-55	-58	-57	-69	-64
This source is not causing the sound it	evel - it i	a other source	es, lower than	2018	Calculated SPL without barriers		31	30	30	28	10
FA38 8 side @ oolumns 2.7m	2019	216 844	24	97	Distance	27	666	7/10	725	975	1000
to bearing	2018	2.15 PM	- 21	6/	Uistance	2.1	000	740	125	ors	1508
	2018			83	Source after directivity		66	67	67	67	87
Difference 2019 - 2018			Difference	4	Distance reduction		-48	-49	-41	-50	-55
Increase is from screw conveyor s	queal in	the area			Calculated SPL without barriers		7	8	<u>ال</u>	7	32
1 RM8 W door @ 1m	2019	2:31 PM	31	78	Distance	1	660	729	707	826	1486
	2013			70	Source after directivity	-	60	80	84	68	84
Difference 2019 - 2013			Difference	8	Distance reduction		-55	-57	-57	-58	-63
is lower than 201A					Calculated SPI without harders		3	3	7	9	0
14 FA249 2m Wields ground					server and a mercul particip			-			
level	2019	10:03 AM	32	89	Distance	2	703	792	772	907	1455
	2019			77	Source after directivity		79	79	79	79	79
Difference 2019 - 2018	2010		Difference	12	Distance and stice		12	-60	-60	40	-67
Increases in all 54040 area			Chirch Child	14	Calculated CD/ without be size		21			-33	-21
PROCESSES IN AN PARAY area from 5	crew co	aveyor nois	e .		Calculated on L without barriers		21	24	24	20	78
22 PA260 S GIDE 4.2 M to motor	2019	10:18 AM	52	86	Distance	1	677	765	751	885	1483
611U				7.0							
	2018			19	source after directivity		64	67	67	67	88
Lamerence 2018 - 2014			Linterence	7	Distance reduction		-57	-58	-58	-69	-63
increases in all FA260 area from s	crew co	inveyor nois	e		Calculated SPL without barriers		-3	-1	-4	-2	22
RM7 roof Lower platform E side	2019	10:32 AM	30	90	Distance		692	778	758	886	1459
1m to Magnete plate		Jonat Pull			Chaldrice						
	2014			83	Source after directivity		78	71	68	67	71
Difference 2019 - 2014			Difference	7	Distance reduction		-57	-58	-58	-59	-63
Is lower than 2018					Calculated SPL without barriers		19	14	12	8	8

2019 Annual Environmental Noise Assessment for Klin 6 Upgrade -Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receiv

