Recognition Research

Boral Cement

Annual Environmental Noise Assessment
October -November 2021

For

Berrima Cement Plant

31 December, 2021

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Recognition Research Pty Ltd
Unit 2 No 5 Thalassa Ave
East Corrimal NSW 2518

ABN: 25 153 946 064
ACN: 153 946 064

Boral Cement Berrima

Annual Environmental Noise Assessment
October - November 2021

Report of assessment

31 December 2021

RRRep:045

2021.12.31	0	Final Draft	Colin Tickell	Stephen Collings		Gabriel Paicu
Date	**Rev.**	**Status**	**Prepared By**	**Checked By**	**Approved By**	**Approved By**
Recognition Research						**Client**

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ACN: 153 946 064

Table of Contents

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Executive Summary

The Berrima Cement works of Boral Cement has a single noise limit condition of $L_{A90,15\text{-minute}}$ not to exceed 58 dBA at monitoring Location 20 in the Store Yard, as part of it's Pollution Control Licence for the total site. To assess compliance with this condition, monitoring for total site emissions at Location 20 over a 14 day period was made in October to November 2021. The results of this monitoring have confirmed that total site emissions are in compliance with the licence condition. The single 15-minute period when that sound level limit was exceeded at the monitoring site was caused by a one or more train movements and associated noises close to the monitoring site during the period. Also, the long-term average sound level objective of $L_{A90,period}$ not to exceed 56 dBA was achieved and did not exceed 52 dBA.

Sound levels of noise sources at the plant and environmental noise in the residential community affected by the noise emissions from the total site have been measured regularly since 2002. Monitoring of both site source sound levels and residential receiver sound levels on an annual basis since 2008 has confirmed that major site projects with noise level conditions were in compliance with their noise limit conditions at the time.

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

- Monitoring of sound levels continuously at Location 20 over a two-week period for compliance assessment;
- comparative measurements around major plant sources of noise at over 300 of the same locations as in previous years, 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 one residential receiver location with unattended monitoring over long-term periods of two weeks and attended monitoring at three residential receiver locations to compare with long-term averages from previous years and assess the audible acceptability of the received sound levels.

The finding of this 2021 annual environmental noise assessment is that total site noise emissions are considered to be in compliance with the licence condition.

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.

Measurements at the North Fence location also assessed potential sleep disturbance and low-frequency impacts according to the 2017 release of the Noise Policy for Industry.

Calculations of sleep disturbance potential use $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ at night-time to provide comparisons with recommended maximum values for night-time of 60 dBA for $L_{A01.1\text{-minute}}$ night-time for the Northern Boundary location and not greater than 15 dB difference for $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$. From the analyses it is considered that the number or times that the objectives of $\mathbf{L_{A01,1\text{-minute}}}$ greater than 60 dBA and $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB are relatively low and

the noise emissions from the Cement Plant have a low potential for sleep disturbance. This is because the Cement Plant sources are continuous with very little change in sound emission level.

Only warning signals from train horns, train operations and truck bumps were likely to cause the 60 dBA objective to be exceeded. This is the same as in previous years.

For low frequency assessment, an initial screening test is made of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value.

From the measurements in the residential receiver locations, the low frequency assessment was made on both $L_{Aeq,15\text{-}min}$ and $L_{A90,15\text{-}min}$ values. Exceedance of the screening test were identified on three occasions out of 9 measurements for L_{eq} at 4 Melbourne St and none of the two measurements at each of Adelaide St and 12 Brisbane St. For the North Fence location exceedance of the screening test occurred on four of the seven measurements.

From the assessment of this survey it is considered that the main source of low-frequency noise events exceeding the policy objectives is from road traffic noise associated with trucks, either from within New Berrima or on distant roads and the freeway, which was identified in the 2020 assessment. The plant can be a source at times but this is not considered to be significant.

Site noise sources

Some sources of noise at the Cement Plant had increased sound levels from previous measurements. Recommendations for review of plant item performance or maintenance were made for the following:

For No.6 Kiln

- PHT Level 2.5 - A review of the condition of FA63 and its discharge silencer for 63 Hz band sound levels. This recommendation was also made in previous years.
- The new kiln shell cooling fans have significantly increased the sound levels at locations on the northern side of the centre of Kiln 6. A review of alternatives for cooling of this area is recommended from a long-term aspect.
- Sound levels in the low frequency bands have increased around fan FA215. A review of the maintenance condition of the fan is recommended to identify if there is a reason for this increase.
- Radicon Cooler fan sound levels were higher, possibly because of higher load. While calculated not to cause contribution sound levels above the objectives, their reasonably high spectrum levels at mid and lower frequencies may make them a major contribution source. If the blades of these fans need replacing at some time in the future, consideration should be given to more aerodynamic and quieter fan-blade profiles

For the No.7 Cement Mill and Cement Mill No.6 area, areas around CM7 had not significantly increased in sound level compared to previous years and remain acceptable:

- Cement Mill No.6 western wall fans discharge silencer continues to be a high sound level source.

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ACN: 153 946 064

- Cement Mill No.5 building western wall fan (FA502) and northern wall annex fan (DC702) fan discharges are also high.
- Openings at the bottom of all main roller doors be able to seal to ground, not left open 50 to 100mm, or totally open.
- Openings of all smaller doorways be cleaned so they can close fully.
- Cement Mill No.6 - edges of the main northern wall doors have edge seals installed.

It is recommended that these items be reviewed for condition and silencers cleaned, replaced or installed if appropriate.

The Mineral Addition Plant was operating during this survey and the fan sound emission levels were found to be high and adding to sound levels at other measurement locations for CM6. It is recommended that a review of the fan discharge silencer on its dust collector unit DC126 be made and an improved silencer identified.

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1 Introduction

Boral Cement Limited operates the New Berrima cement works near Berrima and Moss Vale in the New South Wales' Southern Highlands region. In 2003, approval was granted to construct and operate an upgrade to Kiln 6 at the Site. In 2005, approval was granted to construct and operate No.7 Cement Mill at the site. Both of these developments had conditions of approval which included contribution noise objectives for different receiver areas in the adjacent residential and rural areas. Demonstration of compliance with these contribution objectives was required as a condition of approval for both projects.

Contribution noise objectives for the total Berrima cement works are included in a consolidated Pollution Control Licence for the site, issued in 2019, and revised approval conditions for the projects, issued in early 2020. The new condition replaces several monitoring locations with different contribution sound levels, into just one single location with one contribution sound level to achieve from the plant. The location is known as Monitoring Location No.20 at the south-eastern corner of the western storage yard. Figure 1.1 shows an aerial view of the cement works and surrounding area, with the locations of Kiln 6 and No.7 Cement Mill and monitoring Location 20 indicated. Figure 1.2 shows an aerial view of the plant immediate locality with boundary environmental noise monitoring locations shown. A site layout plan of the works is shown in Figure 1.3.

Compliance assessment is now based on not exceeding the licence and approval condition of $L_{A90,15\text{-}min}$ not greater than 58 dBA. This was based on an objective of not exceeding a long-term average sound level over a two week period of $L_{A90,long\text{-}term}$ 56 dBA. Reports of compliance assessment of the two projects were provided in 2005 for Kiln 6 Upgrade and in 2007 for Cement Mill No.7.

Noise monitoring of environmental noise and source noise is undertaken regularly on an annual basis in the neighbourhood of the plant and on site. Annual reporting of compliance assessments for the two projects was made from 2007 to 2019. In 2020, compliance assessment included results of monitoring at the single Location 20. Annual environmental noise assessments are provided to the NSW EPA and other statutory authorities.

Following the changes in the approval conditions, the annual noise assessment monitoring methods were modified slightly in 2020. Attended monitoring continues at the same residential receiver locations as in the past. Unattended monitoring continues only at Location 20 (monitored since 2015) , the North Fence location (monitored since 2008) and the residential receiver at 4 Melbourne Street (monitored since 2002).

For this 2021 annual noise compliance assessment, measurements of sound levels at the site and in residential areas of New Berrima were obtained from 22 October to 4 November 2021.

During the period of measurements, the Kiln was operating for almost all of the monitoring period with a couple of longer shut-down periods. A lightning strike on the afternoon of 23 October caused the total plant to shut-down for a couple of hours. Kiln 6 was off for 3 hours on 23/10, 6 hours on the afternoon of 24/10, and 25.5 hours from 1:45pm on 29/10.

Major items of plant were idle for short periods at various times during the monitoring activity. Figures 1.4 to 1.6 show the idle times of the major plant items for short periods at different times. Table 1.1 shows the times of non-operation of the major plant items. Figure 1.4 shows the non-operating periods graphically for the whole period monitored, with Figures 1.5 and 1.6 showing the period split into two 7-day periods.

RM6 had from 11 minutes to 1 day 21 hours off; RM7 was off for periods from 10 minutes to 1 day 9 hours and 40 minutes; CM6 had periods of idle from 8 minutes to almost 1 day; CM7 had shorter and fewer idle periods of up 12 minutes to 13 hours 53 minutes. to 6 hours and RM7 up to 12 hours idle. Total idle periods were as follows:

Plant Item	**Total time idle**	**Percent of monitoring period** (313 hrs) idle
CM6	45 hrs	14%
CM7	32.25 hrs	10%
RM6	101 hrs	32%
RM7	65 hrs	21%
Kiln 6	36.25	12%

Some of these periods may have affected measured sound levels at the residential receivers but most will not.

Measurements of continuous sound levels over the period 22 October to 4 November were taken with logging sound level meters at site Location 20, Northern Boundary and residential location 4 Melbourne Street.

Measurements of attended sound levels were made during 15-minute periods in daytime, evening and night-time at the three continuous monitoring locations within the monitoring period. Day and evening attended measurements were also made at Adelaide Street near Taylor Avenue and 12 Brisbane Street. Locations monitored were the same as used in previous years. These were:

Residential Receivers:

- 4 Melbourne Street;
- 12 Brisbane Street
- Corner Adelaide and Taylor at 20m back from the edge of Taylor Ave to be in-line with the front of houses. This location provides the same immission as 72 Taylor Avenue used previously.

Cement Plant Site locations

- Northern Boundary
- Location 20 Store Yard (close)

The location at Argyle Street opposite the general store which, was used in previous surveys was not used because it now adjoins a new Service Station which has relatively high ambient sound levels associated with it and was considered to not represent sound levels caused by the Cement Works.

This report provides an assessment of compliance of the current operation of the total Cement Plant site. Results are compared to those taken in 2005, and 2006, then the continuous annual reviews from 2010 to 2020.

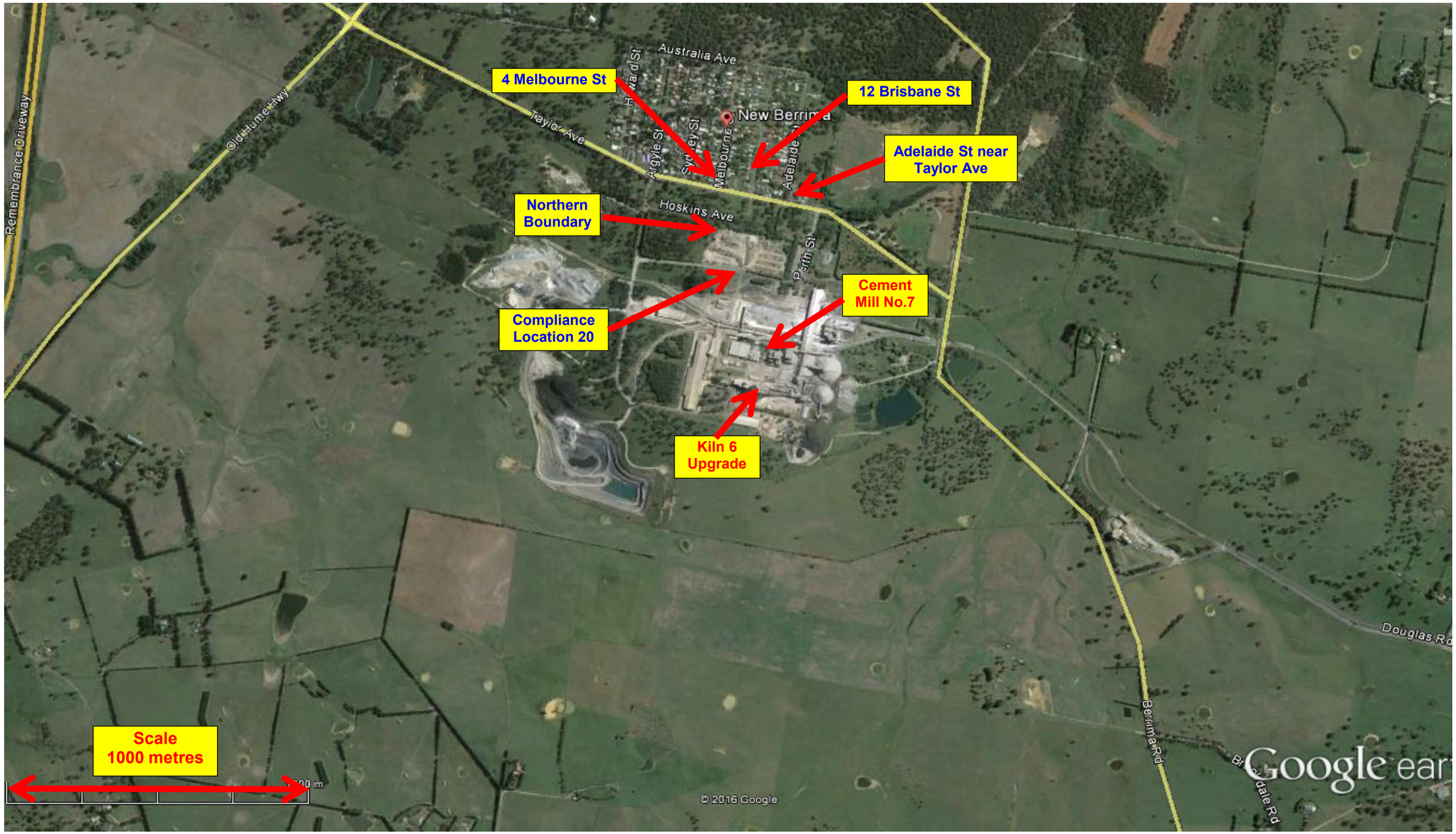


Figure 1.1: Boral Cement - Berrima Cement Works - Aerial view of site, surrounds and long-term and residential logger monitoring locations

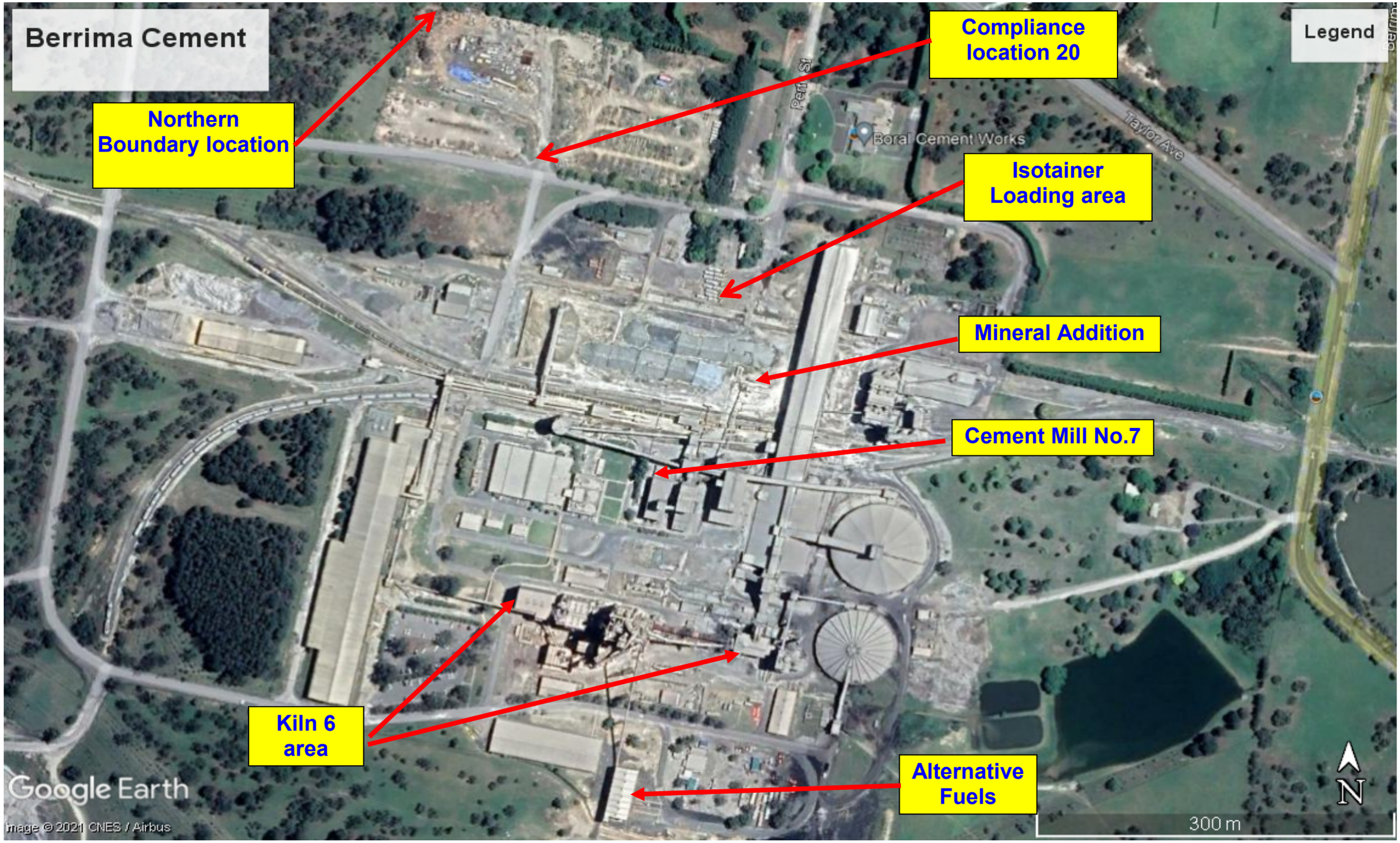


Figure 1.2: Boral Cement - Berrima Cement Works - Aerial view of plant area and major projects areas

AMBULANCE ENTRANCE

TAYLOR AVE.

WORKS MAIN ENTRANCE

SECURITY GATE 2

WEIGHBRIDGE ENTRANCE

TAYLOR AVE.

N

SECURITY GATE 1

W WARDEN AREA

S SAFE ASSEMBLY AREAS

Compliance Location 20

Isotainer Loading Area

SPEED HUMP

ARGYLE S

RAIL CROSSING

RAIL LINE

MOTOR SHED

FETTLERS SHED

LUNCH ROOM

LOCO SHED

SHALE STORAGE SHED

RAW MILLS

No 1 MIXING BASIN

No 2 MIXING BASIN

WALKWAY OVER RAIL

LIMESTONE GANTRY

CO 45

CO 47

CO 48

CO 46

CO 44

CO 43

DUMPING STN

TS1

TS2

TS3

CO 22

CO 23

CLINKER GANTRY

CLINKER STORAGE

POWER SUB STATION

STOCKHOUSE

BULK DISPATCH

WEIGHBRIDGE

ADMIN. OFFICE

CAR PARK

Mineral Addition

Cement Mill No.7

WORKSHOP & STORES COMPLEX

CONTROL CENTRE

No.7 CEM MILL

No.6 CEM MILL

No.6 CEMENT MILL

CLINKER STORAGE

CO 21

60 000 T CLINKER STORAGE

VISITOR CAR PARK

No 5 KILN

COAL MILL

CO 18

CO 73

CO 74

WALKWAY

RAW MILL

No 6 KILN

PRECIPITATOR

BLENDING

COAL BLENDING PLANT

CO 62

CO 61

EXISTING RAW MATERIAL STORE

FIRST AID

VISITOR CAR PARK

PRIMARY SAFE ASSEMBLY AREA

EMPLOYEES CAR PARK

Kiln 6 and new plant area

COOLING PONDS

LARGE STORE SHED BU90

SECONDARY SAFE ASSEMBLY AREA

CONTRACTORS HUTS & PARKING

GROUP ENG.

LAKE QUALITY

TO MOSS VALE

LAKE BREED

SETTLING PONDS

Figure 1.3

BERRIMA WORKS SITE PLAN

DRAWING No 40591 H

Figure 1.3:

Table 1.1: Boral Cement Berrima Annual Noise Assessment - Major Plant operating times

RM6		Period off
ON	OFF	D:hh:mm
10/22/2021 12:00:55 PM	10/23/2021 4:23:13 PM	0:00:11
10/23/2021 4:34:13 PM	10/23/2021 5:12:13 PM	0:03:57
10/23/2021 9:09:13 PM	10/23/2021 9:35:13 PM	1:21:55
10/25/2021 7:30:14 PM	10/25/2021 7:41:14 PM	0:00:12
10/25/2021 7:53:14 PM	10/26/2021 1:12:14 AM	0:01:44
10/26/2021 2:58:14 AM	10/27/2021 11:04:14 AM	0:00:13
10/27/2021 11:17:14 AM	10/29/2021 1:42:15 PM	1:09:02
10/30/2021 10:44:15 PM	10/31/2021 1:38:16 AM	0:11:04
10/31/2021 12:42:16 PM	10/31/2021 2:06:16 PM	0:01:08
10/31/2021 3:14:16 PM	11/01/2021 4:31	0:00:11
11/01/2021 4:42	11/01/2021 6:28	0:01:55
11/01/2021 8:23	11/01/2021 9:55	0:01:28
11/01/2021 11:23	11/01/2021 18:21	0:02:26
11/01/2021 20:47	11/01/2021 21:53	0:00:43
11/01/2021 22:36	11/02/2021 10:29	0:00:44
11/02/2021 11:13	11/03/2021 7:23	0:00:32
11/03/2021 7:55	11/03/2021 13:20	0:02:29
11/03/2021 15:49	11/03/2021 20:21	0:00:13
11/03/2021 20:34	11/04/2021 10:17	0:00:11
11/04/2021 10:28	11/04/2021 10:42	

CM6		Period off
ON	OFF	D:hh:mm
10/22/2021 12:00:55 PM	10/22/2021 3:24:13 PM	0:01:16
10/22/2021 4:40:13 PM	10/23/2021 10:40:13 AM	0:01:03
10/23/2021 11:43:13 AM	10/23/2021 5:12:13 PM	0:02:33
10/23/2021 7:45:13 PM	10/26/2021 7:58:14 PM	0:02:28
10/26/2021 10:26:14 PM	10/27/2021 2:50:14 PM	0:00:58
10/27/2021 3:48:14 PM	10/28/2021 6:03:15 AM	0:00:08
10/28/2021 6:11:15 AM	10/30/2021 8:36:15 AM	0:01:37
10/30/2021 10:13:15 AM	10/31/2021 2:15:16 PM	0:23:30
11/01/2021 14:56	11/01/2021 15:10	0:04:50
11/01/2021 20:00	11/01/2021 21:03	0:00:27
11/01/2021 21:50	11/02/2021 2:32	0:00:29
11/02/2021 3:01	11/02/2021 8:23	0:04:16
11/02/2021 12:39	11/03/2021 13:38	0:02:53
11/03/2021 16:31		

RM7		Period off
ON	OFF	D:hh:mm
10/22/2021 12:00:55 PM	10/22/2021 6:44:11 PM	0:00:44
10/22/2021 7:28:11 PM	10/22/2021 10:03:11 PM	0:01:57
10/23/2021 12:00:11 AM	10/23/2021 4:26:11 PM	0:00:11
10/23/2021 4:37:11 PM	10/23/2021 5:12:11 PM	0:05:15
10/23/2021 10:27:11 PM	10/24/2021 6:16:12 AM	0:08:49
10/24/2021 3:05:12 PM	10/24/2021 6:31:12 PM	0:00:39
10/24/2021 7:10:12 PM	10/25/2021 9:06:12 AM	0:00:10
10/25/2021 9:16:12 AM	10/29/2021 1:37:13 PM	1:09:40
10/30/2021 11:17:14 PM	10/31/2021 1:42:14 AM	0:10:46
10/31/2021 12:28:14 PM	10/31/2021 2:25:14 PM	0:01:31
10/31/2021 4:06:14 PM	11/01/2021 6:29	0:00:17
11/01/2021 6:46	11/01/2021 10:46	0:00:42
11/01/2021 11:28	11/01/2021 18:54	0:00:53
11/01/2021 19:47	11/02/2021 10:46	0:00:28
11/02/2021 11:14	11/03/2021 8:55	0:00:10
11/03/2021 9:05	11/03/2021 13:25	0:02:15
11/03/2021 15:40		

CM7		Period off
ON	OFF	D:hh:mm
10/22/2021 12:00:55 PM	10/23/2021 10:51:11 AM	0:00:32
10/23/2021 11:23:11 AM	10/23/2021 3:57:11 PM	0:00:19
10/23/2021 4:16:11 PM	10/23/2021 5:12:11 PM	0:02:08
10/23/2021 7:20:11 PM	10/24/2021 11:57:12 PM	0:13:53
10/25/2021 1:50:12 PM	10/26/2021 7:59:13 PM	0:02:22
10/26/2021 10:21:13 PM	10/27/2021 2:51:13 PM	0:00:49
10/27/2021 3:40:13 PM	10/28/2021 9:58:13 AM	0:00:22
10/28/2021 10:20:13 AM	10/28/2021 5:00:13 PM	0:00:15
10/28/2021 5:28:13 PM	10/30/2021 8:39:14 AM	0:01:42
10/30/2021 10:21:14 AM	10/31/2021 2:47:14 AM	0:00:20
10/31/2021 3:07:14 AM	11/01/2021 3:27	0:05:12
11/01/2021 8:35	11/01/2021 18:48	0:01:56
11/01/2021 20:44	11/03/2021 11:51	0:04:47
11/03/2021 16:38		

K6		Period off
ON	OFF	D:hh:mm
10/22/2021 12:00:55 PM	10/23/2021 5:14:11 PM	0:02:47
10/23/2021 8:01:11 PM	10/24/2021 6:17:12 AM	0:05:55
10/24/2021 12:12:12 PM	10/29/2021 1:46:13 PM	1:01:31
10/30/2021 3:17:14 PM	10/30/2021 5:27:14 PM	0:02:51
10/30/2021 8:18:14 PM		

Figure 1.4: Times of major plant operations 22 October to 4 November 2021 - Time On

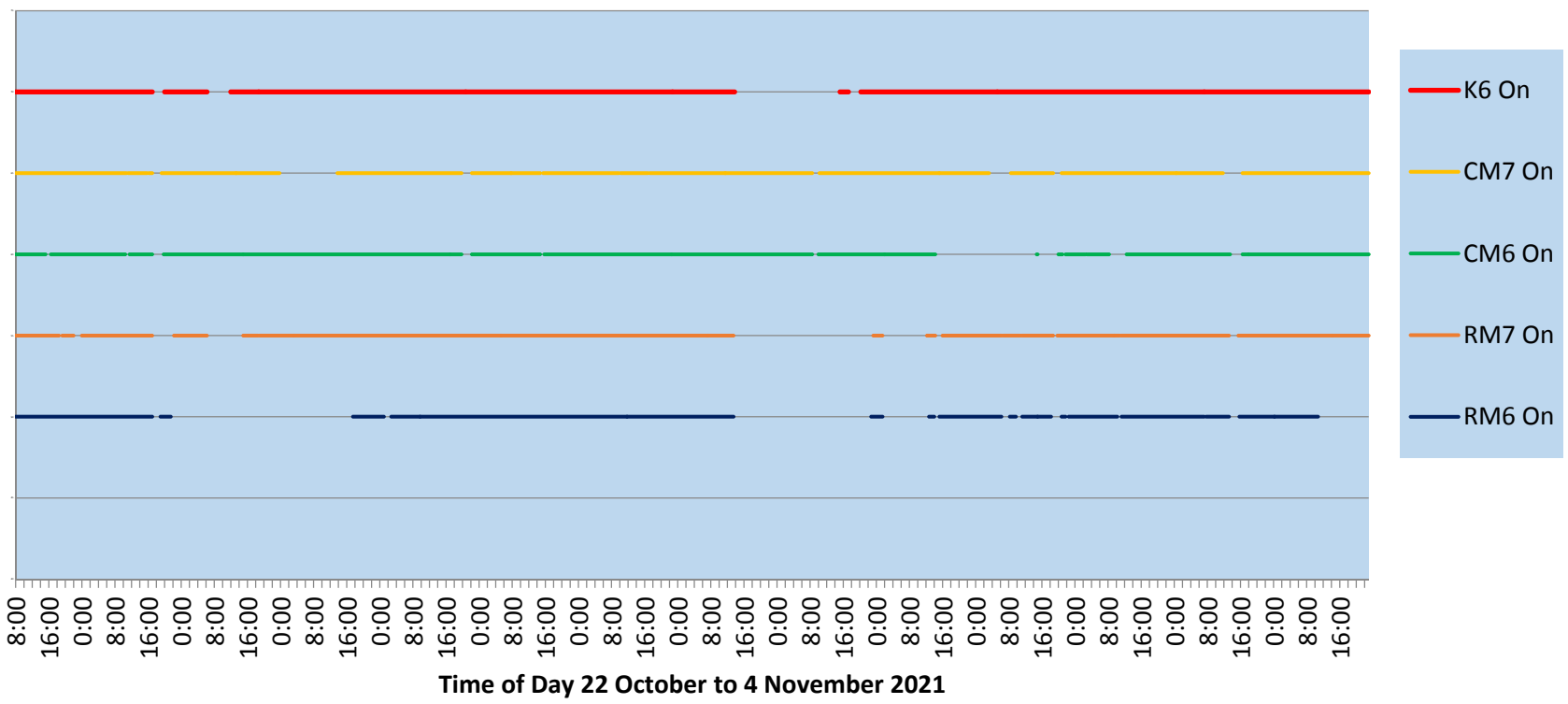


Figure 1.5: Times of major plant operations 22 to 29 October 2021 - Time On

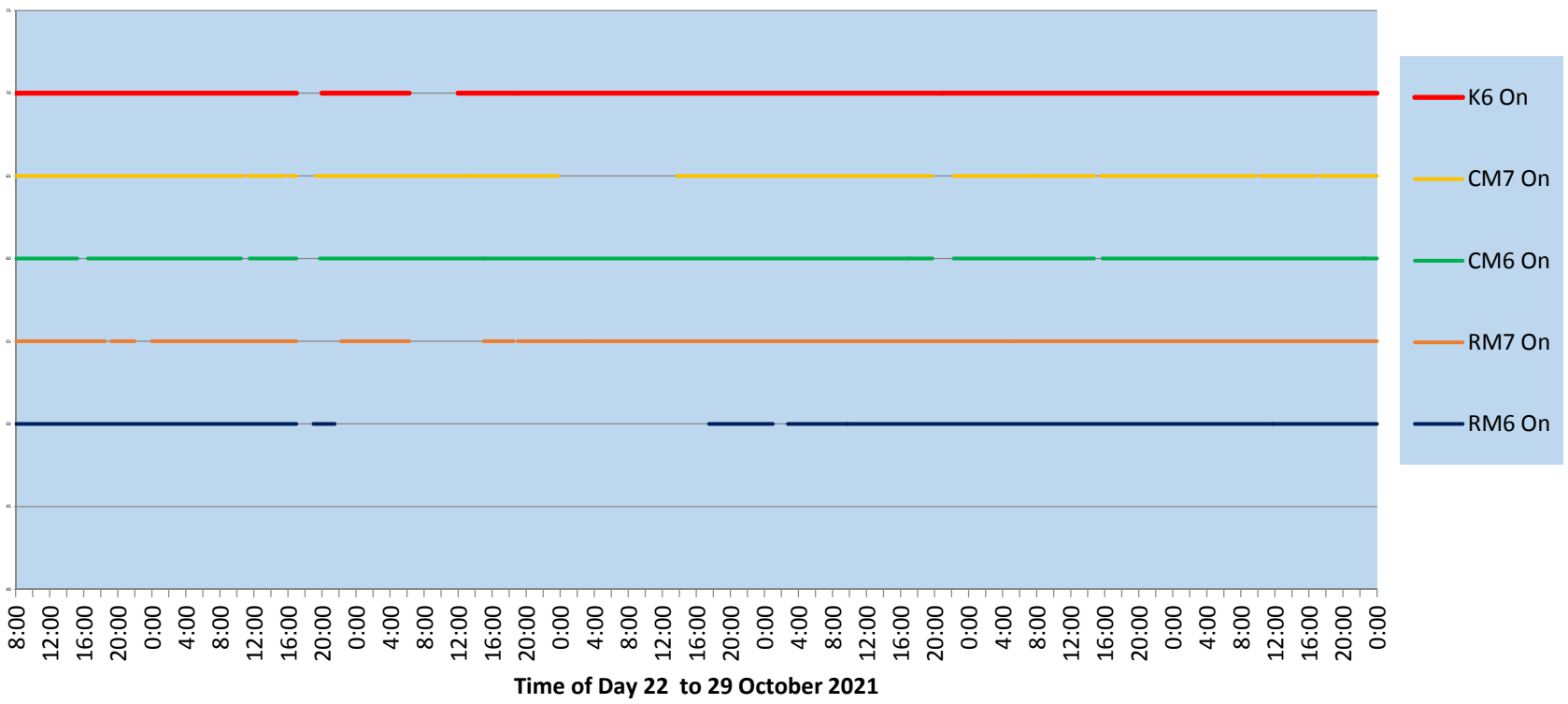
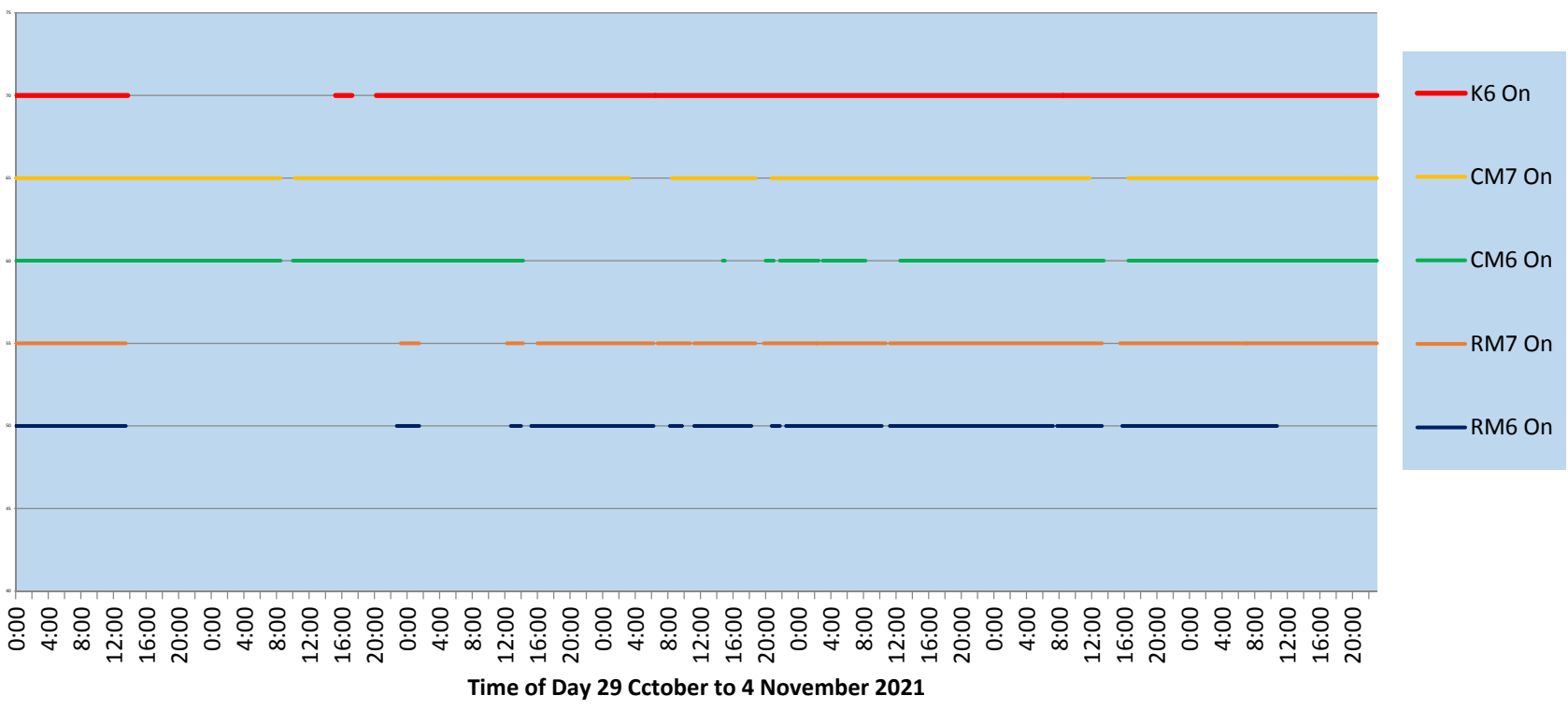


Figure 1.6: Times of major plant operations 29 October to 4 November 2021 - Time On



2 Contribution sound level objectives and method of measurement and assessment

2.1 Modification of Development Consent

In 2020 the Development Consent for the site was modified to allow loading of isotainers on the site and set a single site-wide noise limit. The noise limit condition is shown in Table 2.1. From the Consent Modification document. Noise generated at the site must not exceed the noise limits at the times and location specified in Table 2.1 below.

Table 2.1 – Maximum Allowable Noise Contribution Limit (dB(A))

Location	Day $L_{A90\ (15\text{-minute})}$	Evening $L_{A90\ (15\text{-minute})}$	Night $L_{A90\ (15\text{-minute})}$
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: The location of Noise Compliance Point (Point 20) – Store Yard is shown in Appendix 2 (Figure 2.1 below).

2.2 Previous Project consent contribution sound level objectives -

While this assessment is to assess compliance with the single-site-wide noise limit, the conditions related to each project are also used in the assessment to further demonstrate that received contribution sound levels are achieved in the residential receiver locations. These contribution objective sound levels for the residential receiver locations were as follows:

Table 2.2: Kiln 6 Upgrade Maximum Allowable Noise Contribution Limit dBA

Receiver Location	Day[a] $L_{Aeq(15\ minute)}$	Evening[b] $L_{Aeq(15\ minute)}$	Night[c] $L_{Aeq(15\ minute)}$
4 Melbourne Street	37	37	37
Chesley Park Farm*	30	30	30
Candowie Farm*	37	37	37

Table 2.3: Cement Mill No.7 Maximum allowable noise contribution limit dBA

Receiver Location	Day[a] $L_{Aeq(15\ minute)}$	Evening[b] $L_{Aeq(15\ minute)}$	Night[c] $L_{Aeq(15\ minute)}$
Adelaide Street, near Taylor Avenue	43	43	40
Argyle Street, near Taylor Avenue	43	43	40
Candowie Farm House*	43	43	40

These levels were to be considered as the contributions from the new plant associated with Kiln 6 or Cement Mill No. 7.The modified consent conditions apply to all the noise emissions from the plant at Berrima.

As advised in the 2017 assessment, in 2015 Chesley Park Farm was acquired by Austral Bricks for their proposed development and the residence demolished. This effectively removed the assessment location as there was no receiver and no access available to the site. Similarly, Candowie Farm access is no longer available as it is no longer apparently occupied as a residence, the land having been acquired for a future industrial development. This location has also been effectively removed from the assessment.

2.3 Method of measurement and assessment

Total plant sound levels

Sound levels of the plant are measured by attended and unattended monitoring methods at Location 20.

Sound levels are also measured at the Northern Boundary to compare with previous measurements and also indicate potential for sleep disturbance during night periods. This is done on the assumption that if the Sleep Disturbance objectives are achieved at the boundary location, they will also be achieved at the residential receivers, which are 150m more distant from the plant. If the low-frequency spectra indicate relative compliance at the boundary, they will also indicate compliance at the residential locations.

Kiln 6 Upgrade

While assessment of compliance for Kiln 6 Upgrade has been replaced by monitoring at Location 20, continued review of Kiln 6 noise emissions is continued to demonstrate or identify if sound levels have not increased significantly. The environmental impact assessment report for Kiln 6 Upgrade provided allowable sound power levels for each major source in the upgrade required to ensure the contribution sound level objective was achieved. From those calculated sound power levels, allowable sound pressure levels at different locations and distances from each major source in each plant area were also calculated. The measured sound levels from the operating individual sources were then

compared with the calculated allowable sound levels. If the measured sound levels were less than the allowable sound levels, then compliance was achieved. These measurements were reported in the nominated compliance reports for each plant item.

For Kiln 6 Upgrade, sound power levels and associated sound pressure levels of the new sources were identified as required in the noise impact assessment. These are given in Table 2.4 below. In the compliance assessment report for the Kiln 6 Upgrade provided in 2005, the measured sound levels were compared with the previous objective sound levels. These are also shown in Table 2.4.

Table 2.4: Kiln 6 Upgrade Plant Items and Objective Sound Power Levels and Sound Pressure Levels required to achieve compliance with objective sound levels

Source	Sound Power Level – dB(A)	Sound Pressure Level dB(A)		
		Objective	Measured 2005	Measured 2021
Coal Mill and Clinker cooler fans	117	100 @ 3m	93 @ 2m	Coal mill wall vent 84 @ 2m, Courtyard cooler fans 85 to 93 @ 1m
New Radicon Cooler	103	92 @ 1m	81 @ 1m West 80 @ 2m East	79 to 99 @ 1m Area Average 93 @ 1m E side 85 @ 2.4m E
New Pre-heater fan FA249	97	89 @ 1m	77 @ 2m	75 to 83 @ 1m
New Baghouse fan FA250	102	94 @ 1m	82 @ 2m	80 to 88 @ 1m
Raw Mill 7 Building	117	100 @ 3m	Vents 83 to 86 @ 1m	Vents 79 to 84 @ 1m Roof 78 to 87 @1m

This comparison showed in 2005 that the noise emissions for the Kiln 6 Upgrade items were well below the objectives required to achieve compliance. Higher sound levels were measured for the Radicon Cooler fans at times – the fan speed varied during the 15-minute period of measurements in line with operating variability. For instance one fan at level 1 was 92 dBA at the first measurement and then 84 dBA at a second measurement 15-minutes later.

Comparison of current measured sound levels at the same or similar locations, with those measured for the compliance assessment, will be sufficient to indicate if the contribution objectives are currently being achieved. Results for 2021, some shown above, are generally similar to previous and lower than the objective maximum levels

Increases of more than 5 dBA would be required to indicate potential non-compliance with the licence conditions. As noted, Radicon cooler sound levels vary depending on fan speed and load and sometimes in the past have exceeded the objective by 4 to 5 dB. Sound levels measured in 2021 were 84 to 99 dBA at 1m, averaging 93 dBA over the whole area, just above the objective of 92 dBA.

Cement Mill No.7

As with Kiln 6 Upgrade, assessment of Cement Mill No.7 has continued as previously to demonstrate if source sound levels have remained the same or significantly changed. This was made by measuring the noise emissions from the building and then calculating the contributions from these at the relevant residential receiver locations, using a recognised computer noise model. Three different meteorological conditions were used in the modelling. The results of these predictions are given in Table 2.5 below. The DECCW considered this approach a good example of a method to assess contributions from new noise sources in the presence of a relatively high background sound level.

Table 2.5: Cement Mill No.7 Predicted Contribution Levels at receivers for 2007 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 Street	Mill Room northern wall	23	29	29
	BE Tower northern wall	22	25	26
	Compressor room vents	15	20	21
	Total	**26**	**31**	**31**
Argyle Street	Western wall Mill room	17	28	28
	Western Roll door Mill room	14	25	26
	Western Wall vents I & J	13	19	20
	Western Wall BE Tower	10	17	17
	Western Roll door compressor room	9	16	16
	Total	**21**	**30**	**31**

As with the Kiln 6 Upgrade items measurements, comparison of current measured sound levels at the same or similar locations, with those measured for the compliance assessment, will be sufficient to indicate if the contribution objectives are currently being achieved. Increases of more than 9 dBA would be required to indicate potential non-compliance with the licence conditions.

Results from 2021 are shown later in Section 3 in Tables 3.7 and 3.8. They again indicate that compliance with the previous limit conditions is being achieved by Cement Mill No.7.

ABN: 25 153 946 064
ACN: 153 946 064

2021 receiver and boundary monitoring

As well as the site noise source monitoring, environmental receiver sound levels are measured. The set of measurements for 2021 was done between 22 October and 4 November 2021, with attended measurements on the start and finish days of the survey. As the three logger monitoring locations used recording sound level meters, additional listening "attended monitoring" was done at each location for the same 15-minute periods for (daytime, evening and night-time periods). These periods were:

- Saturday 23 October – 18:00 to 18:15 Evening All plant items were off following a lightning strike
- Tuesday 26 October – 00:00 midnight to 0:15 Night-time All plant items operating
- Thursday 28 October – 19:00 to 19:15 Evening All plant items operating
- Friday 29 October – 00:00 midnight to 0:15 Night-time All plant items operating
- Wednesday 3 November – 14:00 to 14:15 Daytime All plant idle except for Kiln 6 and fans

Results of long-term unattended receiver environmental noise monitoring have also been collated for monitoring undertaken at regular intervals since 2002. Comparison of these results also indicate any trends in receiver location sound levels occurring over the monitoring period since 2002.

3 Measured site source sound levels in 2021 compared to previous measurements

3.1 Kiln 6 area sound levels

The plan view of the Kiln 6 area and upgrade plant items are shown in Figure 3.1. Figures 3.2 to 3.5 show measurement locations around the Kiln and upgrade items area.

Sound levels measured at locations around Kiln 6 Upgrade plant items are shown summarised in Table 3.1. Table 3.2 shows the spectra of each measurement, with the tonality assessment shown in Table 3.2A. Appendix A shows figures of the spectra and tonality for each area in figures A1 to A43. Table 3.3 compares the results of sound levels measured at the same location on previous occasions from 2010 to 2019 and shows the calculated differences.

If the 2021 measured sound level exceeds the previous sound levels by more than 3dB, the cell difference in Table 3.3 is highlighted pink. A difference value of 3 dB is considered to be indicative of a potentially significant change in emission, as less than this is within measurement error or variation expected from location or source load differences. The locations with increased sound levels are shown in Table 3.3A.

There were 132 locations out of approximately 360 measured where 2021 sound levels have been calculated to be above those of previous years back to 2010. Some of these increases are caused by open doorways, a different load condition, other mobile equipment or vehicle operations nearby or a different measurement location. In the RM7 eastern side and FA249 and FA250 baghouse area, increases often occur from the high frequencies associated with squeaking screw conveyors which vary in location and level from year to year.

For locations with an increase of 3 dB or more, other than for noise from passing traffic or open doors or vehicles or other non-normal noise source nearby, calculations of the effects of those increases on received sound are provided in Table 3.4. These are described below, with reference to increases shown in Table 3.3 and the effects calculated in Table 3.4. One-third octave band spectra and calculated tonality for each measurement location are shown in Appendix A. Locations where increased sound levels occurred are described below.

For the locations shown with calculations in Table 3.4, almost all had calculated contributions below the objectives for Kiln 6 Upgrade.

Sound levels in the area of the air slide tower at the top of the pre-heater tower (PHT) had increased sound levels by 4 to 5 dB, with the sound levels near the EL16 gearbox increased by 6 dB above 2019 levels. Calculated sound levels at Location 20 shown in Table 3.4, assuming the source was the gearbox, were well below the objective and for the calculated contribution at residential locations, the distance only attenuated sound level was less than 20 dBA for all locations.

Sound levels at three of the locations on each level of the Alternate Fuels area had higher sound levels than 2019 and 2018 by up to 6 dB, although they were still less than 80 dBA at 1m. This increase is considered to be because the Alternative Fuels system was operating at a reasonable load in 2021, whereas previously it was likely to be at low load. These sound emissions were calculated to have relatively low contribution levels at all receiver locations of less than 15 dBA.

On Level 6, the EL13 drive area had sound levels 5 dB greater than in 2017. The contribution sound levels calculated in Table 3.4 were less than 12 dBA at all receiver locations. On top of the RM Silo,

sound levels near the baghouse discharge had increase by 4 dB compared to 2019. Contribution sound levels at receivers were calculated to be well below objectives.

On Level 5 in the north-west corner near the stack, sound levels were 4 dB above those in 2019 but the source was not identified. Assuming it was from the stack, the contribution sound levels were less than 15 dBA at residential receivers and below 20 dBA at Location 20.

Sound levels measure on top of the eastern side of the ESP were 5 dB higher than in 2016. Assuming this was from general emissions from the PHT, the calculated sound level at the receivers were all well below objectives.

In the PHT Levels 2 to 3 area, sound levels were higher than previous measurements in seven locations, some from increased fan emissions and some from air cannon discharges. For DC31 drive area, the sound level was 7 dB higher than in 2015. This is likely related to an decrease in silencer attenuation. This can be seen in Figure A13 curve 111, with a high level at 63 Hz. The calculated contribution sound levels at the receivers, shown in Table 3.4, were well below the objectives. A similar situation occurred for three other locations in this area, shown in Table 3.4. The calculated receiver sound levels for continuous sources were below the objective. For the measurement in the centre of Level 2.5 caused by an air cannon discharge, the calculated contribution sound levels were with 2 dB of objectives for the residential locations and more than 10 dB below the objective for Location 20.

Sound levels at three locations around FA39 were up to 4 dB higher than in previous years while others were similar. Calculated contributions at each receiver location for these sources were well below objectives.

For FA38, sound levels were up to 7 dB higher than in previous years. For some of these locations the increase may have been because a part of the cover had been removed, as shown in photograph 3.1.

Photograph 3.1: FA38 with part of the side cover removed

ABN: 25 153 946 064
ACN: 153 946 064

Calculated sound levels in Table 3.4 for these locations with up to 7 dB higher levels than previously, were well below the objectives for the receiver locations and Location 20.

For RM7 outside, sound levels at some locations were 4 dB higher than in 2020 but similar to those of previous years. Location 8 increase is shown in Table 3.4 and its calculated contribution without including the barriers of the surrounding buildings were well below the objectives.

Sound levels under the RM7 switchroom ventilation fan inlet were 12 dB above those of previous years. This may have been caused by a higher load of operation. Calculated contribution levels were also well below the objectives.

Sound levels were higher at several locations in the FA249 and FA250 ground level and fan platform area compared to previous years because of local screw conveyor sound levels and their high-frequency emissions. Calculations in Table 3.4 for three of these locations showed their calculated contributions, without the attenuation of surrounding buildings, did not exceed the objectives.

There are significant barriers in place between the source location and receivers, which with atmospheric absorption of the higher frequencies involved, would be expected to reduce the contribution sound levels further.

RM7 Roof platform sound levels near the magnete impact plate have been elevated for a number of years. This location is shown in photograph 3.2 below. This year it appears that the plate has been replaced and well-sealed with the result that the sound levels were lower than any year since 2015. They were still 7 dB above those of 2014 so the calculation is shown in Table 3.4. The contribution sound levels were all below 10 dBA.

Photograph 3.2: Magnete impact plate on RM7 roof platform

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ABN: 25 153 946 064
ACN: 153 946 064

While the sound level on the upper platform was 4 dB above the 2012 measurement, at 82 dBA its contribution would be less than 10 dBA at any receiver.

Sound levels in the doorway of the RM7 Baghouse top were up to 13 dB above those measured in 2013. This would have been caused by the reverse-pulse discharges in the baghouse and these are calculated to not cause any significant contribution at the receiver locations.

As occurred for the FA250 fan area, sound levels in the FA250 baghouse hopper area were affected by screw conveyor emissions. Sound levels calculated for the highest exceeding location, which were 15 dB above those of 2018, were well below objectives, without including the significant attenuation that would also occur from surrounding buildings.

Sound levels along the Coal Road on the southern side of the Kiln 6 area are indicative of any significant changes in emission sound levels from the overall process plant towards the south. Sound levels at these locations have not changed.

Sound levels were higher at some locations along the former southern fenceline, which is now close to the Alternative Fuels building. While sound levels were 10 dB above those of 2019 at one location, they were still relatively low and the calculated contribution, assuming the source was the Alternative Fuels Building, were well below the objectives.

Sound levels near the Coal Mill fan room southern doorway were elevated because the door was fully open. This cause sound levels 5 dB above those in 2018. Even so, the calculated contributions were also very low.

At locations along the southern side of the Kiln 6 at 13m distance, some locations near the centre of the Kiln had higher sound levels by 6 dB compared to 2017. This may have been caused by Kiln Shell Cooling Fans (KSCFs) operating at higher load and the newer fans located around the centre pedestal. The calculated contribution was below objectives at all village receivers and Location 20. While the calculated contribution was above the objective for the nearest Southern Residence, when atmospheric attenuation is included it is expected that the contribution level would be below the recommended objective of 37 dBA. A similar situation occurred for the location by the Kiln Drive platform with sound levels 12 dB above those of 2017, However the calculated contribution at the southern residence was below the objective.

On the northern side of Kiln 6, sound levels opposite the centre pedestal were also elevated by 5 dB compared to 2013 values. This is likely caused by increased KSCF emissions and these increased levels have occurred in the past. The calculated contribution at the village residential receivers were all well above the objectives and well above measured sound levels. The addition of attenuation from atmospheric absorption would reduce these calculated values. Calculated sound levels at Location 20 were less than the objective. However they indicate that the KSCFs are a continued significant source of noise emissions from the process plant.

A measurement of the eastern-most KSCF was 11 dB higher than in 2020 – this is likely caused by a much higher load than was measured in 2020 and there is also the contribution of adjacent KSCFs.. The calculated contribution from this single fan was 3 to 4 dB above the objective for residences in the village, without including attenuation from atmospheric absorption. The calculated contribution at Location 20 was 14 dB below the objective.

The noise emission from FA210 Kiln southern side discharge seal fan was 7 dB above what was measured in 2014. This was calculated to have a contribution sound level well below the objectives.

Radicon Cooler's fan sound levels were all above those of previous measurements. The highest increase was at the highest elevation of fans on Level 4 of the cooler. However the sound levels varied across the measurement period of around 15 minutes. For example at Level 1 the fan sound level was 92 dBA at 1m on the first measurement, then 10 minutes later was 84 dBA, indicating a reasonably rapid process load variation. A couple of fans had some belt-squeal from the drive pulleys, which added higher-frequency noise, as can be seen in some spectra of Figure A40 in the 2000 to 2500 Hz region of the spectrum. The contribution level for the centre fan on level 4 of the cooler was 16 dB above that measured in 2020. When the contribution from this was calculated at the residences it was well below all the objectives.

Fan FA215 appeared to have a new motor from the previous survey. This had increased sound levels of up to 5 dB at some locations. The calculated contribution of this, without including barrier attenuation from the surrounding buildings, was well below the objectives at all locations. Sound levels had also increased near the inlet box but the emission levels of these calculated as contribution sound levels at receivers would not have been greater than from the motor.

Measurements of sound levels on the northern side of the overall Kiln 6 area have been made at three corners on the roof of the Administration Building since 2016. These have remained relatively stable over that period at 70 to 72 dBA. The spectra of these measurements are shown in Figures A42. They show a broad band and non-tonal spectra. This location was selected because it could show if there were significant changes to Kiln 6 emissions in the direction of the residential receivers and Location 20.These results confirm that noise emissions have not significantly increased over time. While some individual source measurement locations may be higher in different years, the overall emissions do appear to have remained constant. This will be confirmed when comparing the result for Location 20 measurements in Section 4.

As noted previously, it is recommended that a review be made of alternatives for kiln shell cooling fans which would have reduced noise emissions.

Increases in sound levels at other locations were found to have contribution sound levels below all objectives at Location 20 and residential receivers.

Assessment of Kiln 6 noise emissions

Over all, the sound levels associated with Kiln 6 sources were calculated to be less than the objective at Location 20. They are also considered to not exceed the contribution objectives at the nearest residential receivers to the northern and southern sides of the plant. Some closer-to-source location measured sound levels had increased but these were calculated to not exceed the previous objectives at the residential receiver locations. More distant measurements of the total emissions from the Kiln 6 area on the roof of the Control Building for receivers to the north and along the Coal Road for receivers to the south, had not increased significantly from previous measurements. This combination of no significant changes to sound levels at a distance from the plant also indicates compliance with the objectives.

On the basis of the measurements and assessment, it is considered that the Kiln 6 source emissions are in compliance both the condition of approval for sound levels at Location 20 and the community noise level objectives at residential receivers.

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ABN: 25 153 946 064
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Some specific sources are recommended for review because of increased sound levels above what is expected or to avoid potentially annoying sound levels developing further. These items are noted below:

- The new kiln shell cooling fans have significantly increased the sound levels at locations on the northern side of the centre of Kiln 6. A review of alternatives for cooling of this area is recommended.
- Sound levels around the FA215 baghouse fan inlet continue to have relatively high low-frequency sound levels. A review of the fan condition is recommended, as suggested in 2020.
- Radicon Cooler fan sound levels were higher, possibly because of higher load. While calculated not to cause contribution sound levels above the objectives, their reasonably high spectrum levels at mid and lower frequencies may make them a major contribution source. If the blades of these fans need replacing at some time in the future, consideration should be given to more aerodynamic and quieter fan-blade profiles.

Figure 3.1: Boral Cement Berrima Annual Environmental Noise 2020 - Kiln 6 survey area

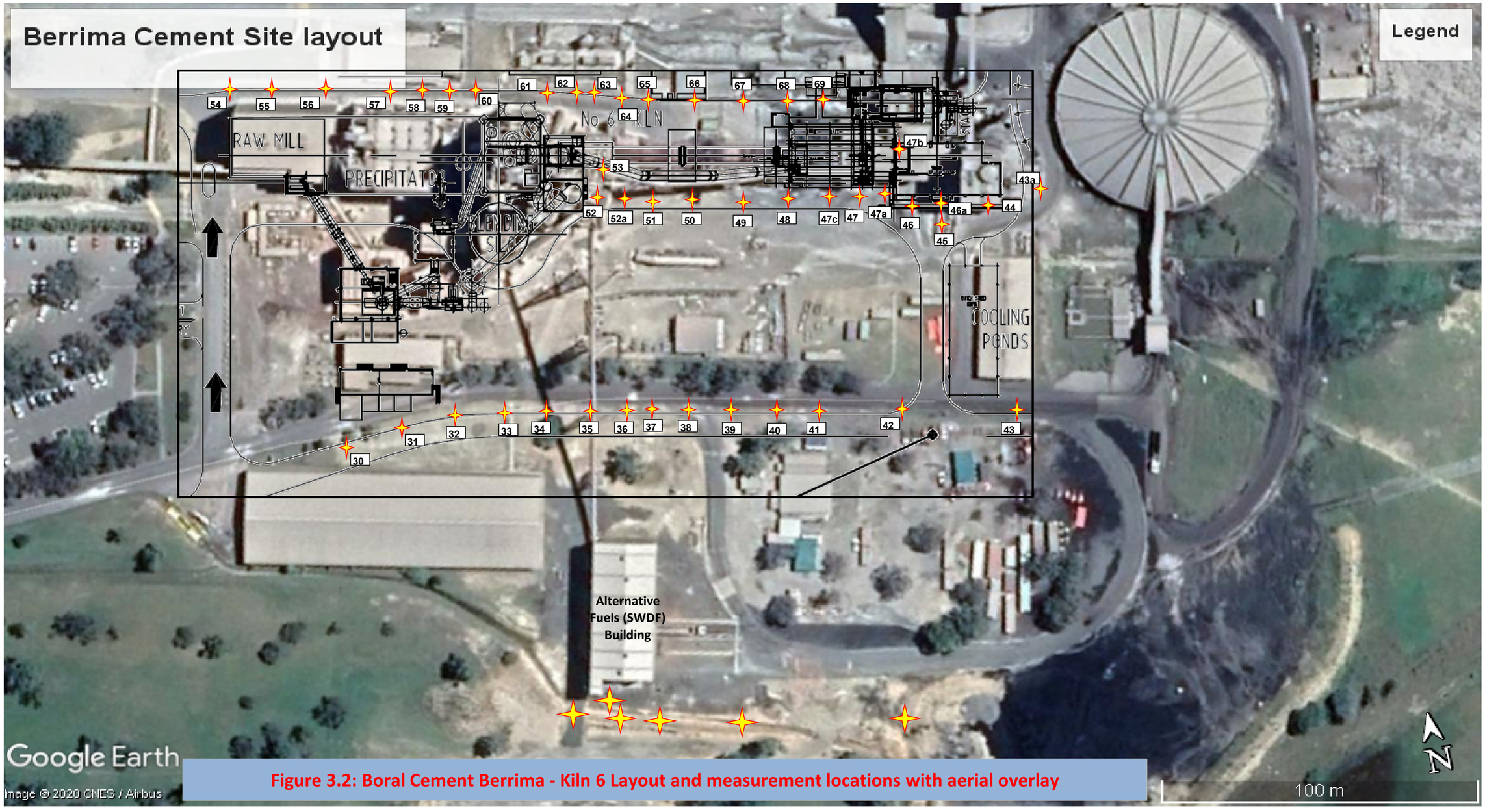

Figure 3.2: Boral Cement Berrima - Kiln 6 Layout and measurement locations with aerial overlay

Figure 3.2: Boral Cement Berrima - Kiln 6 Layout and measurement locations with aerial overlay

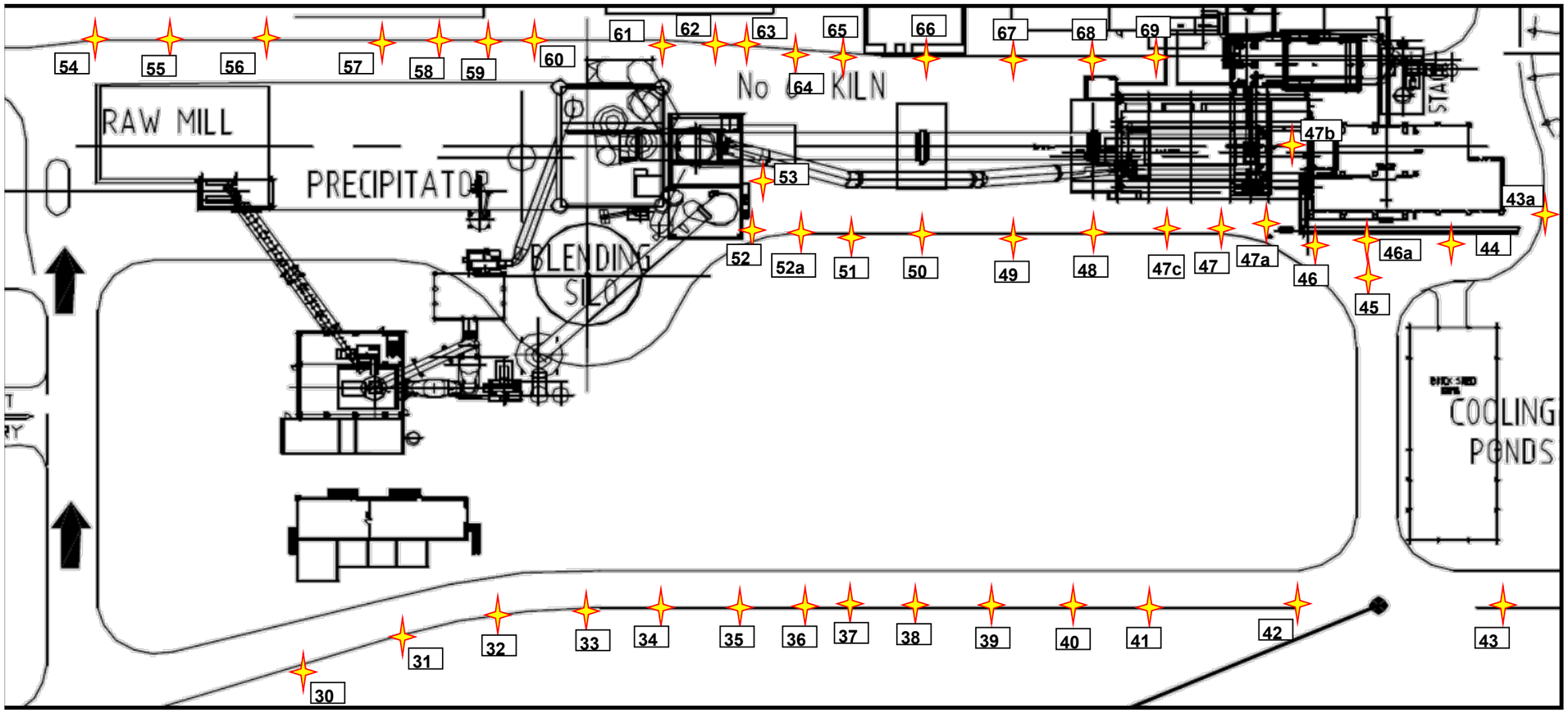

Figure 3.3: Boral Cement Berrima - Noise Assessment - Measurement locations plan for Kiln 6 & RM7