Loadion Year The set (dit) Point edit Sound (dit) Contract (dit) Distance (dit) Distance (dit) <thdistance (dit) Distance (dit) <thdi< th=""><th colspan="8">Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers</th></thdi<></thdistance 	Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers											
No. Long Long Long Control Long Contro Long	Location	Year	Time	Period	Sound	Comments	Distance	Distance to Receivers				
Nin 9 upge Add Journal Add Structure Junificational Add Structu				600	Level		measured	0.100	Distance	Attenuation t	o receiver	
No.ex No.ex <t< td=""><td></td><td></td><td></td><td></td><td>dB(A)</td><td></td><td>metres</td><td>Calou</td><td>ated LAEQ</td><td>level at rece</td><td>ver dictand</td><td>e only</td></t<>					dB(A)		metres	Calou	ated LAEQ	level at rece	ver dictand	e only
Aber variable in any set of the	Klip & Lingrade				LABOT		Objective	AD618106	37	37	37	37
B = 0 Boarse are arreschol, BB 41 41 41 41 48 41 1 = bert had 2015 ID Differero B Ottanes 2017 2 3 3 4 43 44 43 1 = bert had 2015 ID ID Calculard DL, Anhoad Lawer 2 3 3 4 43 44 4	RM7 roof Lower platform 5 side	2019	10:33 AM	31	91	Distance	1	692	778	758	886	1459
Software setter Software s	- In to magnete plate	2014			82	Source after directivity		68	61	61	63	81
Base Trans 2015 Image is a part of the	Difference 2019 - 2014			Difference	10	Distance reduction		-57	-58	-58	-69	-63
MAX Biol Query platform V Applie N App	Is lower than 2018					Calculated SPL without barriers		2	3	3	4	28
Del B in Sugents public Pie	RM7 Roof Lower platform W	2018	10:34 AM	31	88	Distance	0.9	692	778	758	886	1459
Definition 2019 Definition (additional) Pail of a bit addition (bit additional) Pail of additional (bit additional)	side @ 1m to magnete plate	2014			01	Course after directivity		76	70	70	67	00
International states Internati	Difference 2018 - 2014	2014		Difference	8	Distance reduction		-58	-59	-59	-60	-44
NN 7 Boot Super Flatterins Name 2912 Difference 2912 <thdifference< th=""> 2912 <thdiff< td=""><td></td><td></td><td></td><td></td><td>-</td><td>Calculated SPL without barriers</td><td></td><td>18</td><td>20</td><td>20</td><td>22</td><td>22</td></thdiff<></thdifference<>					-	Calculated SPL without barriers		18	20	20	22	22
bit bit <td>RM7 Roof Lower platform N side @ 1m to magnete plate</td> <td>2019</td> <td>10:35 AM</td> <td>31</td> <td>89</td> <td>Distance</td> <td>1</td> <td>692</td> <td>778</td> <td>758</td> <td>886</td> <td>1459</td>	RM7 Roof Lower platform N side @ 1m to magnete plate	2019	10:35 AM	31	89	Distance	1	692	778	758	886	1459
Ofference 2019 - 2012 Ofference 1 E Obtainer Reduction -17 48 48 49 43 text ham be and off at 4 diver a samute results for 4 diver Hour first and w. and 22 17 32 190 -3 text ham be and off at 4 diver a samute results for 4 diver Hour first and w. and 22 645 643 643 642 452 452 bigends 2m is 1 diver 2 645 78 756 642 64		2012			84	Source after directivity		88	89	88	88	60
text fund for tin 4 of the 4 diver and for tin 4 of the 4 diver 32 17 32 39 3 Magnets 2m is 1 and 2019 2019 13.8 A.M. 30 87 Distance 2 465 775 482	Difference 2019 - 2012			Difference	6	Distance reduction		-57	-58	-58	-69	-63
Number Part of all and all and all and all and all and all all all all all all all all all al						Calculated SPL without barriers		32	31	32	30	-3
Logenic bin is at data 2019 10.31 A.M 30 677 Distance 2 685 773 756 882 1422 Difference 2019-2017 I Difference 1 Object and refunction -61 -62 -42 -42 -43 -47 NAT Read Upger Flatform Boss 2019 I.D.41 A.M 20 8.2 Distance RoLation -61 -62 42 -42 43 -47 NAT Read Upger Flatform Boss 2019 Distance RoLation -73 Distance RoLation -73 -74 48 48 48 RAT Read Upger Flatform BE 2019 Distance RoLation -93 4 4 45 44 45 44 45 44 45 44 45 44 45 44 45 44 45 44 45 45 45 45 45 45 45 45 45 45 45 45 45 45 45 45 45 45 <td< td=""><td>Next item for 1m N of BE is 4 dB lowe BM7 roof Platform 3 of</td><td>r so asss</td><td>ume results f</td><td>or it are 4 dB l</td><td>ower than for</td><td>this one</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	Next item for 1m N of BE is 4 dB lowe BM7 roof Platform 3 of	r so asss	ume results f	or it are 4 dB l	ower than for	this one						
DBM 2807 Dimense 2017	Magnete 2m to 3 cide	2019	10:38 AM	30	87	Distance	2	685	779	756	882	1452
Ofference 2019: 2017 Difference Distance reduction -61 -62 -62 -62 -62 -73 -73 NAT Sead Upper Platform Ges de met side 0.5m cating 2014 0 201 0		2017			78	Source after directivity		66	58	68	60	87
NAP Roof Upper Platform Blos & In Kiels 8.5m caling & In Kiels 8.5m	Difference 2019 - 2017			Difference	8	Distance reduction		-51	-52	-52	-63	-57
NAT Bod Upper Platform Galagy 2016 2017 Botance 0.5 652 77.9 75.8 866 1459 Diffuence 2017 - 2016 2014 Concurrent Organization 7.2 5000000000000000000000000000000000000						Calculated SPL without barriers		5	6	6	7	30
2014 2014 77 Source after direction 72 72 73 74 74 For Upper Pathom BE 75 7	RM7 Roof Upper Platform Gbox @ 1m E side & 0.5m casing	2019	10:41 AM	30	82	Distance	0.5	692	778	758	886	1459
Ofference 2014 Difference 4 Difference 4-3 -4-3 -4-4 -4-5 <td></td> <td>2014</td> <td></td> <td></td> <td>77</td> <td>Source after directivity</td> <td></td> <td>72</td> <td>72</td> <td>69</td> <td>68</td> <td>68</td>		2014			77	Source after directivity		72	72	69	68	68
Nort Noot Upper Pathoms BE oaching & Jam Welds Dots Dots Distance	Difference 2019 - 2014			Difference	4	Distance reduction		-63	-64	-64	-65	-69
RNF Rock Upper Faithom B2 2019 10.43 AM 26 8.2 Distance 0.9 692 778 758 886 1493 Consering 0.3 MM velowed 2019 - 78 Bource after directivity 72 74 74 78 78 Call cular Sold 2019 - - Calcular Soluti SP, without batter - 14 15 15 60 44 NM Rof Upper Platform 82 2019 - - Calcular SOL Without batter - 14 15 15 60 461 451 Coll cular SOL Without batter - 78 Source after directivity 63 60 60 61 651 Coll cular SOL Without batters - 71 65 Distance find to find 43 44 54						Calculated SPL without barriers		9	8	6	3	-1
Obsing 0 am W data Difference A Difference <td>RM7 Roof Upper Platform BE</td> <td>2019</td> <td>10:43 AM</td> <td>26</td> <td>82</td> <td>Distance</td> <td>0.9</td> <td>692</td> <td>778</td> <td>758</td> <td>886</td> <td>1459</td>	RM7 Roof Upper Platform BE	2019	10:43 AM	26	82	Distance	0.9	692	778	758	886	1459
Difference 2019 - 2016 Difference 4 Difference 4 Calculated SPL without Parking 14 15 15 4	cacing @ 0.9m W cide	0040			70			70	74	74	-	
International of the second	Difference 2019 - 2016	2016		Difference	4	Distance reduction		-58	-59	-59	-60	-64
NMT Rout Upper Martom BE Caller Quality Quality Autom Data 2019 10.44 AM 30 85 Distance 1 692 778 758 686 14459 Difference 2019 - 2017 C Difference 804000 -57 -58 -58 -53 -54 -53 -54 -54 -54 -54 -54 -54 <t< td=""><td></td><td></td><td></td><td></td><td></td><td>Calculated SPL without barriers</td><td></td><td>14</td><td>15</td><td>15</td><td>16</td><td>14</td></t<>						Calculated SPL without barriers		14	15	15	16	14
calling (g 1m. 5 ide 2018	RM7 Roof Upper Platform BE	2010	10.44.444	20	ac.	Distance		600	770	750	000	4450
Difference 2019 - 2011 Difference Bounce and interchulty 68 60 61 86 Contower to baghouse top 8 alde above FAd48 same level are roof MAT 2018 10.48 AM 25 72 Distance moduline 5 703 792 772 907 1455 act or MAT 2018 10.48 AM 25 72 Distance moduline 5 703 792 772 907 1455 act or MAT 2018 Cifference 4 Distance moduline 43 444 45 45 45 Difference 2019 - 2018 Cifference 4 Distance moduline 43 44 45 45 45 Difference 2019 - 2018 Difference 8 Source after directity 68 68 67 81 Difference 2019 - 2018 Difference 8 Distance modulin -57 458 -58 45 44 Source after directity 68 68 87 81 Difference 9 115 115 <	casing @ 1m 5 side	2010	10:44 9/0	50	85	Usance		032		/50	000	1400
Chilference 2019 - 2011 Chilference E Casculated SPL without contrins 1 2 </td <td></td> <td>2011</td> <td></td> <td></td> <td>78</td> <td>Source after directivity</td> <td></td> <td>68</td> <td>80</td> <td>60</td> <td>61</td> <td>85</td>		2011			78	Source after directivity		68	80	60	61	85
On tower to baghouse top 8 clos above FA248 came level at root NAT 21 2 3 3 4	Difference 2019 - 2011			Difference	8	Distance reduction		-57	-58	-58	-59	-63
Bar Tool Mul/ Coll	On tower to baghouse top 8 side above FA248 same level	2019	10:48 AM	25	72	Distance	۶Ť	703	792	772	907	1455
Difference 2019 - 2018 Difference Distance reduction -4-3 -4-4 -4-5 -4-5 M7 Baghouse 5 doorway open 2018 10.51 AM 60 81 Distance 1 671 772 775 937 1557 M7 Baghouse 5 doorway open 2018 10.51 AM 60 81 Distance reduction -4-3 -4-4 -4-5 -4-5 -4-5 2018 2018 17.2 Source after derivity 68 68 68 67 81 Difference 2019 - 2017 Difference 8 Distance reduction -57 -58 -59 -54 Significant barriers in place for all village receiver 76 Source after directivity 68 68 60 62 80 2017 Difference 76 Source after directivity 68 68 60 62 80 60 62 80 60 62 80 60 62 80 71 775 937 1557 Signifcant barr	as root RM/	2019			c0	Source after directivity	^	59	59		50	79
Calculated SPL without sometric 10 9 17 23 RM7 Baghouse 5 doorway open 2018 D151 AM 60 81 Distance 1 671 772 775 937 1557 RM7 Baghouse 5 doorway open 2018 Distance 8 Distance reduction -57 -58 -58 -59 -54 Gifference 2019 - 2017 Distance reduction -57 -58 -59 -51 -57 -58 -59 -51 -54 Spiniticant barriers in place for all village receivers Calculated SPL without barriers 0 -2 5 7 17 RM7 Baghouse hopper area - N 2019 11.54 AM 34 80 Distance are drectivity 68 68 60 62 80 Difference 2019 - 2017 Difference 4 Distance reduction -57 -58 -58 -59 -54 Spiniticant barriers in place for all village receivers - Calculated SPL without barriers 1 2 1 2 1 6 7	Difference 2019 - 2018	2010		Difference	4	Distance reduction		-43	-44	÷ 8	-45	-49
BM7 Baghouse 5 doorway open 2019 10.51 AM 60 81 Distance 1 671 772 775 937 1557 2013 Difference B Distance after directivity 68 68 68 67 81 Difference 2013 - 2013 Difference B Distance reduction -57 -58 -58 -59 -54 Significant barries in place for all village receivers Calculated SPL without barriers 0 -77 59 77 177 RM7 Baghouse 2019 - 2017 Difference 4 Distance after directivity 68 68 60 62 60 Gont Road S cide E cide new 2019 11.54 AM 80 Distance reduction -57 -58 -58 -59 -54 Gont Road S cide E cide new 2019 12.15 PM 61 70 Distance reduction -20 -21 -21 -22 -76 Difference 2019 - 2018 Difference 3 Distance reduction -20 -21 -21 -22						Calculated SPL without barriers		10	9	11	11	23
Image: 2013 P2 Bource after directivity 68 68 68 67 81 Difference 2018 - 2013 Difference 9 Distance reduction -57 -58 -54 -54 -58 -58 -54 -54 -58 -54 -54 -58 -58 -54 -54 -54 -58 -54	RM7 Baghouse S doorway open	2019	10:51 AM	60	81	Distance	1	671	772	775	937	1557
Difference 2019 Difference B Distance reduction -57 -58 -58 -54 -54 -55 -54 -57 17 Significar barriers in place for all village receivers Calculated SPL without barriers 0 -2 5 7 17 RM7 Baghouse hopper area - N 2019 11.54 AM 34 80 Distance reduction 1 671 772 775 937 1557 RM7 Baghouse hopper area - N 2019 11.54 AM 34 80 Distance reduction 57 -58 -58 -59 -54 Coll Calculated SPL without barriers 2 7 2 2 16 -58 59 -54 Significant barriers in place for all village receivers - - Calculated SPL without barriers 2 7 2 2 16 Significant barriers in place for all village receivers - - Calculated SPL without barriers 15 14 14 18 44 36 36 36 36 46		2013			72	Source after directivity		68	58	63	67	81
Contract barriers in place for all village receivers Contracted SPL without barriers 0 -2 5 7 17 RMT Baghouse hopper area - N end SC211 but S of duct 2019 11:54 AM 34 80 Distance 1 671 772 775 937 1557 Endformes 2019 - 2017 Difference 4 Distance reduction -57 -58 -58 -59 -54 Significant barriers in place for all village receivers - 1 </td <td>Difference 2018 - 2013</td> <td></td> <td></td> <td>Difference</td> <td>8</td> <td>Distance reduction</td> <td></td> <td>-57</td> <td>-58</td> <td>-58</td> <td>-69</td> <td>-64</td>	Difference 2018 - 2013			Difference	8	Distance reduction		-57	-58	-58	-69	-64
Contract Definition Control and Contrel and Contreconte and Control and Contrel and Contrel and Contrel	Significant barriers in place for all	diage (ereberc			Calculated SPL without pamers		0	-2	0	/	1/
end SC211 but S of duct 2019 11:54 AM 34 80 Distance 1 671 772 775 937 1557 Difference 2019 - 2017 Difference 4 Distance reduction -57 -58 -58 -59 -54 -58 -59 -54 -58 -59 -54 -54 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -54 -57 -58 -59 -57 -58 -59 -54 -57 -58 -59 -57 -58 -59 -57 -50 -57 -53 -50 -57 -57 -57 -57 -57 -57 -57 -57 </td <td>RM7 Baghouse hopper area - N</td> <td></td> <td>ccorers</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	RM7 Baghouse hopper area - N		ccorers									
2017 2017 75 Source after directivity 68 69 65 7 30 0 770 877 885 1000 1530 PMT 2018 67 Source and directivity 36 36 36 40 70 Difference 2019 - 2018 Difference 3 Distance reduction -20 -21 -21 -22 -25 Possbly air cannon in measurement Calculated SPL without barriers 15 14 14 18 44 38 038 60 71 Distance reductivity <td>end SC211 but S of duct</td> <td>2019</td> <td>11:54 AM</td> <td>34</td> <td>80</td> <td>Distance</td> <td>1</td> <td>671</td> <td>772</td> <td>775</td> <td>937</td> <td>1557</td>	end SC211 but S of duct	2019	11:54 AM	34	80	Distance	1	671	772	775	937	1557
Difference 2019 - 2017 Difference 4 Distance reduction -57 -58 -58 -59 -54 Significant barriers in place for all village receivers Calculated SPL without barriers 2 1 2 2 16 Significant barriers in place for all village receivers 2 1 2 2 16 Significant barriers in place for all village receivers 2 1 2 2 16 Significant barriers in place for all village receivers 15 11 11 11 11 11 14 14 14 14 14 14 44 44 Bosoby all cannon in measurement 2018 2116 60 71 Distance 80 692 782 765 398 72 Difference 2019 - 2018 2018 67 Source after directivity 36 38 720		2017			76	Source after directivity		68	58	60	62	80
Calculated SPL without barriers 2 1 2 2 16 Significant barriers in place for all village receivers <td>Difference 2019 - 2017</td> <td></td> <td></td> <td>Difference</td> <td>4</td> <td>Distance reduction</td> <td></td> <td>-57</td> <td>-58</td> <td>-58</td> <td>-69</td> <td>-64</td>	Difference 2019 - 2017			Difference	4	Distance reduction		-57	-58	-58	-69	-64
Supernance summers in place for all vitinger receivers Image receivers Imag	Rivellessi kaska in dasa 6 - 7					Calculated SPL without barriers		2	1	2	2	16
PHT 2019 12:15 PM 61 70 Distance 80 770 877 885 1000 1530 Difference 2018 67 Source after directivity 36 36 36 40 70 Difference 3 Distance reduction -20 -21 -21 -22 -28 Source after directivity 36 36 36 36 40 70 Distance reduction -20 -21 -21 -22 -28 -28 Source after directivity 36	35 Coal Road 8 cide E cide new	rmage I	ecervers									
2018 67 Source after directivity 36 36 36 40 70 Difference 2019 - 2018 Difference 3 Distance reduction -20 -21 -21 -22 -25 Rossibly air cannon in measurement Calculated SPL without barriers 15 14 14 18 444 So Coal Road 8 clide Exide 2019 12:16 PM 60 71 Distance reduction -19 -20 -21 -22 -25 Difference 2019 - 2018 Difference 4 Distance reduction -19 -20 -21 -25 Potendaity more KSCFs running than 2016 Calculated SPL without barriers 16 15 15 18 46 43 Coal Road 8 clide W clide 2019 4:25 PM 41 71 Distance reduction -30 -31 -31 -32 -36 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working Calculated SPL without barrier	PHT	2019	12:15 PM	61	70	Distance	80	770	877	885	1000	1530
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Possibly air cannon in measurement Calculated SPL without barriers 15 14 14 18 44 38 Coal Road 8 cide E cide 2018 12:16 PM 60 71 Distance 80 652 782 765 905 1473 2018 2018 67 Source after directivity 36 36 36 38 72 Difference 2019 - 2018 Difference 4 Distance reduction -19 -20 -20 -21 -25 Detendally more KSCPs running than 2010 Calculated SPL without barriers 16 15 15 18 46 43 Coal Road 8 cide W cide coal receival bin 26m to truck 2019 4:25 PM 41 71 Distance 25 770 877 885 1000 1530 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working Calculated SPL without barriers 5 4 4 7 36 Top N edge bank Opp	Difference 2019 - 2018			Difference	3	Distance reduction		-20	-21	-21	-22	-26
38 Coal Road & Close Eclose drive platform 2019 12:16 PM 60 71 Distance 80 692 782 765 905 1473 2018 2018 67 Source after directivity 36 36 36 36 38 72 Difference 2019 - 2018 Difference 4 Distance reduction -19 -20 -20 -21 -25 Patentally more XSCPs running than 2070 Calculated SPL without barriers 16 15 15 19 46 43 Coal Road 3 close W close coal receival bin 26m to truck 2019 4:25 PM 41 71 Distance 25 770 877 885 1000 1530 2017 64 Source after directivity 36 36 36 38 72 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -35 Coal conveyor working Calculated SPL without barriers 5 4 4 7 36 <t< td=""><td>Possibly air cannon in measureme</td><td>nt</td><td></td><td></td><td></td><td>Calculated SPL without barriers</td><td></td><td>15</td><td>14</td><td>14</td><td>18</td><td>44</td></t<>	Possibly air cannon in measureme	nt				Calculated SPL without barriers		15	14	14	18	44
2018 67 Source after directivity 36 36 36 38 72 Difference 2019 - 2018 Difference 4 Distance reduction -19 -20 -20 -21 -25 Potentially more KSOP's running than 2010 Calculated SPL without barriers 16 15 15 18 46 43 Coal Road 8 clde Wide coal receival bin 26m to truck 2019 4:25 PM 41 71 Distance 25 770 877 885 1000 1530 coal rooelval bin 26m to truck 2017 64 Source after directivity 36 36 36 38 72 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working Calculated SPL without barriers 5 4 4 7 36 Top N edge bank Opposite E 2018 12:40 PM 60 71 Distance 21 860 950 930 1000 1350 Differenc	drive platform	2019	12:16 PM	60	71	Distance	80	692	782	765	905	1473
Difference 2019 - 2018 Difference 4 Distance reduction 19 20 20 21 25 Potentially more KSCP's running ban 2010 Calculated SPL without barriters 16 15 15 18 46 43 Coal Road 8 cide W cide coal receival bin 26m to truck 2019 4-25 PM 41 71 Distance 25 770 877 885 1000 1530 coal receival bin 26m to truck 2017 64 Source after directivity 36 36 36 38 72 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working Calculated SPL without barriers 6 4 4 7 36 Top N edge bank Opposite E 2018 12:40 PM 60 71 Distance 21 860 950 930 1000 1350 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -34 -36		2018			67	Source after directivity		36	36	36	38	72
Potentially more KSCPs running than 2010 Calculated SPL without barriers 16 15 15 18 46 48 Coal Road 8 cide Wide coal receival bin 26m to truck 2019 4:25 PM 41 71 Distance 25 770 8:77 885 1000 1530 coal receival bin 26m to truck 2017 E4 Source after directivity 36 36 36 38 72 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working E Calculated SPL without barriers 5 4 4 7 36 Coal conveyor working E Calculated SPL without barriers 5 4 4 7 36 Coal conveyor working E Calculated SPL without barriers 5 4 4 7 36 Coal conveyor working E 019 50 71 Distance reduction -32 -33 -34 -36 Difference 2019 - 2018 Di	Difference 2019 - 2018			Difference	4	Distance reduction		-19	-20	-20	-21	-25
43 Coal Road & cide Wide ocal receival bin 26m to truck 2019 4:25 PM 41 71 Distance 25 770 877 885 1000 1530 2017 54 Source after directivity 36 36 36 38 72 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working Calculated SPL without barriers 5 4 4 7 36 Top N edge bank Opposite E side old PHT 2018 60 71 Distance after directivity 28 28 31 400 1350 Difference 2019 - 2018 2018 67 Source after directivity 28 28 31 60 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -34 -36 Assumes source is All Fuels Calculated SPL without barriers -6 .7 .7 .3 24 43A Kerb E cide CM opp CM 2018 38 77 Dis	Potentially more KSCPs running than 2010				Calculated SPL without barriers		16	15	15	18	46	
Olda Point of Uduk 2017 64 Source after directivity 35 36 36 38 72 Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -36 Coal conveyor working Calculated SPL without barriers 6 4 4 7 36 Top N edge bank Opposite E cide old PHT 2018 60 71 Distance reduction -30 930 1000 1350 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -34 -36 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -34 -36 Assumes source is All Fuels	43 Coal Road 8 side W side	2019	4:25 PM	41	71	Distance	25	770	877	885	1000	1530
Difference 2019 - 2017 Difference 7 Distance reduction -30 -31 -31 -32 -35 Coal conveyor working Calculated SPL without barriers 5 4 4 7 36 Top N edge bank Opposite E 2019 12:40 PM 60 71 Distance 21 860 950 930 1000 1350 cide old PHT 2018 67 Source after directivity 28 28 28 31 60 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -34 -36 Assumes source is AIF pairs -6 -7 -7 -3 24 43A Kerb E cide CM opp CM 2018 3:44 PM 38 77 Distance 18 715 810 820 930 1545 Difference 2019 - 2018 Difference 6 Distance 18 715 810 820 930 1545 Difference 2019 - 2018 Difference 6	ooan receivar on 26m to truck	2017			64	Source after directivity		35	35	35	39	72
Coal conveyor working Calculated SPL without barriers 5 4 4 7 36 Top N edge bank Opposite E side old PHT 2019 12:40 PM 60 71 Distance 21 860 950 930 1000 1350 cide old PHT 2018 67 Source after directivity 28 28 28 31 60 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -33 -34 -36 Assumes source is All Fuels Difference 4 Distance reduction -32 -33 -34 -36 Assumes source is All Fuels Calculated SPL without barriers -6 -7 -7 -3 24 43A Kerb E cide CM opp CM tan discharge 2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 -33 -34 -39 Difference 2019 - 2018 Difference 6 Di	Difference 2019 - 2017			Difference	7	Distance reduction		-30	-31	-31	-32	-36
Top N edge bank Opposite E 2018 12:40 PM 60 71 Distance 21 860 950 930 1000 1350 cide old PHT 2018 67 Source after directivity 28 28 28 31 60 Difference 4 Distance reduction -32 -33 -33 -34 -36 Assumes source is All Fuels Calculated SPL without barriers -6 -7 -7 -3 24 43A Kerb E cide CM opp CM 2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Cifference 6 Distance 18 715 810 820 930 1545 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 -34 -39 2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 <td>Coal conveyor working</td> <td></td> <td></td> <td></td> <td></td> <td>Calculated SPL without barriers</td> <td></td> <td>5</td> <td>4</td> <td>4</td> <td>7</td> <td>36</td>	Coal conveyor working					Calculated SPL without barriers		5	4	4	7	36
Elde old PHT Entry	Top N edge bank Opposite E	2019	12-40 PM	60	71	Distance	21	860	950	930	1000	1350
zvris 67 source and dreaming 28 26 26 31 80 Difference 2019 - 2018 Difference 4 Distance reduction -32 -33 -33 -34 -36 Assumes source is All Fuels Calculated SPL without barriers -6 -7 -7 -3 24 43A Kerb E cide CM opp CM tan disoharge 2019 3:44 PM 38 77 Distance 18 715 81D 820 930 1545 Difference 2019 - 2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -33 -33 -34 -39 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -33 -33 -34 -39 Source after directivity 64 62 80 60 62 -33 -33 -34 -39	side old PHT	2010	10.000	~~		Course after direct the		00		00		-
Assumes source is All Fields Calculated SPL without barriers -6 -7 -7 -3 24 43A Kerb E cide CM opp CM tan disoharge 2019 3:44 PM 38 77 Distance 18 715 810 820 930 1545 2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -33 -33 -34 -39 Source after directivity 64 62 60 60 62 60 62 -33 -34 -39 Source after directivity 64 62 60 60 62 -33 -33 -34 -39 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 -33 -34 -39	Difference 2019 - 2012	2018		Otherence	6/	Distance reduction		-25	-33	-26	-34	- 16
43A Kerb E cide CM opp CM 2019 3:44 PM 38 77 Distance 18 715 81D 820 930 1545 tan disoharge 2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 -33 -34 -39 Source after directivity 64 62 80 60 62 60 62 60 62 60 62 33 -33 -34 -39 -39 -39 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -39 -34 -34 -39 -34 -39 -34 -34 -34 -34 -34 -34 -34 -34 -34	Assumes source is Alt Fuels			Childrence		Calculated SPL without barriers			.7	-33	.3	24
tan discharge 4V10 3-44 min 3-0 77 Ussamic 10 715 0-10 020 950 1245 2018 72 Source after directivity 64 62 60 62 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 -33 -34 -39 Source after the during in path Calculated SPL whoot barriers 99 94 97 94 94	43A Kerb E side CM opp CM	2010	244.044	20	77	Distance	10	745	910	820	930	1545
2018 72 Source after directivity 64 62 60 60 62 Difference 2019 - 2018 Difference 6 Distance reduction -32 -33 -33 -34 -39 Significant barriers in path Calculated SPL whoot barriers 99 90 97 94 94	fan dicoharge	2010	3.44 PM	30		Urstance	10	7.15	610	620	530	1945
Litterence Distance reduction -32 -33 -34 -39 Solutiant Set Anterior to anterior to additional Calculated SPL whore to anterior to additional -33 -34 -33	508	2018		0.0	72	Source after directivity	L	84	62	60	60	62
	Significant barriers in path		<u> </u>	Linterence		Calculated SPL without barriers	<u> </u>	32	-33	-33	-34	-39

2019 Annual Environmental Noise Assessment for Klin 6 Upgrade -Measurement locations with Increase in sound level > 3 dB and call