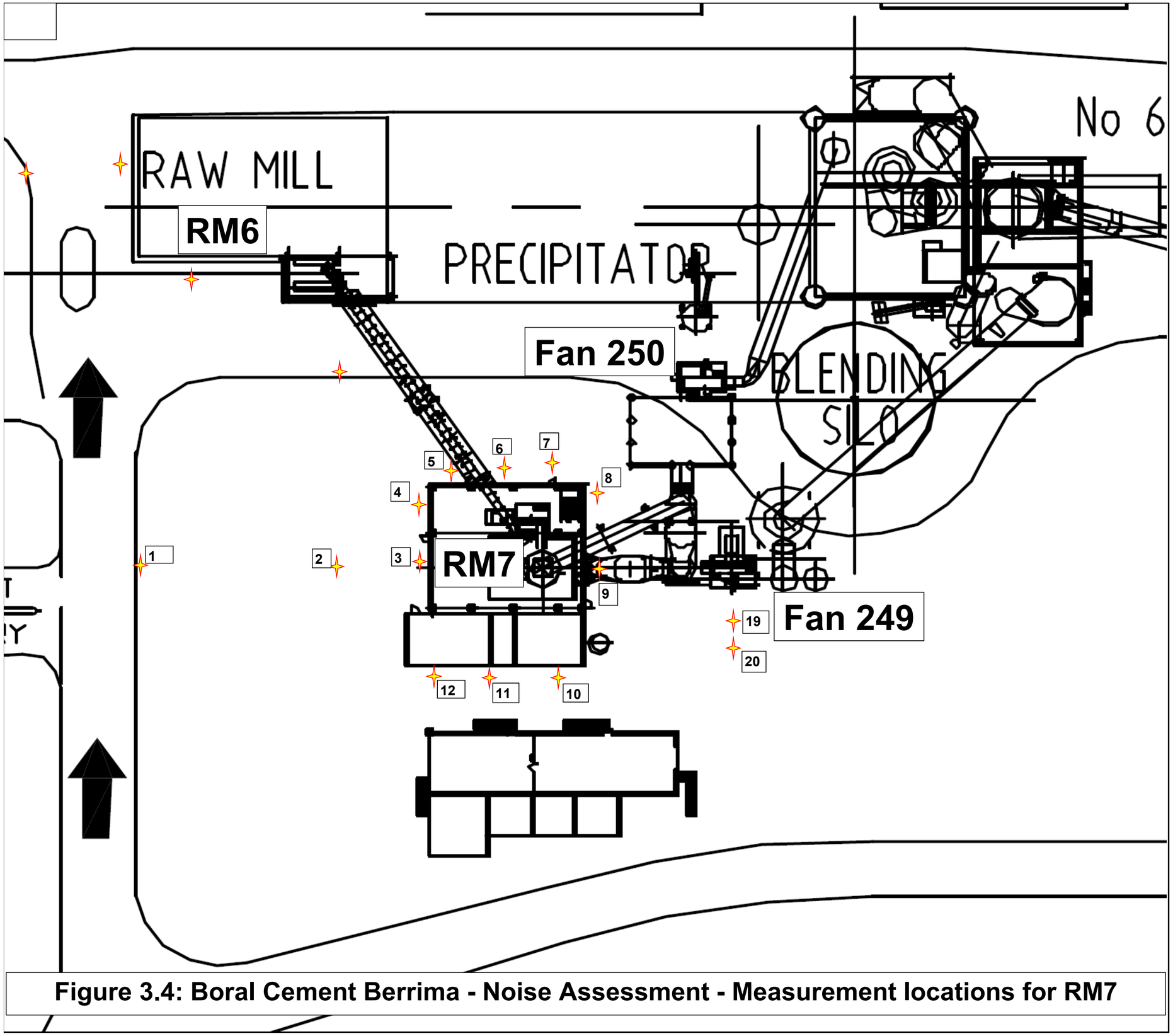

Figure 3.4: Boral Cement Berrima - Noise Assessment - Measurement locations for RM7

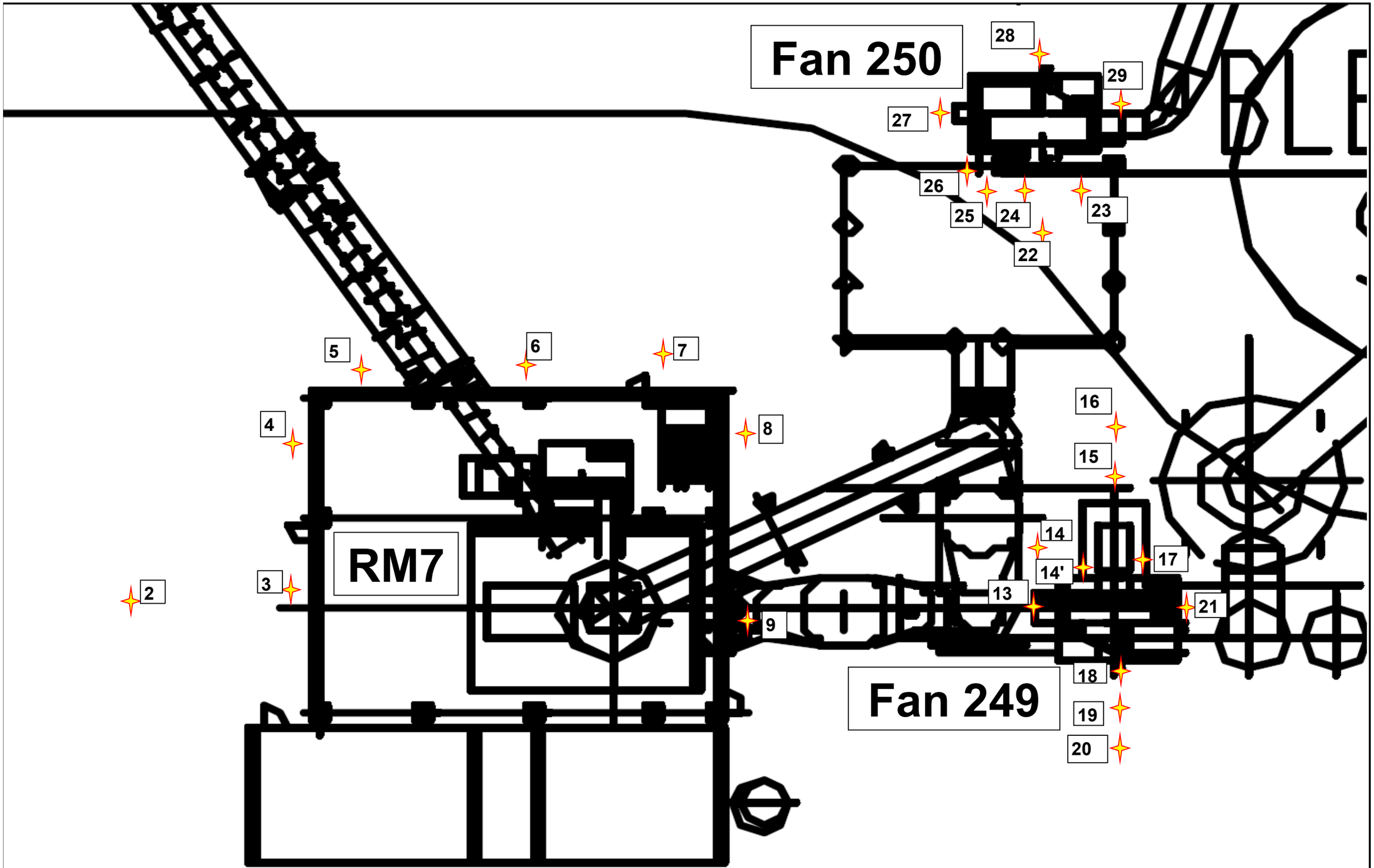

Figure 3.5: Boral Cement Berrima - Noise Assessment - Measurement locations RM7 & FA249 & FA250

Table 3.1: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
PHT Level 8 Top Platform	PHT L8 Top platform level with top of stack	22/10/2021	10:43 AM	9	0:00:20	78	80	77	90	12	
	PHT L8 Top platform level with top of stack	22/10/2021	10:43 AM	10	0:00:20	78	80	78	90	12	
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	22/10/2021	10:44 AM	11	0:00:21	83	85	82	90	7	
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	22/10/2021	10:44 AM	12	0:00:22	84	84	84	91	7	
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	22/10/2021	10:45 AM	13	0:00:25	79	80	78	90	11	
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	22/10/2021	10:46 AM	14	0:00:30	78	79	77	89	12	
	PHT L8 Top Platform S side BE	22/10/2021	10:46 AM	15	0:00:30	72	74	71	88	16	
PHT Level 8 Lower Platform	PHT L8 Lower platform	22/10/2021	10:48 AM	16	0:00:20	76	78	76	90	14	
	PHT L8 Lower platform	22/10/2021	10:48 AM	17	0:00:27	76	78	75	90	14	
	PHT L8 Lower platform EL16 Gbox @ 3m to N side	22/10/2021	10:50 AM	18	0:00:30	76	78	76	90	14	
PHT Level 8	PHT L8 proper FA263 motor & casing @ 1m	22/10/2021	10:54 AM	19	0:00:27	85	86	84	93	8	
	PHT L8 proper 1m to vent on FA263 filter room	22/10/2021	10:55 AM	20	0:00:21	77	79	76	91	14	
	PHT L8 centre tower W side	22/10/2021	10:58 AM	21	0:00:30	79	82	77	91	13	Hammering above - use L90 and next measurement
	PHT L8 centre tower W side	22/10/2021	10:59 AM	22	0:00:16	78	80	77	91	13	
	L8 new PHT centre	22/10/2021	10:59 AM	23	0:00:28	74	75	73	86	12	
	PHT L8 centre tower N side	22/10/2021	11:00 AM	24	0:00:28	74	76	74	87	13	
	PHT L8 centre tower E side	22/10/2021	11:01 AM	25	0:00:27	74	75	73	87	13	
	PHT L8 centre tower S side	22/10/2021	11:02 AM	26	0:00:30	69	70	68	85	16	
PHT Level 7	PHT L7 New S side centre	22/10/2021	11:05 AM	27	0:00:30	71	72	71	83	12	
	PHT L7 New E side centre	22/10/2021	11:06 AM	28	0:00:30	75	76	74	85	10	
	PHT L7 New N side centre	22/10/2021	11:07 AM	29	0:00:30	74	78	74	88	14	Hammering above - use L90 and next measurement
PHT Level 7 Alt. Fuels transfer	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	22/10/2021	11:11 AM	31	0:00:30	76	78	75	85	9	Alt fuels process flow with particle impacts
	PHT L7 Alt Fuels 1m to base of Alt Fuel chute, 1m to bin W, 1m to W side of feeder	22/10/2021	11:20 AM	39	0:00:21	76	77	75	85	9	
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	22/10/2021	11:09 AM	30	0:00:30	76	78	75	85	9	
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	22/10/2021	11:12 AM	32	0:00:30	76	77	75	84	9	
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	22/10/2021	11:13 AM	33	0:00:30	77	78	77	87	9	
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	22/10/2021	11:14 AM	34	0:00:31	75	77	74	86	10	
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	22/10/2021	11:15 AM	35	0:00:30	75	76	74	85	10	
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	22/10/2021	11:16 AM	36	0:00:30	79	80	78	87	8	HF motor drive noise
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	22/10/2021	11:17 AM	37	0:00:32	77	78	76	86	9	
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	22/10/2021	11:19 AM	38	0:00:30	75	77	75	84	9	
PHT Level 7	PHT L7 New centre between towers faces S	22/10/2021	11:23 AM	40	0:00:30	76	77	76	88	12	Air discharge in area
	L7 between PHTs centre facing W	22/10/2021	11:24 AM	41	0:00:31	76	78	76	88	12	Air discharge in area
	PHT L7 Old S side centre, faces W	22/10/2021	11:25 AM	42	0:00:30	76	77	75	89	13	
	PHT L7 under EL13 platform E side	22/10/2021	11:26 AM	43	0:00:30	76	78	75	90	14	
	EL13 platform E side Gbox & coupling @ 0.5m	22/10/2021	11:27 AM	44	0:00:30	82	83	82	90	8	
	EL13 platform N side GB end & side EL @ 1m	22/10/2021	11:28 AM	45	0:00:30	79	80	79	89	10	
	L7 BE drive platform N side @ 1m to BE	22/10/2021	11:29 AM	46	0:00:21	76	77	75	89	13	
	EL13 platform SW side motor & EL & coupling @ 1m	22/10/2021	11:30 AM	47	0:00:30	83	84	82	91	8	
	EL13 platform W side 0.5m	22/10/2021	11:30 AM	48	0:00:24	75	77	74	89	13	
	EL13 platform motor end @ 0.6m	22/10/2021	11:31 AM	49	0:00:21	83	84	83	92	8	
	L7 centre between cylinders	22/10/2021	11:33 AM	50	0:00:32	75	77	74	91	16	
	PHT L7 old NW corner 1.5m to stack	22/10/2021	11:33 AM	51	0:00:30	73	74	72	89	16	
	PHT L7 old centre N side	22/10/2021	11:34 AM	52	0:00:32	73	75	73	92	18	
	PHT L7 old centre N side on new platform	22/10/2021	11:35 AM	53	0:00:30	75	77	73	91	16	
	PHT Level 7: FA213 @ 1m, door closed	22/10/2021	11:36 AM	54	0:00:30	76	77	75	91	15	

Table 3.1: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
PHT Level 6	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	22/10/2021	11:39 AM	55	0:00:30	83	84	83	93	9	
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	22/10/2021	11:41 AM	56	0:00:37	85	86	85	92	7	
	PHT L6 RM Silo top EL15 platform motor side 0.6m	22/10/2021	11:42 AM	57	0:00:31	81	82	81	89	8	
	EL15 W side @ 1m	22/10/2021	11:43 AM	58	0:00:25	72	73	72	86	13	
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	22/10/2021	11:44 AM	59	0:00:22	74	75	73	84	11	
	EL15 S side Gbox @ 1m	22/10/2021	11:44 AM	60	0:00:31	81	83	79	88	7	
	EL15 E side Gbox @ 0.5m	22/10/2021	11:45 AM	61	0:00:28	86	87	85	90	4	High frequency noise
	RM silo top baghouse fan DC30 discharge @ 1.5m	22/10/2021	11:46 AM	62	0:00:20	87	87	86	95	9	
	RM Silo top E side 12.7m to FA260	22/10/2021	11:48 AM	63	0:00:30	75	75	74	85	10	
	RM Silo top N side 12.7m to FA260	22/10/2021	11:49 AM	64	0:00:30	75	76	75	85	10	
	PHT L6 centre W side	22/10/2021	11:50 AM	65	0:00:30	76	77	75	87	11	
	PHT L6 stack test port 100mm diam @ 200mm S side	22/10/2021	11:51 AM	66	0:00:20	86	87	86	94	7	
	PHT L6 stack test port 100mm diam @ 200mm S side	22/10/2021	11:51 AM	67	0:00:25	86	87	86	94	8	
	PHT L6 stack test port 100mm diam @ 200mm W side	22/10/2021	11:52 AM	68	0:00:25	90	91	89	99	9	
	PHT L6 stack test port 200mm diam @ 200mm W side	22/10/2021	11:53 AM	69	0:00:20	91	92	90	98	7	
	PHT L6 NW corner 1m to stack	22/10/2021	11:53 AM	70	0:00:36	79	81	78	90	10	
	PHT L6 centre N side by platform	22/10/2021	11:54 AM	71	0:00:30	74	75	74	86	12	
	PHT L6 centre N side on platform	22/10/2021	11:55 AM	72	0:00:30	74	75	73	86	12	
	PHT L6 centre between towers	22/10/2021	11:56 AM	73	0:00:30	74	76	73	85	11	
	PHT L6 new N side centre	22/10/2021	11:57 AM	74	0:00:31	74	76	74	85	10	
	PHT L6 new E side centre	22/10/2021	11:58 AM	75	0:00:36	75	83	73	85	10	Air discharge noise 85
	PHT L6 new S side centre	22/10/2021	11:58 AM	76	0:00:39	76	87	74	85	9	Air discharge noise 93
	L6 centre S side old PHT by elevator	22/10/2021	12:00 PM	77	0:00:31	73	73	72	84	12	
RM Silo top inside	L6 inside doorway to top RM silo room	22/10/2021	12:01 PM	78	0:00:30	81	83	80	94	13	
	RM Silo top inside centre	22/10/2021	12:02 PM	79	0:00:30	86	88	85	93	8	
	RM silo top inside E doors open	22/10/2021	12:03 PM	80	0:00:30	83	85	83	93	10	
	L6 RM silo top room inside S man door	22/10/2021	12:03 PM	81	0:00:30	84	85	83	94	10	
	RM silo top outside S man door	22/10/2021	12:04 PM	82	0:00:30	73	76	72	84	11	
PHT Level 5	PHT Level 5 old centre S side by stairs	22/10/2021	12:07 PM	83	0:00:30	74	76	74	84	10	
	PHT Level 5 old centre W side by gas valves @ 1m	22/10/2021	12:08 PM	84	0:00:22	78	82	77	86	8	
	PHT Level 5 old NW corner @ 1m to stack	22/10/2021	12:10 PM	85	0:00:30	79	85	78	87	8	Scaffolding hammer - use L90
	PHT Level 5 old centre N side	22/10/2021	12:11 PM	86	0:00:30	75	78	74	87	12	as above
	PHT Level 5 centre between towers	22/10/2021	12:12 PM	87	0:00:30	76	81	74	85	9	as above
	PHT Level 5 New centre N side	22/10/2021	12:13 PM	88	0:00:30	75	76	75	85	10	
	PHT Level 5 New centre E side above kiln	22/10/2021	12:13 PM	89	0:00:32	75	76	75	84	9	
	PHT Level 5 New centre S side	22/10/2021	12:15 PM	90	0:00:30	73	75	72	83	10	
PHT Level 4	PHT Level 4 old centre S side by stairs	22/10/2021	12:17 PM	91	0:00:31	76	77	76	87	11	
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	22/10/2021	12:18 PM	92	0:00:46	79	83	79	87	8	Air cannon 92
	PHT Level 4 old centre W side	22/10/2021	12:19 PM	93	0:00:30	77	78	77	88	11	
	PHT Level 4 old NW corner @ 1.2m to stack	22/10/2021	12:20 PM	94	0:00:30	78	85	76	88	11	Hammering above
	PHT Level 4 old centre N side	22/10/2021	12:21 PM	95	0:00:35	76	87	74	86	10	Air cannon 90 @ 6m
	PHT Level 4 centre between towers by air cannon @ 2m	22/10/2021	12:23 PM	96	0:00:31	74	75	74	86	12	
	PHT Level 4 new centre N side	22/10/2021	12:23 PM	97	0:00:36	75	76	75	85	10	
	PHT Level 4 new centre E side above kiln	22/10/2021	12:24 PM	98	0:00:30	75	76	74	84	10	
	PHT Level 4 new centre S side - air cannon in Leq	22/10/2021	12:25 PM	99	0:00:40	78	90	72	85	7	Air cannon 90 in Leq
ESP E side	ESP Centre E side top walkway looking E to PHT	22/10/2021	12:28 PM	100	0:00:30	76	77	75	87	11	
	ESP top SE corner at barrier	22/10/2021	12:28 PM	101	0:00:30	75	76	74	86	11	
	ESP top SE corner at barrier - facing ESP	22/10/2021	12:29 PM	102	0:00:30	73	74	73	85	12	
	ESP top NE corner at barrier	22/10/2021	12:30 PM	103	0:00:31	75	77	74	86	11	
	ESP top NE corner at barrier - facing west	22/10/2021	12:31 PM	104	0:00:30	73	76	72	85	12	Hammering above
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	22/10/2021	12:34 PM	105	0:00:31	77	79	77	88	10	Screw conveyor squeal
	PHT Level 3 old centre W side above FA39 face E	22/10/2021	12:35 PM	106	0:00:35	81	83	80	93	12	
	PHT Level 3 old centre W side above FA39 face W	22/10/2021	12:36 PM	107	0:00:27	81	83	80	93	12	Face W to FA39
	PHT Level 3 old centre N side	22/10/2021	12:37 PM	108	0:00:30	78	79	78	91	12	
	PHT Level 3 old centre E side above kiln	22/10/2021	12:38 PM	109	0:00:30	77	81	76	88	12	
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	22/10/2021	12:39 PM	110	0:00:50	82	83	81	93	11	Air cannon 85
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	22/10/2021	12:42 PM	111	0:00:44	93	95	92	105	11	
	PHT Level 2.5 by centre by kiln entry W side, air cannon	22/10/2021	12:44 PM	113	0:00:41	86	90	84	99	13	Screw conveyor squeal
	PHT Level 2.5 by DC31 discharge @ 1m	22/10/2021	12:43 PM	112	0:00:31	92	93	91	107	16	as above
PHT Level 2.25	PHT Level 2.25 by centre by kiln entry Air cannons	22/10/2021	12:46 PM	114	0:00:32	87	92	83	96	9	as above
	PHT Level 2.25 centre	22/10/2021	12:48 PM	115	0:00:30	89	94	86	99	10	as above
	PHT Level 2.5 by Radicon Gbox drive E end @ 1.5m	22/10/2021	12:48 PM	116	0:00:30	86	90	84	93	7	as above
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	22/10/2021	12:50 PM	117	0:00:30	89	92	88	102	13	
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	22/10/2021	12:51 PM	118	0:00:20	89	92	88	102	13	

Table 3.1: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	22/10/2021	12:52 PM	120	0:00:30	88	90	87	98	10	
	L2 PHT FA03 casing @ 1m E side	22/10/2021	12:53 PM	121	0:00:30	88	89	87	100	13	
	PHT Level 2 @ 1m to south side FA39 stack entry duct	22/10/2021	12:51 PM	119	0:00:21	89	91	89	102	13	
	PHT Level 2 FA03 discharge @ 1.5m	22/10/2021	12:54 PM	122	0:00:30	91	92	91	109	18	
	PHT Level 2 @ 1m to south side FA39 stack entry duct & stack	22/10/2021	12:55 PM	123	0:00:23	90	92	89	104	14	
	PHT Level 2 FA65 inlet filter @ 1m in front	22/10/2021	12:56 PM	124	0:00:30	91	95	89	103	13	
	PHT Level 2 FA65 rear side 1m	22/10/2021	12:56 PM	125	0:00:30	88	91	87	104	16	
	L2 PHT centre N side edge @ 2m facing centre	22/10/2021	12:57 PM	126	0:00:30	85	87	83	97	13	
	PHT Level 2 @ 1m to north side FA39 stack entry duct	22/10/2021	12:58 PM	127	0:00:30	89	91	88	103	14	
	PHT Level 2 @ 1m to north side FA39 stack entry duct	22/10/2021	12:59 PM	128	0:00:20	89	91	89	103	14	
	PHT Level 2 south side by Lift	22/10/2021	1:03 PM	129	0:00:32	82	85	81	91	9	
PHT Level 1	PHT Level 1 RM silo base blower room N side man door @ 1m	22/10/2021	1:04 PM	130	0:00:31	80	81	79	93	13	
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	22/10/2021	1:05 PM	131	0:00:34	82	83	81	98	17	
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	22/10/2021	1:06 PM	132	0:00:30	83	84	83	95	12	Belt drive noise
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	22/10/2021	1:06 PM	133	0:01:20	78	79	78	95	17	
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	22/10/2021	1:08 PM	134	0:00:31	79	79	78	96	18	
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	22/10/2021	1:09 PM	135	0:00:26	78	79	78	96	17	
FA39	FA39 E side at concrete line 5.4m to motor	22/10/2021	2:04 PM	136	0:00:31	85	86	85	96	11	
	FA39 E side @2.3m in line with columns	22/10/2021	2:06 PM	137	0:00:31	87	89	87	98	11	
	FA39 under discharge duct @ 1m	22/10/2021	2:07 PM	138	0:00:49	91	92	91	99	8	On stairs as can't get access to location
	FA39 E side motor platform @ 0.82m to coupling cover	22/10/2021	2:08 PM	139	0:00:30	95	96	94	101	6	
	FA39 motor platform centre E side@ 1m	22/10/2021	2:11 PM	141	0:00:47	85	86	84	102	17	
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	22/10/2021	2:09 PM	140	0:00:21	96	97	95	99	3	
	FA39 motor N end @ 2.7 to end plates/stop button at line	22/10/2021	2:13 PM	142	0:00:30	82	84	81	93	10	
	FA 39 N side on kerb	22/10/2021	2:13 PM	143	0:00:30	80	81	80	91	11	
	FA39 W side at metal strip 5.25m to motor	22/10/2021	2:14 PM	144	0:00:42	87	88	86	94	7	
	FA39 W side at columns @2.7m to plinth	22/10/2021	2:15 PM	145	0:00:30	88	90	88	95	7	
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	22/10/2021	2:16 PM	146	0:00:30	92	92	91	99	7	
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	22/10/2021	2:17 PM	147	0:00:33	86	87	86	98	12	
	FA39 S side @ columns 2.7m to bearing	22/10/2021	2:18 PM	148	0:00:33	87	88	86	97	11	Screw conveyor squeal behind
	FA39 S side platform bearing cover @ 0.8m	22/10/2021	2:19 PM	149	0:00:29	88	90	87	98	10	as above
	Centre between FA38 & FA39 @ 11.2m at line facing E	22/10/2021	2:20 PM	150	0:00:31	86	87	85	93	7	
FA38	Centre between FA38 & FA39 @ 7.7 m facing FA 38	22/10/2021	2:20 PM	151	0:00:31	86	87	85	93	7	
	FA38 @ 3.9m to E side	22/10/2021	2:21 PM	152	0:00:30	89	91	88	94	5	Motor cladding open - see photo
	FA38 @ 3m to N side	22/10/2021	2:22 PM	153	0:01:05	87	89	87	94	7	
	FA38 @ 5m to NW side at NW column	22/10/2021	2:23 PM	154	0:00:40	87	89	85	93	6	
	FA38 @ 5m to W side at W column	22/10/2021	2:24 PM	155	0:00:31	85	87	83	92	7	
	In centre opening of wall on W side	22/10/2021	2:25 PM	156	0:00:30	83	85	82	90	7	
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	22/10/2021	2:26 PM	157	0:00:33	92	93	91	95	3	
	FA38 at opening on S side of road facing FA38 opening	22/10/2021	2:28 PM	158	0:00:30	79	80	79	88	9	
	56' Road kerb N side opp. Opening to FA38	22/10/2021	2:28 PM	159	0:00:33	75	76	75	86	11	
	57 Road N side opp FA38 doorway	22/10/2021	2:29 PM	160	0:00:31	79	79	78	90	12	
	58 Road N side between FA38 & FA39	22/10/2021	2:30 PM	161	0:00:30	78	79	78	91	12	
RM6	1 RM6 W door @ 1m	22/10/2021	2:32 PM	162	0:00:32	75	76	74	82	8	
	1' RM6 W door at kerb W side @ 13.3m	22/10/2021	2:33 PM	163	0:00:30	69	70	68	80	11	Door fully closed to ground

Table 3.1: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
RM7 outside	1 RM7 at roadside kerb ~32m	22/10/2021	2:34 PM	164	0:00:30	69	70	68	80	11	
	2 Rm7 @ 12m to W door	22/10/2021	2:36 PM	165	0:00:30	74	76	74	83	9	3m closer than previous years as storage material in the way
	3 RM7 W wall door @ 1m	22/10/2021	2:36 PM	166	0:00:31	78	81	77	86	8	
	4 RM7 NE corner wall vents 2 1m	22/10/2021	2:37 PM	167	0:00:30	80	83	78	87	8	
	5 RM7 N side NW roll door @ 1m	22/10/2021	2:38 PM	168	0:00:30	81	82	80	89	8	Screw conveyor squeal to NE on RM7 baghouse
	6 RM7 N wall vents centre next to Roll door	22/10/2021	2:39 PM	169	0:00:37	83	84	82	90	7	as above
	RM7 vents N wall W of man door	22/10/2021	2:40 PM	170	0:00:36	84	86	83	92	8	as above
	7 RM7 N wall man door	22/10/2021	2:40 PM	171	0:00:34	83	85	82	91	7	as above
	8 RM7 E wall vents NE corner @ 1m	22/10/2021	2:41 PM	172	0:00:30	84	86	83	91	6	as above
	9 RM7 E side under duct	22/10/2021	2:42 PM	173	0:00:33	81	84	80	89	8	as above
	10 RM7 By E door RM7 floor	22/10/2021	2:43 PM	174	0:00:31	79	81	78	88	9	as above
	10' RM7 By E door Hydraulics room closed	22/10/2021	2:44 PM	175	0:00:30	75	76	74	84	10	
	11 RM7 Centre Compressor room door @ 1m closed	22/10/2021	2:45 PM	176	0:00:31	74	74	73	84	11	Fan behind location
	11A RM7 compressor room W door @ 1m closed	22/10/2021	2:46 PM	177	0:00:31	73	73	72	84	12	
	12 RM7 Under E inlet for switchroom fan	22/10/2021	2:46 PM	178	0:00:26	86	87	85	97	11	
	12B Under switchroom fan duct W	22/10/2021	2:47 PM	179	0:00:30	87	89	86	97	10	
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	22/10/2021	2:48 PM	180	0:00:30	78	79	77	89	11	
FA249	13 FA249 under inlet duct W side	22/10/2021	2:49 PM	181	0:00:30	79	81	78	90	11	Screw conveyor squeal above
	14 FA249 2m W side ground level	22/10/2021	2:50 PM	182	0:00:30	82	83	81	90	8	as above
	14' FA249 motor platform fan coupling & casing W side @ 1m	22/10/2021	2:52 PM	183	0:00:31	82	84	81	91	9	as above
	15 FA249 1m motor end	22/10/2021	2:53 PM	184	0:00:30	83	85	81	89	7	as above
	16 FA249 end at column 4.3m N of motor plinth	22/10/2021	2:53 PM	185	0:00:30	82	86	81	91	8	as above
	17 FA249 motor platform E side coupling & casing 1m	22/10/2021	2:54 PM	186	0:00:30	82	85	81	92	10	as above
	18 FA249 Platform S side centre @ 1m	22/10/2021	2:56 PM	187	0:00:31	75	76	75	85	10	as above
	18' FA249 platform S side under discharge duct E side	22/10/2021	2:56 PM	188	0:00:31	77	81	76	86	9	as above
	19 FA249 S side @ 5.5m at S edge barrier	22/10/2021	2:57 PM	189	0:00:30	74	75	73	84	11	as above
	20 FA 249 S side @ 10.9m	22/10/2021	2:58 PM	190	0:00:39	74	77	73	85	10	as above
	21 FA249 E side of fan casing ground level @ 2m	22/10/2021	2:59 PM	191	0:00:31	77	81	75	87	10	as above
FA250	22 FA250 S side 4.2 m to motor end at columns	22/10/2021	3:00 PM	192	0:00:30	85	86	84	91	6	as above
	22' FA250 Motor end S side @ 1m	22/10/2021	3:01 PM	193	0:00:20	86	88	85	91	6	as above
	23 FA250 E side platform coupling & casing	22/10/2021	3:02 PM	194	0:00:31	86	87	85	95	9	as above
	23' FA250 E side centre motor @ 1m	22/10/2021	3:02 PM	195	0:00:27	85	87	85	94	8	as above
	FA250 W side motor shaft @ casing @ 1m	22/10/2021	3:03 PM	196	0:00:33	88	90	87	96	9	as above
	25 FA250 coupling & casing W side motor centre @1m	22/10/2021	3:04 PM	197	0:00:31	88	90	86	94	6	as above
	26 FA250 W side casing @ 1m & coupling @ 3m	22/10/2021	3:06 PM	198	0:00:30	86	88	85	93	7	as above
	27 FA250 W side 1m under inlet casing expansion joint	22/10/2021	3:07 PM	199	0:00:30	86	88	85	92	6	as above
	28 FA250 N side casing shaft platform @ 1m	22/10/2021	3:07 PM	200	0:00:30	84	85	84	94	9	as above
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	22/10/2021	3:09 PM	201	0:00:30	84	86	83	93	9	
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	22/10/2021	3:13 PM	202	0:00:30	87	89	86	90	3	
	Lower platform S side @ 1m to magnete plate	22/10/2021	3:14 PM	203	0:00:30	88	90	87	90	2	Improved sealing from previous years - see photo
	Lower platform W side @ 0.9m to magnete plate	22/10/2021	3:16 PM	204	0:00:31	87	90	86	90	3	
	Lower platform N side @ 2m to magnete plate (scaffolding)	22/10/2021	3:17 PM	205	0:00:33	86	88	85	91	5	
	Lower platform N side @ 1m to BE casing	22/10/2021	3:17 PM	206	0:00:30	83	86	82	90	7	
	Platform S of Magnete 2m to S side	22/10/2021	3:18 PM	207	0:00:30	85	87	84	88	3	Screw conveyor squeal noise
	Upper Platform Gbox @ 1m E side & 0.5m casing	22/10/2021	3:19 PM	208	0:00:34	80	81	79	89	9	
	Upper Platform Gbox @ 1m N side	22/10/2021	3:20 PM	209	0:00:31	81	82	80	90	10	
	Upper Platform motor end @ 1m W side	22/10/2021	3:21 PM	210	0:00:34	80	82	79	89	9	
	Upper Platform BE casing @ 0.9m W side	22/10/2021	3:22 PM	211	0:00:30	78	80	78	89	10	
	Upper Platform BE casing @ 1m S side	22/10/2021	3:23 PM	212	0:00:35	82	84	80	89	8	Cover off door in BE casing
	Upper Platform BE casing @ 1m E side	22/10/2021	3:24 PM	213	0:00:31	80	81	79	88	8	
RM7 Baghouse tower	On tower to baghouse top S side above FA249 same level as roof RM7	22/10/2021	3:27 PM	214	0:00:31	71	73	70	84	13	Screw conveyor squeal noise
	On tower to baghouse top S side above FA249 halfway up level	22/10/2021	3:28 PM	215	0:00:31	75	78	73	87	12	as above
	On tower to baghouse top S side above FA249 top level facing tower	22/10/2021	3:29 PM	216	0:00:30	71	72	70	82	11	
	Baghouse S doorway open, discharges	22/10/2021	3:30 PM	217	0:01:00	86	98	72	86	1	Min 70, max 95

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Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
RM7 Inside	Top floor E open doorway	22/10/2021	3:35 PM	219	0:00:31	83	85	82	90	7	Screw conveyor squeal noise
	Centre top 2m N of BE casing	22/10/2021	3:36 PM	220	0:00:30	86	89	85	92	6	
	Top level 1m E side entry of conveyor to chute	22/10/2021	3:37 PM	221	0:00:31	89	91	88	94	5	
	Top level by top of RM7	22/10/2021	3:38 PM	222	0:00:34	89	93	88	94	5	
	Top level W side of chute entry end of conveyor	22/10/2021	3:39 PM	223	0:00:27	91	95	90	94	3	
	Top level W side of chute opening entry of conveyor	22/10/2021	3:40 PM	224	0:00:36	90	93	89	93	3	
	Top level centre W side platform	22/10/2021	3:41 PM	225	0:00:30	87	90	86	92	5	
	Top level in doorway of conveyor from RM6	22/10/2021	3:42 PM	226	0:00:30	84	85	83	90	7	
	On conveyor walkway on centre from RM6 at centre light	22/10/2021	3:43 PM	227	0:00:37	78	79	77	86	8	Screw conveyor squeal noise
	Level 3 2m N of BE casing	22/10/2021	3:44 PM	228	0:00:31	87	89	85	93	6	
	Level 3 between chute & duct on platform on top of Mill	22/10/2021	3:45 PM	229	0:00:30	92	95	89	95	4	
	Level 2 2m N side of BE casing	22/10/2021	3:46 PM	230	0:00:31	87	90	86	93	6	
	Level 2 1m N of cone top of Mill by entry door	22/10/2021	3:47 PM	231	0:00:30	90	93	88	95	5	
	Level 1 2m N of BE casing is work bench	22/10/2021	3:48 PM	232	0:00:31	89	93	87	95	6	
	Level 1 2m to RM7 body N side	22/10/2021	3:49 PM	233	0:00:32	90	96	88	96	5	
	Level 1 2m W side of RM7 on platform	22/10/2021	3:50 PM	234	0:00:30	90	94	89	95	5	
	L0 1m E side of feeder VF100 inlet chute & RM7 body	22/10/2021	3:52 PM	235	0:00:28	95	100	93	100	5	
	L0 Ground Floor 3m N of BE casing	22/10/2021	3:53 PM	236	0:00:38	90	92	89	96	6	
	L0 Inside man door N side	22/10/2021	3:53 PM	237	0:00:32	90	93	89	95	5	
	L0 Inside W roll door @ 1m	22/10/2021	3:54 PM	238	0:00:30	89	90	88	94	5	
	L0 Drive motor N @ 2m to N side & 3m to mill body	22/10/2021	3:55 PM	239	0:00:30	91	95	90	97	5	
	L0 Drive motor S side @ 2m and RM7 body @ 2m	22/10/2021	3:56 PM	240	0:00:31	92	96	91	96	4	
	L0 RM7 body S side @ 2m	22/10/2021	3:57 PM	241	0:00:31	92	95	89	96	4	
	L0 NW corner 1.5m to roll door and vents	22/10/2021	3:58 PM	242	0:00:30	87	89	86	92	5	
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	22/10/2021	4:02 PM	243	0:00:31	80	81	79	88	8	Screw conveyor squeal noise
	Centre S side of screw in line with motor FA250	22/10/2021	4:03 PM	244	0:00:31	81	84	79	88	8	
	E end of SC212 body @ 2m and other N-S aligned screw	22/10/2021	4:04 PM	245	0:00:30	83	86	80	89	6	
	Centre E side - on	22/10/2021	4:05 PM	246	0:00:30	91	96	86	93	2	
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	22/10/2021	4:07 PM	247	0:00:30	79	80	79	87	8	
	Centre W side	22/10/2021	4:07 PM	248	0:00:33	79	80	78	88	9	
	N end Sc211 but S of duct	22/10/2021	4:08 PM	249	0:00:30	79	80	79	88	9	
	By FA252 @ 0.8m shaft S side, casing & discharge box	22/10/2021	4:09 PM	250	0:00:38	85	96	82	92	7	Air discharge 95
	By FA252 @ 0.8m shaft N side, casing & inlet	22/10/2021	4:10 PM	251	0:00:30	84	96	82	93	9	Air discharge 95
	Baghouse hopper platform level N end	22/10/2021	4:12 PM	253	0:00:30	78	79	78	88	10	
	Baghouse hopper centre platform	22/10/2021	4:13 PM	254	0:00:33	77	78	77	88	11	
	Baghouse hopper centre platform	22/10/2021	4:16 PM	255	0:00:29	78	79	77	89	11	
	By FA252 @ 1m to side discharge box top grill	22/10/2021	4:11 PM	252	0:00:25	82	83	82	91	9	Air discharge 95
Coal Road South	30 Coal Road S side in line W side RM7	22/10/2021	4:05 PM	217		68	70		80	11	
	31 Coal Road S side in-line E side RM7	22/10/2021	4:07 PM	218		67	68		80	12	
	32 Coal Road S side in-line FA249	22/10/2021	4:08 PM	219		68	68		80	13	
	33 Coal Road S side Centre Blending Silo	22/10/2021	4:09 PM	220		69	72		81	12	
	34 Coal Road S side E side PHT	22/10/2021	4:10 PM	221		69	70		81	12	
	35 Coal Road S side E side new PHT	22/10/2021	4:12 PM	222		70	73		81	11	
	36 Coal Road S side E side drive platform	22/10/2021	4:13 PM	223		70	71		82	12	
	37 Coal Road S side centre column W support duct	22/10/2021	4:15 PM	224		70	73		82	12	
	38 Coal Road S side centre pedestal	22/10/2021	4:16 PM	225		69	70		81	12	
	39 Coal Road S side Between centre & E pedestal	22/10/2021	4:18 PM	226		70	71		81	11	
	40 Coal Road S side E pedestal	22/10/2021	4:19 PM	227		70	73		81	11	
	41 Coal Road S side W end Firing floor building	22/10/2021	4:20 PM	228		68	70		80	12	
	42 Coal Road S side opposite grate	22/10/2021	4:25 PM	229		69	71		81	12	
	43 Coal Road S side W side coal receival bin 25m to truck	22/10/2021	4:26 PM	230		66	67		86	20	
Coal Mill S side	43A Kerb E side CM opp CM fan discharge	22/10/2021	4:31 PM	235		72	73		83	11	
	43A Kerb E side CM opp CM fan discharge	4/11/2021	10:10 AM	343	0:00:30	79	80	78	86	7	
	44A Under Coal Mill fan discharge	22/10/2021	4:32 PM	236		90	91		96	6	
	44A Under Coal Mill fan discharge	4/11/2021	10:10 AM	344	0:00:31	91	93	91	97	6	Fan room door fully open
	44 CM fan room roll door @ 2m	4/11/2021	10:11 AM	345	0:00:31	88	88	87	94	6	as above
	44' CM S wall E door @2m, large swing door	4/11/2021	10:12 AM	346	0:00:30	83	84	83	90	7	
	44' CM S wall E door @1m, at line in concrete	4/11/2021	10:13 AM	347	0:00:30	87	88	87	92	5	
	45 CM S roll door and wall vent @ 14.6m S side	22/10/2021	4:37 PM	239		77	78		86	8	
	45 CM S roll door and wall vent @ 9.9m S side	4/11/2021	10:14 AM	348	0:00:30	80	80	79	87	8	
	46 CM room wall vent @ 2m	4/11/2021	10:15 AM	349	0:00:31	84	85	84	91	7	
	46A Coal Mill Room S roll door W @ 1m	4/11/2021	10:16 AM	350	0:00:30	84	85	84	89	5	
	47B Centre between Grate & CM blower room roll door	22/10/2021	4:42 PM	242		86	86		93	8	

Table 3.1: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
Kiln 6 S side at 13.5m to kiln	47A Centre between CM Room and grate	22/10/2021	4:43 PM	243		80	81		88	8	
	47A Centre between CM Room and grate, S side	4/11/2021	10:16 AM	351	0:00:30	83	84	82	90	7	
	47 Opp FA264 @ 3.2m	22/10/2021	4:45 PM	244		84	84		90	7	
	47 Opp FA264 @ 8m	4/11/2021	10:17 AM	352	0:00:32	81	82	81	88	7	
	47C Between FA264 & FA200 on kerb	4/11/2021	10:18 AM	353	0:00:30	81	82	81	88	7	
	47D FA 200 S Side @ 3.2m	22/10/2021	4:46 PM	246		84	90		90	6	
	47D FA 200 S Side @ 5m on kerb	4/11/2021	10:19 AM	354	0:00:30	83	83	82	89	6	
	48 Opp. E pedestal roller	22/10/2021	5:07 PM	247		83	84		90	8	
	48 Opp. E pedestal roller	4/11/2021	10:20 AM	355	0:00:30	83	84	82	89	6	
	49 Half way between centre & E pedestals	22/10/2021	5:06 PM	248		83	84		92	9	
	49 Half way between centre & E pedestals	4/11/2021	10:20 AM	356	0:00:30	84	85	84	91	7	
	50 Opp. Centre pedestal	22/10/2021	5:05 PM	249		82	82		89	7	
	50 Opp. Centre pedestal	4/11/2021	10:21 AM	357	0:00:31	82	83	82	89	6	
	51 Half way between Centre & Western pedestals, by duct sup	22/10/2021	5:04 PM	250		82	83		89	8	
	51 Half way between Centre & Western pedestals, by duct support trestle	4/11/2021	10:22 AM	358	0:00:31	82	83	82	88	6	
	52A Opp E end of kiln drive platform	22/10/2021	4:59 PM	251		85	86		91	6	
	52A Opp E end of kiln drive platform	4/11/2021	10:23 AM	359	0:00:30	80	81	80	87	7	
	52 Opp W pedestal roller	22/10/2021	5:02 PM	252		80	81		88	8	
	52 Opp W pedestal roller	4/11/2021	10:24 AM	360	0:00:31	80	80	79	87	7	
	53 Kiln drive platform Centre E end on platform (ground level)	22/10/2021	5:00 PM	253		85	85		92	7	
	53 Kiln drive platform Centre E end on platform (ground level) under kiln	4/11/2021	10:25 AM	361	0:00:30	86	86	85	92	6	
Kiln drive platform	S side S motor end @ 1.5m S side kiln drive, 2m GB	4/11/2021	10:26 AM	362	0:00:30	85	86	85	92	7	
	S side of S Gbox @ 1.5m	4/11/2021	10:27 AM	363	0:00:31	84	85	83	91	7	
	E side of S drive motor @ 1.5m, 2m to Gbox	4/11/2021	10:28 AM	364	0:00:30	86	86	86	93	7	
	53 Kiln drive platform Centre E end on platform between motors	4/11/2021	10:29 AM	365	0:00:30	87	88	87	94	6	
	53 Kiln drive platform Centre E end on platform between gearboxes	4/11/2021	10:29 AM	366	0:00:31	87	87	86	95	8	
	N side motor end @ 1m kiln drive	4/11/2021	10:30 AM	367	0:00:34	88	89	88	94	6	
	N side motor N end @ 1.5m kiln drive	4/11/2021	10:31 AM	368	0:00:30	86	86	85	92	7	
	N side of N drive & Gbox @ 1.5m	4/11/2021	10:32 AM	369	0:00:30	86	87	86	93	7	
RM6 N side	54 W end RM6	22/10/2021	5:28 PM	253		71	73		84	13	
	55 Centre RM6	22/10/2021	5:30 PM	253		72	73		85	13	
	56 E End RM6	22/10/2021	5:31 PM	253		76	77		87	11	
FA38 to FA39 N side of road	56' Between RM6 & New wall for FA38	4/11/2021	9:51 AM	322	0:00:30	77	79	76	87	9	
	57 Door opp FA38	22/10/2021	5:32 PM	254		78	79		90	12	
	58 Half way between FA38 & FA39, by big column	22/10/2021	5:33 PM	254		79	80		91	12	
	59 Opp FA39 end	22/10/2021	5:34 PM	254		80	82		91	11	
	59 Opp FA39 end	4/11/2021	9:52 AM	323	0:00:30	80	81	80	91	11	
PHT N side	60 Opp Conditioning Tower	4/11/2021	9:53 AM	324	0:00:30	81	82	80	91	10	
	60' Opp. Stack	4/11/2021	9:54 AM	325	0:00:30	80	80	79	91	11	
	61 Kiln 6 road Northern side of @ 13m to PHT	22/10/2021	5:21 PM	272		79	81		89	9	
	61 Opp. Centre PHT	4/11/2021	9:54 AM	326	0:00:30	80	82	80	91	11	
	62 Opp E side of old PHT	22/10/2021	5:22 PM	273		80	82		89	9	
	62 Opp E side PHT	4/11/2021	9:55 AM	327	0:00:30	79	79	79	89	10	
Kiln 6 N side	63 Opp. W pedestal	4/11/2021	9:56 AM	328	0:00:30	80	81	79	90	11	
	64 E end drive platform	22/10/2021	5:19 PM	275		81	82		90	9	
	64 E end drive platform	4/11/2021	9:57 AM	329	0:00:30	83	83	82	88	6	
	65 Opp column for return duct W side	22/10/2021	5:18 PM	276		84	85		90	7	
	65 Opp column for return duct W side	4/11/2021	9:57 AM	330	0:00:30	85	85	84	91	6	
	66 Opp centre pedestal	22/10/2021	5:17 PM	277		87	88		93	6	
	66 Opp centre pedestal	4/11/2021	9:58 AM	331	0:00:33	88	88	87	93	5	
	67 Half way between centre & e pedestals	22/10/2021	5:16 PM	278		87	88		95	8	
	67 Half way between centre & e pedestals	4/11/2021	9:59 AM	332	0:00:30	88	88	87	95	7	Compressor van @ 1m
	68 Opp E pedestal	22/10/2021	5:15 PM	279		87	87		96	9	
	68 Opp E pedestal	4/11/2021	10:00 AM	333	0:00:30	87	87	87	95	8	
Grate cooler fan courtyard	69 Centre courtyard - opposite F201	22/10/2021	5:13 PM	280		88	89		98		
	69 Centre courtyard - opposite F201	4/11/2021	10:01 AM	334	0:00:50	88	89	88	95	7	
	69' Centre courtyard - opposite F203	4/11/2021	10:02 AM	335	0:00:30	88	89	88	96	8	
	FA201 @ 2m to motor & casing	4/11/2021	10:03 AM	336	0:00:30	90	91	90	97	7	
	FA201 N side inlet & casing @ 1m	4/11/2021	10:03 AM	337	0:00:30	91	92	91	98	7	
	Between FA201 & 203 & 202	4/11/2021	10:04 AM	338	0:00:30	93	94	93	99	6	
	FA203 inlet & casing @ 2m	4/11/2021	10:05 AM	339	0:00:31	90	91	90	97	7	
	FA203,FA204 & FA205 @ 1m	4/11/2021	10:06 AM	340	0:00:30	90	90	89	98	9	
	Between inlet filters FA206 & FA207 on walkway	4/11/2021	10:07 AM	341	0:00:30	85	86	85	95	10	
Grate area N side	Centre between Grate & CM blower room roll door	4/11/2021	10:08 AM	342	0:00:30	87	88	87	94	6	
	Coal Mill Building N roll door @ 2m	4/11/2021	11:08 AM	403	0:00:30	86	87	86	92	6	

Table 3.1: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
Kiln Firing Floor	Centre N side opening face E	4/11/2021	10:35 AM	370	0:00:40	83	90	82	91	8	Air cannons 91
	Centre N side opening face W	4/11/2021	10:36 AM	371	0:00:30	83	84	82	91	8	
	FA209 E side inlet & filter silencer	4/11/2021	10:37 AM	372	0:00:30	87	88	86	94	7	
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	4/11/2021	10:38 AM	373	0:00:30	93	94	92	98	5	KSCF's
	Eastern KSCF @ 1m	4/11/2021	10:38 AM	374	0:00:30	97	98	97	102	5	
	Eastern KSCF @ 1m	4/11/2021	10:39 AM	375	0:00:30	98	99	97	101	4	
	Centre S side opening face E	4/11/2021	10:40 AM	376	0:00:30	82	82	82	88	6	
	Centre S side opening face W	4/11/2021	10:41 AM	377	0:00:30	81	82	81	88	6	
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	4/11/2021	10:42 AM	378	0:00:30	93	93	92	96	3	
	FA200 inlet side @ 1.5m	4/11/2021	10:43 AM	379	0:00:30	87	89	86	94	7	
	FA210 S side seal fan inlet W side & casing @ 1m	4/11/2021	10:46 AM	381	0:00:31	87	89	87	93	5	
	New replacement FA211 centre under kiln, inlet @ 1m	4/11/2021	10:44 AM	380	0:00:31	97	98	96	102	6	
	Kiln floor centre E S of duct/clinker elevator	4/11/2021	10:47 AM	382	0:00:30	81	81	80	87	7	
	KFF burner air cannon N side @ 2m	4/11/2021	10:48 AM	383	0:00:30	87	95	86	91	4	
	KFF burner by air cannon S side @ 2m	4/11/2021	10:48 AM	384	0:01:36	86	99	85	90	4	
Radicon Cooler	RC L1 centre fan @ 1m	4/11/2021	10:51 AM	385	0:00:30	92	92	91	101	9	
	RC L1 centre fan @ 1m lower speed	4/11/2021	11:06 AM	402	0:00:30	84	85	83	91	7	Fans at lower speed
	RC L1 S fan @ 0.5m	4/11/2021	10:51 AM	386	0:00:20	92	92	91	102	10	
	RC L1 N fan @ 1m	4/11/2021	10:52 AM	387	0:00:30	87	88	87	98	10	
	RC L2 centre fan @ 1m	4/11/2021	10:53 AM	388	0:00:24	93	94	93	102	9	
	RC L2 S fan @ 0.7m	4/11/2021	10:53 AM	389	0:00:20	93	93	92	103	10	
	RC L2 N fan @ 1m	4/11/2021	10:54 AM	390	0:00:28	92	93	92	100	8	
	RC L3 Centre fan @ 1m	4/11/2021	10:55 AM	391	0:00:24	93	94	93	102	8	
	RC L3 S fan @ 0.7m	4/11/2021	10:56 AM	392	0:00:22	93	94	93	103	11	
	RC L3 N fan @ 1m	4/11/2021	10:56 AM	393	0:00:32	91	92	91	100	9	
	RC L4 Centre fan @ 1m	4/11/2021	10:57 AM	394	0:00:26	99	100	98	102	4	Belt squeal on S fan
	RC L4 S fan @ 0.7m	4/11/2021	10:58 AM	395	0:00:20	101	102	100	102	1	
	RC L4 N fan @ 1m	4/11/2021	10:59 AM	396	0:00:30	94	95	94	103	8	
	RC L5 face E	4/11/2021	10:59 AM	397	0:00:30	85	86	84	96	11	Noise from below
	RC L5 face W	4/11/2021	11:00 AM	398	0:00:21	86	87	86	95	9	
	L1 E side 2.4m	4/11/2021	11:02 AM	399	0:00:30	85	86	85	95	10	
	L1 E side 6m	4/11/2021	11:03 AM	400	0:00:30	79	81	78	87	9	
	L1 E side 12m	4/11/2021	11:04 AM	401	0:00:31	78	79	78	87	9	Fan 215 behind location
FA215	Motor S end @ 2.5m	4/11/2021	11:09 AM	404	0:00:28	82	83	82	90	8	Appears to be a new motor since last time
	Platform E side drive coupling @ casing @ 1m	4/11/2021	11:10 AM	405	0:00:30	86	86	86	92	7	
	Platform E side drive coupling @ casing @ 1m	4/11/2021	11:11 AM	406	0:00:30	86	86	86	92	7	
	W side platform @ 1m to coupling & casing	4/11/2021	11:12 AM	407	0:00:30	87	87	86	92	6	
	Under expansion joint discharge duct to stack @ 1m	4/11/2021	11:13 AM	408	0:00:30	81	81	80	92	11	
	N side inlet box platform @ 1m to discharge duct & inlet box	4/11/2021	11:14 AM	409	0:00:30	80	81	79	91	12	
	Platform centre N side inlet box	4/11/2021	11:15 AM	410	0:00:25	79	80	79	89	10	
	Under Inlet box W side entry duct	4/11/2021	11:15 AM	411	0:00:30	82	83	82	91	9	Appears to be a new motor since last time
	Inlet box N side ground level @ 1m	4/11/2021	11:16 AM	412	0:00:30	78	79	78	90	12	
Admin Roof	Admin Roof SW	22/10/2021	10:23 AM	3	0:01:00	72	73	71	81	9	
	Admin Roof SW	4/11/2021	9:38 AM	316	0:00:36	71	72	71	82	11	
	Admin Roof SW	4/11/2021	9:44 AM	321	0:01:00	71	72	70	80	9	
	Admin Roof SE	22/10/2021	10:28 AM	8	0:01:00	72	73	71	82	10	
	Admin Roof SE	4/11/2021	9:39 AM	317	0:00:31	72	73	72	81	10	
	Admin Roof SE	4/11/2021	9:43 AM	320	0:01:00	72	73	72	82	10	
	Admin Roof NE	22/10/2021	10:27 AM	7	0:00:31	71	71	70	82	12	
	Admin Roof NE	4/11/2021	9:40 AM	318	0:00:31	71	72	71	82	11	Unloading at Rail dump station and clean up vac. Truck
	Admin Roof NE	4/11/2021	9:41 AM	319	0:01:00	72	73	71	81	9	
Fenceline South	Former Gate site opp W end Firing floor	22/10/2021	4:27 PM	256	0:00:59	62	64	61	78	16	Noise from below
	Former Gate site opp W end Firing floor	22/10/2021	4:28 PM	257	0:00:30	62	64	61	76	14	
	Former Gate site opp W end Firing floor	4/11/2021	1:19 PM	447	0:00:30	62	63	61	72	11	Air cannon 67
	Former Gate site opp W end Firing floor	4/11/2021	1:20 PM	448	0:01:06	62	64	61	74	12	
	Top N edge of bank 21m S of centre Alt Fuels Building	22/10/2021	4:30 PM	258	0:00:30	56	58	55	73	17	
	Top N edge of bank opposite centre pedestal	22/10/2021	4:31 PM	259	0:01:00	61	63	60	74	13	
	Top N edge bank Opposite E side old PHT	22/10/2021	4:33 PM	260	0:01:00	59	60	59	74	15	
	Top N edge bank Opposite E side old PHT	22/10/2021	4:34 PM	261	0:00:34	59	63	59	74	15	
	Bottom N edge of bank 13m S of centre Alt Fuels Building	22/10/2021	4:37 PM	262	0:01:00	52	54	51	70	18	Birds to 58

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																	
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 8 Top Platform	PHT L8 Top platform level with top of stack	9	78	25	27	34	34	43	44	46	51	51	58	62	71	71	64	65	70	64	61	64	64	63	61	61	60	60	62	63	61	58	51	44	30	16
	PHT L8 Top platform level with top of stack	10	78	24	27	34	34	43	45	46	51	51	58	62	72	71	64	65	70	64	62	64	64	63	62	61	59	60	63	63	62	58	51	44	31	16
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	11	83	24	28	35	34	44	46	45	51	55	57	61	67	67	65	68	77	68	66	67	67	68	67	68	67	71	73	73	72	69	65	62	48	31
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	12	84	23	26	34	34	43	48	49	50	52	54	58	67	70	66	68	79	67	65	66	67	67	72	69	66	71	74	72	72	70	65	60	46	33
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	13	79	24	27	32	34	41	46	48	51	54	57	61	71	70	60	62	69	65	62	65	63	62	63	64	62	65	68	66	66	63	60	54	43	27
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	14	78	24	28	34	36	41	47	49	48	51	60	65	66	66	66	64	71	62	63	67	65	65	68	63	61	60	62	61	59	56	51	45	33	22
	PHT L8 Top Platform S side BE	15	72	23	27	31	38	39	45	49	48	50	55	59	68	64	60	57	60	55	56	58	56	56	58	52	52	56	55	55	52	48	41	34	26	18
PHT Level 8 Lower Platform	PHT L8 Lower platform	16	76	25	28	34	35	43	47	48	50	54	59	63	70	70	64	61	68	63	60	62	60	59	59	56	54	54	56	55	52	49	44	36	26	15
	PHT L8 Lower platform	17	76	25	28	34	35	43	48	48	50	54	59	62	70	70	64	61	68	64	60	62	60	59	59	56	55	55	57	56	53	50	44	37	26	15
	PHT L8 Lower platform EL16 Gbox @ 3m to N side	18	76	26	29	35	34	42	46	49	49	55	59	62	71	69	63	63	67	61	61	62	60	61	60	59	58	58	61	60	58	57	53	48	34	21
PHT Level 8	PHT L8 proper FA263 motor & casing @ 1m	19	85	26	34	36	39	48	47	48	48	49	53	61	69	76	69	69	67	75	73	80	70	70	77	69	69	66	64	62	59	56	52	47	42	34
	PHT L8 proper 1m to vent on FA263 filter room	20	77	26	36	34	37	48	47	50	47	51	55	59	66	73	65	63	64	64	64	65	61	62	64	60	60	57	55	54	52	50	46	39	31	23
	PHT L8 centre tower W side	21	79	26	34	35	40	46	41	43	47	53	59	64	69	74	65	64	64	64	63	70	65	66	63	63	63	59	57	56	53	52	48	42	36	28
	PHT L8 centre tower W side	22	78	27	34	35	38	46	41	44	48	53	60	64	69	74	65	63	64	64	62	69	64	65	64	60	59	57	56	54	53	51	48	42	36	28
	L8 new PHT centre	23	74	23	29	23	30	38	40	44	46	50	56	59	64	65	61	61	63	65	62	63	62	62	60	61	60	57	55	52	51	50	46	36	27	15
	PHT L8 centre tower N side	24	74	18	31	35	36	40	39	45	46	50	54	59	64	67	61	62	64	63	63	63	62	62	61	62	60	56	54	51	49	48	43	34	24	12
	PHT L8 centre tower E side	25	74	23	32	34	36	35	41	45	43	50	56	58	61	64	61	63	64	65	63	63	62	61	60	61	60	55	53	50	47	45	40	30	20	8
	PHT L8 centre tower S side	26	69	18	28	31	37	42	43	43	42	45	50	52	58	63	55	56	56	59	57	56	56	55	55	56	55	51	48	44	44	40	35	29	22	11
PHT Level 7	PHT L7 New S side centre	27	71	22	25	24	34	40	39	40	42	43	49	54	58	61	58	60	61	61	61	61	60	59	57	59	57	54	54	51	48	46	42	34	25	15
	PHT L7 New E side centre	28	75	24	26	25	31	38	40	44	44	48	53	57	63	62	60	62	63	63	63	63	63	63	62	65	64	62	64	59	58	57	53	45	37	27
	PHT L7 New N side centre	29	74	24	30	31	35	47	44	47	44	46	54	59	64	65	61	62	62	63	62	62	62	62	61	62	61	58	58	55	55	54	51	43	35	24
PHT Level 7 Alt. Fuels transfer	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	31	76	21	25	25	28	39	38	42	46	49	54	57	60	65	61	63	63	65	65	64	64	64	63	68	65	63	64	60	57	54	50	43	35	25
	PHT L7 Alt Fuels 1m to base of Alt Fuel chute, 1m to bin W, 1m to W side of feeder	39	76	25	26	26	32	34	37	42	46	47	51	56	61	63	61	63	62	64	65	64	64	63	63	68	65	63	64	61	59	57	52	45	37	26
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	30	76	22	26	27	29	35	39	45	47	51	55	57	61	64	63	62	64	66	68	64	64	64	63	67	66	63	63	59	56	55	49	43	35	27
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	32	76	18	19	24	31	39	38	44	45	49	53	57	60	64	62	63	65	65	65	63	63	64	62	66	64	61	61	58	55	52	47	40	31	21
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	33	77	22	24	29	34	43	42	46	44	49	57	60	60	65	63	65	66	66	66	65	65	64	63	68	67	63	66	63	58	56	51	44	36	28
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	34	75	22	23	28	32	40	40	44	48	52	55	59	60	64	63	63	64	65	65	63	63	62	61	64	63	59	63	58	55	53	49	42	33	24
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	35	75	22	24	28	30	37	37	43	45	50	56	57	60	62	62	63	64	65	65	64	63	63	61	65	64	59	59	55	53	52	49	41	31	23
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	36	79	24	25	29	36	43	38	44	44	48	54	59	62	63	63	65	65	65	66	65	65	63	63	68	72	67	69	66	61	59	54	48	41	33
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	37	77	26	26	30	33	40	40	42	43	49	54	58	60	64	61	62	64	65	65	64	65	63	63	66	65	65	67	65	62	60	55	48	40	32
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	38	75	19	20	26	32	38	38	43	44	47	53	56	60	63	62	63	64	65	66	64	64	64	63	64	63	62	62	59	55	52	47	40	32	21
PHT Level 7	PHT L7 New centre between towers faces S	40	76	27	32	34	37	44	42	44	44	47	53	59	64	63	61	61	63	61	62	62	61	61	62	63	65	65	65	64	65	65	62	55	48	39
	L7 between PHTs centre facing W	41	76	27	32	33	37	44	42	45	43	47	53	58	64	65	61	61	63	62	62	62	61	62	62	63	65	65	65	65	65	65	62	56	49	39
	PHT L7 Old S side centre, faces W	42	76	25	29	33	37	42	46	48	44	47	53	58	67	70	61	62	64	65	63	64	62	61	62	58	57	55	54	52	50	49	45	37	28	16
	PHT L7 under EL13 platform E side	43	76	20	29	34	40	48	47	48	49	52	54	56	68	71	63	64	63	63	64	64	63	61	59	57	56	54	54	50	47	44	39	31	22	11
	EL13 platform E side Gbox & coupling @ 0.5m	44	82	20	27	31	36	43	45	48	49	49	56	58	67	74	66	72	70	74	71	71	73	72	70	67	65	62	60	57	55	52	48	42	35	27
	EL13 platform N side GB end & side EL @ 1m	45	79	19	27	30	37	43	47	50	51	51	53	57	65	69	63	74	70	70	67	71	67	66	64	60	60	57	55	52	49	46	41	33	25	16
	L7 BE drive platform N side @ 1m to BE	46	76	20	26	29	36	43	45	48	50	51	53	57	69	71	63	64	63	62	62	61	65	61	57	55	55	52	50	47	44	41	36	29	21	11
	EL13 platform SW side motor & EL & coupling @ 1m	47	83	18	26	31	36	43	46	48	52	51	55	65	72	71	66	72	72	77	72	71	74	70	67	65	64	61	58	55	52	49	46	40	33	24
	EL13 platform W side 0.5m	48	75	17	26	30	37	42	44	48	48	52	55	62	71	66	60	62	63	64	61	62	64	61	59	56	54	52	50	47	43	39	34	27	18	8
	EL13 platform motor end @ 0.6m	49	83	18	27	31	35	44	46	49	53	50	52	60	71	75	65	72	73	74	73	74	74	73	69	66	65	65	61	60	58	55	53	48	41	33
	L7 centre between cylinders	50	75	28	33	35	42	47	46	47	47	52	53	59	65	71	62	61	63	62	61	63	60	60	60	58	58	57	56	54	53	53	49	41	32	20
	PHT L7 old NW corner 1.5m to stack	51	73	23	31	32	38	45	49	49	44	51	57	60	64	68	65	61	62	62	57	57	55	55	54	52	50	49	47	44	41	39	35	27	19	10
	PHT L7 old centre N side	52	73	28	37	41	41	46	46	45	45	51	58	65	66	66	63	61	64	61	58	58	57	56	55	53	51	50	49	47	46	45	41	33	24	13
	PHT L7 old centre N side on new platform	53	75	25	34	37	40	45	43	42	42	51	55	62	70	71	61	59	60	58	56	56	55	54	53	51	49	48	46	44	42	40	36	29	21	12
	PHT Level 7: FA213 @ 1m, door closed	54	76	28	35	36	38	45	46	50	46	51	54	63	68	70	67	63	65	64	61	62	62	60	61	57	55	54	52	49	48	47	43	35	27	16