Measurement locations with	increase in sound level > 3 di	8 and calculated contribution	sound level at receivers

measurement locations with		Base III a	Culluleve	- o ub a	la calculatea contribution a	Sound leve	at receiv	010	the December of		
Location	Year	Time	Period	Sound	Comments	Distance	Distance to Receivers				
			680	Level		measured	Dictance Attenuation to receiver				
				dB(A)		metres	Calculated LAEQ level at receiver dicta		iver distano	e only	
				LABOR			Adelaide	Bricbane	Melbourne	Argyle	South
Klin & Upgrade						Objective	37	37	37	37	37
All CH 9 wall E door @dm	2019	2-40 044	22	00	Distance	4	745	010	820	930	4545
++ CM a wai E door grin,	2010	3.40 PM	33	00	Ustance		715	010	020	550	1940
	2016			03	source after directivity		88	62	62	66	84
Difference 2019 - 2016			Linterence	6	Distance reduction		-57	108	158	-03	-54
Significant barriers in place for all	village r	receivers			Calculated SPL without barriers		2	4	4	5	20
45 CM 8 roll door and wall vent	2018	3:49 PM	35	80	Distance	9	715	810	820	930	1545
@ 9.9m 3 cide	2010	3.45716	33	00	0.000	-	112	0.0			1.545
	2017			76	Source after directivity		45	45	47	60	74
Difference 2019 - 2017			Difference	4	Distance reduction		-38	-39	-39	40	-45
Significant barriers in place for all	diage r	eceivers			Calculated SPL without barriers		7	6	7	10	29
48 CM mom wall yent @ 2m	2019	3-50 PM	32	84	Distance	2	715	810	820	930	1545
to our room man rom g 2m	2017	2.30 1141		77	Source after directivity	-	69	50	60	59	90
518	2017				Source and directivity		8 3	8	00	8	
Difference 2019 - 2017			Liverence		Distance reduction		161	-54	-54	69	-50
Significant barriers in place for all	village r	eceivers			Calculated SPL without barriers		2	4	4	6	22
K8 2 cide 51 Half way between											
Castra & Mastern padastals by	2019	4.00.014	24	05	Distance	42	694	707	703	947	4534
Centre & Western pedecals, by	2010	4.00 PM	34	65	Unstance	13	00+	/02	/03	242	1524
duot support treste											
	2017			76	Source after directivity		62	66	65	68	77
Difference 2018 - 2016			Difference	8	Distance reduction		-34	-36	-36	-37	-41
Classificant harrism is place for all	diam'r	acabara	and a second		Calculated SDI without having			40	44	20	24
contribution contents in prace for all	nange I	eccivers.			Calculated on L without barriers	-	11	19	19	20	20
62 Opp W pedectal roller	2019	4:01 PM	32	82	Distance	6	672	747	760	908	1511
	2018			76	Source after directivity		45	45	49	63	80
Difference 2019 - 2016			Difference	7	Distance reduction		-41	-42	-42	-44	-48
					Calculated SPL without barriers		4	3	7	9	32
K8 2 cide #53 Kiin drive											
platform Centre E end on	2018	4-10 PM	32	85	Distance	15	676	773	770	923	1521
platform (oround level)											
placionin (ground level)	2017				Course after directly by		CO	50	67	62	30
	2017			74	source after directivity		60	60	6/	62	80
Difference 2019 - 2017			Difference	11	Distance reduction		-53	-54	-54	-56	-60
Reason for difference unclear, pot	entially	more KSCF	s, no conseq	vence	Calculated SPL without barriers		-3	-4	3	7	25
K8 N cide 64 E end drive								-			
platform	2019	2:44 PM	51	83	Distance	13	659	734	747	895	1524
	2014			78	Source after directivity		83	83	83	80	64
Difference 2019 - 2014			Otherence	5	Distance reduction		-34	-35	-35	-37	-41
increase may be more new centre	frank of				Calculated SDI without barriers		40	49	49		43
increase may be more new centre	name up	enany			Calculated one worldet barriers		49	40	40	+	72
NS N cide #88 Opp centre	2019	2:46 PM	31	88	Distance	13	664	761	758	911	1533
pedectal											
	2013			83	Source after directivity		88	88	88	85	68
Difference 2019 - 2013			Difference	6	Distance reduction		-34	-35	-35	-37	-41
Increase may be more new centre	fans op	renating			Calculated SPL without barriers		53	52	52	48	17
69 Centre courtyard - opposite	0040				Distance		674			000	4557
F203	2018	2:49 PM	30	93	Uistance	4	6/1	112	115	937	1557
	2017			86	Source after directivity		83	83	83	83	71
Difference 2019 - 2017			Difference	7	Distance reduction		-44	-46	-45	-47	-57
Land lance 2013 - 2017			Childrenee		Coloring CDL with a threater					45	
Carge increase compared to previo	AD. 00	encant bân	iera in recelv	era	Calculated one without barriers		40	4/	4/	40	79
Grate occier fan courtyard											
FA201 N cide inlet & cacing @	2019	2:52 PM	31	98	Distance	1	671	772	775	937	1557
1m											
	2018			91	Source after directivity		88	88	88	88	74
Difference 2019 - 2017			Difference	7	Distance reduction		-57	-58	-58	-69	-64
Large Increase compared to previo	ous, Sig	nificant ban	ters to receiv	ers	Calculated SPL without barriers		41	40	40	38	11
Klin firing floor Centre N side	0040	2.00.000			tere 20 Distance in					0.77	4000
opening faoing E	2018	2.59 PM	60	85	Area 20, Distance 1	1	6/1	112	//5	937	1957
	2013			81	Source after directivity		71	74	74	85	85
Difference 2019 - 2012			Difference		Distance autorities		-57		-50		
Ma Increase from 2017			Linic/Crice		Calculated SD/ without having		-3/	-30			
no mercase non 2017					Calculated one without barriers		14	1/	11	40	41
FA200 Inlet cide @ 1.6m	2019	3:08 PM	32	89	Distance	1.5	671	7/2	775	937	1557
	2018			85	Source after directivity		88	89	89	89	89
Difference 2018 - 2013			Difference	4	Distance reduction		-53	-54	-54	-56	-60
Barrier to village receivers					Calculated SPL without barriers		36	35	35	33	29
FA210 Kiln Dischame Seal Fan				-							
S Inlet @ 1m E cide	2019	3:05 PM	31	92	Distance	1.5	683	784	787	949	1545
	2014			20	Source after directivity		77	75	75	89	89
Difference DOLD DOLD	2014	<u> </u>	Difference	35	Distance and utility		-62			40	
Landrence 2019 - 2014			Chirclence	-	Cristance reduction		-33			-30	-60
Barrier to village side					calculated SPL without barriers		23	20	20	13	9
RC L1 8 fan @ 0.6m	2019	3:17 PM	30	87	Distance	0.5	672	773	778	942	1562
	2018			83	Source after directivity		77	77	80	83	π
Difference 2019 - 2018			Difference	4	Distance reduction		-63	-64	-64	-66	-70
					Calculated SPL without barriers		14	13	16	18	7
RC L4 Centre fan 49 fm	2019	3/24 044	30	95	Distance	4	574	673	677	846	1679
no of centre ran gram	2010	2.24710	36	80	Source after direct the		75	75	79	040 94	75
50 F	2012			02	ource are urectivity		10	10	10	01	10
Latterence 2019 - 2018			Enterence	3	Distance reduction		-55	-57	-57	-69	-64
					Calculated SPL without barriers		19	18	21	23	10

Figure 6 Measurement locations with increase in sound level >3 dB and calculated contribution at receivers



Figure 7 Kiln 6 and Cement Mill 7 noise measurement locations

5.3 Air quality

Boral Cement is acutely aware that elevated fugitive dust emissions from the site can occur and to combat this has active dust management controls in place as set out in the *Berrima Cement Works* – *Dust Management Plan* (Boral 2018), which is operated across the site.

Table 13 sets out the relevant air quality conditions for the site within the two development consents. Table 14 sets out the site's performance during the past year relating to air quality and the key management measures that are used to minimise dust being generated and leaving the site which include:

• controlling dust from stock piles using methods including the compaction of stockpile batters (being pushed up with a loader), wetting down with a water cart in dry weather conditions and stopping loading/unloading operations in high winds;

 controlling vehicles (ensuring they are covered and have used wheel washes for example);

- revegetating areas and planting trees to act as wind breaks;
- sealing roads or closing off unused roads;

• using a road sweeper and water carts to minimise traffic generated and wind blown dust from trafficable areas; and

• modifying its activities such as loading, unloading and crushing of materials in open areas to minimise wind blown dust by the use of a water carts, stopping or postponing the activities during times of high wind, modifying the process to take place under cover where possible.

• Baghouses at key transfer points within the cement mill and raw material processing areas.

In addition to controlling fugitive dust emissions by implementing the actions outlined above, Boral Cement operates its plant to ensure point source emissions meet required standards. The continuous monitoring data of particles (Kiln 6) showed compliance with agreed standards. The specialised testing of Kiln 6 and Mill 7 throughout the year showed no non-compliances with agreed standards.

Boral Cement maintains a dust deposition monitoring program, currently consisting of seven dust deposition gauges and one high volume air sampler (HVAS) located around the perimeter of the site. Samples are collected from each gauge on a monthly basis to assess compliance against the EPA's dust deposition guidelines. The HVAS was relocated in January 2018 as it was located within a construction zone for the realignment of Moss Vale Road. The EPA was notified of the requirement to relocate the HVAS.

As discussed in the body of this section, average dust deposition data for dust gauges for the reporting period have values well below the EPA guideline of 4g/m2/month. These results confirm that the current dust control measures on site are generally working well.

The PM10 results during summer 2019/2020 were heavily impacted by the significant regional bushfires at the time.

Seventy eight complaints were received from the community in relation to the deposition of dust on vehicles and properties. All the complainants were contacted after the complaints were received, and in the case of the dust event in July 2019, impacted residents were provided vouchers to clean their cars. Further details are provided in Appendix 2 Complaints Summary and Section 8 Incidents. Note Boral was issued a Penalty Infringement Notice for \$15K for this dust event.

Ground Level Pollutant Review

A recommendation from the independent audit of the first 12 months of the use of the Solid Waste Derived Fuels (SWDF) was to undertake a review of the modelling undertaken as part of the approval against data collected during the PoPT.

Boral has undertaken a review to compare actual emissions during the PoPT as well as emission testing during the 2019/20 period compared to the estimated emissions used to model ground level emissions.

The Boral Berrima Air Quality Impact Assessment undertaken as part of MOD 9 in April 2015 to support the use of SWDFs undertook dispersion modelling to predict ambient concentrations of pollutants discharged from the Works site and to demonstrate that emissions at the proposed limits during the burning of SWDF met the environmental outcomes adopted by the NSW.

The modelling was based on emissions of all pollutants at licence emission limit levels. These were very conservative as it is unlikely that emissions from the stack would all be at that level at all times. The modelling found that with the exception of the 24-hour average PM10, for all pollutants the maximum applicable ground level concentrations were lower than the relevant ambient air assessment threshold limits, and therefore no adverse impacts are expected. In the PM10 modelling, not only stack emissions were included but also all possible fugitive sources of PM10 such as stockpiles and exposed areas. The PM10 from open sources was estimated using emission factors, not actual measurements. These factors were conservative which can overestimate the impacts.

The report found that there would be no effective change to off-site local air quality impacts of PM10 due to the project as the model results were insensitive to the Kiln 6 PM10 emission rates at the equivalent TSP concentrations proposed during the burning of the NSF.

A review of the quarterly stack emission results during the reporting period produced a range of (min 28 and max 47) which show emission levels below the 50ppm limit which was used to model ground-level PM10.

An analysis of the actual PM10 data collected shows no difference in levels pre and post use of SWDFs (see Figure 8). The largest impact on PM10 data related to the bushfire smoke in January and early February. 2020.

Any seasonal variation or trends are more likely the result of other external factors such as bushfires, dust storms and fugitive emissions from the facility, not via the kiln.

The introduction of SWDF is not impacting on the emission of particulates or other pollutants from Kiln 6 and as is described in the Pollutant Tracking Reports, there are other fuels including coal and raw materials such as limestone, slag and shale etc. that are part of the production process to produce clinker which all contribute to the potential pollutant load from the Kiln 6 stack.

Table 6 below out of the 3rd quarterly report describes the % input of pollutants into the production of clinker compared to other fuels and raw materials noting 29.7% of the fuel was Solid Waste Derived Fuels and 77.30% Coal.

To interpret the table, for example As, in assessing the chemical composition of all the raw materials and fuels used to produce 1kg of clinker a total of 2.73mg of As would be within that material. Of that 2.73mg 0.62mg came from the alternative fuels which made up a total of 22.57% of total As inputs.

	Input							
	Total Input							
	Raw material + Fuel	Alterna	ative Fuels					
	mg/kg clk	mg/kg clk	% input from AF					
Arsenic	2.73	0.62	22.57%					
Beryllium	0.63	0.04	5.80%					
Cadmium	0.21	0.04	17.59%					
Chromium	65.71	0.93	1.41%					
Cobalt	3.38	0.06	1.70%					
Copper	9.99	0.80	8.02%					
Mercury	0.17	0.00	1.06%					
Manganese	1736.51	5.04	0.29%					
Nickel	6.84	0.06	0.84%					
Lead	6.09	0.23	3.73%					
Antimony	0.25	0.04	14.74%					
Selenium	1.82	0.04	2.00%					
Tin	0.31	0.04	11.54%					
Vanadium	193.77	0.12	0.06%					
Thallium	0.21	0.04	17.40%					
Chlorine	0.17	0.00	1.41%					

Table 6 – Alternate Fuels inputs compared to total inputs from Raw materials and Fuels

Table 12: Air quality conditions

Number	Condition
K3.7	The Applicant shall design, construct, operate and maintain the cement works upgrade in a manner that minimises dust emissions from the site and complies with the EPL.
	The Applicant shall apply all reasonable and feasible measures to minimise the generation of dust from coal stockpiles, including but not necessarily limited to:
K3.7A	a) compaction of stockpile batters to minimise pick up of dust;
	b) installation of water sprays or use of a water cart to keep stockpile surfaces wet, if dust is being generated; and
	c) cessation of stockpile generation during periods of high wind, if dust generation cannot be controlled.
K3.8	The Applicant shall take all practicable measures to ensure that all vehicles entering or leaving the site and carrying a load that may generate dust are covered at all times, except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times.
K3.9	All trafficable areas and vehicle manoeuvring areas on the site shall be maintained in a condition that will minimise the generation or emission of wind blown or traffic generated dust from the site at all times.
M2.7 Dust Emissions	⁵ The Applicant shall design, construct, operate and maintain the cement works upgrade in a manner that minimises dust emissions from the site. The raw material storage bunker associated with the cement works upgrade shall be maintained in a condition that effectively eliminates wind generated dust emissions. Dust collection systems shall be provided to all potential sources of dust production associated with the cement works upgrade. (Footnote: 5 Incorporates EPA General Terms of Approval (O2.1 and O2.2))
M2.8	The Applicant shall take all practicable measures to ensure that all vehicles entering or leaving the site and carrying a load that may generate dust are covered at all times, except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times.
M2.9	All trafficable areas and vehicle manoeuvring areas associated with the cement works upgrade shall be maintained in a condition that will minimise the generation or emission of wind blown or traffic generated dust from the site at all times.
K3.10 Air Quality Discharges	The Applicant shall install and operate equipment in line with best practice to ensure that the Development complies with all load limits, air emission limits and air quality monitoring requirements as specified in the EPL for the site.
K3.10A	Deleted
M2.10 Discharge Limits	⁶ The Applicant shall design, construct, operate and maintain the cement works upgrade to ensure that total solid particle emission from the exhaust stack on Cement Mill No.7 (EPA Identification Point 10) does not exceed 20mg/m ³ (100% concentration limit). The concentration limit specified above is based on 101.3 kPa, 273 K, dry reference conditions and shall be determined in accordance with the monitoring requirements described under condition 3.1. To avoid any doubt, this condition does not authorise the discharge or emission of any other pollutants. (Footnote: 6 Incorporates EPA General Terms of Approval (P1.1, L2.1 and L2.2))