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																		
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 6	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	55	83	21	26	31	36	45	48	54	57	56	60	64	71	73	69	70	73	71	73	73	75	73	72	67	65	63	60	57	56	54	52	48	42	32
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	56	85	22	28	33	35	40	43	48	53	53	59	64	69	73	72	72	72	73	75	77	72	73	78	71	70	67	65	61	62	59	54	50	43	35
	PHT L6 RM Silo top EL15 platform motor side 0.6m	57	81	17	23	29	32	39	42	49	52	53	60	62	66	67	65	68	71	70	69	76	71	71	67	66	64	63	60	56	54	52	47	40	33	23
	EL15 W side @ 1m	58	72	14	21	28	32	38	41	46	53	53	58	58	60	63	60	62	63	60	62	63	60	60	58	56	55	54	52	49	45	41	38	33	26	16
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	59	74	14	22	26	30	37	41	46	51	52	55	56	58	62	58	58	67	58	60	68	63	62	58	57	55	55	53	50	46	44	39	33	26	16
	EL15 S side Gbox @ 1m	60	81	16	22	27	31	37	41	48	52	51	56	59	66	68	60	62	75	61	64	77	67	68	62	60	60	63	61	50	47	44	40	34	28	17
	EL15 E side Gbox @ 0.5m	61	86	16	22	28	30	38	42	49	52	52	59	58	60	63	58	65	77	65	69	85	70	68	64	65	63	64	62	53	51	49	45	39	33	22
	RM silo top baghouse fan DC30 discharge @ 1.5m	62	87	21	28	33	37	44	47	56	62	58	64	69	72	74	73	76	75	73	75	78	79	77	77	71	68	66	63	60	57	53	50	44	36	26
	RM Silo top E side 12.7m to FA260	63	75	18	24	25	31	37	41	43	47	47	51	56	63	66	60	64	67	62	64	65	63	61	63	59	57	53	51	48	45	41	36	31	23	12
	RM Silo top N side 12.7m to FA260	64	75	16	22	30	30	39	41	47	49	45	52	55	60	63	60	65	68	64	65	66	63	62	62	59	57	56	54	50	48	45	42	38	31	20
	PHT L6 centre W side	65	76	20	30	28	35	39	41	47	46	48	52	57	64	70	63	65	65	65	64	63	64	62	60	59	58	55	54	51	47	43	39	33	27	17
	PHT L6 stack test port 100mm diam @ 200mm S side	66	86	26	33	37	39	44	45	49	52	53	56	64	71	76	69	70	76	79	74	76	79	76	74	72	70	66	64	60	57	55	50	43	37	29
	PHT L6 stack test port 100mm diam @ 200mm S side	67	86	26	33	38	40	44	46	49	51	53	57	64	72	76	69	70	76	78	74	76	78	76	73	72	69	66	64	60	56	54	50	43	37	30
	PHT L6 stack test port 100mm diam @ 200mm W side	68	90	28	35	41	41	46	46	49	52	64	63	70	78	82	77	84	80	78	74	74	81	79	75	72	72	67	66	62	58	54	49	42	37	29
	PHT L6 stack test port 200mm diam @ 200mm W side	69	91	28	34	39	40	45	46	49	52	63	63	70	75	78	73	85	85	77	83	81	76	78	75	70	66	64	63	57	52	47	41	36	31	22
	PHT L6 NW corner 1m to stack	70	79	16	27	33	36	43	42	45	46	49	53	59	67	74	68	70	71	68	67	65	67	63	62	61	62	57	55	52	48	44	40	34	29	23
	PHT L6 centre N side by platform	71	74	21	31	31	33	40	39	44	45	46	55	58	63	66	62	63	64	64	64	63	63	62	61	61	59	57	54	51	47	43	38	30	22	12
	PHT L6 centre N side on platform	72	74	20	27	31	37	40	40	42	46	48	54	58	61	64	61	62	63	65	64	62	62	61	60	60	59	55	53	50	44	40	34	26	17	7
	PHT L6 centre between towers	73	74	22	30	31	31	34	35	41	45	47	52	58	61	63	61	63	63	64	63	63	62	61	60	60	60	58	56	53	50	47	43	39	31	22
	PHT L6 new N side centre	74	74	16	23	31	36	39	36	43	47	47	53	59	61	61	62	64	64	64	65	63	63	62	61	62	61	58	56	54	50	47	43	38	31	22
	PHT L6 new E side centre	75	75	21	29	31	35	35	35	40	48	47	54	57	59	60	60	62	63	64	65	63	63	63	63	65	64	61	60	59	56	52	49	44	36	25
	PHT L6 new S side centre	76	76	20	22	29	32	36	35	41	46	48	56	58	63	61	62	63	63	64	64	63	64	63	65	66	65	64	63	62	60	58	55	50	42	31
	L6 centre S side old PHT by elevator	77	73	19	26	29	32	39	39	45	46	47	52	55	59	62	59	62	62	62	62	63	63	60	60	58	56	54	52	49	44	41	34	28	19	8
RM Silo top inside	L6 inside doorway to top RM silo room	78	81	14	28	30	38	55	51	57	58	55	62	61	62	66	66	69	69	72	68	68	76	72	64	63	61	59	56	53	50	45	40	35	27	19
	RM Silo top inside centre	79	86	10	17	31	34	43	51	54	59	55	66	66	68	68	68	73	73	76	70	72	82	77	69	66	64	62	59	57	55	51	46	42	35	26
	RM silo top inside E doors open	80	83	13	25	32	33	50	51	53	58	55	65	66	67	70	68	71	72	73	71	70	79	75	67	65	64	62	60	57	54	49	42	36	28	18
	L6 RM silo top room inside S man door	81	84	16	26	28	35	46	52	55	59	55	66	69	70	68	66	73	74	77	70	71	78	73	67	66	67	65	63	60	55	50	46	41	33	23
	RM silo top outside S man door	82	73	13	19	26	31	36	40	46	47	49	56	58	57	59	60	60	61	60	64	66	61	61	60	58	58	58	56	54	50	48	44	39	32	21
PHT Level 5	PHT Level 5 old centre S side by stairs	83	74	19	23	28	34	36	41	41	45	46	51	55	60	62	60	63	63	62	64	65	64	63	63	62	61	59	58	55	51	47	42	36	27	16
	PHT Level 5 old centre W side by gas valves @ 1m	84	78	18	24	32	36	39	40	42	43	45	51	58	62	65	62	64	64	62	64	65	64	64	64	65	66	66	69	67	67	64	65	58	52	43
	PHT Level 5 old NW corner @ 1m to stack	85	79	17	21	30	38	38	44	46	47	48	53	58	62	71	66	65	65	64	65	65	65	65	67	65	67	66	66	67	67	66	65	62	60	51
	PHT Level 5 old centre N side	86	75	20	24	38	40	38	40	41	45	49	53	59	62	65	62	64	64	64	64	64	64	63	62	62	62	59	58	56	53	51	46	41	34	25
	PHT Level 5 centre between towers	87	76	14	21	34	34	35	37	40	46	49	54	56	60	63	60	63	63	64	64	64	64	64	64	65	66	64	62	61	57	54	48	42	35	24
	PHT Level 5 New centre N side	88	75	14	21	27	35	36	37	41	48	50	54	59	62	65	61	64	63	65	65	64	64	63	62	63	62	59	57	55	51	48	44	39	34	26
	PHT Level 5 New centre E side above kiln	89	75	17	18	28	31	34	36	40	45	49	54	59	61	61	62	63	64	65	66	65	64	63	62	63	64	58	56	54	48	43	38	33	28	20
	PHT Level 5 New centre S side	90	73	17	21	29	32	34	35	40	47	47	55	57	60	62	59	61	62	62	62	62	63	61	60	60	59	57	55	52	48	45	40	35	29	20
PHT Level 4	PHT Level 4 old centre S side by stairs	91	76	19	23	33	35	38	41	43	59	49	51	57	60	63	61	65	64	63	67	67	67	66	65	65	64	62	60	57	53	49	44	38	31	23
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	79	16	22	34	36	39	41	43	55	50	51	58	62	64	62	66	65	64	69	69	70	70	69	68	68	66	64	62	59	56	51	45	37	32
	PHT Level 4 old centre W side	93	77	20	25	36	39	42	43	43	51	51	54	60	66	67	63	65	66	64	66	67	67	67	65	64	62	60	58	56	52	48	43	37	31	20
	PHT Level 4 old NW corner @ 1.2m to stack	94	78	19	22	33	39	43	45	46	51	53	51	61	66	68	64	65	66	64	64	65	65	65	65	66	66	65	65	66	62	58	51	45	37	25
	PHT Level 4 old centre N side	95	76	19	25	31	36	41	41	42	48	48	51	59	63	64	62	63	64	64	65	65	65	65	64	65	65	63	63	61	59	57	53	47	40	30
	PHT Level 4 centre between towers by air cannon @ 2m	96	74	15	23	35	37	38	38	42	49	46	55	59	62	62	61	64	64	64	64	63	63	62	61	62	60	55	53	51	44	40	35	30	23	18
	PHT Level 4 new centre N side	97	75	18	22	29	33	36	37	40	49	49	56	59	62	61	62	65	64	65	65	65	65	63	62	62	61	57	55	51	46	40	35	28	20	9
	PHT Level 4 new centre E side above kiln	98	75	16	18	32	35	38	36	42	47	48	53	58	61	59	61	63	64	65	65	64	64	63	61	64	62	56	55	52	45	39	33	26	20	10
	PHT Level 4 new centre S side - air cannon in Leq	99	78	19	16	32	32	36	36	41	52	48	51	57	60	61	59	62	63	63	64	65	65	65	66	67	67	68	67	68	67	67	62	57	50	41
ESP E side	ESP Centre E side top walkway looking E to PHT	100	76	17	24	36	37	39	41	43	51	47	51	57	64	67	60	62	63	62	66	68	64	64	65	62	60	58	56	53	49	45	40	32	26	14
	ESP top SE corner at barrier	101	75	12	22	37	36	38	39	41	45	48	51	57	61	63	59	62	62	62	66	68	66	63	64	62	61	58	57	54	50	45	40	32	23	11
	ESP top SE corner at barrier - facing ESP	102	73	12	22	36	36	38	39	40	44	47	51	56	61	64	59	61	62	60	63	66	63	62	61	59	58	55	53	51	50	45	40	35	26	16
	ESP top NE corner at barrier	103	75	18	24	31	35	39	41	43	49	49	52	57	64	68	62	62	61	62	64	65	63	63	62	62	60	59	59	58	55	50	44	37	30	18
	ESP top NE corner at barrier - facing west	104	73	17	24	30	35	39	39	42	50	49	53	56	61	63	61	61	62	61	62	63	61	61	60	59	58	56	55	54	50	44	37	29	19	7
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	105	77	24	24	34	36	43	46	48	52	49	54	58	63	64	63	65	66	65	68	68	70	67	65	64	63	61	59	59	54	50	48	42	34	23
	PHT Level 3 old centre W side above FA39 face E	106	81	25	27	37	40	47	53	51	58	55	57	62	69	72	68	70	71	68	69	70	71	69	68	67	65	64	61	60	56	51	47	40	32	22
	PHT Level 3 old centre W side above FA39 face W	107	81	25	27	37	40	47	52	50	59	55	57	63	70	71	69	71	70	68	70	71	71	70	68	66	65	63	61	59	55	50	45	37	28	16
	PHT Level 3 old centre N side	108	78	25	23	31	40	46	44	45	60	52	55	60	66	71	66	68	68	66	67	67	68	66	64	63	61	59	57	56	51	48	52	44	38	29
	PHT Level 3 old centre E side above kiln	109	77	23	26	32	37	43	44	44	53	49	58	59	65	66	64	67	66	65	66	66	67	65	64	62	61	59	57	54	51	48	46	41	34	26
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	82	24	27	39	42	46	52	51	57	56	58	63	68	73	70	70	72	69	70	71	71	71	69	68	65	63	60	58	54	50	46	38	29	16
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111	93	26	29	51	52	51	58	60	74	68	71	75	85	81	81	81	84	83	82	86	82	79	78	76	75	74	72	72	74	67	63	58	50	40
	PHT Level 2.5 by centre by kiln entry W side, air cannon	113	86	23	27	43	45	47	58	57	70	63	63	65	76	73	73	73	75	73	75	73	81	74	69	70	65	66	63	64	59	54	65	53	49	37
	PHT Level 2.5 by DC31 discharge @ 1m	112	92	27	31	54	54	52	55	62	80	69	69	73	82	79	77	82	82	79	79	81	80	80	79	76	74	73	70	69	69	63	59	52	45	35
PHT Level 2.25	PHT Level 2.25 by centre by kiln entry Air cannons	114	87	24	25	44	47	50	53	52	62	58	60	62	71	72	70	71	72	72	81	72	82	74	70	73	69	69	68	67	64	61	59	54	46	36
	PHT Level 2.25 centre	115	89	27	25	40	42	48	54	54	72	62	64	65	71	74	72	74	75	76	75	75	86	83	73	75	71	72	71	68	64	61	59	53	43	29
	PHT Level 2.5 by Radicon Gbox drive E end @ 1.5m	116	86	24	21	33	41	44	50	51	61	60	60	63	69	70	69	70	72	73	77	76	81	79	73	74	69	69	66	66	61	56	54	46	37	27
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	89	27	30	41	46	54	55	57	75	63	64	71	80	77	76	76	76	78	79	77	82	79	76	75	72	72	70	70	68	66	62	55	47	36
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	118	89	29	30	42	46	54	55	57	75	64	64	71	81	78	76	76	76	78	79	77	82	78	76	75	72	72	71	70	68	66	62	55	46	36

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																			
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	120	88	26	25	44	45	51	55	53	66	60	66	69	77	78	73	72	74	75	81	75	79	75	73	73	73	74	74	75	73	73	69	62	55	44
	L2 PHT FA03 casing @ 1m E side	121	88	25	25	43	45	50	54	57	72	63	63	68	80	76	71	73	74	76	79	75	79	74	72	72	71	72	72	72	69	69	65	58	49	38
	PHT Level 2 @ 1m to south side FA39 stack entry duct	119	89	28	30	46	50	56	57	55	72	63	67	71	81	81	74	74	78	77	78	78	80	79	77	75	72	71	69	69	66	63	57	50	39	26
	PHT Level 2 FA03 discharge @ 1.5m	122	91	29	29	42	48	55	57	62	83	73	74	72	75	77	75	77	80	79	82	79	82	80	77	76	74	73	72	72	70	68	64	57	49	38
	PHT Level 2 @ 1m to south side FA39 stack entry duct & stack	123	90	28	30	45	50	56	58	57	76	65	64	71	80	81	74	75	76	77	81	78	82	79	76	75	73	72	69	68	66	63	58	50	41	27
	PHT Level 2 FA65 inlet filter @ 1m in front	124	91	27	29	41	45	55	56	58	77	65	65	70	81	78	74	75	78	77	80	77	86	79	75	74	72	71	69	68	65	62	57	50	42	32
	PHT Level 2 FA65 rear side 1m	125	88	27	28	39	43	51	52	59	79	66	63	66	76	78	74	73	75	76	78	75	82	78	73	72	71	69	68	67	64	63	59	52	44	32
	L2 PHT centre N side edge @ 2m facing centre	126	85	18	21	38	43	48	51	51	70	60	61	65	69	74	70	72	73	72	77	71	78	74	69	70	67	66	65	66	62	60	56	49	40	27
	PHT Level 2 @ 1m to north side FA39 stack entry duct	127	89	26	30	49	52	56	57	56	73	65	66	73	79	84	75	75	76	76	76	76	80	78	76	75	73	71	67	65	62	59	54	47	38	26
	PHT Level 2 @ 1m to north side FA39 stack entry duct	128	89	26	31	49	52	56	57	56	72	65	66	73	79	84	75	75	77	76	75	77	79	78	75	75	73	70	67	65	62	59	54	47	38	26
	PHT Level 2 south side by Lift	129	82	23	20	33	40	48	51	47	58	55	58	61	65	67	65	68	70	71	75	71	76	70	69	69	65	64	62	61	56	52	50	41	32	21
PHT Level 1	PHT Level 1 RM silo base blower room N side man door @ 1m	130	80	27	24	40	45	43	51	49	57	56	61	69	66	71	66	66	67	65	69	69	70	67	71	68	63	62	60	59	55	53	48	44	38	32
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	131	82	32	27	38	56	47	54	51	59	56	70	69	72	74	68	70	70	68	69	69	70	68	66	66	67	66	65	63	59	57	52	45	35	22
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	132	83	31	24	34	48	41	46	47	57	59	72	65	71	72	68	69	72	71	73	72	72	70	70	69	70	70	66	65	59	58	53	46	37	26
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	133	78	36	27	35	52	44	49	49	56	56	66	62	66	65	68	68	68	67	68	66	68	66	64	63	61	60	58	57	52	48	43	35	26	17
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	134	79	42	32	37	49	41	48	51	57	60	62	65	65	65	67	68	66	68	69	67	68	69	66	63	61	59	56	53	50	46	41	35	27	17
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	135	78	42	32	37	49	41	47	51	58	60	62	65	65	65	66	67	67	68	68	68	68	69	66	63	61	59	56	54	50	47	42	35	27	17
FA39	FA39 E side at concrete line 5.4m to motor	136	85	27	31	42	44	50	52	54	63	58	62	67	73	74	69	71	73	71	73	74	74	79	75	72	72	70	66	62	58	53	48	42	35	27
	FA39 E side @2.3m in line with columns	137	87	29	31	46	48	51	56	55	61	59	63	74	72	74	68	72	75	72	73	75	76	82	77	77	73	73	71	67	63	57	52	47	40	32
	FA39 under discharge duct @ 1m	138	91	27	31	43	47	52	59	56	60	60	65	73	73	74	77	75	80	76	76	75	77	85	82	79	79	81	80	75	71	66	61	54	47	39
	FA39 E side motor platform @ 0.82m to coupling cover	139	95	27	31	41	46	51	54	55	61	60	68	79	75	78	77	77	82	79	78	75	82	91	87	82	79	77	75	70	66	60	54	47	39	29
	FA39 motor platform centre E side@ 1m	141	85	29	34	50	51	56	61	61	71	63	65	69	70	74	69	73	74	71	74	75	75	75	73	72	70	69	66	62	58	52	48	41	32	23
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	140	96	26	29	42	45	50	54	53	57	60	67	75	73	75	75	76	79	76	75	74	83	91	86	90	85	82	78	72	69	64	57	52	44	32
	FA39 motor N end @ 2.7 to end plates/stop button at line	142	82	22	26	39	44	47	52	49	54	54	57	64	69	71	65	68	70	69	69	70	71	77	73	70	67	65	63	58	54	48	43	35	26	17
	FA 39 N side on kerb	143	80	22	27	35	39	44	50	49	54	54	58	62	67	69	64	67	69	68	71	70	70	72	68	67	66	63	60	56	52	46	41	33	23	13
	FA39 W side at metal strip 5.25m to motor	144	87	22	29	39	44	46	50	49	62	57	57	67	68	70	69	73	74	71	75	76	77	82	77	77	74	72	68	65	61	55	49	43	34	24
	FA39 W side at columns @2.7m to plinth	145	88	23	28	38	45	49	51	51	61	58	58	69	69	71	70	72	74	72	74	75	76	82	78	81	77	75	71	67	63	58	52	46	38	28
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	146	92	24	30	44	45	53	59	55	60	60	65	74	72	72	78	77	80	76	76	76	78	85	81	79	80	81	81	78	75	69	65	58	52	44
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	147	86	23	27	38	46	52	58	56	59	58	60	70	78	76	70	73	73	71	75	75	75	78	75	73	72	69	66	62	58	53	47	39	31	21
	FA39 S side @ columns 2.7m to bearing	148	87	25	30	48	46	48	57	55	64	58	59	63	69	71	68	74	74	71	79	80	75	78	76	75	72	70	66	65	60	55	51	45	37	27
	FA39 S side platform bearing cover @ 0.8m	149	88	26	32	42	43	51	58	57	63	65	64	66	71	73	72	76	77	74	79	81	75	77	76	73	72	70	68	66	63	59	55	50	43	34
	Centre between FA38 & FA39 @ 11.2m at line facing E	150	86	26	26	38	43	48	50	52	57	59	57	66	68	69	66	71	71	70	74	75	75	82	77	74	71	69	66	62	59	53	48	42	33	20
FA38	Centre between FA38 & FA39 @ 7.7 m facing FA 38	151	86	26	25	37	43	48	50	52	56	60	57	64	68	68	67	72	71	71	74	74	75	82	77	73	70	68	65	62	59	55	51	48	41	31
	FA38 @ 3.9m to E side	152	89	27	27	36	42	48	47	52	61	56	58	63	68	69	69	72	71	71	75	75	76	87	81	73	71	69	65	63	59	55	51	48	40	32
	FA38 @ 3m to N side	153	87	25	25	40	41	49	48	52	61	57	56	63	67	72	71	71	72	74	75	76	76	84	78	73	71	69	66	63	59	54	49	43	34	25
	FA38 @ 5m to NW side at NW column	154	87	24	26	38	44	45	47	51	59	55	55	63	68	69	69	70	71	71	73	73	74	84	78	73	71	68	65	62	59	55	50	46	39	30
	FA38 @ 5m to W side at W column	155	85	24	24	31	39	46	49	50	58	57	56	62	67	68	66	70	70	71	72	72	72	81	75	70	69	67	64	61	58	54	48	42	33	23
	In centre opening of wall on W side	156	83	23	24	30	39	44	47	48	56	57	55	61	68	65	63	67	68	69	71	72	73	79	73	69	68	66	64	61	58	54	48	43	34	24
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	157	92	23	26	36	40	47	48	52	57	61	59	63	68	73	73	74	77	77	79	77	82	89	81	76	76	74	73	72	69	66	62	59	53	45
	FA38 at opening on S side of road facing FA38 opening	158	79	22	26	32	37	42	44	46	53	54	54	59	62	63	61	66	66	65	68	70	70	73	69	68	66	65	63	61	59	55	50	43	34	22
	56' Road kerb N side opp. Opening to FA38	159	75	18	22	32	37	40	42	44	52	50	52	58	60	61	58	62	63	63	66	65	64	67	65	63	62	60	58	57	55	51	46	39	30	18
	57 Road N side opp FA38 doorway	160	79	21	24	39	41	44	44	48	57	53	54	62	64	67	64	67	68	66	67	68	67	72	67	65	63	60	58	55	51	47	41	33	23	11
	58 Road N side between FA38 & FA39	161	78	22	24	36	40	44	45	47	61	55	56	62	64	66	64	67	67	66	68	68	68	70	68	65	63	60	58	55	51	47	40	32	22	9
RM6	1 RM6 W door @ 1m	162	75	15	24	27	29	35	38	40	42	47	50	52	56	60	59	58	65	60	66	68	64	65	65	59	56	56	53	50	46	41	35	26	16	7
	1' RM6 W door at kerb W side @ 13.3m	163	69	12	18	26	29	35	36	39	42	44	46	50	53	56	53	58	59	55	59	62	58	58	58	53	51	49	45	41	37	31	24	16	8	0

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																	
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
RM7 outside	1 RM7 at roadside kerb ~32m	164	69	12	20	25	29	32	36	38	43	44	47	48	59	61	52	54	56	57	59	60	58	58	57	54	53	51	49	46	43	37	30	22	13	3
	2 Rm7 @ 12m to W door	165	74	15	23	27	31	36	40	42	47	47	49	53	59	61	57	60	64	61	65	67	65	63	63	62	60	58	56	52	48	43	36	28	17	5
	3 RM7 W wall door @ 1m	166	78	17	26	30	34	39	40	44	46	50	52	55	61	65	65	66	71	68	68	70	68	67	65	64	62	62	62	57	52	47	40	31	21	9
	4 RM7 NE corner wall vents 2 1m	167	80	18	26	31	34	38	41	46	48	51	55	58	63	67	65	70	72	69	69	71	68	68	67	65	64	63	60	56	52	47	41	34	27	15
	5 RM7 N side NW roll door @ 1m	168	81	18	25	34	40	42	46	49	51	51	53	59	63	66	64	66	68	66	73	75	70	69	69	67	65	63	60	58	54	49	43	36	27	16
	6 RM7 N wall vents centre next to Roll door	169	83	17	25	34	38	42	45	50	51	52	57	59	65	67	65	69	72	71	74	75	73	71	71	69	67	67	63	60	57	52	47	42	35	25
	RM7 vents N wall W of man door	170	84	19	27	38	41	46	47	52	52	55	58	62	66	67	67	70	72	70	76	78	76	72	72	70	69	70	64	62	58	53	48	42	34	23
	7 RM7 N wall man door	171	83	18	26	37	40	44	46	50	53	53	62	60	65	67	65	68	70	67	74	78	76	71	71	70	68	67	63	60	56	50	44	37	29	18
	8 RM7 E wall vents NE corner @ 1m	172	84	17	27	34	39	42	45	50	54	55	57	62	66	67	66	70	72	70	75	79	75	72	72	70	69	68	64	61	56	51	46	39	31	19
	9 RM7 E side under duct	173	81	20	26	34	37	43	45	48	54	56	56	61	62	65	65	68	69	67	72	76	75	68	68	67	64	62	60	57	52	47	41	34	25	15
	10 RM7 By E door RM7 floor	174	79	20	26	34	37	41	45	47	52	53	55	58	61	64	63	65	67	64	71	73	69	65	66	64	62	61	60	56	52	48	43	37	28	18
	10' RM7 By E door Hydraulics room closed	175	75	18	22	25	35	37	40	44	47	48	51	56	61	60	59	63	65	63	63	65	64	63	62	61	60	58	56	53	51	50	48	45	41	32	22
	11 RM7 Centre Compressor room door @ 1m closed	176	74	17	22	26	33	34	39	45	48	48	48	55	64	61	61	61	64	63	63	64	63	62	61	60	58	56	53	51	50	48	45	41	32	22
	11A RM7 compressor room W door @ 1m closed	177	73	18	21	27	35	36	40	44	46	47	48	59	63	60	60	62	62	61	62	62	62	61	59	59	57	54	52	49	47	44	40	34	24	14
	12 RM7 Under E inlet for switchroom fan	178	86	14	19	28	37	36	42	46	50	58	63	75	79	69	78	80	69	68	70	69	70	70	68	67	66	63	60	59	58	56	46	39	31	21
	12B Under switchroom fan duct W	179	87	13	19	27	36	37	42	46	50	58	64	75	78	70	81	84	68	68	71	69	70	70	68	68	66	62	59	57	55	53	48	38	30	20
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	180	78	14	21	26	31	34	39	42	46	50	53	65	71	64	67	72	65	65	66	64	65	64	62	61	59	56	54	51	49	47	42	36	28	22
FA249	13 FA249 under inlet duct W side	181	79	18	24	33	41	44	48	52	54	53	55	65	66	64	59	65	65	62	70	74	71	64	66	64	62	59	58	55	51	47	42	35	26	15
	14 FA249 2m W side ground level	182	82	19	26	36	41	40	45	52	51	51	57	62	63	64	63	67	67	64	72	77	75	66	68	67	65	62	61	58	54	49	44	37	29	18
	14' FA249 motor platform fan coupling & casing W side @ 1m	183	82	19	24	35	41	42	49	55	53	56	58	61	65	68	64	66	67	67	73	77	74	67	69	68	67	65	65	63	60	57	54	50	45	38
	15 FA249 1m motor end	184	83	18	23	30	37	40	45	51	54	52	55	64	64	64	64	68	67	66	71	78	77	67	70	69	69	63	62	59	56	52	48	42	35	26
	16 FA249 end at column 4.3m N of motor plinth	185	82	17	22	33	41	39	47	53	57	53	56	67	65	67	65	66	66	66	71	78	77	67	69	67	67	62	61	59	54	50	45	38	30	20
	17 FA249 motor platform E side coupling & casing 1m	186	82	18	24	35	41	42	51	57	55	55	59	63	65	68	64	67	67	67	71	77	75	68	70	68	68	65	66	64	62	59	56	53	47	40
	18 FA249 Platform S side centre @ 1m	187	75	16	20	30	36	39	46	48	47	47	51	56	57	59	58	60	61	62	62	66	64	62	63	62	63	63	62	62	62	61	59	55	49	40
	18' FA249 platform S side under discharge duct E side	188	77	15	21	28	38	41	46	49	50	48	52	58	59	60	58	60	62	62	65	72	71	63	66	64	62	59	58	55	53	50	46	40	33	23
	19 FA249 S side @ 5.5m at S edge barrier	189	74	16	20	30	35	38	41	45	49	47	53	54	59	61	59	59	59	59	64	68	65	60	60	59	58	57	55	55	55	56	55	51	46	36
	20 FA 249 S side @ 10.9m	190	74	15	21	30	34	37	41	44	50	51	54	57	60	62	60	60	59	61	64	68	65	61	61	59	59	57	55	55	53	52	47	43	38	28
	21 FA249 E side of fan casing ground level @ 2m	191	77	15	21	29	39	43	47	48	48	49	52	56	60	60	58	61	61	60	66	73	70	61	66	62	61	58	57	55	53	50	48	41	34	26
FA250	22 FA250 S side 4.2 m to motor end at columns	192	85	13	22	34	40	40	48	51	58	54	55	64	66	68	63	70	67	67	76	81	78	69	71	70	69	65	65	62	58	54	49	43	36	26
	22' FA250 Motor end S side @ 1m	193	86	16	22	36	39	40	47	52	52	57	60	64	67	69	65	68	70	71	78	81	78	72	73	72	71	67	66	64	60	57	53	49	43	35
	23 FA250 E side platform coupling & casing	194	86	16	20	34	39	44	52	59	57	61	63	66	72	74	69	72	73	73	76	79	77	74	74	72	72	68	68	66	62	59	56	52	47	39
	23' FA250 E side centre motor @ 1m	195	85	15	20	34	38	42	49	56	56	60	62	65	72	75	68	70	71	71	77	79	77	72	72	72	71	67	67	64	61	57	53	48	42	33
	FA250 W side motor shaft @ casing @ 1m	196	88	16	22	35	41	45	54	61	60	61	62	67	72	75	68	71	74	74	78	83	78	75	75	74	73	70	71	68	64	61	57	52	47	40
	25 FA250 coupling & casing W side motor centre @1m	197	88	15	23	36	40	43	50	57	57	59	60	64	67	72	68	70	73	72	80	83	80	73	73	73	72	69	69	66	62	59	54	49	43	34
	26 FA250 W side casing @ 1m & coupling @ 3m	198	86	16	23	36	42	42	46	53	57	57	58	62	70	73	67	69	69	71	79	80	76	72	72	72	71	70	68	66	63	62	57	54	48	39
	27 FA250 W side 1m under inlet casing expansion joint	199	86	16	24	37	41	45	48	51	58	56	57	61	66	69	65	70	69	68	79	82	77	72	73	73	71	69	67	65	62	58	58	54	49	42
	28 FA250 N side casing shaft platform @ 1m	200	84	19	25	41	43	44	52	55	59	56	60	64	68	71	67	71	73	71	75	77	74	72	73	72	71	69	67	66	65	64	61	56	50	40
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	201	84	20	24	37	40	45	51	53	56	57	59	67	71	73	67	69	70	68	75	79	73	70	73	70	69	66	65	63	61	58	55	47	39	27
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	202	87	17	24	31	37	39	43	50	54	54	59	61	62	64	65	66	69	70	71	74	74	76	77	77	78	79	78	75	72	69	64	57	49	39
	Lower platform S side @ 1m to magnete plate	203	88	17	24	30	34	39	43	48	53	54	58	62	62	64	71	66	66	70	70	74	76	77	79	78	78	78	79	77	77	76	69	60	52	42
	Lower platform W side @ 0.9m to magnete plate	204	87	16	24	29	34	39	45	49	52	54	62	60	64	66	66	66	69	69	71	74	76	77	77	78	78	78	77	74	71	68	63	57	50	40
	Lower platform N side @ 2m to magnete plate (scaffolding)	205	86	16	24	31	36	41	46	52	55	55	61	63	67	68	65	64	66	69	70	72	73	73	74	74	76	80	78	74	70	66	61	55	47	36
	Lower platform N side @ 1m to BE casing	206	83	17	25	34	37	40	46	55	56	53	61	62	64	65	63	65	66	67	70	72	73	71	71	71	72	76	75	71	67	64	59	52	44	33
	Platform S of Magnete 2m to S side	207	85	16	24	30	35	38	39	46	53	52	57	58	60	62	64	62	65	68	69	73	74	74	76	75	76	76	77	77	72	66	60	54	47	36
	Upper Platform Gbox @ 1m E side & 0.5m casing	208	80	14	24	30	34	39	47	55	54	58	61	59	60	61	61	64	66	66	69	72	72	69	69	68	68	69	67	64	61	57	52	47	42	31
	Upper Platform Gbox @ 1m N side	209	81	16	22	31	36	39	47	56	55	56	62	61	64	64	62	65	66	67	69	73	72	69	69	69	69	69	68	64	61	59	54	51	47	37
	Upper Platform motor end @ 1m W side	210	80	13	22	29	34	37	46	54	55	56	63	59	63	64	61	64	64	65	68	70	70	69	69	69	69	70	68	66	62	61	56	52	47	39
	Upper Platform BE casing @ 0.9m W side	211	78	12	20	29	33	37	45	52	56	57	62	60	61	62	61	62	64	64	65	68	68	67	67	67	67	69	66	64	61	59	55	50	45	37
	Upper Platform BE casing @ 1m S side	212	82	14	23	31	36	39	45	54	56	55	59	61	61	62	62	61	64	67	67	70	70	69	69	71	72	73	72	70	68	66	63	57	51	42
	Upper Platform BE casing @ 1m E side	213	80	14	22	29	33	38	44	48	53	56	60	59	65	68	62	63	65	64	70	71	72	69	68	67	67	69	68	64	60	56	52	46	41	29
RM7 Baghouse tower	On tower to baghouse top S side above FA249 same level as roof RM7	214	71	13	17	30	31	36	40	45	49	47	50	60	60	57	57	60	58	57	58	62	63	57	57	56	54	51	50	46	43	39	34	26	16	5
	On tower to baghouse top S side above FA249 halfway up level	215	75	13	19	29	33	41	46	47	51	48	51	63	64	60	61	60	61	61	61	66	69	65	61	60	59	56	54	52	49	46	41	35	27	17
	On tower to baghouse top S side above FA249 top level facing tower	216	71	12	19	28	29	35	37	41	47	44	48	56	60	61	56	57	57	59	61	61	62	58	59	57	56	53	52	49	46	43	38	32	25	15
	Baghouse S doorway open, discharges	217	86	12	22	28	32	36	39	43	45	45	50	54	59	61	60	63	65	66	67	67	69	69	71	73	75	77	78	77	76	75	72	68	63	55