Note: (K = Kiln 6, M = Mill 7)

Table 13: Response to air quality conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.7	 Dust monitoring There are seven dust monitoring gauges and one HVAS around the perimeter of the site and in New Berrima. The locations of the gauges are shown on Figure 1. Samples are collected from the dust gauges each month and each week for the HVAS. The samples are assessed for compliance against the dust deposition and total suspended particulates (TSP) guidelines in <i>Approved Methods and Guidance for Analysis for the Modelling and Assessment of Air Pollutants in NSW</i> (DEC 2005) and <i>National Environment Protection Measure for Ambient Air Quality</i> (NEPC 1998) PM₁₀ guideline. As there is no emission limit specified in the Licence, the following guidelines have been adopted: EPA dust deposition guideline of 4 g/m2/month (expressed as a 12-month rolling average). NEPM PM₁₀ 24 hr standard of 50 μg/m³. EPA TSP annual goal of 90 μg/m³. As can be seen in figure 8 and 9, the dust gauges and HVAS have values below the guidelines for the reporting period except for the period of the 2020 Summer bushfires which clearly shows the impact of smoke on PM10 and TSP. Stack emission monitoring for Kiln 6 as required by the EPL was undertaken in July and November 2019 and February and April 2020. Figure 10 shows that the Works maintained emissions well under the EPA limits. 78 complaints were received from the community in relation to the deposition of dust on vehicles and properties. The complainants were contacted after the complaints were received. Further details are provided in Appendix 2. 	Figure 8 shows the results of the analysis of the HVAS from May 2017 to April 2020. There is no significant change in the trend data from the operations. The summer 2020 bushfires are clearly influencing results in late January early Feb 2020. As can be seen, the current data shows that we remain below the EPA guideline of 4 g/m2/month. Figure 9 shows the results of the analysis of the dust gauges located around the site and the New Berrima community from Jan 2017 to April 2020. As can be seen, the current data shows that we remain below the EPA guideline of 4 g/m2/month. Boral Cement Berrima will continue to respond rapidly to, thoroughly investigate, and rectify any dust complaints received from the local community.	Dust control is a fundamental part of the operational management of this site. Dust is controlled through the implementation of the Dust Management Plan. As sound control measures are in place and this is supported by monitoring data, these operations will continue. During 2020/21 the site will fully commission the recently purchased real-time dust monitor and embed the use of the new site Dust Trigger Action Response Plan.
K3.7A	See K3.7 above under Dust monitoring.	Reasonable and feasible measures are being implemented to minimise fugitive dust from coal stockpiles. This includes compaction of stockpile batters (being pushed up with a loader),	

		wetting down with a water cart in dry weather conditions and stopping loading/unloading operations in high winds. The site's re-vegetation program is maturing in the areas surrounding the stockpiles to create a windbreak and a dust screen.	
K3.8	No complaints were received during this period and no related issues arose during this period.	All transport contractors are made aware of this requirement during site inductions. Section 3 of the <i>Driver Code of Conduct –</i> <i>Truck and Heavy Vehicles Operator</i> , which is part of the <i>Berrima Cement Works – Traffic Management Plan</i> (Boral 2017) includes requirements for all drivers of heavy vehicles on site to ensure they cover their loads and prevent spillages.	
K3.9	See K3.7 above under Dust monitoring. During this reporting period Boral Cement has actively worked to reduce the generation of dust from vehicles and internal haul roads through implementation of the Dust Management Plan.	Some of the unsealed roads on site have been sealed in the previous years and some have been closed off and recently re- vegetated. Two wheel wash stations were installed in 2016, one at the exit of a shale pad, the other at the end of Quarry Road. The wheel wash stations continue to be routinely used. Boral Cement operates a road sweeper and water carts to minimise traffic generated and wind blown dust from trafficable areas and vehicle manoeuvring areas. Mechanical sweepers undergo regular maintenance to ensure sweepers are working efficiently. Boral Cement modified its activities such as loading, unloading and crushing of materials in open areas to minimise wind blown dust. Actions included the use of a water cart, stopping or postponing the activities until wind subsides, modifying the process to take place under cover where possible, etc.	Boral Cement continues to investigate opportunities to reduce fugitive dust throughout the site. Issues are managed through immediate corrective action and reporting through the incident management database SIMS. The recently purchased real-time dust monitor will be an extra tool to alert the site to potential fugitive dust events that could impact the New Berrima village residents.
M2.7	Covered under KK3.7 and K3.7A		
M2.8	Covered under K3.8		
M2.9	Covered under K3.9		
K3.10	Stack emission monitoring for Kiln 6 for standard fuels was conducted by Ektimo July, November 2019 and February and April 2020 in accordance with the sampling methods specified under EPL 1698. The reports demonstrated compliance with the emission limits for standard fuels for all monitoring parameters (see Figure 12).	No exceedances demonstrated for continuous particulate monitoring for Kiln 6 from May 2019 – April 2020 as demonstrated in Figure 10.	
M2.10	Ektimo monitored solid particle emissions from the Mill 7 stack in July 2019 in accordance with the sampling methods specified under EPL 1698. The report demonstrated compliance with the emission limit as shown in Figure 12.		



Ambient Air Quality Monitoring High Volume Air Sampler Data, May 2017 - 26 April 2020

Figure 8 Ambient air quality monitoring May 2017 - April 2020

Total Deposited Dust (12-Month Rolling Average) Berrima Cement Works - January 2017- May 2020



Figure 9 Total deposited dust (12-month rolling average) January 2017 – May 2020





Figure 10 Continuous particulate monitoring for Kiln 6 April 2019 – May 2020

Figure 11 Continuous particulate monitoring for Kiln 6 May 2012 - April 2019
2019-2020 EPL 1698 Stack Testing Annual Return Summary

	0		R007956-			
Report ID			1	R008378	R008764	R008994
	Unit of					
Pollutant	Measure	EPL Limit	Jul-2019	Nov-2019	Feb-2020	Apr-2020
Vol flowrate	M3/sec		200	200	200	230
Velocity	m/s		28	28	29	32
Temp	С		109	107	122	113
Nox	mg/m3	1250	940	750	1000	1100
Solid Particles	mg/m3	50	47	28	31	33
Moisture	%		12	13	13	13
Molecular wgt stack gases	g per g mole		30.3	30.2	29.9	30
Dry das density	kg/m3		1.35	1.35	1.33	1.34
Carbon dioxide	%		22.5	22.1	19.3	20.4
Oxygen (O2)	%		8.4	8.7	9.9	10.1
Type 1 & 2 aggregate	mg/m3	0.5	<0.079	<0.14	<0.03	<0.046
Cadmium	mg/m3	0.05	<0.0006	<0.0003	<0.0004	<0.0007
Mercury	mg/m3	0.05	0.0088	0.0091	0.0075	0.0072
Chlorine	mg/m3	50	<0.02	0.012	0.015	<0.02
Carbon monoxide	%		270	370	560	340
Dioxins & Furans	nanograms/m3	0.1	0.0021	0.0017	0.0027	0.00064
Chromium (hexavalent)	mg/m3		<0.009	<0.01	<0.003	<0.1
Hydrogen Chloride	mg/m3	10	0.057	0.19	0.14	0.4
Hydrogen fluoride	mg/m3	1	<0.47	0.18	<0.041	<0.03
Sulphur dioxide	mg/m3	50	0.6	0.13	0.13	0.86
Sulfuric mist (SO3)	mg/m3	50	0.096	2	<0.023	0.043
VOC	ppm	40	2.8	4	1.5	1.1
Thallium	mg/m3	0.05	0.0028	0.043	<0.002	<0.003

Figure 12 Stack testing license comparison table

5.4 Soils and water quality

The consent requirements for soils and water quality for Kiln 6 are in conditions 3.11 to 3.14 of Development Consent No. 401-11-2002-i and for Mill 7 in conditions 2.11 to 2.14 of Development Consent No. 85-4-2005-i, which are replicated in Table 14. The consents refer to EPL 1698, however, there are no water discharge limits in the EPL.

Table 16 sets out the site's performance during the past year relating to soils and water quality and the key management measures that are used at the site.

Boral manages water on site in accordance with the *Berrima Cement Works – Water Management Plan* (Boral 2018), which describes the monitoring points, frequency and parameters. Storm water and residual process water from all areas of the Works (including Kiln 6 and Mill 7) is harvested and used on site with water quality in the storages (Lake Quality and Lake Breed) tested monthly, and water quality in the receiving waterway (Wingecarribee River) tested every three months. Water is only discharged from site during very heavy rainfall, with two overflow events during the reporting period.

Three of the conditions relate to construction, with the SWDF facility partially built during the reporting period. It is demonstrated in Table 15 that the overall water management performance of the site is good. This indicates that the water management performance at Kiln 6 and Mill 7 is also good and that the conditions have been complied with during the reporting period.

During the 2019/20 reporting period, due to drought conditions and restrictions on extracting water from the Wingecarribee River during low flows, the site was required to truck in water from November 2019 until February 2020. This water was sourced from the Council's water supply network. The site is actively looking at alternative options for water supply such as investigating the feasibility of sourcing water from the former Berrima Colliery, via a pipeline, to assist in that sites long term solution to their excess ground waters that currently requires treatment underground prior to discharge.

Table 14: Soils and water quality conditions

Number	Condition
K3.11 Constructio n Soil and Water Manageme nt	Soil and water management measures consistent with Managing Urban Stormwater – Soils and Construction Vol.1 (Landcom, 2004) (the Blue Book) shall be employed during construction of the Development to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.
K3.12	All construction vehicles exiting the site, having had access to unpaved areas, shall depart via a wheel-wash facility.
K3.13	All erosion and sedimentation controls required as part of this consent shall be maintained for the duration of the construction works, and until such time as all ground disturbed by the construction works, has been stabilised and rehabilitated so that it no longer acts as a source of sediment.
K3.14 Water Discharge Limits	The Applicant shall ensure that all surface water discharges from the site comply with the: a) discharge limits (both volume and quality) set for the development in any EPL; or b) relevant provisions of the POEO Act.
M2.11 Water Quality Impacts	⁷ Except as may be expressly provided by a licence under the Protection of the Environment Operations Act 1997 in relation to the cement works upgrade, section 120 of that Act (pollution of waters) shall be complied with in, and in connection with, the carrying out of the cement works upgrade. (Footnote 7: 7 Incorporates an EPA General Term of Approval (L1.1))
M2.12 Erosion and All construction vehicles exiting the site, having had access to unpaved areas, shall depart via a wheel-wash facility. Sediment Control	
M2.13	All erosion and sedimentation controls required as part of this consent shall be maintained for the duration of the construction works, and until such time as all ground disturbed by the construction works, has been stabilised and rehabilitated so that it no longer acts as a source of sediment.
M2.14 Site Drainage and Stormwate r	The Applicant shall ensure that the cement works upgrade does not lead to an increase in the volume or flow rate of stormwater leaving the site over and above pre-development flow conditions.
Note: (K = Kiln 6	5, M = Mill 7)

Table 15: Response to soils and water quality conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.11	 There was two overflows from Lake Quality during the reporting period (10/2/2020 & 14/2/2020). Water was sampled at the overflow point (EPA Point 9), which had the following results: Biochemical oxygen demand (mg/L) - <2 & <2 (guideline: 20) Oil and grease (mg/L) - <5 & <5 (guideline: 10) pH - 9.0, & 8.9 Total suspended solids (mg/L) - 26 & 21 (guideline: 30-50) The results were within guideline values apart from pH, which was slightly elevated. 	rflows from Lake Quality during the $10/2/2020 \& 14/2/2020$). Water was erflow point (EPA Point 9), which had lts: xygen demand (mg/L) - <2 & <2 e (mg/L) - <5 & <5 (guideline: 10) 9 The discharge water quality is similar to previous years, with two overflow events for the year.ed solids (mg/L) - 26 & 21 (guideline: vithin guideline values apart from pH, elevated.The discharge water quality is similar to previous years, 	
K3.12	Construction vehicles exited the site via a wheel wash.	NA	
K3.13	Refer to K3.11.	Construction is a short-term activity which cannot be used to establish trends.	
K3.14	 No water volume and quality discharge limits are specified in EPL 1698 and water was not regarded as a project risk (SLR 2015). Notwithstanding, the EPL requires monitoring at the Lake Quality overflow point during overflows. There was two overflows from Lake Quality during the reporting period (10/2/2020 & 14/2/2020). Water was sampled at the overflow point (EPA Point 9), which had the following results: Biochemical oxygen demand (mg/L) – <2 & <2 (guideline: 20) Oil and grease (mg/L) – <5 & <5 (guideline: 10) pH – 9.0, & 8.9 Total suspended solids (mg/L) – 26 & 21 (guideline: 30-50) solids (mg/L) – 24, 30 (guideline: 30-50) 	The water in Lake Quality is reused in site processes and the lake only overflows during heavy rainfall. There were two overflow events during the reporting period which occurred after heavy rain in February 2020. Sampling demonstrated that water quality met the typical NSW discharge criteria. Occasionally, an exceedance of pH may occur in the overflow due to alkaline nature of raw materials and products handled on site.	Berrima Cement Works – Water Management Plan (Boral 2018) is implemented at the Works, which includes the Kiln 6 area and is reviewed every three years or after an incident and is revised/improved as deficiencies become apparent.

	The results were within guideline values apart from pH, which was slightly elevated.		
M2.11	No water volume and quality discharge limits are specified in EPL 1698.	Refer to K3.14.	Berrima Cement Works – Water Management Plan (Boral 2018) is implemented at the Works, which includes the Mill 7 area and is reviewed every three years or after an incident and is revised/improved as deficiencies become apparent.
M2.12	Refer to K3.11.	Construction is a short-term activity which cannot be used to establish trends.	
M2.13	Refer to K3.12.	Construction is a short-term activity which cannot be used to establish trends.	
M2.14	Refer to K3.11.	Construction is a short-term activity which cannot be used to establish trends.	

5.5 Traffic and transport

The requirements for traffic and transport for Kiln 6 are in conditions 3.15 to 3.16A of Development Consent No. 401-11-2002-i and for Mill 7 in conditions 2.15 to 2.17 of Development Consent No. 85-4-2005-i, which are replicated in Table 17.

Table 18 summarises the site's performance during the past year relating to traffic and transport and the key management measures that are used at the site.

Boral manages traffic on site in accordance with the Traffic Management Plan.

Four of the conditions relate to construction, with most of the SWDF facility constructed during the reporting period. The *Berrima Solid Waste Derived Fuels Project – Construction Traffic Management Plan* (Boral 2017) was implemented to prevent incidents and queuing on public roads. No community complaints were received regarding construction or operational traffic.

Two of the conditions relate to parking provision and truck queuing. Sufficient car parking has historically, and continues to be, provided to accommodate employee and visitor vehicles on site without the need to park on surrounding public roads. Deliveries of fuel and ingredient materials for Kiln 6, and ingredient materials for Mill 7, have not historically, and continue to not, require queuing of trucks along Taylor Avenue. Therefore, operations at Kiln 6 and Mill 7 complied with the traffic and transport consent conditions during the reporting period.

Table 16: Traffic and transport conditions

Number	Condition
K3.15	Traffic and Transport Impacts The Applicant shall establish a bus transport system generally consistent with that identified in section 6.9 of the SEE to transport construction employees to and from the site during the construction period.
K3.16	The Applicant shall ensure that vehicles associated with the cement works upgrade do not stand or park on any public road or footpath adjacent to the site. Measures provided by the Applicant shall include sufficient parking for all employees and contractors during construction and operation of the cement works upgrade and management measures to ensure that heavy vehicles entering the site are not permitted to queue on Taylor Avenue at any time.
K 3.16A 3.16	B 3.16C 3.16D 3.16E Port Kembla Coal Haulage Campaigns Deleted.
K3.16A	The Applicant shall pay a road maintenance levy to Council of 4 cents/tonne/km for the transport of SWDF.
M2.15 Traffic and Transport Impacts	The Applicant shall establish a bus transport system generally consistent with that identified in section 6.6.7 of the SEE referred to in condition 1.2b to transport construction employees to and from the site during the construction period.
M2.16	The Applicant shall ensure that vehicles associated with the cement works upgrade do not stand or park on any public road or footpath adjacent to the site. Measures provided by the Applicant shall include sufficient on-site parking for all employees and contractors during construction and operation of the cement works upgrade and management measures to ensure that heavy vehicles entering the site are not permitted to queue on Taylor Avenue at any time.
M2.17	The Applicant shall install an advance warning signage along Taylor Avenue to advise vehicles approaching the entrance to the site of turning truck traffic in the area. This signage is to be installed prior to the commencement of operations of the cement works upgrade. Details of the design and installation of this signage are to be provided to the satisfaction of the Director-General prior to the commencement of operations at the cement works upgrade.
Note: (K = Kiln	6, M = Mill 7)

Table 17: Response to traffic and transport conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.15	Only a small workforce was required to construct the alternative waste facility with employees travelling to site from different directions. Therefore, a bus service was not implemented for construction during this reporting period as it was not required nor practical.	Construction timeframes are short and no performance trends can be established.	The Construction Traffic Management Plan will continue to be implemented for the duration of construction of the alternative waste facility.
K3.16	No construction vehicles stood or parked on public roads or footpaths as there is sufficient room on roads within the site and parking areas to accommodate vehicles. Employee car parking was extended three years ago. The employee car park has unused capacity.	Construction timeframes are short and no performance trends can be established.	The Construction Traffic Management Plan will continue to be implemented for the duration of construction of the alternative waste facility.
K3.16A	28 997t of SWDF were used in the reporting period, at the time of writing the levy has yet to be paid to Council	SWDF vehicles travel 2km from the highway to the site entrance and return to the highway. Based on 21869t in 2018/19 a levy of \$3499.04 would be payable. Based on 28997t in 2019/20 a levy of \$4639.52 would be payable.	As of the date of this report the levy is still to be paid for the SWDF transport of Council roads. Boral will work with Council on how best to be invoiced for this levy to permit payment.
M2.15	NA	NA	NA
M2.16	No construction vehicles stood or parked on public roads or footpaths as there is sufficient room on roads within the site and parking areas to accommodate vehicles. Employee car parking was extended three years ago. The employee car park has unused capacity.	Construction timeframes are short and no performance trends can be established.	NA
M2.17	As previously reported, warning signage was installed along Taylor Avenue.	This was a one-off activity with no associated trends.	Signs will be replaced if damaged or defaced.

5.6 Waste management

The consent requirements relating to waste management for Kiln 6 are in conditions 3.17 to 3.17C of Development Consent No. 401-11-2002-i and for Mill 7 in Condition 2.18 of Development Consent No. 85-4-2005-i, which are replicated in Table 19. The consents refer to EPL 1698, which provides waste requirements in conditions L4, O5, O6.1/2/3/4/5/6/7, E3 and E4.

Table 20 sets out the site's performance during the past year relating to waste management and the key management measures that are used at the site.

Boral manages waste on site in accordance with *Berrima Cement Works – Waste Management Plan* (Boral 2018), which describes recycling and disposal requirements for the different waste categories generated and used on site.

The waste conditions and the EPL 1698 specifically detail what wastes can be received on site for storage, treatment, processing, reprocessing or disposal such as granulated blast furnace slag (slag). These conditions exclude non-standard fuels approved for use at Kiln 6.

Table 18: Waste conditions

Number	Condition
K3.17 Waste Management Impacts	Except as otherwise permitted by this consent and a licence issued under the Protection of the Environment Operations Act 1997 the Applicant shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing or disposal, or any waste generated at the site to be disposed of at the site.
K3.17A	Condition 3.17 of this consent only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require a licence under the Protection of the Environment Operations Act 1997 (POEO Act), and does not include: a) any Non-Standard Fuels approved for use at the upgraded Kiln 6 under this consent; b) any material normally brought to the site for the purpose of cement clinker production (as detailed in the documents listed under condition 1.2 of this consent); c) any material normally recycled or reused within the cement works; and d) any material that is subject to a specific waste recovery exemption (RRE) issued by the EPA to exempt that material from the specific clauses of the Protection of the Environment(Waste) Regulation 2005.
M2.18 Waste Management Impacts	⁸ The Applicant shall not cause, permit or allow any waste generated outside Cement Mill 7 to be received at Cement Mill 7 for storage, treatment, processing, reprocessing or disposal, or any waste generated at Cement Mill 7 to be disposed of at Cement Mill 7, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997. This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if it requires an environment protection licence under the Protections Act 1997. (Footnote 8: 8 Incorporates an EPA General Term of Approval (L3.1 and L3.2))
K3.17AB Alternative Raw material Trial - Granulated Blast Furnace Slag (GBFS)	Prior to the receipt of GBFS on-site, the Applicant must obtain a specific waste Resource Recovery Exemption (RRE) for GBFS from the EPA.
K3.17AC GBFS Trial Requirements	Provided that the specific waste RRE is obtained for GBFS, the Applicant shall trial the use of up to 3,000 tonnes of GBFS as an alternate raw material in Kiln 6. The Applicant shall: a) undertake the trial over a continuous 3 day period, unless otherwise agreed in writing by the Secretary; b) conduct stack testing of all relevant air emissions and trace elements, to the satisfaction of the EPA; and c) use quality controlled GBFS only.
K3.17AD GBFS Trial Verification Report	 Within 1 month of the completion of the GBFS trial, the Applicant shall prepare and submit a Verification Report to the Department to the satisfaction of the Director-General and the EPA. The Verification Report shall include: (a) stack emissions monitoring data measured for the duration of the trial; (b) copies of all analytical test reports for all substances sampled and tested; (c) a comparison of monitoring results from the trial with the relevant EPA standards and requirements, as determined by the EPA.

	K3.17AE	Provided the results of stack testing for the GBFS trial confirm that the air pollutants emitted from the cement Kiln 6 meet the relevant EPA standards and requirements, the Applicant may commence full-scale usage of GBFS as a raw material additive in Kiln 6 at a maximum usage rate that is determined in writing by the Secretary in consultation with the EPA. Note: the Applicant must not commence full-scale usage of GBFS as a raw material additive in Kiln 6 until it has received written approval from the Secretary. In addition, the maximum usage rate per annum of GBFS in cement Kiln 6 must not exceed 150,000 tonnes per annum.		
K3.17BExcept as provided by any condition of a licence under t 'Group A' waste may be stored at the site: a) AKF1.		Except as provided by any condition of a licence under the Protection of the Environment Operations Act 1997, only the following 'Group A' waste may be stored at the site: a) AKF1.		
	K3.17C	Except as provided by the condition of a licence under the Protection of the Environment Operations Act 1997, the Applicant must assess, classify and dispose of all wastes generated as a result of the use of Non-Standard Fuels in a accordance with the NSW EPA's Waste Classification Guidelines.		
Ν	lote: (K = Kiln 6, M = Mill 7)			

Table 19: Response to waste conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.17	Except for raw materials and SWDF non-standard fuels and HiCal 50 approved in EPL 1698 no waste generated outside the Works was received at the site during the reporting period.	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).
K3.17A	As described above and prohibited by Condition L4.1 of the EPL, no waste generated outside the Works was received at the site during the reporting period.	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).
M2.18	Landfilling of waste is prevented by crushing and recycling old refractory bricks through the kiln.	No waste materials are disposed on site.	
K3.17AB	The site-specific resource recovery exemption for full-scale GBFS use was issued by EPA on 19 September 2012.	The use of GBFS since 2012 has not resulted in an increase in stack emissions (see responses to air quality).	Current management measures for the use of GBFS are achieving desired outcomes.
K3.17AC	Compliance with this condition was detailed in the AEMR for 2013 – the trial was conducted between 14-16 May 2012 with stack testing on 15 May, the use of quality controlled GBFS and provision of a report on 13 July 2013.	The use of GBFS since 2012 has not resulted in an increase in stack emissions (see responses to air quality).	Current management measures for the use of GBFS are achieving desired outcomes.
K3.17AD	Compliance with this condition was detailed in the AEMR for 2013 – the verification report was provided on 13 July 2013 which reported that there were no stack contributions from the GBFS, coal use decreased and CO ₂ /CO emissions decreased.	The use of GBFS since 2012 has not resulted in an increase in stack emissions (see responses to air quality).	Current management measures for the use of GBFS are achieving desired outcomes.
K3.17AE	Compliance with this condition was detailed in the AEMR for 2013 – the Secretary approved the ongoing use of GBFS in a letter dated 7 September 2012.	Boral has been using less GBFS than the approved rate of 150,000 tonnes per annum.	Current management measures for the use of GBFS are achieving desired outcomes.

K3.17B	No AKF1 or other Group A wastes were stored on site during the reporting period.	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).	The Operational Environmental Management Plan was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018).
K3.17C	There has been no generation of wastes from the use of the SWDF non-standard fuels.	Wastes generated from the use of nonstandard fuels on site will be classified using the NSW EPA's Waste Classification Guidelines in accordance with EPL Condition L4.2.	Wastes generated from the use of nonstandard fuels on site will be classified using the NSW EPA's Waste Classification Guidelines in accordance with EPL Condition L4.2.

Note: (K = Kiln 6, M = Mill 7)

5.7 Non-standard fuels

The non-standard fuels consent requirements for Kiln 6 are in conditions 3.20 to 3.28 of Development Consent No. 401-11-2002-i, which are replicated in Table 21 and considered in Table 22. The consent refers to EPL 1698, which provides non-standard fuel requirements in conditions O5, O6.1/2/3/4/5/6/7 and E4.

In August 2018 Boral Cement commenced the use of Solid Waste Derived Fuels (SWDF) including Wood Waste (WW) and Refuse Derived Fuels (RDF). As per condition 3.25 a Proof of Performance Trial was undertaken with the six month report submitted to the Department for approval on 28 February 2018.

On the 23 April 2019 the Secretary approved the ongoing use of SWDF subject to:

a) limiting the amount of SWDF to be fired in Kiln 6 to 40%, as a percentage of total fuel,
 b) periodic stack testing being undertaken every three months for the first 12 months of use of SWDF. The monitored pollutants must be consistent with the requirements of the Environment Protection Licence (EPL 1698)

c) provision of a monitoring report that outlines the results of the quarterly stack testing required in (b) above and provides an assessment of compliance against the air emissions limits for the facility, to the satisfaction of the Secretary

d) periodic measurements of hydrogen chloride (HCI) taken every three months until such time the Secretary agrees the accuracy of the HCI CEMS is confirmed through successful calibration audits undertaken in accordance with the USEPA Performance Specification 18.

The EPA updated the licence to reflect these changes in December 2019.

During the reporting period SWDF usage increased from 21 869t to 28 997t.

On the 16 November 2018 Boral sought approval from the Department to store up to 17 500t of carbon anode material (Hi Cal 50), sourced from the former Hydro Aluminium Kurri Kurri smelter for a period of 36 months. The Department reviewed the request and the additional information provided in consultation with the EPA and on 4 April 2019 confirmed approval of:

• the 'Hi Cal 59 Storage and Handling Procedure', Version 3dated 27 March 2019 and

• the 'Hi Cal 50 (Carbon anode ex-Hydro Kurri Kurri) Recovered Resource Specification Version 3 dated 27 March 2019

During the 2019/20 reporting period (October 2019) MOD 11 was approved to permit the use of Hi Cal 50 during start up conditions. It is anticipated that the site will recommence the use of Hi Cal early in the 2020/21 reporting period.

Table 20: Non-standard fuels conditions

Number	Condition			
	Subject to meeting the requirements of this consent, and the requirements of a licence issued under the Protection of the Environment Operations Act 1997 for the site, the following fuels are permitted to be received at the site for use at the upgraded Kiln 6 development at the quantities, firing rates and proportions specified in Table 1.			
	Table 1 – Permitted Fuels for use in upgra	ded Kiln 6		
	Fuel Category Tonnes per annum		I	
	Natural Gas, Fuel Oil Diesel Standard Fuel	No limits		
K1.4A Use of	Coal Standard Fuel	No Limit		
non standard	Coke Fines Standard Fuel	No Limit 10 000		
lueis	AKF1 Non-Standard Fuel	20,000	+	
	AKF5 Non-Standard Fuel	30,000		
	RDE Non-Standard Fuel	50,000 ≤100,000 combined		
	Note: The consent, as modified, permits only the use of the fuels listed above at the specified quantities. The use of any additional fuels would be the subject of appropriate assessment and determination under the Act. This consent, as modified, does NOT approve the establishment of a protocol for general use of Non-Standard Fuels.			
	AKF5 is approved for use at the development under this consent subject to the necessary approvals under the Act being obtained for storage facilities and kiln feeding infrastructure. No			
K1.4B	AKF5 is permitted to be received at the site until the necessary storage facilities and kiln feeding infrastructure have been constructed in accordance with any such approvals. Storage of AKF5 must be in accordance with Fire & Rescue NSW (Fire Safety Branch) Guidelines for Bulk Storage of Rubber Tyres.			
	If the Applicant proposes to exceed the stockpile sizes and heights within the above Guidelines, the Applicant must obtain written approval from Fire and Rescue NSW, to the satisfaction of the			
	Secretary.			
	Hi Cal 50 and AKF1 are approved for use at the development under this consent subject to the detailed design for any necessary storage facilities and kiln feeding infrastructure being approved to the Secretary. In particular, the detailed design shall:			
	a) demonstrate that the storage facilities would be appropriately bunded in accordance with the relevant Australian Standards, especially Australian Standard AS1940-2004 (for AKF1, this would include having a minimum capacity sufficient to accommodate catastrophic failure of the tank and that adequate measures are in place to ensure a catastrophic failure of a tanker during transfer was adequately contained to ensure no off-site discharge;			
K1.4C	b) include appropriate measures to ensure liquids draining from the bund (and other containment areas) are kept separate and adequately treated prior to discharge to the onsite stormwater management system, and demonstrate that these measures were developed in consultation with the Sydney Catchment Authority and Wingecarribee Shire Council; and			
	c) include a Fire Safety Study prepared in Study and in consultation with Fire and kiln feeding infrastructure until the Secr site under this consent until any necessa design parameters approved by the Secr	n accordance with the Department's guid Rescue NSW. A construction certificate r etary has approved the detailed design p ry storage facilities and kiln feeding infra etary.	leline Hazardous Industry Planning Advisory Paper No. 2: Fire Safety nust not be issued in relation to any necessary storage facilities and arameters. No Hi Cal 50 or AKF1 is permitted to be received at the astructure have been constructed in accordance with the detailed	