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																		
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
RM7 Inside	Top floor E open doorway	219	83	19	27	30	36	42	45	48	51	55	56	63	67	67	68	70	73	72	71	72	72	71	71	71	71	69	69	67	63	59	53	47	39	28
	Centre top 2m N of BE casing	220	86	24	32	35	41	43	44	49	52	55	58	63	68	70	70	72	77	74	75	75	75	76	75	75	75	74	74	71	68	64	59	54	45	36
	Top level 1m E side entry of conveyor to chute	221	89	23	32	34	39	42	48	54	54	57	62	66	68	69	72	73	77	75	77	77	78	78	78	78	78	78	77	75	73	71	66	63	55	47
	Top level by top of RM7	222	89	25	34	35	40	45	48	52	52	56	60	62	69	72	74	76	79	78	78	79	78	80	78	78	78	76	75	73	70	66	62	57	50	44
	Top level W side of chute entry end of conveyor	223	91	23	32	34	38	43	46	54	52	57	58	63	68	72	73	75	77	78	78	79	79	81	80	82	81	81	80	78	75	72	68	63	54	44
	Top level W side of chute opening entry of conveyor	224	90	21	32	32	37	42	46	49	52	54	59	64	67	70	72	75	79	76	78	78	79	79	79	81	80	79	80	78	75	72	68	63	54	45
	Top level centre W side platform	225	87	22	26	31	37	42	46	50	51	53	57	60	67	71	72	73	77	76	76	76	76	76	75	75	75	74	73	72	68	65	58	53	44	33
	Top level in doorway of conveyor from RM6	226	84	18	24	33	37	41	45	48	53	54	58	60	67	70	68	69	73	73	73	72	73	73	73	73	72	71	70	68	66	63	58	53	47	38
	On conveyor walkway on centre from RM6 at centre light	227	78	14	20	26	32	37	41	45	52	50	54	58	62	65	62	65	67	65	67	70	68	67	67	65	64	63	62	60	56	51	45	38	29	17
	Level 3 2m N of BE casing	228	87	22	32	36	44	45	45	49	52	55	60	64	68	71	72	73	76	76	77	77	76	76	75	75	75	74	72	69	65	61	55	48	40	31
	Level 3 between chute & duct on platform on top of Mill	229	92	22	27	35	42	46	49	51	51	57	61	64	70	74	74	77	80	80	80	80	81	82	82	83	81	79	78	76	73	68	63	58	50	40
	Level 2 2m N side of BE casing	230	87	23	33	35	43	45	45	48	51	55	59	64	68	70	72	75	78	77	77	77	76	76	75	75	75	73	71	68	65	61	56	50	42	33
	Level 2 1m N of cone top of Mill by entry door	231	90	20	28	36	40	45	49	53	54	58	59	64	70	74	76	77	80	78	79	79	79	79	78	78	78	77	76	74	72	69	65	61	56	49
	Level 1 2m N of BE casing is work bench	232	89	22	30	36	41	44	44	48	55	58	64	65	71	74	75	77	81	79	78	79	79	77	77	76	76	74	73	69	67	62	57	51	47	36
	Level 1 2m to RM7 body N side	233	90	18	28	37	40	44	46	49	55	59	64	68	70	75	75	77	82	80	80	80	80	80	79	78	79	77	76	73	71	67	63	58	58	48
	Level 1 2m W side of RM7 on platform	234	90	18	23	32	35	45	46	49	52	59	68	64	71	74	75	77	82	81	79	80	80	79	78	78	78	77	78	74	71	67	62	58	52	43
	L0 1m E side of feeder VF100 inlet chute & RM7 body	235	95	23	39	40	42	49	48	52	57	63	69	74	77	79	79	81	84	83	82	83	86	85	84	83	84	84	84	82	81	78	72	65	58	48
	L0 Ground Floor 3m N of BE casing	236	90	22	33	39	38	47	44	50	54	61	69	68	71	75	73	74	78	79	79	80	79	79	78	78	80	81	75	73	70	65	60	53	46	36
	L0 Inside man door N side	237	90	23	34	38	38	46	47	52	54	55	63	65	72	75	73	75	80	79	79	80	81	80	79	79	79	80	75	73	70	65	60	54	46	36
	L0 Inside W roll door @ 1m	238	89	19	30	33	36	41	44	50	54	54	58	65	70	75	73	76	81	79	78	78	79	78	77	76	76	75	74	71	67	63	57	50	42	32
	L0 Drive motor N @ 2m to N side & 3m to mill body	239	91	19	34	36	39	44	46	50	54	57	67	69	73	77	75	76	81	81	80	81	83	81	80	79	79	78	75	71	68	61	55	47	36
	L0 Drive motor S side @ 2m and RM7 body @ 2m	240	92	22	31	38	39	43	48	48	58	56	62	64	70	75	75	77	81	80	80	80	87	82	80	79	79	78	78	76	72	68	63	58	54	42
	L0 RM7 body S side @ 2m	241	92	25	37	37	40	46	48	47	53	51	61	65	70	74	74	77	82	80	80	81	85	81	80	79	79	77	76	75	71	67	62	56	50	40
	L0 NW corner 1.5m to roll door and vents	242	87	22	30	34	38	40	42	46	48	51	62	61	67	70	73	74	78	77	77	77	77	76	76	75	75	74	72	69	65	61	56	49	40	29
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	243	80	12	18	31	34	39	42	47	52	54	57	61	65	69	65	66	71	67	69	71	71	68	68	67	65	63	61	58	55	51	46	40	32	23
	Centre S side of screw in line with motor FA250	244	81	13	19	34	35	37	44	50	54	53	55	61	62	65	65	69	68	66	68	75	73	67	68	68	65	63	62	60	57	54	50	45	37	27
	E end of SC212 body @ 2m and other N-S aligned screw	245	83	12	18	33	40	39	42	48	54	52	55	64	63	67	66	66	68	66	67	80	77	66	69	69	65	62	62	59	55	52	47	42	34	23
	Centre E side - on	246	91	13	17	28	41	37	41	47	50	51	53	62	63	66	63	69	66	65	69	89	86	67	75	75	70	65	65	64	57	52	47	42	34	23
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	247	79	14	21	33	34	37	43	47	50	51	55	60	61	65	63	66	69	69	71	70	70	68	67	66	64	62	61	58	55	51	45	39	32	22
	Centre W side	248	79	16	23	30	34	37	44	49	51	52	54	57	66	69	63	66	66	66	68	71	70	68	66	67	65	63	62	59	55	51	46	39	31	20
	N end Sc211 but S of duct	249	79	16	19	32	36	39	43	51	51	52	55	58	65	67	64	67	68	66	69	71	69	68	68	67	65	64	63	59	56	51	45	39	29	19
	By FA252 @ 0.8m shaft S side, casing & discharge box	250	85	14	18	32	36	37	44	57	58	53	56	61	64	69	71	72	77	73	69	75	72	67	69	72	71	72	73	72	70	67	65	61	54	45
	By FA252 @ 0.8m shaft N side, casing & inlet	251	84	13	19	34	36	39	46	59	59	54	56	62	64	68	72	77	74	70	69	74	70	66	69	68	69	71	73	74	70	68	66	61	55	46
	Baghouse hopper platform level N end	253	78	17	22	36	41	41	45	45	54	51	54	58	62	64	62	66	66	64	68	71	68	66	67	66	65	63	62	59	56	53	48	43	36	26
	Baghouse hopper centre platform	254	77	21	27	38	42	43	43	47	44	45	50	55	62	64	61	65	65	64	67	68	67	66	65	65	64	64	64	63	60	59	56	50	43	35
	Baghouse hopper centre platform	255	78	21	28	37	43	43	44	47	44	45	49	53	62	65	60	67	66	64	67	69	67	65	65	65	65	64	64	64	61	60	56	50	44	36
	By FA252 @ 1m to side discharge box top grill	252	82	12	19	33	37	40	43	55	55	55	55	61	66	70	71	77	72	70	70	74	70	67	68	66	64	62	61	59	56	56	51	46	40	32
Coal Road South	30 Coal Road S side in line W side RM7	217	68				26	31	32	36	39	43	50	51	58	61	54	56	54	55	56	58	60	55	55	53	51	49	47	43	39	26	20	14	9	
	31 Coal Road S side in-line E side RM7	218	67				28	32	34	37	41	45	50	52	57	59	54	55	55	56	57	57	57	55	54	53	50	48	45	41	35	25	20	14	7	
	32 Coal Road S side in-line FA249	219	68				28	34	35	38	41	46	50	53	57	59	54	55	55	57	57	58	57	56	55	54	50	48	46	44	40	30	24	16	8	
	33 Coal Road S side Centre Blending Silo	220	69				29	33	37	40	46	47	54	54	57	59	54	55	57	59	59	60	58	57	57	55	53	52	50	49	45	37	31	23	12	
	34 Coal Road S side E side PHT	221	69				31	31	36	40	43	47	51	55	57	61	55	56	55	58	59	60	59	58	57	55	52	50	49	45	41	33	26	17	14	
	35 Coal Road S side E side new PHT	222	70				31	31	34	40	43	47	52	57	58	60	55	57	56	60	60	61	61	60	59	57	54	52	50	46	42	30	23	14	8	
	36 Coal Road S side E side drive platform	223	70				35	34	34	40	44	47	55	58	58	60	55	56	57	60	61	61	60	59	58	56	53	51	49	45	40	29	22	15	8	
	37 Coal Road S side centre column W support duct	224	70				32	32	36	40	44	47	54	58	58	61	55	56	56	59	59	59	60	58	58	56	53	51	49	46	42	30	22	11	5	
	38 Coal Road S side centre pedestal	225	69				28	33	35	40	44	47	56	57	57	57	54	55	56	60	60	59	59	58	57	55	53	50	48	44	40	27	19	12	7	
	39 Coal Road S side Between centre & E pedestal	226	70				30	33	36	40	45	47	52	55	57	58	55	55	57	59	60	61	60	58	59	56	54	52	49	45	41	28	19	11	5	
	40 Coal Road S side E pedestal	227	70				27	33	34	39	43	46	54	55	58	57	56	58	58	59	58	58	59	59	58	57	54	53	51	47	43	32	22	11	5	
	41 Coal Road S side W end Firing floor building	228	68				26	33	34	39	43	47	52	52	55	56	57	59	56	58	57	58	57	58	57	55	53	51	50	45	39	26	22	15	14	
	42 Coal Road S side opposite grate	229	69				26	35	36	39	43	46	51	54	58	58	57	58	57	58	59	59	59	58	57	57	53	51	50	46	40	26	18	13	7	
	43 Coal Road S side W side coal receival bin 25m to truck	230	66				27	31	31	39	42	42	46	48	52	54	52	56	57	57	57	55	54	53	54	55	53	50	47	42	44	26	21	14	13	
Coal Mill S side	43A Kerb E side CM opp CM fan discharge	235	19	32	37	41	46	47	53	53	59	63	60	68	61	61	61	60	58	56	55	55	53	50	49	45	39	27	21	13	8					
	43A Kerb E side CM opp CM fan discharge	343	79	9	22	27	30	39	41	49	49	50	53	56	58	64	60	71	70	67	75	69	63	63	63	61	60	57	55	52	48	43	37	30	21	10
	44A Under Coal Mill fan discharge	236	37	48	49	52	49	55	61	63	74	72	71	83	82	79	81	81	77	75	75	75	73	71	70	66	61	50	44	35	27					
	44A Under Coal Mill fan discharge	344	91	21	26	32	37	45	48	50	50	55	59	61	67	72	75	88	81	81	81	80	77	75	75	74	73	71	69	66	61	56	50	44	35	23
	44 CM fan room roll door @ 2m	345	88	21	25	31	40	47	49	50	52	56	61	62	70	72	72	78	78	78	79	78	76	76	76	75	73	72	71	67	62	58	53	47	38	28
	44' CM S wall E door @2m, large swing door	346	83	26	26	32	39	44	44	48	48	54	59	59	67	71	68	73	74	73	74	74	72	71	71	71	70	68	67	63	58	53	48	41	30	17
	44' CM S wall E door @1m, at line in concrete	347	87	26	26	29	37	44	44	50	56	55	60	61	66	68	71	75	75	74	76	78	77	77	77	77	76	74	72	71	67	62	55	46	38	30
	45 CM S roll door and wall vent @ 14.6m S side	239	32	39	39	45	50	51	57	56	61	66	62	66	65	67	68	67	66	66	67	67	64	63	62	59	55	42	32	22	12					
	45 CM S roll door and wall vent @ 9.9m S side	348	80	20	23	29	35	38	41	47	50	52	58	58	63	66	64	68	69	69	69	69	68	68	68	69	67	66	64	61	58	52	46	37	25	13
	46 CM room wall vent @ 2m	349	84	21	24	31	41	40	44	48	56	55	59	60	65	68	67	72	72	71	75	78	73	73	73	72	71	69	67	64	60	54	47	37	25	13
	46A Coal Mill Room S roll door W @ 1m	350	84	22	24	31	37	40	41	46	50	53	60	57	61	65	66	73	71	72	75	79	74	72	72	71	70	67	63	60	56	51	44	36	26	14
	47B Centre between Grate & CM blower room roll door	242	38	42	42	54	55	58	66	64	68	72	73	75	75	77	78	77	74	74	73	72	69	67	65	61	56	45	37	31	23					

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																	
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
Kiln 6 S side at 13.5m to kiln	47A Centre between CM Room and grate	243	38	42	41	46	51	53	59	59	63	66	66	69	66	67	73	72	70	68	68	67	65	62	60	57	54	45	39	32	22					
	47A Centre between CM Room and grate, S side	351	83	18	26	32	37	37	42	49	54	57	61	62	65	69	68	71	71	71	74	76	73	72	71	71	69	66	64	60	56	52	46	38	29	17
	47 Opp FA264 @ 3.2m	244	39	44	43	53	52	54	58	60	65	66	69	69	71	74	74	74	73	74	74	72	70	68	67	66	64	61	57	52	46					
	47 Opp FA264 @ 8m	352	81	15	23	30	35	37	42	50	51	54	59	60	63	64	71	69	69	70	73	71	70	72	70	69	66	65	63	62	60	57	54	49	42	32
	47C Between FA264 & FA200 on kerb	353	81	17	23	28	35	37	43	48	53	56	58	62	64	66	69	69	71	71	72	72	70	70	70	68	66	65	63	61	59	56	52	47	40	31
	47D FA 200 S Side @ 3.2m	246	35	41	44	48	51	56	60	62	68	69	71	70	71	73	73	73	71	71	72	72	72	72	70	70	70	67	64	60	53					
	47D FA 200 S Side @ 5m on kerb	354	83	13	20	26	35	37	42	47	51	57	60	63	66	68	74	72	73	73	72	73	71	71	70	69	67	65	63	61	58	55	50	44	36	26
	48 Opp. E pedestal roller	247	32	38	41	46	49	56	61	64	67	70	74	73	69	72	75	72	71	71	70	69	67	65	63	59	56	48	42	37	29					
	48 Opp. E pedestal roller	355	83	17	21	28	32	37	41	46	51	56	61	65	66	68	70	72	73	73	73	73	72	72	71	69	68	66	64	61	58	54	50	44	36	25
	49 Half way between centre & E pedestals	248	32	38	40	46	50	56	69	65	68	69	71	72	69	73	74	73	73	72	72	70	68	66	63	60	57	49	43	37	28					
	49 Half way between centre & E pedestals	356	84	17	21	26	32	35	40	48	52	56	60	65	66	65	70	73	73	74	74	75	74	73	73	71	70	67	65	62	59	56	51	45	37	26
	50 Opp. Centre pedestal	249	34	40	40	45	49	54	60	62	66	66	68	71	69	74	73	72	72	71	70	68	66	64	62	58	54	46	39	33	24					
	50 Opp. Centre pedestal	357	82	17	24	25	34	36	39	46	53	55	59	64	64	64	69	72	72	73	72	72	72	72	71	69	67	65	63	60	56	53	48	42	33	22
	51 Half way between Centre & Western pedestals, by duct sup	250	36	39	40	43	52	56	63	62	65	66	68	70	69	73	73	72	73	71	71	69	67	64	62	58	54	47	40	34	25					
	51 Half way between Centre & Western pedestals, by duct support trestle	358	82	19	24	28	37	37	39	45	51	56	59	62	65	65	68	71	72	73	72	73	73	73	71	70	68	65	64	60	56	52	48	41	33	22
	52A Opp E end of kiln drive platform	251	38	38	41	45	51	54	62	64	69	69	71	74	73	75	77	76	76	75	74	73	71	68	66	62	58	50	44	36	27					
	52A Opp E end of kiln drive platform	359	80	17	25	27	32	37	41	44	50	54	59	63	64	63	66	69	71	70	70	70	70	70	68	67	65	63	63	58	53	50	45	37	27	15
	52 Opp W pedestal roller	252	32	37	43	44	49	53	60	62	64	64	66	68	68	70	71	70	70	69	68	67	64	63	61	56	53	45	38	31	20					
	52 Opp W pedestal roller	360	80	17	26	30	38	38	41	45	54	53	57	62	64	63	67	67	70	71	70	70	70	69	68	66	64	62	62	57	52	48	43	35	25	12
	53 Kiln drive platform Centre E end on platform (ground level)	253	35	42	42	44	51	57	59	68	69	68	71	74	74	75	76	75	75	75	73	72	70	67	65	61	56	49	41	34	24					
	53 Kiln drive platform Centre E end on platform (ground level) under kiln	361	86	22	26	33	36	39	40	45	54	60	59	66	68	67	71	75	75	76	76	76	76	76	75	73	71	69	67	63	59	55	50	43	34	22
Kiln drive platform	S side S motor end @ 1.5m S side kiln drive, 2m GB	362	85	19	30	33	37	39	45	50	56	55	60	65	69	69	72	79	71	73	74	73	73	73	72	71	71	69	76	70	63	62	54	48	38	28
	S side of S Gbox @ 1.5m	363	84	22	32	33	38	41	44	47	56	57	59	64	66	68	69	73	71	72	75	72	72	72	71	70	70	70	76	70	65	62	54	47	37	26
	E side of S drive motor @ 1.5m, 2m to Gbox	364	86	22	32	35	40	41	46	52	59	58	60	66	69	69	71	75	74	76	77	75	75	75	74	73	72	70	75	71	65	61	54	48	38	27
	53 Kiln drive platform Centre E end on platform between motors	365	87	17	36	38	42	44	47	47	55	60	63	67	68	68	72	81	72	74	78	75	74	75	73	75	75	71	78	75	66	64	56	46	35	24
	53 Kiln drive platform Centre E end on platform between gearboxes	366	87	21	38	38	42	43	46	47	57	60	62	68	67	68	71	80	71	74	77	74	74	75	74	75	73	72	77	73	65	61	55	47	35	23
	N side motor end @ 1m kiln drive	367	88	22	33	36	40	42	46	50	60	61	64	68	69	76	70	75	73	75	77	75	74	75	75	78	81	73	79	75	69	61	55	49	40	28
	N side motor N end @ 1.5m kiln drive	368	86	14	31	32	36	41	44	48	58	57	63	69	67	70	69	73	72	74	79	73	72	73	72	75	75	69	73	72	64	57	53	43	34	21
	N side of N drive & Gbox @ 1.5m	369	86	15	33	32	38	42	45	47	58	57	63	70	71	71	70	77	72	75	79	75	73	73	72	74	73	68	73	72	63	57	53	42	35	22
RM6 N side	54 W end RM6	253					31	40	39	41	50	48	51	54	59	62	57	57	57	57	59	62	62	61	59	55	53	50	47	44	39	28	23	15	10	
	55 Centre RM6	253					32	38	39	41	54	49	50	55	60	61	57	59	58	58	61	63	62	63	60	57	56	53	50	46	42	32	25	16	8	
	56 E End RM6	253					37	40	42	46	53	51	52	57	61	63	60	62	63	62	65	66	65	68	65	64	63	60	59	56	54	47	41	34	25	
FA38 to FA39 N side of road	56' Between RM6 & New wall for FA38	322	77	23	24	34	39	41	43	44	53	50	53	57	62	63	58	61	63	62	64	67	65	72	70	65	64	62	60	58	55	52	47	41	32	21
	57 Door opp FA38	254	78				40	44	47	47	59	55	55	60	64	66	63	65	65	64	67	68	68	71	67	64	64	60	57	54	51	42	35	27	17	
	58 Half way between FA38 & FA39, by big column	254	79				40	46	48	48	60	56	55	61	65	68	64	66	67	65	68	68	68	72	67	66	64	61	58	55	51	41	34	26	16	
	59 Opp FA39 end	254	80				39	45	52	50	57	55	56	64	66	69	66	66	67	67	70	69	69	73	69	69	66	64	61	57	53	45	38	31	23	
	59 Opp FA39 end	323	80	24	28	36	40	44	51	50	56	54	59	61	67	69	64	67	69	68	69	69	69	73	70	68	67	64	61	57	53	48	44	36	27	18
PHT N side	60 Opp Conditioning Tower	324	81	22	24	32	40	48	50	52	56	55	59	66	67	69	64	67	69	67	67	68	69	74	71	69	67	65	62	59	55	50	46	38	29	18
	60' Opp. Stack	325	80	21	24	38	42	46	45	48	53	54	58	64	65	67	64	67	68	68	68	68	69	72	68	69	66	64	61	58	53	48	50	40	32	19
	61 Kiln 6 road Northern side of @ 13m to PHT	272	79				34	41	43	43	56	57	58	63	65	65	64	68	67	68	70	71	70	69	68	66	64	63	60	57	53	46	40	32	20	
	61 Opp. Centre PHT	326	80	18	21	37	40	45	45	47	61	56	59	65	69	68	64	66	68	67	68	68	70	71	69	70	66	63	61	58	54	50	52	42	33	20
	62 Opp E side of old PHT	273					35	45	45	43	50	56	58	63	65	65	66	70	68	70	71	71	71	70	68	67	66	64	61	58	54	47	40	33	23	
	62 Opp E side PHT	327	79	18	23	32	38	45	44	46	59	56	58	63	65	66	64	66	67	68	69	68	69	69	68	68	66	63	61	57	52	48	46	37	27	16
Kiln 6 N side	63 Opp. W pedestal	328	80	16	24	29	36	43	44	45	59	55	58	63	65	65	64	67	69	70	70	69	70	70	69	68	66	63	62	58	55	50	45	37	28	16
	64 E end drive platform	275	81				34	45	45	44	52	56	62	63	66	65	67	71	69	71	73	73	71	71	70	68	67	64	62	58	54	48	41	35	25	25
	64 E end drive platform	329	83	15	22	31	33	41	42	43	55	56	58	64	65	64	66	70	73	73	73	73	73	73	72	71	69	66	64	61	57	53	48	41	32	21
	65 Opp column for return duct W side	276	84				32	43	44	44	54	56	59	63	67	69	70	72	71	74	75	74	75	74	73	71	70	67	65	62	58	51	45	40	31	31
	65 Opp column for return duct W side	330	85	17	23	28	33	42	43	44	56	56	58	62	65	67	69	73	73	75	75	75	75	75	74	73	71	69	67	63	60	56	51	45	36	26
	66 Opp centre pedestal	277	87				34	40	38	42	51	57	67	64	69	72	73	74	76	77	78	77	77	76	76	74	72	70	68	64	61	53	46	40	32	32
	66 Opp centre pedestal	331	88	17	26	30	34	41	42	43	52	55	61	64	68	71	74	76	77	77	78	78	78	78	77	75	74	72	69	66	63	59	55	48	40	29
	67 Half way between centre & e pedestals	278	87				32	41	42	50	55	60	70	68	72	71	74	77	74	78	78	77	76	76	75	73	72	70	68	64	61	53	47	40	31	31
	67 Half way between centre & e pedestals	332	88	14	20	28	32	41	43	50	60	60	66	68	68	69	72	77	77	77	78	78	77	77	77	75	73	72	70	67	65	63	60	55	48	37
	68 Opp E pedestal	279	87				34	41	44	55	55	62	73	69	72	72	73	75	74	76	78	77	76	75	76	73	71	69	67	63	60	52	45	37	28	28
	68 Opp E pedestal	333	87	16	23	30	33	37	45	56	56	62	67	70	74	69	72	75	77	77	77	77	77	76	76	74	72	70	68	65	62	60	55	48	39	28
Grate cooler fan courtyard	69 Centre courtyard - opposite F201	280	88				45	56	49	55	57	59	70	70	74	72	73	76	76	78	79	78	78	77	78	75	73	71	70	66	63	57	49	42	36	36
	69 Centre courtyard - opposite F201	334	88	19	23	31	39	42	44	52	60	63	67	70	75	71	73	76	78	78	78	79	78	78	77	78	76	74	72	71	69	65	64	59	51	42	34
	69' Centre courtyard - opposite F203	335	88	19	25	36	41	40	46	53	60	64	69	69	72	70	73	76	77	78	78	79	78	78	78	75	74	72	71	68	65	64	58	50	42	34
	FA201 @ 2m to motor & casing	336	90	18	26	32	39	41	45	55	59	64	69	71	75	72	73	78	79	80	80	81	80	80	80	77	76	74	72	71	67	65	61	54	47	37
	FA201 N side inlet & casing @ 1m	337	91	20	25	31	38	42	49	56	60	66	72	73	73	73	77	78	79	80	82	83	82	81	80	78	77	74	73	71	67	66	61	53	46	36
	Between FA201 & 203 & 202	338	93	20	26	33	42	46	51	62	62	65	71	72	74	71	80	81	82	84	84	85	84	83	83	81	79	77	75	73	70	68	63	55	46	37
	FA203 inlet & casing @ 2m	339	90	19	24	34	43	45	52	55	59	65	67	70	73	72	76	77	78	79	80	81	80	81	80	77	76	74	74	69	66	64	59	52	43	34
	FA203,FA204 & FA205 @ 1m	340	90	19	25	38	45	44	52	59	61	67	69	71	75	74	75	77	79	78	79	81	79	79	80	76	75	74	76	70	66	64	59	53	46	35
	Between inlet filters FA206 & FA207 on walkway	341	85	19	26	36	41	46	49	53	59	65	67	67	71	72	71	73	73	74	74	75	74	74	76	72	70	68	68	63	59	57	51	44	35	22
Grate area N side	Centre between Grate & CM blower room roll door	342	87	18	24	29	38	42	44	52	57	60	64	63	67	71	72	75	78	77	80	80	75	77	76	74	71	69	67	62	58	53	47	38	28	17
	Coal Mill Building N roll door @ 2m	403	86	19	26	33	36	43	45	52	55	57	63	64	67	72	73	72	75	77	79	79	75	74	73	72	71	70	69	66	63	57	50	41	30	17

Table 3.2: Boral Cement Berrima Annual Noise Assessment 2021 **- Kiln 6 Upgrade measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																	
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
Kiln Firing Floor	Centre N side opening face E	370	83	14	21	26	34	38	43	53	55	57	63	65	66	67	68	70	70	72	72	72	72	73	73	72	70	69	68	69	70	67	62	58	51	39
	Centre N side opening face W	371	83	15	22	26	34	37	43	54	55	57	63	66	67	67	67	69	72	73	72	72	73	72	72	71	69	67	66	66	67	64	59	53	44	32
	FA209 E side inlet & filter silencer	372	87	16	23	28	33	38	45	52	61	62	66	69	70	71	70	73	78	78	77	76	76	76	75	74	72	70	69	66	64	61	57	53	45	37
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	373	93	16	23	28	35	40	45	53	60	63	67	69	70	73	77	82	83	82	84	84	84	83	81	80	78	76	74	71	68	64	60	55	49	39
	Eastern KSCF @ 1m	374	97	18	24	30	36	40	48	55	58	64	68	75	80	79	81	84	88	89	87	87	88	87	86	84	83	81	79	76	74	70	66	61	55	46
	Eastern KSCF @ 1m	375	98	19	24	30	36	41	48	55	59	64	68	76	80	79	80	85	89	90	87	88	89	88	86	85	83	82	80	77	74	71	67	62	56	48
	Centre S side opening face E	376	82	15	20	26	35	37	42	50	52	53	57	61	63	66	65	67	67	69	70	72	73	72	71	70	69	68	67	67	69	67	61	57	51	41
	Centre S side opening face W	377	81	16	20	25	35	36	41	50	51	53	57	60	63	65	64	67	69	69	70	72	72	72	71	70	69	67	66	65	66	63	57	52	44	32
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	378	93	17	22	28	34	37	42	49	54	56	63	67	70	73	72	74	77	81	83	87	84	83	81	80	79	77	75	73	70	66	61	56	50	41
	FA200 inlet side @ 1.5m	379	87	18	25	32	37	41	46	51	57	62	66	69	73	72	75	76	76	77	77	78	77	76	75	74	72	71	69	65	62	58	53	47	40	30
	FA210 S side seal fan inlet W side & casing @ 1m	381	87	17	22	26	32	36	42	50	55	58	62	65	70	71	71	73	75	76	79	80	78	77	77	75	74	72	70	67	64	61	56	50	43	33
	New replacement FA211 centre under kiln, inlet @ 1m	380	97	19	25	33	39	42	49	60	61	63	69	76	78	80	82	85	90	89	85	84	86	83	84	84	83	82	80	79	76	73	69	64	58	50
	Kiln floor centre E S of duct/clinker elevator	382	81	15	20	24	31	36	42	48	51	55	59	61	63	65	66	67	67	69	69	69	70	72	70	69	68	66	65	66	67	64	57	52	48	34
	KFF burner air cannon N side @ 2m	383	87	13	20	29	35	38	43	48	56	59	60	64	65	66	69	69	69	72	71	72	73	74	76	77	75	75	76	78	80	76	71	66	61	51
	KFF burner by air cannon S side @ 2m	384	86	15	21	28	36	37	42	47	54	58	60	64	64	65	67	67	68	71	70	71	73	76	76	76	74	74	74	77	77	76	71	68	63	56
Radicon Cooler	RC L1 centre fan @ 1m	385	92	15	21	29	35	41	46	55	68	71	70	77	77	79	79	80	83	84	83	81	79	76	75	76	74	74	72	67	64	61	58	54	48	41
	RC L1 centre fan @ 1m lower speed	402	84	15	20	27	34	40	44	47	54	57	63	66	67	68	70	71	71	73	72	73	73	75	77	72	67	66	65	61	57	54	47	39	32	21
	RC L1 S fan @ 0.5m	386	92	18	25	33	38	45	49	57	72	75	73	78	78	79	82	82	82	82	81	79	78	77	76	79	76	76	74	69	65	63	58	53	47	38
	RC L1 N fan @ 1m	387	87	14	19	27	36	42	47	54	66	66	66	71	72	73	76	77	77	80	77	77	75	74	73	74	72	69	68	64	59	55	50	44	36	26
	RC L2 centre fan @ 1m	388	93	15	22	29	36	42	48	56	70	72	70	76	77	79	80	82	84	87	85	85	82	78	77	78	77	74	73	69	65	62	58	54	48	40
	RC L2 S fan @ 0.7m	389	93	16	23	29	37	44	50	58	74	73	71	78	77	79	82	82	83	84	83	83	80	77	76	79	77	76	75	69	65	63	58	52	45	35
	RC L2 N fan @ 1m	390	92	17	22	28	37	43	48	56	70	71	70	74	75	77	79	81	83	85	84	84	82	78	77	77	77	73	71	69	65	61	58	54	48	40
	RC L3 Centre fan @ 1m	391	93	16	23	28	37	43	48	59	71	71	70	76	77	78	79	80	82	84	82	80	79	77	77	86	87	75	78	76	69	66	60	56	51	42
	RC L3 S fan @ 0.7m	392	93	17	23	30	38	46	51	59	74	73	72	78	77	79	81	81	83	83	82	81	78	77	76	85	83	75	77	73	69	64	60	55	49	41
	RC L3 N fan @ 1m	393	91	19	24	29	38	45	48	58	70	70	70	75	75	76	77	80	82	83	81	81	79	78	77	80	81	75	74	72	68	64	59	54	49	41
	RC L4 Centre fan @ 1m	394	99	16	22	29	37	43	52	62	69	68	68	73	74	75	75	77	78	80	78	77	76	76	80	95	95	79	87	84	77	73	67	61	56	44
	RC L4 S fan @ 0.7m	395	101	17	23	29	38	46	56	61	70	67	67	72	72	74	75	76	78	79	78	77	76	76	83	99	92	79	89	83	82	75	70	65	56	45
	RC L4 N fan @ 1m	396	94	17	22	29	37	45	51	63	68	74	74	75	76	77	77	78	83	84	83	80	81	80	80	86	88	78	80	78	71	67	62	57	52	43
	RC L5 face E	397	85	14	19	27	36	41	49	57	64	64	63	66	68	69	69	71	71	71	72	70	69	69	69	80	78	66	69	68	60	56	49	42	35	22
	RC L5 face W	398	86	13	19	26	35	39	48	56	62	62	63	68	67	66	69	71	71	72	71	71	70	70	71	81	81	68	72	72	64	62	53	46	38	24
	L1 E side 2.4m	399	85	15	21	29	37	38	43	51	61	64	66	72	74	74	73	75	76	78	75	73	71	67	65	69	65	64	63	58	58	54	49	46	41	33
	L1 E side 6m	400	79	12	21	26	31	37	44	52	53	56	61	64	66	69	67	67	69	69	68	66	65	65	67	64	63	61	59	58	56	52	47	41	35	26
	L1 E side 12m	401	78	12	24	31	37	40	38	46	51	56	58	60	64	70	67	68	70	68	69	66	65	64	68	62	59	58	59	56	52	49	45	41	34	24
FA215	Motor S end @ 2.5m	404	82	15	23	28	33	47	45	49	51	52	59	64	65	69	68	69	70	71	72	71	74	72	69	68	69	66	68	65	60	59	51	48	37	25
	Platform E side drive coupling @ casing @ 1m	405	86	15	24	32	36	45	45	51	55	57	61	64	68	74	68	70	73	71	72	74	79	76	73	73	74	72	75	73	68	67	59	56	47	36
	Platform E side drive coupling @ casing @ 1m	406	86	15	23	32	36	44	45	51	56	57	62	64	68	74	68	70	73	71	72	74	79	76	73	73	74	72	76	73	67	66	59	55	46	36
	W side platform @ 1m to coupling & casing	407	87	13	25	30	35	43	44	54	55	57	60	64	68	74	69	71	74	73	73	75	78	77	74	74	74	74	75	73	69	68	61	56	47	36
	Under expansion joint discharge duct to stack @ 1m	408	81	16	25	36	42	46	48	55	57	58	60	62	64	72	69	69	71	70	70	68	69	69	65	66	65	65	66	62	56	55	46	40	30	17
	N side inlet box platform @ 1m to discharge duct & inlet box	409	80	20	25	36	34	46	45	58	55	58	64	65	65	70	67	69	71	71	70	68	66	64	63	64	65	67	64	59	51	47	40	35	27	16
	Platform centre N side inlet box	410	79	15	25	32	34	44	44	51	52	58	61	61	64	73	66	67	70	69	69	69	66	64	62	61	61	64	66	61	53	49	46	46	38	26
	Under Inlet box W side entry duct	411	82	15	27	33	35	38	43	51	55	59	60	62	64	74	71	69	72	73	73	72	70	70	67	66	65	66	66	62	55	52	44	39	29	17
	Inlet box N side ground level @ 1m	412	78	16	26	32	36	47	47	56	51	52	57	62	64	71	65	66	69	68	68	67	65	64	63	61	61	61	61	55	48	46	38	32	23	11
Admin Roof	Admin Roof SW	3	72	8	14	25	28	36	34	39	46	45	49	53	59	58	56	59	62	63	62	62	61	61	60	59	57	54	53	53	52	48	44	38	25	13
	Admin Roof SW	316	71	8	15	26	28	36	34	39	46	46	49	52	56	59	56	60	61	61	61	62	60	60	60	60	58	54	52	48	44	38	31	23	13	4
	Admin Roof SW	321	71	8	16	25	28	37	34	38	45	44	48	52	56	59	55	57	60	61	62	62	60	60	60	59	57	53	51	47	43	38	32	25	19	12
	Admin Roof SE	8	72	10	16	24	28	39	38	39	50	47	50	54	58	59	56	59	63	63	62	63	62	61	61	58	56	54	51	47	43	37	30	19	8	0
	Admin Roof SE	317	72	10	17	24	28	38	37	40	48	46	49	53	57	58	57	61	63	62	62	61	61	61	60	59	58	54	52	49	45	39	34	25	15	5
	Admin Roof SE	320	72	10	17	24	28	38	37	39	49	47	50	54	57	58	57	61	63	62	62	62	61	62	61	60	59	55	53	50	46	41	34	26	15	4
	Admin Roof NE	7	71	8	13	21	28	42	40	40	46	45	49	52	56	57	56	58	61	62	61	60	60	59	59	57	54	53	52	48	45	49	33	19	9	1
	Admin Roof NE	318	71	6	15	23	29	40	38	41	44	45	48	53	57	57	56	58	61	62	62	62	61	60	60	60	59	55	53	49	44	37	30	20	12	3
	Admin Roof NE	319	72	7	16	22	30	40	38	40	43	45	49	53	57	57	56	59	62	63	62	62	61	60	60	60	58	56	53	50	45	38	31	23	16	9
Fenceline South	Former Gate site opp W end Firing floor	256	62	8	20	27	23	31	33	38	44	43	47	48	49	50	47	49	52	52	51	52	50	51	50	49	46	43	43	37	31	24	18	12	5	0
	Former Gate site opp W end Firing floor	257	62	7	19	26	23	30	29	33	38	40	45	47	49	50	47	50	52	52	51	52	50	51	49	48	46	43	40	35	29	22	16	10	4	-1
	Former Gate site opp W end Firing floor	447	62	6	14	19	22	28	29	33	38	39	45	46	48	49	45	47	52	54	52	51	52	51	50	49	47	44	42	38	34	28	24	19	14	6
	Former Gate site opp W end Firing floor	448	62	6	13	18	23	28	29	34	39	39	44	46	48	49	45	49	53	53	50	51	52	50	50	49	47	44	42	38	33	27	20	13	7	0
	Top N edge of bank 21m S of centre Alt Fuels Building	258	56	7	18	23	20	27	25	31	34	35	41	41	43	46	40	45	49	48	43	45	44	42	42	40	39	36	34	30	27	20	13	8	4	-1
	Top N edge of bank opposite centre pedestal	259	61	7	17	24	21	25	26	33	37	41	47	44	47	43	44	51	53	50	50	51	51	51	50	49	46	42	38	33	27	20	15	9	4	0
	Top N edge bank Opposite E side old PHT	260	59	9	16	21	25	29	32	32	38	37	44	44	49	50	45	48	50	47	49	48	48	47	45	44	42	39	41	34	32	31	21	16	10	1
	Top N edge bank Opposite E side old PHT	261	59	9	16	21	24	28	32	32	37	37	44	44	49	50	44	47	51	48	48	49	48	46	46	44	43	41	42	35	34	31	22	17	12	2
	Bottom N edge of bank 13m S of centre Alt Fuels Building	262	52	5	14	19	19	22	22	27	31	33	38	38	43	45	38	41	40	39	39	39	39	38	37	36	38	35	31	24	22	20	12	8	4	0