	Notwithstanding condition 1.4C of this consent, the Applicant is permitted to undertake a single trial of chipped tyres in the development, ahead of the construction of storage facilities and kiln feeding infrastructure for AKF5, provided that the trial meets the following requirements:
	a) no more than 205 tonnes of 2" chipped tyres is to be received at the site for the trial;
	b) the trial shall be conducted over no more than six months from the date of first receipt of the trial materials, after which any remaining trial materials shall be removed from the site to a facility lawfully permitted to accept the materials;
	c) the trial shall be undertaken for the purpose of investigating design and operational aspects
	of the full-scale use of AKF5;
	d) the trial shall be undertaken in full compliance with the environmental performance standards stipulated in this consent, and the requirements of the Environmental Protection
K1.4CA	Licence for the site;
	e) the Applicant shall consult with and meet the requirements of the EPA with respect to undertaking the trial, and shall not commence the trial without the prior written approval of the EPA;
	f) trial materials shall be stored in an area that is sealed, or otherwise treated to the satisfaction of the Secretary, and away from all potential ignition sources;
	g) the Applicant shall notify Fire and Rescue NSW prior to the receipt of trial materials on the site, and address any requirements with respect to the safe storage of the trial materials;
	h) the Applicant shall notify the Secretary, the EPA and the Community Liaison Group prior to the commencement of the trial; and
	i) the Applicant shall report the status and outcomes of the trial to the Secretary and the EPA on a monthly basis from the date that trial materials are first received on the site until conclusion of the trial.
K1.4D	Only Standard Fuels and the Group 1 Non-Standard Fuel, Hi Cal 50, are permitted to be used at the development during start-up and shut-down.
K1.4E	Non-Standard Fuels are not permitted to be stored at the site for longer than 3 months, except with the written permission of the Secretary.
	No Non-Standard Fuel is permitted to be received at, or used at the development, unless it complies with:
	a) the handling, transporting, sampling, analysis and quality control requirements of this consent;
K1.4F	b) any requirements of a licence issued under the Protection of the Environment Operations
	Act 1997 for the site; and
	c) the fuel specification for that specific fuel.
K1.4G	Prior to the receipt of the first batch of a Group 1 Non-Standard Fuel from a particular supplier, the Applicant shall certify in writing to the Secretary that the supplier has implemented appropriate quality control and quality assurance procedures to ensure the Applicant's responsibilities under this consent can be met. At the request of the Secretary, the Applicant shall forward a copy of the supplier's quality control and quality assurance procedures to the Department demonstrating how those procedures cause the Applicant to meet the requirements of this consent.
V. du	Prior to the receipt of the first batch of a Group 2 Non-Standard Fuel from a particular supplier, the Applicant shall certify in writing to the Secretary that the supplier has met the pre-qualification requirements set out in the approved Quality Assurance and Control Procedure for Receipt and NSW Government Department of Planning and Environment 8
К1.4Н	Use of Solid Waste Derived Fuels (Appendix 1 of this consent) and that the Applicant's responsibilities under this consent can be met. At the request of the Secretary, the Applicant shall forward a copy of the supplier's quality control and quality assurance procedures to the Department demonstrating how those procedures cause the Applicant to meet the requirements of this consent.

K1.4I	Prior to the receipt of the first batch of SWDF the Applicant shall develop and submit operational procedures for co-firing SWDF to ensure that the temperature of gas generated in the process is raised to a minimum temperature of 8500C for a minimum of two seconds. Operational procedures must include interlocks in the process control system.			
K1.4J	Hi Cal 50 must only be used in Kiln 6 when lended with coal to create a homogenous blend. The concentration of Hi Cal 50 in the blend must not exceed 4%.			
K3.20 Non- Standard Fuel Specifications	For each Group 1 or Group 2 Non-Standard Fuel approved for use at the development the Applicant shall provide a fuel specification, to be approved by the Secretary and the EPA prior to the use of that Non-Standard Fuel at the development under this consent. The Non-Standard Fuel specification shall include, but not be limited to, the minimum calorific value and the maximum quantity of all relevant pollutants, particularly the listed pollutants.			
K3.21	 Based on the Non-Standard Fuel specification specified in condition 3.20 the following Non-Standard Fuel specification criteria are required to be met: a) deleted MOD-109-9-2006-i; b) for Hi CAL 50 a mercury specification no greater than 1 mg/kg and a cadmium specification no greater than 10 mg/kg; c) for AKF1 a mercury specification no greater than 2 mg/kg and a cadmium specification no greater than 5 mg/kg; d) organohalogen compounds, expressed as chlorine, in any Non-Standard Fuel not to exceed 1% by weight; and e) the waste materials to be used as Non-Standard Fuels must not be diluted or blended to meet any of the fuel specification requirements. 			
K3.22 Non- Standard Fuels Pollution Tracking	 Prior to the use of any Group 1 or Group 2 Non-Standard Fuels at the development in accordance with this consent, the Applicant shall implement a Tracking Program that meets the requirements of the Secretary. The Tracking Program shall include, but not be limited to, the identification and recording of the following information in accordance with the time periods specified in condition 3.23: a) batch analyses of Non-Standard Fuels received at the development as provided by the suppliers, and the results of any check analyses carried out by the Applicant as part of the quality control management procedures required under condition 6.7 and condition 6.8 of this consent; NSW Government Department of Planning and Environment 13 b) a mass inventory of each listed pollutant entering the process in raw materials, conventional fuels and Non-Standard Fuels, with particular attention to, but not limited to chlorine, mercury, cadmium and chromium; c) emission factors for each listed pollutant calculated from inputs, outputs, and measured air emissions, variance in the emissions factors from period to period and an assessment with regards to the reasons for any such variance; and d) any adjustments that may be necessary to Non-Standard Fuel specifications arising from the Tracking Program analysis. 			
K3.23	The Applicant shall submit a Report that details and assesses the results of the Tracking Program prescribed in condition 3.22 of this consent to the Secretary. The Report shall be submitted to the Secretary: a) every three months in the first year of operation using Non-Standard Fuels under this consent, (to be synchronised with stack monitoring); and b) thereafter every six months, or as otherwise agreed to by the Secretary.			
K3.24 Process Parameters	The Applicant shall cease to burn Non-Standard Fuels in Kiln 6 if: a) the temperature is below 8500C in the zone where Non-Standard Fuels are fired or in the vicinity of the pre-calciner; or b) the temperature is below 3000C at the outlet of the preheater strings.			
K3.25	The Applicant must undertake PoP trials for the burning of SWDF. The maximum length of the trial will be eight months. At least one month prior to the PoP trials, the Applicant shall submit a detailed plan(s) for the PoP trials, to the satisfaction of the Secretary. The plan(s) must be prepared for the co-incineration of each permitted SWDF and be prepared in consultation with the EPA. The plan(s) must, as a minimum:			

	a) verify the residence time, the minimum temperature and the oxygen content of the exhaust gas which will be achieved during normal operation and under the most unfavourable operating condition anticipated;
	b) establish all criteria for operation, control and management of the abatement equipment to ensure compliance with the emission limit values specified in the EPL;
	c) assess the performance of any monitors on the abatement system and establish a maintenance and calibration program for each monitor;
	d) establish criteria for the control of all alternative fuel input including the maximum flow and maximum calorific value;
	e) confirm that all measurement equipment of devices (including thermocouples) used for the purpose of establishing compliance with this approval have been subjected, in situ, to normal operating temperatures to prove their operation under such conditions;
	f) detail procedures for testing the performance of all major process components and emission control systems associated with the processing and burning of SWDF; and
	g) address all relevant requirements of the EPL for the project.
K3.24A	The temperature requirement of Condition 3.24(b) does not apply to the Group 1 Non-Standard Fuel Hi Cal 50, when Hi Cal 50 is blended with coal in accordance with the requirements of condition 1.4J.
K3.24B	Notwithstanding Condition 3.24A, the feed rate of the Group 1 Non-Standard Fuel, Hi Cal 50, must not exceed 400kg/hr when the temperature is below 300°C at the outlet of the preheater strings.
	The PoP trials shall:
	a) be carried out in accordance with a detailed PoP plan(s) approved by the Secretary;
	b) be undertaken by a suitably qualified and experienced person(s);
K3.26	c) test performance of all major process components including emission control systems using no SWDF, and representative fuels containing SWDF designed to cover the range of materials and compositions of SWDF;
	d) identify changes to the Kiln 6 emission control system that may be necessary to achieve compliance with the consent and the EPL; and
	e) demonstrate compliance with the relevant requirements of the EPL, development consent and relevant environmental and safety criteria.
	The Applicant is to report on each PoP trial to the Secretary and EPA. The reports shall be
	submitted at:
	a) monthly intervals during the PoP trial. The information to be contained in these reports is to be determined in consultation with the EPA as part of the PoP Trial Plan required under condition 3.25; and
	b) six months after the commencement of the PoP trial. The six month report shall contain but not be limited to the following information:
	i. the total quantity of SWDF used during the previous six months;
K3.27	ii. the dates and times when the trial commenced and will conclude;
	iii. the results of stack emissions testing for the analytes and properties specified in any relevant trial plan and baseline emissions for comparison, where applicable;
	iv. all monitoring data collected for the project during the previous six months;
	v. identification of any non-compliance with the conditions of this consent and the EPL;
	vi. details of additional measures to be implemented to address any non-compliance; and
	vii. an assessment of the suitability of the SWDF for ongoing use.

	Copies of the POP Trial Reports shall be made available to the public upon request.		
K3.28	Use of SWDF is not permitted (outside of the approved PoP trials) until such time as the Secretary has indicated in writing that it is satisfied with the results of the six month PoP trial report specified under condition 3.27 b) for an individual SWDF.		
	In each Annual Management Report submitted after the First Year Monitoring and Modelling Assessment Report required in accordance with condition 7.6 has been submitted, the applicant shall include details of the use of all Non-Standard fuels at the development including but not limited to:		
K7.3A	 a) the nature, quantity and quality of Non-Standard Fuels used at the development b) details of any fuels that did not meed the Fuel Specification, including the source of the fuels and how the rejected fuels were managed or disposed of; c) a review of the results of the Non-Standard Fuels Tracking Program and Non-Standard Fuels Quality Control Management Procedures; and d) the results of all monitoring undertaken in accordance with the requirements of this consent and an assessment of these monitoring results, including comparison of stack emissions against the concentration limits set in condition 2 10 		
	One year after the commencement of the use of Non-Standard Fuels in accordance with this consent, the Applicant shall prepare a First-Year		
K7.6	Monitoring and Modelling Assessment Report. The Report shall be submitted to the Secretary, the NSW Department of Health and the EPA not more than 15 months after the commencement of the use of Non-Standard Fuels in accordance with this consent.		

Table 21: Response to non-standard fuels conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K1.4A	The majority of fuel consumed was coal. Small amounts of diesel are used during kiln start-ups. The site commenced the use of SWDF's in August 2018.	SWDF are now in use. Usage has increase from 21809t in 2018/19 to 28997t in 2019/20	The OEMP was updated in April 2018 in accordance with Condition 6.7 to incorporate measures for management of nonstandard fuels prior to their use at the site (approval letter received from DPE on 21/05/2018). The OEMP was updated in April 2020 to reflect findings of the PoPT and EPL variation.
K1.4B	No AKF 5 was received, stored or used at the site during the reporting year.	NA	
K1.4C	Compliance was confirmed in the 2007-2008 AEMR.	The site will be recommencing the use of HiCal50 in 2020/21	
K1.4CA	Boral did not conduct any tyre trials in the reporting period.	Trials are one-off events that do not display reportable trends.	No trials were conducted and no associated management actions were required.
K1.4D	No non-standard fuels were used during start-up or shut-down conditions.	SWDF are currently the only non-standard fuels in use. These are fed into the Calciner and are easily removed during start-up and shut down conditions	Modification 11 was approved on 25 October 2020 which permits the use of HiCal50 when blended with coal at 4% HiCal 50 to 96% coal during start-up and shut down conditions.
K1.4E	Written approval from the Secretary received $(4/4/2019)$ to store up to 17 500t of HiCal 50 for three years.	NA	Manage as per approved HiCal50 Storage and Handling Procedure nd Hi Cal 50 Rescovered Resource Specification.
K1.4F	All non-standard fuels received and used at site are tested to ensure compliance with approved specifications.		
K1.4G	Boral provided and had approved from the Secretary their own procedures for the Group 1 HiCal 50 Specification and Storage procedures as Boral are processing and testing for supply.	NA	NA
K1.4H	Boral provided in writing to the Secretary on 12 July 219 that the Group 2 SWDF supplier Veolia had implemented appropriate quality control and quality assurance procedures with correspondence from DPIE on 5/9/19 acknowledging receipt of review.		Boral will continue to review suppliers prior to the receipt of the first batch SWDFs from a particular supplier.

K1.4I	Operational procedures were submitted as part of the PoPT plan process.		
K1.4J	HiCal will be blended within the coal blending plant when in use.		Prepare a one point lesson or SWMS on blending process to ensure blends do not exceed 4%.
K3.20	HiCal50 specification was approved on 4/4/2019. PoPT for SWDF including specification approved 28/8/2018.		
K3.21	All non-standard fuels have met the specified non-standard fuel specifications.	The review of results is undertaken on a routine basis.	
K3.22	The Non-Standard Fuels pollutant tracking procedure (SP10-01-10 Non-Standard Fuels Pollutant Tracking Procedure) was issued on 1 March 2003 and a copy was provided to DP&E by email on 2 March 2003. The procedure addresses all requirements of Condition 3.22.		
K3.23	The first Tracking Program report will be submitted within two weeks of the first quarterly stack test post PoPT trial approval.	Quarterly tracking reports submitted to the DPIE for July 19, Nov 19 and Feb 20 stack tests. As of the date of this report the final stack test results had only just been received.	Prepare the final quarterly report.
K3.24	This is complied with.		
K3.25	PoPT plan was approved in consultation with the EPA		
K3.26	The PoPT was approved by the DPE 28/8/2018	PoPT was completed during the 2019/20 reporting period.	
K3.27	All PoPT monthly reports and the six monthly report were submitted to the Secretary and the EPA. The reports are available on request.	The PoPT six month report was accepted and approved by the DPE with continual use (with conditions) of SWDF approved by the Secretary on 23/4/2019.	The site will need to engage with the EPA and DPIE if we are to go to 50% SWDFs to undertake some PoPT at that rate.
K3.28	The continual use of SWDF was approved by the Secretary on $23/4/2019$.		
K3.24B	No Hi Cal 50 used in 2019/20		
K7.3A	Only SWDFs were is use during the reporting period. This material came from the three approved suppliers. Two Wood Waste and one Refuse Derived Fuel. A total of 28997t was used during the reporting period. Weekly meetings are held with suppliers to provide updates on		In 2020/21 provide a summary of trends since commencement of SWDF.

	operational demands and to review quality and the contracted specifications. All material met the consented specification during the reporting year.	
	3 out of the 4 quarterly non-standard fuel tracking program reports were submitted for the reporting period with the final report to be completed as the finalisation of the April stack test was only completed in late June 2020. An independent 3 rd party audit was undertaken on QC management procedures of all suppliers in June 2020, with no non-compliances raised.	
	Table 12 under section 5.3 summarises stack emission test results against the licence limits. All stack tests undertaken during 2019/20 were compliant with licence limits.	
K7.6	A first year assessment report was submitted in November 2019 to the DPIE	

5.8 Visual amenity

The visual amenity consent requirements for Kiln 6 are in conditions 3.18 to 3.19A of Development Consent No. 401-11-2002-i and for Mill 7 in Condition 2.19 of Development Consent No. 85-4-2005-i, which are replicated in Table 23.

Compliance with the construction requirements of the second Kiln 6 pre-heat tower was demonstrated in previous AEMRs. It is demonstrated in Table 24 that the community has not historically lodged complaints about the visual amenity of the site and this continues for the current reporting period.