Table 3.2A: Boral Cement Berrima Annual Noise Assessment 2021 - Kiln 6 Upgrade measurement results - Tonality Assessment

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																											
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 8 Top Platform	PHT L8 Top platform level with top of stack	9	4	0	2	2	3	2	3	5	3	4	2	6	2	2	1	0	1	1	1	1	0	1	1	1	2	0	3	1
	PHT L8 Top platform level with top of stack	10	3	1	2	3	3	2	3	5	3	4	2	6	2	2	1	1	0	0	1	1	1	1	1	1	2	0	3	1
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	11	3	2	3	1	1	1	1	3	1	3	2	9	3	2	0	0	0	1	1	3	1	1	1	0	1	1	6	1
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	12	3	2	0	0	0	1	3	3	3	3	5	12	5	2	1	0	3	4	0	4	1	3	1	1	2	0	4	0
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	13	2	1	1	0	0	1	2	5	4	6	3	6	0	3	2	1	0	1	2	3	0	2	1	1	0	1	3	3
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	14	1	2	2	2	4	2	2	0	0	1	4	8	5	2	4	2	1	4	1	1	1	2	1	0	1	1	3	1
	PHT L8 Top Platform S side BE	15	3	1	3	2	2	1	3	7	0	0	3	4	3	1	2	2	0	3	3	2	2	0	1	1	1	0	1	0
PHT Level 8 Lower Platform	PHT L8 Lower platform	16	2	2	1	1	1	1	2	4	3	1	5	6	1	2	2	1	0	1	0	1	1	2	1	0	1	1	2	0
	PHT L8 Lower platform	17	2	2	1	1	1	1	2	4	3	1	5	6	0	3	2	1	0	1	1	0	1	1	1	0	1	1	2	0
	PHT L8 Lower platform EL16 Gbox @ 3m to N side	18	2	1	1	3	1	1	3	5	2	3	2	5	3	1	2	2	1	0	1	1	1	2	0	0	1	1	4	1
PHT Level 8	PHT L8 proper FA263 motor & casing @ 1m	19	5	2	1	0	2	2	0	1	7	3	1	5	5	5	8	5	3	8	4	1	0	0	1	0	0	1	0	1
	PHT L8 proper 1m to vent on FA263 filter room	20	6	2	3	3	0	0	1	0	8	3	1	0	0	1	3	3	0	3	2	2	0	0	0	0	1	2	0	1
	PHT L8 centre tower W side	21	6	4	1	1	0	1	0	0	7	4	1	1	0	4	6	2	1	1	0	2	1	0	0	0	1	1	0	1
		21-L90	6	4	1	1	0	1	0	1	6	3	1	0	0	4	6	3	2	1	0	0	0	1	0	0	1	1	0	1
	PHT L8 centre tower W side	22	6	4	1	1	0	1	1	0	7	4	1	0	1	4	6	3	1	1	1	0	0	0	1	0	0	1	1	0	1
		22-L90	5	4	0	1	1	1	1	1	6	3	1	0	1	4	6	3	1	1	1	0	0	1	0	0	1	1	0	1
	L8 new PHT centre	23	3	1	1	1	1	2	1	2	2	1	1	0	3	2	1	0	1	1	0	2	1	0	1	0	2	2	0	1
	PHT L8 centre tower N side	24	3	4	2	1	0	0	0	1	4	3	1	1	0	0	0	0	1	1	1	2	1	0	1	0	2	2	0	1
	PHT L8 centre tower E side	25	3	1	3	4	1	2	0	0	3	3	0	1	1	1	0	0	0	2	2	2	1	1	0	1	2	2	0	1
	PHT L8 centre tower S side	26	1	1	0	2	1	1	2	1	6	4	0	1	3	1	0	0	0	1	0	2	1	0	2	2	1	1	0	2
PHT Level 7 Alt. Fuels transfer	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	31	6	3	0	1	2	1	0	1	4	2	0	0	0	1	1	0	0	3	4	1	1	2	1	0	1	1	0	1
	PHT L7 Alt Fuels 1m to base of Alt Fuel chute, 1m to bin W, 1m to W side of feeder	39	0	1	0	2	2	1	0	1	2	2	1	1	0	2	1	1	0	2	3	0	1	2	0	0	1	1	0	1
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	30	1	1	2	1	0	1	1	0	2	0	1	0	0	3	2	1	0	3	3	1	2	3	1	0	2	1	0	1
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	32	4	3	2	1	0	0	1	1	3	1	1	1	1	1	1	0	1	3	4	0	1	1	0	0	1	1	1	1
	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	33	5	2	4	4	2	3	1	2	3	2	1	1	0	0	0	1	0	3	4	1	3	2	1	2	1	1	0	0
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	34	4	2	0	0	1	1	2	2	3	1	1	1	0	1	1	1	0	2	2	1	4	5	1	0	1	2	0	1
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	35	4	3	2	1	0	3	1	0	1	1	0	0	0	1	0	0	1	3	2	2	2	2	1	0	1	2	1	0
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	36	5	5	3	2	1	0	1	1	0	1	1	0	0	1	1	1	1	3	1	4	3	3	1	1	1	1	0	1
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	37	4	1	1	3	0	0	1	1	3	2	0	1	0	1	1	1	1	2	2	1	1	2	0	1	2	1	1	0
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	38	3	2	2	2	1	2	1	1	2	1	0	0	0	1	1	0	0	1	1	0	0	1	1	0	1	1	1	1
PHT Level 7	PHT L7 New S side centre	27	3	1	1	1	3	1	0	0	3	2	0	0	0	0	0	0	0	1	1	1	2	2	0	0	1	2	0	1
	PHT L7 New E side centre	28	3	2	2	2	1	0	0	3	1	2	0	1	0	1	0	0	0	2	2	1	2	3	1	0	2	2	0	1
	PHT L7 New N side centre	29	8	3	3	2	3	1	0	2	3	3	1	0	1	0	0	0	0	1	1	1	1	1	1	0	2	2	0	1
	PHT L7 New centre between towers faces S	40	5	2	1	2	2	0	0	3	1	1	0	1	1	0	1	1	0	0	1	1	0	0	1	0	2	2	0	1
	L7 between PHTs centre facing W	41	5	2	2	2	1	0	0	2	2	2	1	1	0	0	1	1	0	0	0	1	0	0	0	0	2	2	0	1
	PHT L7 Old S side centre, faces W	42	1	1	3	4	1	1	3	4	6	5	0	0	1	2	2	1	0	2	1	0	0	1	0	0	1	2	1	1
	PHT L7 under EL13 platform E side	43	4	1	0	1	1	0	5	5	5	4	1	0	1	0	1	0	0	0	1	0	0	2	0	0	1	2	0	2
	EL13 platform E side Gbox & coupling @ 0.5m	44	3	1	1	1	4	2	3	1	7	7	5	3	3	1	1	2	0	0	0	0	0	0	1	1	0	1	0	1
	EL13 platform N side GB end & side EL @ 1m	45	1	1	1	1	1	1	2	2	5	8	7	2	1	3	4	2	1	0	2	1	0	0	0	0	1	2	0	1
	L7 BE drive platform N side @ 1m to BE	46	2	0	1	0	0	1	4	5	5	5	1	0	1	0	2	4	0	1	1	2	0	0	0	0	1	1	0	1
	EL13 platform SW side motor & EL & coupling @ 1m	47	3	0	1	2	2	3	1	4	2	6	3	2	5	2	2	3	0	0	0	1	0	0	0	0	0	1	1	1
	EL13 platform W side 0.5m	48	2	1	2	2	0	1	2	7	1	5	1	0	2	2	0	2	0	0	0	0	0	1	0	0	0	1	0	1
	EL13 platform motor end @ 0.6m	49	3	1	0	3	3	3	2	4	6	8	3	0	1	1	0	1	1	1	1	0	1	1	0	0	0	1	1	1
	L7 centre between cylinders	50	3	1	1	2	2	2	0	1	7	4	1	1	0	1	2	1	0	1	1	0	0	1	0	0	2	2	1	1
	PHT L7 old NW corner 1.5m to stack	51	1	2	2	6	0	2	0	0	4	1	3	1	2	2	1	1	0	0	0	0	0	1	0	0	1	2	0	1
	PHT L7 old centre N side	52	3	0	0	3	1	0	3	0	1	0	3	3	1	1	1	0	0	1	0	0	0	0	0	0	1	2	0	1
	PHT L7 old centre N side on new platform	53	4	1	1	4	3	1	1	4	5	4	2	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1
	PHT Level 7: FA213 @ 1m, door closed	54	3	1	4	4	1	3	2	1	3	0	2	1	1	2	1	1	1	2	1	0	0	0	0	0	1	2	0	1
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	55	2	1	1	3	3	0	1	2	3	3	1	3	2	1	1	2	0	2	2	0	0	0	1	1	0	0	2	2

Area	Location	File	Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																												
		Objective	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
			15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 6	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	56	1	1	1	3	3	1	0	0	3	0	0	0	1	1	3	3	2	6	2	0	0	0	2	2	0	0	1	0
	PHT L6 RM Silo top EL15 platform motor side 0.6m	57	2	1	1	1	3	2	1	1	2	3	0	2	0	4	6	3	2	1	0	1	1	0	1	0	1	1	0	1
	EL15 W side @ 1m	58	1	1	1	3	2	2	1	0	3	2	1	2	3	0	2	1	0	1	1	0	1	0	0	0	0	0	1	1
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	59	1	1	0	2	1	2	1	1	4	3	4	9	6	3	7	2	1	1	0	1	1	1	0	0	1	1	0	2
	EL15 S side Gbox @ 1m	60	1	2	1	3	3	1	2	2	6	6	6	14	9	5	12	5	3	2	1	2	3	4	4	0	1	1	0	2
	EL15 E side Gbox @ 0.5m	61	2	2	2	2	3	3	1	1	4	6	3	12	8	6	15	7	1	2	1	1	1	3	3	1	1	1	0	2
	RM silo top baghouse fan DC30 discharge @ 1.5m	62	2	3	2	4	4	0	1	1	1	2	2	0	1	1	1	2	1	3	1	0	0	0	0	0	0	1	1	1
	RM Silo top E side 12.7m to FA260	63	1	2	2	2	2	0	1	2	4	4	0	4	4	1	1	0	1	3	1	1	1	1	0	1	1	0	1	1
	RM Silo top N side 12.7m to FA260	64	4	2	2	3	5	2	1	1	3	4	1	3	2	0	2	1	0	1	1	0	0	1	1	1	0	0	2	2
	PHT L6 centre W side	65	2	3	3	1	1	1	1	1	6	4	2	0	0	0	0	1	0	0	0	1	1	1	0	0	1	1	1	2
	PHT L6 stack test port 100mm diam @ 200mm S side	66	2	1	1	1	1	2	0	1	6	4	3	2	4	4	0	3	0	1	1	0	1	1	1	0	1	1	1	2
	PHT L6 stack test port 100mm diam @ 200mm S side	67	2	1	0	0	1	2	0	2	6	4	3	2	3	3	0	2	0	1	1	0	0	1	1	0	1	1	1	1
	PHT L6 stack test port 100mm diam @ 200mm W side	68	2	1	0	4	7	4	1	2	4	6	6	1	1	2	4	4	1	1	1	2	1	1	0	0	1	1	1	1
	PHT L6 stack test port 200mm diam @ 200mm W side	69	2	1	0	4	6	4	1	1	5	8	6	4	7	4	1	3	2	1	1	1	1	3	1	0	1	0	0	2
	PHT L6 NW corner 1m to stack	70	4	1	0	1	0	1	1	1	7	4	1	2	1	1	2	3	1	0	1	3	1	1	0	0	0	1	0	1
	PHT L6 centre N side by platform	71	4	3	2	0	4	3	1	1	3	3	0	0	1	0	0	0	0	0	0	1	0	1	0	0	1	1	1	1
	PHT L6 centre N side on platform	72	2	1	1	1	2	1	0	1	3	2	0	0	2	0	1	0	0	1	0	2	1	1	1	0	1	1	1	1
	PHT L6 centre between towers	73	1	2	0	1	1	0	1	1	2	2	1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	1	1
	PHT L6 new N side centre	74	3	5	1	3	3	0	2	1	0	0	1	0	0	1	1	0	0	1	1	1	1	1	0	0	1	1	1	1
	PHT L6 new E side centre	75	0	3	1	4	4	2	0	0	1	1	1	0	0	1	0	0	0	1	1	1	1	0	1	0	0	1	1	2
	PHT L6 new S side centre	76	3	4	1	1	3	3	1	3	1	0	1	1	1	0	0	0	1	1	1	0	1	0	1	0	1	1	1	2
	L6 centre S side old PHT by elevator	77	3	2	2	0	2	1	0	0	3	2	1	0	0	0	0	1	1	1	0	0	0	1	1	0	1	0	1	1
RM Silo top inside	L6 inside doorway to top RM silo room	78	11	5	3	2	5	4	1	1	2	2	1	1	4	2	4	6	2	3	0	0	0	0	0	1	0	0	1	1
	RM Silo top inside centre	79	1	2	1	5	8	6	1	1	1	3	2	1	5	4	4	7	2	3	0	0	1	0	0	1	0	0	1	1
	RM silo top inside E doors open	80	9	1	2	5	7	5	1	0	2	3	2	0	2	1	4	6	2	3	0	0	0	0	0	1	1	0	1	1
	L6 RM silo top room inside S man door	81	2	1	0	4	7	4	1	1	0	5	3	1	5	4	3	6	1	3	0	1	1	0	1	0	0	0	1	1
	RM silo top outside S man door	82	0	1	2	0	3	3	1	1	1	0	0	1	3	1	3	2	0	1	1	0	1	1	0	0	1	0	1	2
PHT Level 5	PHT Level 5 old centre S side by stairs	83	2	2	2	1	2	0	0	2	2	3	2	0	2	1	1	1	0	0	0	1	0	1	1	0	1	1	1	2
	PHT Level 5 old centre W side by gas valves @ 1m	84	1	0	0	1	1	1	2	0	3	3	1	0	1	0	1	1	1	1	0	1	2	3	1	2	2	4	1	1
	PHT Level 5 old NW corner @ 1m to stack	85	3	2	0	0	2	0	1	3	7	2	0	0	0	0	0	0	1	2	2	1	0	1	1	0	0	1	0	4
	PHT Level 5 old centre N side	86	1	0	2	0	0	1	2	0	3	2	1	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	2
	PHT Level 5 centre between towers	87	1	0	1	1	1	2	1	0	3	3	1	0	0	0	0	0	0	1	0	1	0	0	1	0	1	1	0	2
	PHT Level 5 New centre N side	88	0	1	2	2	1	0	1	0	3	3	1	1	0	1	0	0	0	1	1	1	1	1	1	0	1	0	0	1
	PHT Level 5 New centre E side above kiln	89	0	1	1	1	1	0	2	1	1	0	0	0	0	1	0	0	0	1	1	3	2	1	2	1	0	0	0	2
	PHT Level 5 New centre S side	90	1	2	1	3	3	3	1	0	2	2	1	0	0	0	0	1	0	1	1	1	1	1	1	0	1	0	0	2
PHT Level 4	PHT Level 4 old centre S side by stairs	91	0	0	6	12	5	2	2	0	2	3	2	0	3	2	1	1	0	0	0	1	0	0	1	0	1	0	0	1
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	92	0	0	5	9	4	3	1	1	2	3	2	0	3	3	1	0	0	0	0	1	0	0	0	0	1	1	0	1
	PHT Level 4 old centre W side	93	1	0	4	4	2	2	0	3	2	3	1	2	2	0	1	0	1	0	0	0	0	0	1	0	0	0	1	2
	PHT Level 4 old NW corner @ 1.2m to stack	94	1	0	2	2	1	5	2	1	4	3	1	1	1	0	0	0	0	1	1	0	0	1	2	0	1	0	1	2
	PHT Level 4 old centre N side	95	3	0	2	3	1	3	2	2	2	2	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	1	1	1
	PHT Level 4 centre between towers by air cannon @ 2m	96	0	2	1	5	6	2	0	1	0	1	1	0	0	0	0	0	0	1	1	2	1	0	2	1	0	1	0	1
	PHT Level 4 new centre N side	97	1	1	3	4	3	1	0	2	1	1	2	1	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0	2
	PHT Level 4 new centre E side above kiln	98	2	3	0	2	2	1	1	2	2	0	1	0	0	0	0	1	0	2	2	2	3	1	1	0	1	0	0	2
	PHT Level 4 new centre S side - air cannon in Leq	99	2	2	3	7	4	1	1	1	1	2	1	0	0	0	0	0	0	0	1	0	1	1	1	0	2	0	1	1
ESP E side	ESP Centre E side top walkway looking E to PHT	100	0	0	3	6	4	0	1	2	4	4	0	1	2	1	3	2	0	2	1	0	0	0	0	0	1	1	0	3
	ESP top SE corner at barrier	101	1	1	1	1	0	2	1	1	3	3	1	0	2	1	2	0	1	1	0	1	1	1	1	0	1	1	1	2
	ESP top SE corner at barrier - facing ESP	102	1	1	1	0	0	1	0	2	4	4	1	1	2	0	2	0	0	0	0	1	1	0	1	2	0	0	2	1
	ESP top NE corner at barrier	103	1	0	2	3	1	1	1	2	5	3	0	0	1	1	1	1	0	0	0	0	1	0	1	1	0	0	0	2
	ESP top NE corner at barrier - facing west	104	2	1	3	4	3	1	1	1	2	1	0	1	1	0	1	1	0	0	0	0	0	0	1	1	1	0	1	2
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	105	2	1	1	4	4	0	0	1	1	2	1	1	2	1	1	2	0	1	0	1	1	1	2	1	1	2	1	2
	PHT Level 3 old centre W side above FA39 face E	106	0	4	4	5	2	2	1	2	3	3	1	2	2	0	1	1	0	0	1	0	0	0	1	1	0	1	1	1
	PHT Level 3 old centre W side above FA39 face W	107	1	4	6	7	3	2	0	2	2	2	1	1	1	0	0	1	1	0	0	0	0	0	1	1	0	1	1	1
	PHT Level 3 old centre N side	108	5	2	7	11	5	1	0	0	5	4	1	1	2	1	0	1	0	1	1	0	0	0	2	1	3	6	1	2
	PHT Level 3 old centre E side above kiln	109	3	0	5	7	7	4	2	2	2	2	1	0	1	0	0	1	0	0	0	0	0	1	0	0	1	2	0	1
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	110	1	3	3	3	1	2	0	0	4	2	1	3	2	0	0	0	1	1	1	0	0	0	1	0	0	2	1	1
PHT Level 2.5	PHT Level 2.5 by DC31 drives @ 0.6m	111	4	3	6	10	4	1	2	7	2	0	2	2	0	3	4	0	1	1	0	0	0	0	2	5	1	1	1	1
	PHT Level 2.5 by centre by kiln entry W side, air cannon	113	4	6	7	9	3	1	4	6	1	0	1	2	2	2	5	7	1	3	3	3	2	2	3	0	8	11	4	4
	PHT Level 2.5 by DC31 discharge @ 1m	112	2	2	6	15	6	2	3	6	1	3	2	2	1	1	2	0	1	1	1	0	1	1	1	3	1	1	0	1
PHT Level	PHT Level 2.25 by centre by kiln entry Air cannons	114	0	2	6	7	3	0	3	4	1	2	1	0	4	9	9	9	2	4	4	2	1	1	2	0	0	1	1	1
	PHT Level 2.25 centre	115	0	2	9	14	6	1	3	2	3	2	0	0	1	0	6	7	3	5	3	2	1	1	1	1	0	1	2	2
	PHT Level 2.5 by Radicon Gbox drive E end @ 1.5m	116	1	2	4	5	0	2	2	3	1	1	1	1	2	3	3	3	2	3	3	2	1	1	2	0	1	3	1	0

Area	Location	File	Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
		Objective	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
			15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
PHT Level 2.25	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	117	4	0	8	15	6	3	2	6	1	1	0	1	0	2	4	4	0	1	1	1	1	1	1	0	1	1	1	1
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	118	3	0	8	15	6	3	2	7	0	1	0	1	1	1	3	4	0	1	1	2	1	1	1	0	1	1	1	1
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	120	1	3	8	10	6	1	2	3	4	3	1	1	3	6	5	4	1	1	0	1	1	1	1	1	2	1	0	2
	L2 PHT FA03 casing @ 1m E side	121	1	0	6	12	4	3	3	8	0	4	0	0	1	4	4	5	2	1	0	1	1	1	2	1	2	2	1	1
	PHT Level 2 @ 1m to south side FA39 stack entry duct	119	3	1	10	14	7	0	3	5	3	3	2	2	1	1	1	2	0	0	0	1	0	1	1	1	1	1	2	1
	PHT Level 2 FA03 discharge @ 1.5m	122	3	1	9	16	5	1	3	0	2	2	0	2	2	3	3	3	1	1	0	1	0	1	1	0	1	1	1	2
	PHT Level 2 @ 1m to south side FA39 stack entry duct & stack	123	2	1	10	15	5	4	1	5	3	4	0	0	1	3	3	4	1	1	1	1	1	1	1	1	1	1	1	2
	PHT Level 2 FA65 inlet filter @ 1m in front	124	4	0	8	15	5	3	3	7	1	2	1	2	2	4	6	8	1	2	1	1	1	1	1	0	1	1	1	1
	PHT Level 2 FA65 rear side 1m	125	3	3	7	17	5	2	4	5	2	1	2	0	0	2	5	5	1	2	0	0	0	0	1	1	1	1	1	2
	L2 PHT centre N side edge @ 2m facing centre	126	1	1	9	15	6	1	0	0	4	3	1	1	3	5	6	5	1	3	2	1	0	1	2	1	1	2	1	2
	PHT Level 2 @ 1m to north side FA39 stack entry duct	127	1	1	9	12	4	3	1	1	7	5	1	1	0	1	1	3	0	1	1	0	1	1	0	0	1	1	1	1
	PHT Level 2 @ 1m to north side FA39 stack entry duct	128	1	1	9	12	4	3	0	1	7	5	1	1	0	1	1	2	1	1	2	0	0	0	0	0	1	1	1	1
	PHT Level 2 south side by Lift	129	2	4	7	7	3	0	0	1	2	2	1	0	2	4	4	6	3	0	2	1	0	0	2	1	0	3	0	1
PHT Level 1	PHT Level 1 RM silo base blower room N side man door @ 1m	130	4	4	5	4	3	1	5	4	5	3	0	1	3	2	1	2	4	4	1	1	0	0	1	0	1	0	1	0
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	131	8	5	6	6	8	7	2	0	4	4	1	1	2	1	0	1	0	1	0	1	0	1	1	1	1	1	2	1
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	132	6	2	4	4	6	10	7	2	3	2	2	2	1	1	1	1	1	0	1	0	2	2	3	2	2	2	0	1
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	133	6	2	3	3	5	7	4	2	2	2	0	0	1	1	1	2	0	1	0	0	0	0	1	1	1	1	0	1
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	134	8	2	2	2	1	1	2	1	1	0	1	1	0	1	1	0	2	0	1	0	0	0	0	0	1	1	1	1
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	135	7	1	2	2	1	1	2	0	0	0	1	1	1	0	0	0	2	0	1	0	0	0	0	0	1	1	1	1
FA39	FA39 E side at concrete line 5.4m to motor	136	2	0	4	7	4	1	1	3	3	3	0	2	2	0	1	3	5	0	2	1	1	0	0	1	0	1	0	1
	FA39 E side @2.3m in line with columns	137	1	3	3	4	3	4	7	3	4	5	1	2	2	1	1	2	5	2	1	1	0	2	0	1	0	1	0	1
	FA39 under discharge duct @ 1m	138	1	5	4	2	3	2	4	0	1	3	3	4	1	0	2	3	5	0	2	1	2	1	0	1	0	1	0	1
	FA39 E side motor platform @ 0.82m to coupling cover	139	1	1	3	4	5	1	8	3	2	1	2	4	1	1	4	2	7	0	1	1	0	2	0	1	0	1	1	1
	FA39 motor platform centre E side@ 1m	141	0	3	5	9	5	1	1	1	4	4	1	2	3	1	1	1	1	0	0	0	1	0	0	1	0	1	1	0
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	140	0	3	3	1	3	0	4	2	1	1	0	2	1	0	5	1	6	4	4	1	1	0	1	1	0	0	1	1
	FA39 motor N end @ 2.7 to end plates/stop button at line	142	1	4	4	2	1	2	1	1	4	5	0	2	1	0	0	3	5	1	1	0	0	1	0	0	0	1	1	0
	FA 39 N side on kerb	143	0	3	2	2	2	0	0	1	4	4	1	1	2	2	0	1	3	2	0	1	0	0	0	0	0	1	1	1
	FA39 W side at metal strip 5.25m to motor	144	1	2	7	9	2	6	5	0	1	3	1	3	4	2	0	2	5	2	1	0	1	0	0	1	0	0	1	1
	FA39 W side at columns @2.7m to plinth	145	1	2	5	7	2	5	5	0	1	1	0	2	2	1	1	2	5	4	3	1	1	0	0	1	0	0	1	1
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	146	0	6	5	3	3	2	5	1	3	4	2	3	2	0	1	3	5	1	1	0	1	1	0	2	1	1	0	1
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	147	0	4	2	2	2	4	2	4	3	5	2	1	3	2	1	2	3	1	0	1	0	0	0	1	0	1	1	1
	FA39 S side @ columns 2.7m to bearing	148	3	5	6	8	3	2	1	2	3	5	3	2	6	3	3	4	3	0	1	0	0	1	1	0	0	1	1	1
	FA39 S side platform bearing cover @ 0.8m	149	0	5	4	3	1	1	2	2	2	2	1	2	4	1	4	4	1	1	0	0	0	0	1	0	0	1	1	1
	Centre between FA38 & FA39 @ 11.2m at line facing E	150	1	0	2	1	2	6	4	0	2	4	2	0	3	2	0	3	6	1	1	1	0	1	0	1	0	0	2	2
FA38	Centre between FA38 & FA39 @ 7.7 m facing FA 38	151	2	0	1	1	3	5	2	2	1	3	3	0	2	2	0	4	7	1	1	0	0	0	0	1	0	0	2	2
	FA38 @ 3.9m to E side	152	3	3	1	7	4	1	1	2	1	2	2	0	2	2	0	5	9	1	4	1	0	0	0	1	0	0	2	0
	FA38 @ 3m to N side	153	5	2	2	6	1	4	2	1	3	1	0	1	1	0	0	4	7	1	1	0	0	0	0	0	0	1	1	1
	FA38 @ 5m to NW side at NW column	154	1	0	2	6	2	3	1	3	0	1	0	0	1	1	0	5	8	1	1	0	0	0	0	0	0	0	1	1
	FA38 @ 5m to W side at W column	155	2	1	3	4	0	3	0	3	1	3	2	0	1	1	0	5	7	0	2	1	0	0	0	0	1	0	1	0
	In centre opening of wall on W side	156	1	1	4	4	1	3	1	4	0	3	2	0	1	1	0	3	6	1	1	0	0	0	0	0	1	0	2	1
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	157	2	1	0	0	3	3	0	1	2	1	0	1	0	2	4	1	8	2	2	0	0	0	1	0	1	0	2	0
	FA38 at opening on S side of road facing FA38 opening	158	2	0	3	4	1	3	1	1	2	4	3	0	2	1	1	1	3	1	0	0	1	0	0	1	1	1	1	1
	56' Road kerb N side opp. Opening to FA38	159	1	0	3	5	2	2	1	1	2	3	2	0	1	2	0	2	3	0	1	1	0	0	0	1	1	1	1	1
	57 Road N side opp FA38 doorway	160	2	2	3	7	3	3	3	0	3	3	1	1	2	0	1	3	5	1	0	1	0	0	0	0	1	1	1	1
	58 Road N side between FA38 & FA39	161	2	1	5	9	4	2	1	0	2	3	1	1	1	1	0	1	3	0	0	1	0	1	0	1	1	1	1	1
RM6	1 RM6 W door @ 1m	162	1	1	0	2	1	0	1	0	2	0	4	5	5	2	3	3	0	3	2	1	1	0	1	0	1	1	1	0
	1' RM6 W door at kerb W side @ 13.3m	163	3	1	0	1	0	1	1	0	3	4	2	3	4	1	3	2	0	3	2	0	1	0	1	0	1	0	0	0
	1 RM7 at roadside kerb ~32m	164	0	1	2	2	1	1	5	4	6	5	0	0	0	1	1	1	0	1	0	0	0	0	1	1	1	0	1	0