Table 22: Visual amenity conditions

Number	Condition
K3.18 Visual Amenity Impacts	The Applicant shall ensure that all external lighting associated with the cement works upgrade, and including those lights already erected, is mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding properties or roadways. The lighting shall be the minimum level of illumination necessary and shall comply with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.
K3.19	The second pre-heater tower shall be designed, constructed, operated and maintained in a manner that minimises the visual impact to surrounding properties and roadways. Note: The second pre-heater tower shall be built in a manner consistent with that described in the additional information provided (identified in condition 1.2 f)). This includes using the building materials identified and minimising the height of the pre-heater tower.
K3.19A	Operational stockpiling of RDF in the external bale material storage area (identified on Drawing No.GE-B-2278-01 Revision DP, dated 15 January 2015) is limited to periods of extended kiln downtime for maintenance or repair only. RDF for stockpiling must be delivered in plastic wrapped 1 cubic metre bales. Stockpiles must not exceed a maximum height of five metres.
M2.19 Visual Amenity	Impacts The Applicant shall ensure that all external lighting associated with the cement works upgrade, and including those lights already erected, is mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding properties or roadways. The lighting shall be the minimum level of illumination necessary and shall comply with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.

Table 23: Response to visual amenity conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K3.18 Visual Amenity Impacts	Provision of lighting at the Berrima Cement Works complies with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.	No community complaints regarding light spill have been received during the reporting period – the community has not previously complained about light spill from the site.	A minimum amount of lights must be on during nigh time for safety, however, management measures are implemented to prevent significant light spill from the site.
K3.19	Compliance with this condition has been confirmed previously.	No community complaints regarding light spill have been received during the reporting period – the community has not previously complained about light spill from the site.	Planting of trees for visual screening is effectively shielding the tower from sensitive receivers – this screening will become more effective as plantings mature.
K3.19A	Managed by the site EMP	No community complaints were received in relation to stockpiling	N/A
M2.19 Visual Amenity	Provision of lighting at the Berrima Cement Works complies with AS 4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.	No community complaints regarding light spill have been received during the reporting period – the community has not previously complained about light spill from the site.	A minimum amount of lights must be on during nigh time for safety, however, management measures are implemented to prevent significant light spill from the site.

5.9 Rehabilitation

The Guideline requirement for reporting on rehabilitation activities focuses on mining, however, Development Consent No. 401-11-2002-i and Development Consent No. 85-4-2005-i relate to activities in a cement production facility. Areas disturbed during construction of the SWDF facility are being rehabilitated in accordance with *Construction Environmental Management Plan – Solid Waste Derived Fuels Project* (Boral 2017).
5.10 Community

The community relations conditions for Kiln 6 are in conditions 5.1 to 5.5 of Development Consent No. 401-11-2002-i and in conditions 4.1 to 4.3 of Development Consent No. 85-4-2005-i for Mill 7 (Table 25). Performance for both consents are reported under the conditions for Kiln 6 in Table 26 because the conditions are the largely the same in both consents.

78 community complaints were received during the reporting period, all of which related to dust generation and deposition and the other was in regards to weeds on the rail line. One whole of community meeting was held during the reporting period on 25 July 2019.

The Community Liaison Group (CLG) was re-established during the 2019/20 reporting period with the members endorsed by the DPIE on 30 August 2019.

Three meetings were held on 27 June 2019, 26 September 2019 and 5 December 2020. Unfortunately the meeting scheduled for the 19 March 2020 was deferred due to COVID-19 restrictions.

Details of these meetings are held on the (www.boral.com.au/berrimacement) website.

Table 24: Community conditions

Number	Condition
K5.1	Subject to confidentiality, the Applicant shall make all documents required under this consent available for public inspection upon request. This shall include provision of all documents at the site for inspection by visitors, and in an appropriate electronic format on the Applicant's internet site, should one exist.
	Prior to the commencement of construction for the cement works upgrade, the Applicant shall ensure that the following are available for community complaints for the life of the cement works upgrade (including construction and operation):
K5.2	a) a telephone number on which complaints about operations on the site may be registered;
	b) a postal address to which written complaints may be sent; and
	c) an email address to which electronic complaints may be transmitted, should the Applicant have email capabilities.
	The telephone number, the postal address and the email address shall be displayed on a sign near the entrance to the site, in a position that is clearly visible to the public. These details shall also be provided on the Applicant's internet site, should one exist.
	The Applicant shall record details of all complaints received through the means listed under condition 5.2 of this consent in an up-to-date Complaints Register. The Register shall record, but not necessarily be limited to:
	a) the date and time, where relevant, of the complaint;
	b) the means by which the complaint was made (telephone, mail or email);
K5.3	c) any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
	d) the nature of the complaint;
	e) any action(s) taken by the Applicant in relation to the complaint, including any follow-up contact with the complainant; and
	f) if no action was taken by the Applicant in relation to the complaint, the reason(s) why no action was taken. The Complaints Register shall be made available for inspection by the EPA or the Secretary upon request.
K5.4	Prior to the use of Non-Standard Fuels at the development the Applicant shall establish a Community Liaison Group that has access to all environmental management plans and monitoring data, environmental reporting and tracking and audit reports required by this consent. The Group shall: a) be comprised of the following, whose appointment has been approved by the Secretary: i) 1 or 2 representatives from the Applicant, including the person responsible for environmental management at the development; ii) 1 representative from Council; and iii) 3 or 4 representatives from the local community. b) be chaired by a representative agreed to by the Group and approved by the Secretary; c) meet a minimum of once in every 6 month period; and d) review and provide advice on the environmental performance of the development, including providing comment where necessary on any environmental management plans, monitoring results, audit reports, or complaints.
K5.5	The Applicant shall at its own expense: a) ensure that 1 or 2 of its representatives attend the Group's meetings; b) provide the Group with regular information on the environmental management and performance of the development; c) provide access to independent scientific/technical support to assist member in understanding and interpreting information provided, if requested; d) provide meeting facilities for the Group, where necessary; e) arrange site inspections for the Group, if requested; f) take minutes of the Group's meetings and make these minutes available to the public for inspection within 14 days of the Group meeting, or as agreed to by the Group; g) respond to any advice or recommendations the Group may have in relation to the environmental management or performance of the development; and h) maintain a record and a copy of the minutes of each Group meeting, and any responses to the Group's recommendations, to be provided to the Secretary upon request.
	Note. The above condition's also cover an elements of conditions 4.1 to 4.3 of the conditions set out for the development of Centent Mills /.

Note: (K = Kiln 6, M = Mill 7)

Table 25: Response to community conditions

Condition / EIS prediction	Performance during reporting period	Trend / management implications	Implemented / proposed management actions
K5.1	Development Consent No. 401-11-2002-i, Development Consent No. 85-4-2005-i and EPL 1698 are available for inspection on request at the Berrima Cement Works. Current environmental monitoring data under the EPL is available at https://www.boral.com.au/our- commitment/environmental-reporting The site's environmental management plans and some previous AEMRs are available at (www.boral.com.au/berrimacement)	Boral historically and continues to make information available on request at the site and on the site's website.	Boral will continue to make information available on request at the site and on the site's website.
K5.2	Berrima Cement Plant's complaints procedures are documented in the operational environmental management plan and subordinate plans. Contact details for Boral Cement Berrima are included on all site entrance signage, and include a telephone number, postal address and email address. Additionally, contact details are provided on the website (www.boral.com.au/berrimacement)	Boral historically and continues to provide contact information on signs and on the site's website.	Boral will continue to make information available on request at the site and on the site's website.
K5.3	Berrima Cement Plant's complaints procedures are documented in the Operation Environmental Management Plan and subordinate plans. A summary of all complaints (by type) received during this reporting period of 1/05/2019 – 30/04/2020 is provided in Appendix 2. There were 78 complaints, each of which related to dust.	The number of complaints were higher than last year and is largely reflective of the Dust event that occurred in late June 2019 which resulted in a Penalty Infringement Notice from the EPA issued in December 2019.	Boral will continue to implement the Operational Environmental Management Plan to prevent nuisance impacts on neighbouring properties and implement the real-time dust monitor.
K5.4	The community liaison committee (CLC) was originally established in April 2004. Since 2010, , the CLC was converted to public meetings, including invitations to the CLC members, as, at the time the CLC format proved unsuccessful in communicating meeting contents and outcomes to the broader community. In 2019/20 a Community Liaison Group was restablished with 3 meetings held. A forth meeting was deferred due to COVID social restrictions. One whole community meeting was held during this reporting period, on 25 July 2019. Notes of meetings and	The CLG will meet quarterly and there will be one whole of community meeting held annually.	The CLG will meet quarterly and there will be one whole of community meeting held annually.

	copies of presentations made at the community meetings are sent to all meeting participants and are displayed in the community section of the Berrima website: (www.boral.com.au/berrimacement)		
K5.5	The Berrima Cement Management Team is represented by the Site Operations Manager and the Environmental Sustainability Manager, together with Boral's Stakeholder Relations Manager - Southern Region (NSW/VIC/TAS/SA), and a representative from Boral Cement's Group Engineering Team. Minutes from the CLG meetings have been posted on the website.	Boral has historically, and will continue to, respond to requests from CLG members and post the meeting minutes on the website.	Boral will continue to respond to requests from CLG members and post the meeting minutes on the website.

Note: (K = Kiln 6, M = Mill 7)

6 INDEPENDENT AUDIT

Condition 4.5 of the Kiln 6 development consent and Condition 3.3 of Cement Mill 7 development consent require Boral Cement to audit the site once every three years. Both conditions are nearly identical and the audit is undertaken as a single operation. Condition 4.5 of the Kiln 6 development consent states:

Within three years of the commencement of operation of the cement works upgrade, and every three years thereafter or as otherwise required by the Director-General, the Applicant shall commission an independent person or team to undertake an Environmental Audit of the cement works upgrade. The independent person or team shall be approved by the Director-General, prior to the commencement of the Audit. An Environmental Audit Report shall be submitted for comment to the Director-General, the EPA and Council, within one month of the completion of the Audit. The Audit shall:

• be carried out in accordance with ISO 14010 - Guidelines and General Principles for Environmental Auditing and ISO 14011 - Procedures for Environmental Auditing;

- assess compliance with the requirements of this consent, and other licences and approvals that apply to the cement works upgrade;
- assess the cement works upgrade operations against the predictions made and conclusions drawn in the SEE and other documents listed under conditions 1.2a to 1.2q inclusive; and
- review the effectiveness of the environmental management of the cement works upgrade, including any environmental impact mitigation works.

The Secretary may, having considered any submission made by the EPA and/or Council in response to the Environmental Audit Report, require the Applicant to undertake works to address the findings or recommendations presented in the Report. Any such works shall be completed within such time as the Director-General may agree. The above wording is replicated in Condition 3.3 of the Mill 7 development consent.

The above wording is replicated in Condition 3.3 of the Mill 7 development consent.

Somerset Risk Management audited the site against the development consents, statement of environmental effects for Cement Mill 7, statement of environmental effects for Kiln 6, EPL and management plans in November 2017. The audit determined there were no major or minor non-conformances with the approval and management documents during the previous three years. The next three yearly audit is due to be undertaken in November 2020.

- Condition 4.6 of the Kiln 6 development consent requires Boral Cement to undertake Non-Standard Fuel auditing within 12 months of receipt of the first load of any Group 1 or Group 2 Non-Standard Fuels under the consent, with further audits to be undertaken every 12 months.
- With the commencement of Solid Waste Derived Fuels in the 2018/19 reporting period, the first year audit was to be undertaken and submitted by the end of November 2019. With approval from the DPIE on 29 July 2019, Boral engaged Robert Byrnes from IEC in August 2019 to undertake this audit and submitted the final report on 29 November 2019.

The audit did not identify any non-compliances with the consent, however did recommend the following:

- The OEMP should be updated to include current operating triggers.
- The data collected during the PoPT should be used to review the modelling undertake as part of the approval.

In response to this audit Boral committed to updating the

- OEMP and the Air Quality Monitoring Plan to include an air quality Trigger Action Response Plan. This was completed in April 2020 and submitted to the DPIE in June 2020.
- Undertaking a ground pollutant modelling exercise. This was undertaken and is included in Section 5.3 Air Quality.

7 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

There were two non-compliances reported for the reporting period within the annual return for EPL 1698. The following provides details of reported non-compliances.

High Volume Air Sampler failure to run

- I. Licence condition: M2.2 Point 18 PM Monitoring
- II. Summary: On 4 occasions out of 62 (60 required for licence) sample events the HVAS failed to run. The HVAS is required to run every 6 days to measure PM10. On two occasions this was the result of a software issue and two occasions related to power failure.
- III. Dates: 31/7/2019, 6/8/2019, 2/2/2020, 27/03/2020
- IV. Cause: 31/7/2019 & 6/8/2019 Software bug which required resetting after each run as it could not recognise the date. 2/2/2020 & 27/3/2020 Power trip or outage.
- V. Actual or Potential impacts: HVAS for PM10 is one of many fugitive monitors around the site to measure any offsite impacts of dust. Figure 8 in Section 5.3 details the sites performance regarding PM10 and Total Suspended Solids. While TSP is not on the licence it was sampled at the same dates with results of 1/8/19 = 20.5ppm, 6/8/19 = 42.8ppm, 2/2/20 = 201 ppm and 27/3/20 = 13.3ppm. These were all below the annual NEPM annual average goal of 90ppm except for 2/2/20 which was during the summer bushfires and at a time when the kiln was not operating as part of its annual shut.
- VI. Action Taken: The software on the HVAS was updated in August 2019 to eliminate the date recognition risk. Two additional samples were taken to make up for the missed monitoring.
- VII. Action to prevent recurrence: Due to the remote locations of the monitoring units and the standard that requires monitoring every 6 days, if the monitor fails due to a power outage etc. there is nothing that can be done to sample other than attempt to undertake additional samples and to assess against other dust parameters taken on that day. The current Air Quality Management Plan has been updated to recommend that if there is a power failure or the equipment fails to run that an additional sample is to be taken.

July 2019 Dust Release Incident

- I. Licence condition: O2.1 Maintenance of Plant and Equipment
- II. Summary: From 23 June 2019 to approximately 28 June 2019, failures in a bag house resulted in cement dust emissions that left the premises, affecting New Berrima Residents, depositing cement dust on their vehicles and property. An incident report for this event was submitted to the EPA and DPIE on 12 July 2019. The EPA issued a Penalty Infringement Notice of \$15000 for this event on 19 December 2019.
- III. Dates: 23 June to 28 June 2019
- IV. Cause: After correlating the (i) dates, (ii) wind direction (southerly at 20-22 km/hr), (iii) location of the complaints within Brisbane and Melbourne streets New Berrima and (iv) visual indications that the type of dust as cement like, the Boral Cement operational team identified the most likely source of dust to be within the cement milling and handling areas. See Figure 1 below.

There was no clinker handling during the days of the complaints, so this activity as a source was ruled out. Rather, the Boral operational teamed turned their focus to various dust collectors (which vary significantly in size) which are located within the cement milling and handling areas.

During investigations on the 25 June 2019, it was identified that dust collector (DC 123) within Mill 6 was venting dust through the exhaust outlet approximately 12m above ground (see image one of vent location).

DC 123 is smaller dust collector which captures dust from Cement Mill 6 feed conveyors and is made up of 144 bags. On inspection of the dust collector, a number of bags were identified as having failed prematurely and the fan speed could have contributed to the dust collector performance. The feed conveyors carry clinker and gypsum into the mill. Clinker and gypsum are the main ingredients in cement which describes why the material deposited on cars was cement like.

It is believed the weather (southerly wind and light rain) was a significant mitigating factor in the offsite deposition of dust onto cars and property from 23 June to 24 June 2019. Other fugitive emissions from roads may have contributed to the dust load, however given there was limited dust generating activities (e.g. slag handling over the weekend) and the height of the fan release point for DC 123, we consider DC 123 to be the likely main source of the fugitive dust emissions.



Figure 1: Berrima complaints, weather and location of DC123



Image 1: DC 123 fan outlet.

- V. Actual or potential impacts: The off-site impact was limited to the deposition of cement dust on residents cars. As at 11 July 2019 a total of 67 vouchers were provided to residents to have their cars cleaned.
- VI. Action taken to mitigate impacts: All complainants were spoken to and where possible visited to understand their individual concerns.

The inspections confirmed the presence of cement-like dust on vehicles. As this can be difficult to remove after the addition of moisture, a correct cleaning process was established with a car cleaning business in Mittagong. This business uses appropriate cleaning agents ("Crete wash") and methods to prevent damage during cleaning.

Vouchers were purchased and offered to impacted car owners.

On 5 July 2019, we released a letter to all households in the New Berrima village detailing our apologies regarding deposited dust on cars and property and contact details if people were affected to contact our operations.

The incident was also discussed at the open Community meeting on 25 July 2019.

VII. Action taken to prevent recurrence: On 26 June 2019 repairs were scheduled and completed on 1 July 2019 with three bags replaced and with work also undertake to identify and scope works to reduce air flow on the fan speed and modifications required to block the fan inlet dampener by 20%. To avoid other bags potentially failing, on 28 June 2019 a decision was made to replace all bags in DC 123 commencing and completed 4 July 2019.

Boral committed to and has purchased a real-rime dust monitor and will also use weather forecasting to predict the risk of off-site dust events. This unit will be linked to the control room and form part of the sites new dust Trigger Action Response Plan (TARP).

The operations have also purchased a larger water cart with greater capacity and water cannon improvements.

8 ACTIVITIES TO BE COMPLETED DURING THE NEXT REPORTING PERIOD

During the 2020-21 reporting period, in addition to the annual kiln shutdowns, the following projects will be undertaken or be progressed:

- Potential upgrades to AKF1 fuel storage facility will be investigated to enable potential reinstatement of the non-standard fuel AKF1.
- Continue to maintain all wheel wash stations replacement of a water cart

APPENDIX 1 – ANNUAL ENVIRONMENTAL NOISE ASSESSMENT (SEE ATTACHED)

APPENDIX 2 – COMMUNITY COMPLAINTS REGISTER APRIL 2019-MAY 2020

	Community Complaints 2019 2020						
DATE	COMPLAINT	COMPLAINT ADDRESS	HOW REPORTED	DETAIL & ACTION			
23-Jun-2019	Dust	Brisbane Street, New Berrima	SMS - Gabriel Paicu	Dust on car. Voucher provided.			
24-Jun-2019	Dust	Melbourne Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
24-Jun-2019	Dust	Melbourne Street, New Berrima	Called Reception	Dust on car. Did not want voucher.			
24-Jun-2019	Dust	Melbourne Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
24-Jun-2019	Dust	Brisbane Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
24-Jun-2019	Dust	Brisbane Street, New Berrima	Called Control Room	Dust on car. Voucher provided			
25-Jun-2019	Dust	Melbourne Street, New Berrima	Callou Control Hoom	Dust on car. Voucher provided.			
25-Jun-2019	Dust	Brisbane Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
25-Jun-2019	Dust	Brisbane Street, New Berrima	Called Control Room	Dust on car. Voucher provided.			
25-Jun-2019	Dust	Adelaide Street, New Berrima	Called Control Room	Thank you for voucher			
25-Jun-2019	Dust	Melbourne Street, New Berrima	Received email	Dust on car. Voucher provided.			
25-Jun-2019	Dust	Sydney Street, New Berrima	Called & SMS - Waqas	Dust on car. Voucher provided.			
25-Jun-2019	Dust	Adelaide Street, New Berrima	Called & SMS - Waqas	Dust on car. Voucher provided.			
25-Jun-2019	Dust	Brisbane Street, New Berrima	Called Control Room	Dust on car. Voucher provided			
25-Jun-2019	Dust	Adelaide Street, New Berrima	Called Control Room	Dust on car. Voucher provided.			
26-Jun-2019	Dust	Melbourne Street, New Berrima	Visited Reception	Dust on car. Voucher provided.			
26-Jun-2019	Dust	Argyle Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
26-Jun-2019	Dust	Melbourne Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
26-Jun-2019	Dust	Argyle Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
26-Jun-2019	Dust	Brisbane Street, New Berrima	Called Control Room	Dust on car. Voucher provided.			
27-Jun-2019	Dust	Adelaide Street, New Berrima	Called Reception	Dust on car. Voucher provided.			
27-Jun-2019	Dust	Brisbane Street, New Berrima	Called Reception	Dust on car. Voucher provided			
28-Jun-2019	Dust	Brisbane Street, New Berrima	Called Control Room	Dust on car. Voucher provided			
28-Jun-2019	Dust	Argyle St. New Berrima	Called Control Room	Dust on car. Voucher provided.			
1-Jul-2019	Dust	Adelaide St, New Berrima	Called Control Room	Resident thanked site for voucher			
1-Jul-2019	Dust	Brisbane Street, New Berrima	Spoke to Branko.V	Dust on car. Voucher provided.			
1-Jul-2019	Dust	Melbourne Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
5-Jul-2019	Dust	Sydney Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
4-Jul-2019	Dust	Sydney Street, New Berrima	Spoke to Control Room	5/7 - GP went and visited and spoke to his wife.			
5-Jul-2019	Dust	Argyle Street, New Berrima	Spoke to Waqas	Dust on car. Voucher provided.			
8-Jul-2019 8- Jul-2019	Dust	Brisbane Street, New Berrima	Spoke to Control Room	Dust on car. Voucher provided. 8/7 - GP spoke to Resident and said he has dust and got the newsletter			
8-Jul-2019	Dust	Melbourne Street, New Berrima	Spoke to Control Room	8/7 - GP spoke to Resident, and said he has dust and got the newsletter.			
9-Jul-2019	Dust	Adelaide Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
9-Jul-2019	Dust	Brisbane Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
9-Jul-2019	Dust	4 Howard Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
9-Jul-2019	Dust	72 Taylor Avenue, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
10-Jul-2019	Dust	25 Argyle Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
11-Jul-2019	Dust	Adelaide Street, New Berrima	Left message at Reception	10/7 - Reception received and message and there was no return number, asked GP to go and visit.			
15-Jul-2019	Dust	Arygle Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
15-Jul-2019	Dust	Argyle Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
15-Jul-2019	Dust	Adelaide Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided			
17-Jul-2019	Dust	Sydney Street, New Berrima	Spoke to Control Room	Dust on car. Voucher provided.			
17-Jul-2019	Dust	Brisbane Street, New Berrima	Spoke to Reception	Dust on car. Voucher provided.			
18-Jul-2019	Dust	Howard Street, New Berrima	E-mailed to Paul Jackson	Dust on furniture.			
19-Jul-2019	Dust	Taylor Avenue, New Berrima	Spoke to Reception	Dust on car and solar panel concerns. Voucher provided.			
23-Jul-2019	Dust	Melbourne Street, New Berrima	Spoke to Reception	Dust on solar panels.			
24-Jul-2019	Dust	Brisbane Street, New Berrima	Spoke to Gabriel	Dust on car. Voucher provided.			
12-Jul-2019	Dust	Argle Street, New Berrima	Emailed feedback site	Dean sent response email to Allision on 24/7/19.			
9-Jul-2019	Dust	Adelaide Street, New Berrima	Emailed feedback site	Dust on car. Voucher provided.			
8-Jul-2019	Dust	Taylor Avenue, New Berrima	Emailed feedback site	Dust on car. Voucher provided.			
8-Jul-2019	Dust	Taylor Avenue, New Berrima	Emailed feedback site	Dust on car. Voucher provided			
30-Jul-2019	Dust	Taylor Avenue, New Berrima	Upset at WoC meeting at	Dust on car. Voucher provided.			
5-Aug-2019	Dust	Sydney Street New Berrima	Visited Reception	Dust on car. Voucher provided			
7-Aug-2019	Dust	Howard Street, New Berrima	Call Reception	Dust on car and solar panel concerns. Voucher provided.			
13-Aug-2019	Dust	Sydney Street, New Berrima	Call Reception	Dust on car. Voucher provided.			
25-Aug-2019	Dust	Brisbane Street, New Berrima	Gabriel	Dust on Car on Saturday Night. Checked wind direction and it was NW			
28-Aug-2019	Dust	Brisbane Street, New Berrima	Gabriel	Dust on Car between 11am and 3pm. Checked wind drection and it was W			
29-Aug-2019	Dust	Brisbane Street, New Berrima	Gabriel	Wind SE			
30-Aug-2019	Dust	Brisbane Street, New Berrima	Gabriel	Wind SE. Went to see her in the afternoon and it was very fine grey dust			
31-Aug-2019	Dust	Brisbane Street, New Berrima	Gabriel	Wind SE			
31-Aug-2019	Dust	Melbourne Street, New Berrima	Control Room	Dust on car. Voucher provided.			
1-Sep-2019	Dust	Arvale Street, New Berrima	Control Room	Dust on car. Voucher provided.			
2-Sep-2019	Dust	Brisbane Street. New Berrima	Reception	Dust on car. Voucher provided.			
2-Sep-2019	Dust	Sydney Street, New Berrina	Control Room	Dust on car. Voucher provided.			
4-Sep-2019	Dust	Brisbane Street, New Berrima	Reception	Dust on car. Voucher provided.			
3-Dec-2019	Dust	Brisbane Street, New Berrima	Reception	Dust on car. Voucher provided.			
17-Mar-2020	Dust	Melbourne Street, New Berrima	CCR	Resident called about dust on car. GP went to visit and found fine grey dust. Berrima will look into possible dust source			
16-Mar-2020	Dust	Brisbane Street, New Berrima	EPA	Dust on car. Did not want voucher.			
17-Mar-2020	Dust	Melbourne Street, New Berrima	CCR	Dust on car. Voucher provided.			
16-Mar-2020	Dust	Argyle Street, New Berrima	EPA	Dust on car. Voucher provided.			
18-Mar-2020	Dust	Brisbane Street, New Berrima	CCR	Dust on car. Voucher provided.			

APPENDIX 3 – QUARTERLY TESTING COMPLIANCE TABLES

BERRIMA CEMENT WORKS - 2020 AEMR

2 LICENCE COMPARISON

July 2019 Stack Testing

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The following licence comparison table shows that all analytes highlighted in green are below the licence limit set by the NSW EPA as per licence 1698 (last amended on 23/12/2016).

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 10% O ₂)
	Mercury	mg/m ³	0.05	0.0093	0.0088
	Type 1 and Type 2 substances in aggregate	mg/m ³	0.5	≤0.084	≤0.079
	Solid particles	mg/m ³	50	54	47
	Nitrogen oxides	mg/m ³	1250	1100	940
	Cadmium + Thallium	mg/m ³	0.05	≤0.0035	≤0.0034
EPA 2 - Kilp Stack No. 6	Chlorine	mg/m ³	50	<0.02	<0.02
EPA 2 - Kin Stack No. 0	Dioxins & furans (I-TEQ middle bound)	ng/m ³	0.1	0.0024	0.0021
	Hydrogen chloride	mg/m ³	10	0.063	0.057
	Hydrogen fluoride	mg/m ³	1	≤0.52	≤0.47
	Sulfur dioxide	mg/m ³	50	0.69	0.60
	Sulfuric acid mist and sulfur trioxide (as SO ₃)	mg/m ³	50	0.11	0.096
	Volatile organic compounds	mg/m ³	40	3.2	2.8
EPA 4 - No.6 Cement Mill Stack Duct 1	Solid particles	mg/m ³	100	≤3.1	NA
EPA 4 - No.6 Cement Mill Stack Duct 2	Solid particles	mg/m ³	100	<2	NA
EPA 5 - No. 6 Kiln Cooler Stack	Solid particles	mg/m ³	100	<1	NA
EPA 10 - No.7 Cement Mill Stack	Solid particles	mg/m ³	20	4.4	NA



1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit set by the NSW EPA as per licence 1698 (last amended on 18 December 2019).

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 10% O ₂)
	Mercury	mg/m ³	0.05	0.0081	0.0091
	Type 1 and Type 2 substances in aggregate	mg/m ³	0.5	≤0.12	≤0.14
	Solid particles	mg/m ³	50	27	28
	Nitrogen oxides	mg/m ³	1250	830	750
	Cadmium + Thallium	mg/m ³	0.05	≤0.039	≤0.043
EPA 2 - Kiln Stack No. 6	Chlorine	mg/m ³	50	0.013	0.012
EFA 2 - KIII Stack NO. 0	Dioxins & furans (I-TEQ middle bound)	ng/m ³	0.1	0.0019	0.0017
	Hydrogen chloride	mg/m ³	10	0.2	0.19
	Hydrogen fluoride	mg/m ³	1	0.2	0.18
	Sulfur dioxide	mg/m ³	50	0.12	0.13
	Sulfuric acid mist and sulfur trioxide (as SO ₃)	mg/m ³	50	1.9	2
	Volatile organic compounds	mg/m ³	40	4.4	4

Please note that the measurement uncertainty associated with the test results **was not** considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.

Reference: R008764 Date: 20/04/2020 Prepared for: Boral Cement Ltd (Berrima) Page: 5 of 16 February 2020 Kiln Stack Testing



1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence set by the NSW EPA as per licence 1698 (last amended on 18 December 2019).

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 10% O ₂)
	Mercury	mg/m ³	0.05	0.0076	0.0075
	Type 1 and Type 2 substances in aggregate	mg/m ³	0.5	<0.03	<0.03
	Solid particles	mg/m ³	50	31	31
	Nitrogen oxides	mg/m ³	1250	1000	1000
	Cadmium + Thallium	mg/m ³	0.05	≤0.0024	≤0.0024
EPA 2 - Kilp Stack No. 6	Chlorine	mg/m ³	50	0.015	0.015
EFA 2 - KIII Stack NO. 0	Dioxins & furans (I-TEQ middle bound)	ng/m ³	0.1	0.0028	0.0027
	Hydrogen chloride	mg/m ³	10	0.14	0.14
	Hydrogen fluoride	mg/m ³	1	≤0.042	≤0.041
	Sulfur dioxide	mg/m ³	50	0.13	0.13
	Sulfuric acid mist and sulfur trioxide (as SO ₃)	mg/m ³	50	≤0.023	≤0.023
	Volatile organic compounds	mg/m ³	40	1.5	1.5

Please note that the measurement uncertainty associated with the test results **was not** considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.

 Reference: R008994
 April 2020 Kiln 6 Stack Testing

 Date: 15/06/2020
 Prepared for: Boral Cement Ltd (Berrima)

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1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit and all analytes highlighted in red are outside the licence limit set by the NSW EPA as per licence 1698 (last amended on 18 December 2019).

EPA	Parameter	Units	Licence limit	Detected values	Detected values (corrected to 10% O ₂)
	Mercury	mg/m ³	0.05	0.0066	0.0072
	Type 1 and Type 2 substances in aggregate	mg/m ³	0.5	≤0.042	≤0.046
	Solid particles	mg/m ³	50	25	33
	Nitrogen oxides	mg/m ³	1250	1100	1100
	Cadmium + Thallium	mg/m ³	0.05	≤0.0027	≤0.0037
FRA 2 - Kilp Stock No. 6	Chlorine	mg/m ³	50	<0.01	<0.02
EFA 2 - KIII Stack NO. 0	Dioxins & furans (I-TEQ middle bound)	ng/m ³	0.1	0.00063	0.00064
	Hydrogen chloride	mg/m ³	10	0.3	0.4
	Hydrogen fluoride	mg/m ³	1	<0.03	<0.03
	Sulfur dioxide	mg/m ³	50	0.66	0.86
	Sulfuric acid mist and sulfur trioxide (as SO_3)	mg/m ³	50	0.033	0.043
	Volatile organic compounds	mg/m ³	40	1.1	1.1

Please note that the measurement uncertainty associated with the test results **was not** considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.