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
RM7 outside	2 Rm7 @ 12m to W door	165	1	1	2	2	0	2	1	2	3	4	1	3	3	1	2	0	1	0	1	0	0	1	0	0	1	1	1	1
	3 RM7 W wall door @ 1m	166	2	1	0	0	1	1	1	1	2	0	2	4	2	1	2	0	0	0	0	0	0	2	0	0	1	1	1	1
	4 RM7 NE corner wall vents @ 1m	167	0	1	1	0	0	0	1	1	3	3	1	2	1	1	2	1	0	1	0	0	1	1	0	0	1	0	0	3
	5 RM7 N side NW roll door @ 1m	168	1	0	0	2	1	3	1	1	2	2	0	3	5	3	3	2	0	1	0	0	1	0	0	1	1	1	1	1
	6 RM7 N wall vents centre next to Roll door	169	1	1	2	0	2	1	2	2	2	3	1	2	2	1	2	0	1	1	0	1	2	0	0	1	0	0	1	1
	RM7 vents N wall W of man door	170	2	2	2	1	0	0	1	2	1	2	1	2	4	2	2	1	2	1	0	1	3	2	1	0	0	0	1	1
	7 RM7 N wall man door	171	2	2	1	1	4	6	4	1	2	2	1	2	4	1	3	2	3	1	1	1	1	0	0	0	0	1	1	1
	8 RM7 E wall vents NE corner @ 1m	172	0	1	0	2	1	2	0	2	1	2	1	2	3	0	4	0	2	1	0	0	2	1	1	0	0	1	1	2
	9 RM7 E side under duct	173	2	1	1	2	1	2	1	1	1	1	0	2	4	1	3	3	4	1	0	0	0	1	1	0	1	0	1	0
	10 RM7 By E door RM7 floor	174	0	1	1	1	0	1	0	0	2	1	0	2	4	2	3	1	2	1	0	1	0	1	0	0	1	0	1	0
	10' RM7 By E door Hydraulics room closed	175	0	1	1	1	1	1	0	3	0	3	1	2	1	1	1	2	3	2	1	0	0	1	0	1	1	1	2	2
	11 RM7 Centre Compressor room door @ 1m closed	176	2	0	2	1	0	4	0	6	2	0	1	2	1	0	1	0	0	0	0	0	0	0	1	0	0	1	2	1
	11A RM7 compressor room W door @ 1m closed	177	2	0	1	1	0	5	3	4	2	1	1	1	1	0	0	1	0	0	0	1	0	0	0	0	1	1	2	0
	12 RM7 Under E inlet for switchroom fan	178	3	0	1	2	1	3	4	7	10	4	7	5	1	1	1	1	1	0	1	1	0	1	0	0	4	1	0	1
	12B Under switchroom fan duct W	179	2	0	0	2	1	2	4	6	10	4	9	8	1	2	2	0	1	1	0	2	1	0	0	0	2	2	1	1
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	180	1	1	1	0	1	5	3	6	4	2	6	4	0	1	1	0	1	0	0	0	0	0	0	0	1	1	0	0
FA249	13 FA249 under inlet duct W side	181	0	0	1	2	2	4	5	1	2	5	3	1	5	2	3	2	4	2	0	0	1	1	1	0	0	1	1	1
	14 FA249 2m W side ground level	182	3	1	3	0	3	0	2	0	2	3	2	1	5	1	3	3	5	2	0	1	1	1	1	0	0	1	1	1
	14' FA249 motor platform fan coupling & casing W side @ 1m	183	3	0	4	3	1	0	1	1	4	3	1	1	4	1	4	2	4	1	0	0	1	1	0	0	0	0	1	1
	15 FA249 1m motor end	184	1	0	2	2	2	4	5	0	0	2	2	0	3	1	4	4	6	2	1	3	2	0	1	0	0	1	1	1
	16 FA249 end at column 4.3m N of motor plinth	185	5	1	1	4	3	4	6	2	2	1	0	0	3	1	4	5	6	2	0	2	1	1	1	0	0	1	1	1
	17 FA249 motor platform E side coupling & casing 1m	186	4	2	4	1	2	0	1	0	4	3	1	0	2	1	4	3	5	2	1	1	1	1	0	0	0	0	1	1
	18 FA249 Platform S side centre @ 1m	187	1	2	1	1	2	0	2	0	1	1	1	0	0	2	3	0	1	1	1	0	1	0	1	1	0	1	1	1
	18' FA249 platform S side under discharge duct E side	188	1	1	1	1	3	1	2	0	1	2	0	1	1	2	4	4	6	2	0	0	1	1	0	0	1	1	1	1
	19 FA249 S side @ 5.5m at S edge barrier	189	0	0	1	3	3	2	1	1	2	1	1	0	2	0	4	1	3	1	0	0	0	1	0	0	1	2	0	2
	20 FA 249 S side @ 10.9m	190	0	0	1	2	1	0	0	1	1	1	0	1	1	1	4	0	2	1	1	1	0	1	1	0	2	0	0	2
	21 FA249 E side of fan casing ground level @ 2m	191	0	1	1	0	1	1	0	2	1	3	2	1	4	1	5	3	7	4	1	1	1	1	0	0	0	2	0	0
FA250	22 FA250 S side 4.2 m to motor end at columns	192	4	3	2	5	3	4	3	0	4	6	4	1	5	2	4	3	5	2	0	1	2	1	1	0	0	0	1	1
	22' FA250 Motor end S side @ 1m	193	3	1	3	3	1	1	0	1	3	3	0	1	3	3	3	1	3	1	0	1	1	1	1	0	0	0	1	1
	23 FA250 E side platform coupling & casing	194	1	0	4	3	1	0	2	2	4	4	0	1	2	0	3	1	2	1	1	2	2	1	0	0	0	0	1	2
	23' FA250 E side centre motor @ 1m	195	1	0	3	2	1	0	2	2	5	5	0	1	3	2	2	1	2	0	0	2	2	2	0	0	0	1	1	1
	FA250 W side motor shaft @ casing @ 1m	196	2	0	5	2	0	2	0	1	5	5	0	2	2	0	5	1	1	1	0	1	2	2	0	0	0	0	0	1
	25 FA250 coupling & casing W side motor centre @1m	197	2	0	3	0	0	2	1	1	4	3	0	2	5	3	3	2	3	0	1	1	2	2	0	0	1	0	1	1
	26 FA250 W side casing @ 1m & coupling @ 3m	198	1	2	2	2	1	2	2	3	4	4	1	1	3	3	3	1	2	0	0	0	1	0	0	0	2	1	2	1
	27 FA250 W side 1m under inlet casing expansion joint	199	0	1	3	5	2	2	0	1	4	5	3	0	6	4	4	0	3	1	1	0	0	0	0	0	2	2	1	1
	28 FA250 N side casing shaft platform @ 1m	200	3	2	0	3	3	0	0	1	3	4	1	2	3	1	2	0	2	1	0	0	0	0	0	0	1	1	1	2
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	201	0	2	0	1	1	3	2	1	4	3	0	2	5	1	5	1	3	3	1	0	0	0	0	0	0	2	0	2
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	202	0	1	1	2	3	1	1	0	0	0	1	1	1	0	1	0	0	0	0	0	1	1	0	1	0	2	0	2
	Lower platform S side @ 1m to magnete plate	203	0	1	0	2	2	0	2	1	2	5	2	2	2	2	2	0	0	1	0	0	0	1	0	0	3	1	0	1
	Lower platform W side @ 0.9m to magnete plate	204	0	0	1	0	3	4	3	1	1	0	1	1	0	1	0	1	0	1	1	0	1	1	0	0	1	0	1	1
	Lower platform N side @ 2m to magnete plate (scaffolding)	205	0	0	1	2	3	2	1	2	2	1	1	0	1	0	1	0	1	0	0	2	3	1	0	0	1	0	1	1
	Lower platform N side @ 1m to BE casing	206	1	2	4	2	5	3	0	0	1	2	1	1	1	0	1	1	1	0	0	2	2	2	0	0	1	1	1	1
	Platform S of Magnete 2m to S side	207	1	3	0	4	3	2	1	0	0	2	2	0	1	1	2	0	1	2	1	0	0	0	2	0	0	0	0	2
	Upper Platform Gbox @ 1m E side & 0.5m casing	208	1	0	4	2	0	3	2	0	0	1	0	1	1	0	2	2	2	1	1	0	1	0	1	0	0	0	0	3
	Upper Platform Gbox @ 1m N side	209	3	1	5	1	2	3	2	1	1	2	1	1	1	0	2	1	1	0	0	0	1	1	0	1	1	1	1	3
	Upper Platform motor end @ 1m W side	210	3	1	3	0	3	5	4	2	2	3	1	0	2	1	1	1	1	0	1	0	2	0	0	1	1	0	1	1
	Upper Platform BE casing @ 0.9m W side	211	2	0	2	2	2	4	2	0	1	1	0	1	0	1	1	0	0	0	0	1	2	0	0	0	1	1	1	2
	Upper Platform BE casing @ 1m S side	212	1	2	3	2	3	1	1	1	1	0	2	0	1	1	1	0	1	1	0	1	0	1	0	0	0	1	1	2
	Upper Platform BE casing @ 1m E side	213	0	1	0	1	1	2	3	2	4	4	0	1	3	2	0	2	1	0	0	1	2	1	0	0	0	1	0	3
	On tower to baghouse top S side above FA249 same level as roof RM7	214	0	0	0	3	3	4	5	2	2	1	2	0	1	2	2	3	3	1	1	0	1	1	0	0	1	1	1	1

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																											
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
RM7 Baghouse tower	On tower to baghouse top S side above FA249 halfway up level	215	1	2	2	4	3	5	6	2	2	1	1	1	1	2	1	3	0	2	0	1	1	1	0	0	1	1	1	1
	On tower to baghouse top S side above FA249 top level facing tower	216	2	1	2	5	4	2	2	2	2	2	0	1	0	1	1	3	2	1	0	1	1	1	0	0	1	0	1	2
	Baghouse S doorway open, discharges	217	1	1	1	1	2	0	0	2	2	2	0	1	0	0	1	1	1	0	0	1	0	1	0	0	1	1	1	2
	Inside centre baghouse top, discharges every 5s	218	2	2	1	4	3	1	0	2	1	1	1	0	0	1	0	1	1	0	0	0	0	1	0	0	1	1	0	2
RM7 Inside	Top floor E open doorway	219	1	0	0	1	2	3	1	2	0	1	1	2	0	1	0	1	0	0	0	0	0	1	1	0	1	0	1	1
	Centre top 2m N of BE casing	220	0	2	1	0	0	1	0	1	1	1	1	4	2	0	0	0	1	0	0	0	0	1	0	1	0	0	1	1
	Top level 1m E side entry of conveyor to chute	221	1	0	3	1	1	1	1	1	0	1	1	2	1	1	0	0	0	0	0	1	0	1	0	0	1	0	2	0
	Top level by top of RM7	222	1	0	2	2	0	1	2	2	1	0	1	2	1	0	0	1	2	1	0	1	1	1	0	1	0	1	1	0
	Top level W side of chute entry end of conveyor	223	1	2	5	3	1	2	0	1	2	1	1	0	0	0	0	1	1	1	1	0	0	1	0	0	0	1	2	1
	Top level W side of chute opening entry of conveyor	224	1	1	0	0	1	0	1	0	1	0	1	4	2	1	0	0	0	0	1	0	1	1	1	0	0	0	2	0
	Top level centre W side platform	225	1	1	2	1	1	0	2	2	1	0	1	3	1	0	0	0	1	0	0	1	0	0	1	0	1	1	2	1
	Top level in doorway of conveyor from RM6	226	0	0	1	2	2	1	3	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
	On conveyor walkway on centre from RM6 at centre light	227	1	1	1	4	3	0	0	0	3	3	1	2	2	0	2	0	1	1	1	0	0	0	1	1	1	0	1	1
	Level 3 2m N of BE casing	228	0	2	1	0	1	0	0	1	1	0	1	2	1	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
	Level 3 between chute & duct on platform on top of Mill	229	1	0	1	3	1	0	1	1	1	1	0	2	0	0	0	0	0	1	1	0	0	1	0	1	0	0	1	2
	Level 2 2m N side of BE casing	230	1	2	0	0	0	0	0	1	1	1	0	2	0	0	1	0	0	0	0	1	0	1	0	1	0	1	1	1
	Level 2 1m N of cone top of Mill by entry door	231	1	1	2	1	1	2	0	1	1	1	1	2	1	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1
	Level 1 2m N of BE casing is work bench	232	2	2	2	2	1	2	3	1	1	0	1	3	0	1	1	0	0	0	1	1	0	1	0	1	0	0	1	3
	Level 1 2m to RM7 body N side	233	1	1	1	1	0	1	0	1	2	1	1	3	1	1	1	0	0	0	1	2	0	1	1	2	0	0	2	5
	Level 1 2m W side of RM7 on platform	234	4	0	0	2	1	7	6	2	1	0	2	3	1	2	1	0	0	0	0	1	2	3	0	0	0	0	1	2
	L0 1m E side of feeder VF100 inlet chute & RM7 body	235	3	2	1	0	0	1	1	0	1	1	0	2	0	1	0	2	0	0	1	0	0	1	0	1	2	0	1	1
	L0 Ground Floor 3m N of BE casing	236	6	4	0	1	1	5	2	0	3	2	1	2	1	1	1	0	0	0	1	0	4	2	0	1	0	1	0	1
	L0 Inside man door N side	237	4	2	2	0	3	3	2	2	3	3	1	3	1	0	0	1	0	0	1	0	3	1	0	1	0	1	1	1
	L0 Inside W roll door @ 1m	238	1	1	1	2	2	1	0	0	4	3	1	3	0	1	0	1	0	1	0	0	0	1	1	0	1	0	1	2
	L0 Drive motor N @ 2m to N side & 3m to mill body	239	1	1	0	0	3	4	1	0	3	2	2	3	0	1	1	2	1	0	1	0	1	1	0	0	1	0	1	1
	L0 Drive motor S side @ 2m and RM7 body @ 2m	240	0	2	5	5	3	2	2	1	2	1	1	3	1	0	3	6	2	0	0	0	1	1	1	1	1	1	0	4
	L0 RM7 body S side @ 2m	241	2	2	4	4	6	3	0	0	2	1	1	3	1	0	2	4	1	0	0	1	0	0	1	0	1	0	0	2
	L0 NW corner 1.5m to roll door and vents	242	0	1	1	0	4	6	4	1	0	1	2	3	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1
RM7 Baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	243	1	1	0	2	1	1	0	0	4	3	2	4	3	0	1	1	1	0	1	0	0	1	0	0	1	0	1	1
	Centre S side of screw in line with motor FA250	244	3	0	1	2	1	2	3	1	2	2	2	0	1	3	4	2	4	0	2	0	1	1	0	0	0	1	1	1
	E end of SC212 body @ 2m and other N-S aligned screw	245	2	1	0	4	3	3	5	2	2	0	1	2	1	6	7	5	8	2	2	1	1	1	0	0	0	0	2	1
	Centre E side - on	246	4	1	1	1	0	4	4	1	3	4	4	1	2	8	12	8	13	4	3	0	2	1	2	1	0	0	1	1
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	247	2	2	0	1	2	1	2	1	3	3	0	1	0	1	0	1	0	0	1	0	0	1	1	0	1	0	1	2
	Centre W side	248	2	1	1	0	0	0	3	3	4	4	1	0	1	0	2	1	0	1	2	0	0	1	0	0	1	1	1	1
	N end Sc211 but S of duct	249	0	2	4	1	0	0	2	2	3	3	1	1	2	0	2	1	1	1	0	0	0	1	0	1	0	1	1	0
	By FA252 @ 0.8m shaft S side, casing & discharge box	250	2	3	6	3	4	1	1	1	1	1	2	5	0	5	5	1	3	0	2	1	0	1	1	0	0	1	2	1
	By FA252 @ 0.8m shaft N side, casing & inlet	251	2	3	7	3	4	2	3	1	1	1	4	0	1	3	5	1	3	1	0	1	0	1	2	1	0	1	1	1
	Baghouse hopper platform level N end	253	2	2	4	5	2	1	0	1	2	3	2	1	3	0	3	0	1	1	0	1	0	1	0	0	1	0	1	2
	Baghouse hopper centre platform	254	1	2	3	2	2	0	1	3	2	3	2	1	2	1	2	0	0	1	0	0	0	1	1	1	1	1	1	1
	Baghouse hopper centre platform	255	0	1	3	2	2	0	2	3	4	5	3	1	3	1	2	0	1	0	0	0	1	1	1	1	1	1	0	1
	By FA252 @ 1m to side discharge box top grill	252	0	4	6	1	0	3	0	0	2	3	6	2	1	2	4	0	2	2	0	0	0	0	0	1	2	0	0	1
Coal Road South	30 Coal Road S side in line W side RM7	217	2	2	0	0	2	3	3	2	5	4	1	1	1	0	0	3	2	1	0	0	0	1	1	4	3	0	0	
	31 Coal Road S side in-line E side RM7	218	1	1	0	0	0	2	1	1	3	3	0	0	0	0	0	1	0	0	1	0	0	1	1	2	2	0	1	
	32 Coal Road S side in-line FA249	219	2	1	0	1	0	1	1	2	3	3	1	1	1	0	1	0	0	0	1	1	0	0	1	3	2	0	1	
	33 Coal Road S side Centre Blending Silo	220	0	1	2	3	3	3	2	1	3	2	1	0	1	0	1	0	0	0	1	1	0	0	1	3	1	1	1	
	34 Coal Road S side E side PHT	221	2	0	0	0	0	0	1	0	5	4	1	1	1	0	1	1	1	1	0	0	0	1	0	2	0	1	3	3
	35 Coal Road S side E side new PHT	222	2	1	1	0	1	0	2	1	4	4	1	2	2	0	1	1	0	1	0	1	0	1	0	4	2	0	1	
	36 Coal Road S side E side drive platform	223	1	3	1	0	2	2	2	1	3	3	0	1	1	1	1	0	0	0	1	0	0	1	0	4	2	0	0	
	37 Coal Road S side centre column W support duct	224	2	0	0	0	2	2	2	2	4	3	0	1	1	0	1	1	0	1	0	1	0	1	1	4	2	1	2	
	38 Coal Road S side centre pedestal	225	1	1	0	1	3	4	0	0	2	2	0	1	2	0	0	1	0	0	1	0	0	1	0	5	3	0	1	4
	39 Coal Road S side Between centre & E pedestal	226	0	0	1	1	1	0	1	0	2	2	1	0	1	0	1	1	2	2	0	0	0	1	0	4	2	1	1	
	40 Coal Road S side E pedestal	227	2	2	0	1	3	3	1	2	0	1	1	0	1	1	0	0	0	1	0	1	0	1	0	4	1	0	2	
	41 Coal Road S side W end Firing floor building	228	3	2	0	0	1	2	1	1	0	1	3	2	1	0	0	1	1	0	1	0	0	2	0	4	5	1	3	1
	42 Coal Road S side opposite grate	229	4	1	1	1	1	1	1	2	1	1	1	1	0	1	0	0	0	0	1	1	0	1	1	4	3	1	0	
	43 Coal Road S side W side coal receival bin 25m to truck	230	2	4	2	1	1	1	1	1	3	3	1	1	0	1	1	0	1	0	1	1	0	1	4	11	7	1	3	1
	43A Kerb E side CM opp CM fan discharge	235	4	1	1	2	2	2	2	1	3	5	7	3	1	1	1	1	0	1	1	1	1	2	1	3	3			
	43A Kerb E side CM opp CM fan discharge	343	4	3	4	0	1	1	0	1	5	8	6	1	6	7	0	3	0	1	0	1	0	1	0	0	1	1	1	1
	44A Under Coal Mill fan discharge	236	5	1	3	4	0	2	4	6	0	7	7	1	2	1	2	1	1	0	1	0	1	2	0	3	3			

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																											
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Coal Mill S side	44A Under Coal Mill fan discharge	344	3	1	1	3	1	1	2	1	1	5	10	4	0	1	1	1	1	0	1	0	0	1	0	0	0	0	1	2
	44 CM fan room roll door @ 2m	345	3	1	1	2	0	2	4	3	1	3	3	0	1	1	0	1	0	0	1	0	1	2	0	0	0	1	1	1
	44' CM S wall E door @2m, large swing door	346	3	2	2	3	0	3	4	2	4	4	2	1	1	0	2	1	0	0	1	0	1	2	0	0	0	1	2	1
	44' CM S wall E door @1m, at line in concrete	347	4	3	0	3	3	2	3	2	0	1	2	0	2	0	2	1	0	1	0	1	0	0	1	1	1	1	0	0
	45 CM S roll door and wall vent @ 14.6m S side	239	3	3	0	2	3	3	2	0	4	4	3	2	0	1	1	1	0	0	1	0	0	1	0	4	1			
	45 CM S roll door and wall vent @ 9.9m S side	348	0	1	1	1	2	3	3	1	3	3	2	0	0	0	1	1	0	0	1	0	0	1	0	1	1	1	1	1
	46 CM room wall vent @ 2m	349	2	0	2	5	2	1	2	1	2	3	3	0	2	0	5	3	0	0	1	0	0	0	1	0	1	1	1	0
	46A Coal Mill Room S roll door W @ 1m	350	1	2	1	1	3	5	4	0	2	3	4	1	1	1	4	1	1	0	0	1	0	0	0	1	1	0	1	1
	47B Centre between Grate & CM blower room roll door	242	2	6	5	0	3	5	3	0	2	1	1	1	0	1	1	2	0	0	1	0	0	1	0	3	1			
Kiln 6 S side of Firing Floor	47A Centre between CM Room and grate	243	2	3	0	1	2	3	2	1	1	1	3	2	2	4	0	0	1	0	1	1	0	0	0	2	1			
	47A Centre between CM Room and grate, S side	351	2	2	1	1	1	2	1	0	3	2	1	0	1	0	3	2	0	0	1	0	0	1	0	0	1	1	1	1
	47 Opp FA264 @ 3.2m	244	4	6	6	2	0	1	1	2	1	2	1	1	1	0	1	2	1	1	0	0	1	0	1	1	0			
	47 Opp FA264 @ 8m	352	2	2	4	2	0	2	1	1	3	4	1	1	1	2	0	2	2	0	1	1	0	0	1	0	0	1	1	1
	47C Between FA264 & FA200 on kerb	353	2	0	1	1	0	1	1	0	0	1	0	1	0	1	1	1	0	1	0	0	0	0	0	1	0	1	1	1
	47D FA 200 S Side @ 3.2m	246	1	1	0	1	1	1	1	2	0	2	1	1	1	0	1	1	1	0	1	0	1	1	0	2	0			
	47D FA 200 S Side @ 5m on kerb	354	1	0	0	1	1	0	0	1	2	4	1	0	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	2
Kiln 6 S side at 13.5m to kiln	48 Opp. E pedestal roller	247	1	1	1	2	1	1	0	0	0	3	1	4	1	2	1	0	0	1	0	0	0	1	0	2	1			
	48 Opp. E pedestal roller	355	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1
	49 Half way between centre & E pedestals	248	1	2	1	1	3	8	4	1	1	1	2	3	1	1	1	0	0	1	0	0	0	1	0	2	1			
	49 Half way between centre & E pedestals	356	1	1	1	0	0	0	2	1	3	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1
	50 Opp. Centre pedestal	249	3	3	0	0	1	2	1	2	1	0	2	3	3	0	1	0	0	1	0	0	0	1	0	2	1			
	50 Opp. Centre pedestal	357	0	2	0	2	1	0	3	0	2	1	2	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1
	51 Half way between Centre & Western pedestals, by duct sup	250	1	1	3	3	2	4	2	1	1	0	1	3	2	1	1	1	0	1	0	0	0	1	0	2	0			
	51 Half way between Centre & Western pedestals, by duct support trestle	358	1	2	1	1	0	1	0	2	2	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	0	1	1	1
	52A Opp E end of kiln drive platform	251	1	1	1	2	2	3	1	2	1	0	2	1	0	2	0	0	0	0	0	0	0	1	0	2	0			
	52A Opp E end of kiln drive platform	359	1	1	2	1	1	1	1	1	2	0	1	1	0	0	0	1	0	0	0	0	1	2	0	0	1	1	1	1
	52 Opp W pedestal roller	252	0	2	2	1	1	2	0	1	1	0	1	1	1	1	1	1	0	0	0	0	0	2	1	2	0			
	52 Opp W pedestal roller	360	1	1	3	5	2	1	1	2	3	2	1	0	1	1	0	0	1	0	0	0	1	2	0	0	1	1	2	1
	53 Kiln drive platform Centre E end on platform (ground level)	253	3	1	3	1	2	4	5	1	2	0	2	1	0	1	0	0	0	0	0	1	0	1	0	2	0			
	53 Kiln drive platform Centre E end on platform (ground level) under kiln	361	2	2	2	1	3	4	3	1	3	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2
Kiln drive platform	S side S motor end @ 1.5m S side kiln drive, 2m GB	362	1	0	1	4	3	0	1	2	1	2	7	5	0	1	1	0	1	1	0	1	5	7	0	3	4	1	2	0
	S side of S Gbox @ 1.5m	363	0	0	3	4	1	1	1	0	1	1	3	2	1	3	1	0	0	0	0	1	2	6	0	2	3	1	2	0
	E side of S drive motor @ 1.5m, 2m to Gbox	364	2	1	0	4	1	2	1	1	1	1	3	1	0	1	1	0	1	1	0	1	4	5	1	1	2	0	1	1
	53 Kiln drive platform Centre E end on platform between motors	365	1	2	4	2	1	1	2	1	2	2	9	5	1	4	1	0	1	2	1	2	6	5	3	3	3	1	0	1
	53 Kiln drive platform Centre E end on platform between gearboxes	366	1	1	4	3	1	2	4	1	1	3	9	6	0	3	1	1	1	1	1	0	4	5	1	2	1	1	2	0
	N side motor end @ 1m kiln drive	367	1	0	3	5	1	0	1	3	6	5	3	2	0	2	1	0	0	2	1	5	7	5	1	0	1	0	1	2
	N side motor N end @ 1.5m kiln drive	368	1	1	3	6	4	0	4	3	2	2	3	2	1	6	3	1	1	2	2	3	5	3	3	1	1	3	0	2
	N side of N drive & Gbox @ 1.5m	369	1	0	5	6	3	1	4	0	1	4	6	4	0	4	1	2	1	2	2	2	5	3	4	2	1	3	2	3
RM6 W side	1 RM6 W door @ 1m	162	1	1	0	2	1	0	1	0	2	0	4	5	5	2	3	3	0	3	2	1	1	0	1	0	1	1	1	0
	1' RM6 W door at kerb W side @ 13.3m	163	3	1	0	1	0	1	1	0	3	4	2	3	4	1	3	2	0	3	2	0	1	0	1	0	1	0	0	0
RM6 N side	54 W end RM6	253	5	1	3	5	2	0	1	1	4	2	0	0	1	1	2	0	0	1	1	1	0	0	1	3	3	1	1	
	55 Centre RM6	253	3	0	6	9	3	2	0	2	3	3	2	1	1	0	2	1	2	0	1	1	0	0	0	3	2	1	0	
	56 E End RM6	253	1	1	2	5	2	2	1	1	3	3	1	1	2	1	1	2	3	1	0	1	0	0	0	3	1	1	1	
FA38 to FA39 N side of road	56' Between RM6 & New wall for FA38	322	0	0	4	6	3	1	0	2	3	4	0	2	2	0	2	4	4	2	2	0	0	0	0	0	1	1	1	2
	57 Door opp FA38	254	0	2	6	8	2	2	0	1	3	3	1	1	2	1	1	2	4	1	1	1	0	0	0	3	1	1	1	
	58 Half way between FA38 & FA39, by big column	254	2	1	6	8	2	3	1	1	3	3	1	2	2	1	1	2	4	1	0	1	0	0	0	3	1	1	1	
	59 Opp FA39 end	254	0	4	5	5	2	3	2	0	3	1	1	1	2	2	0	2	4	2	1	0	0	0	0	2	1	0	0	
	59 Opp FA39 end	323	2	4	4	4	3	1	2	2	3	4	0	2	1	0	1	1	3	0	0	1	0	0	0	0	0	2	0	1
PHT N side	60 Opp Conditioning Tower	324	3	0	1	2	2	1	3	0	3	4	0	2	1	0	0	2	4	0	0	0	0	0	0	0	0	2	0	1
	60' Opp. Stack	325	2	2	1	2	1	1	2	0	2	2	0	1	1	0	1	1	3	2	2	1	0	1	0	0	4	6	1	2
	61 Kiln 6 road Northern side of @ 13m to PHT	272	2	1	6	6	0	2	1	1	0	2	2	1	0	1	1	1	1	0	0	0	0	1	0	2	0	1	2	
	61 Opp. Centre PHT	326	3	1	6	9	4	1	1	2	1	3	0	2	1	1	1	0	2	1	2	1	0	0	0	2	6	1	2	
	62 Opp E side of old PHT	273	5	1	4	1	2	1	1	1	1	2	3	2	0	1	0	0	0	0	0	0	0	1	0	2	0	0	1	
	62 Opp E side PHT	327	4	2	5	8	2	2	2	1	1	2	0	0	0	1	1	0	1	1	1	1	1	1	1	0	1	4	0	1
	63 Opp. W pedestal	328	4	0	6	9	3	1	2	0	1	3	1	0	1	0	1	1	0	0	1	1	1	1	0	1	0	1	1	2
	64 E end drive platform	275	6	0	5	2	1	2	0	2	2	1	3	2	0	1	0	0	0	0	0	0	0	1	0	1	0	0	2	5
	64 E end drive platform	329	3	0	5	5	1	1	2	2	2	1	1	1	0	0	0	0	1	0	1	0	0	1	0	0	0	1	1	1

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Kiln 6 N side	65 Opp column for return duct W side	276	5	0	5	4	0	1	0	1	1	1	1	2	1	1	1	1	0	0	0	0	0	1	0	2	1	0	1	4
	65 Opp column for return duct W side	330	4	0	6	6	1	1	1	1	0	1	2	1	1	1	0	0	1	0	1	0	0	1	0	0	0	1	1	1
	66 Opp centre pedestal	277	4	3	2	1	2	7	4	1	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	2	1	0	1	4
	66 Opp centre pedestal	331	3	0	4	3	2	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1
	67 Half way between centre & e pedestals	278	4	3	1	0	3	6	3	2	1	0	3	4	2	1	0	0	0	1	0	0	0	1	0	2	1	1	1	4
	67 Half way between centre & e pedestals	332	4	3	2	5	3	2	1	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1	2
	68 Opp E pedestal	279	2	4	6	4	2	8	3	1	1	0	1	1	0	1	0	0	1	2	1	0	0	1	0	2	0	0	1	5
	68 Opp E pedestal	333	2	1	5	3	0	1	0	4	4	0	1	1	0	0	1	0	0	1	0	0	0	1	0	0	1	1	1	1
Grate cooler fan courtyard	69 Centre courtyard - opposite F201	280	9	6	2	0	5	6	3	3	2	1	1	1	1	1	0	1	1	2	0	0	1	2	0	1	1	1	0	3
	69 Centre courtyard - opposite F201	334	0	3	0	2	0	0	0	4	3	0	0	1	0	0	1	0	0	1	1	0	0	0	1	1	2	1	1	0
	69' Centre courtyard - opposite F203	335	4	0	1	2	0	2	1	2	2	0	1	0	1	0	1	0	0	1	1	0	0	1	0	1	2	1	0	1
	FA201 @ 2m to motor & casing	336	1	3	3	0	1	2	1	3	2	2	2	0	0	0	1	0	0	1	0	0	0	1	2	1	1	1	0	1
	FA201 N side inlet & casing @ 1m	337	2	0	1	1	0	2	1	0	2	1	0	0	0	1	1	0	0	1	0	0	0	0	1	1	1	2	0	1
	Between FA201 & 203 & 202	338	1	3	5	1	1	2	0	3	6	4	0	1	0	0	0	0	0	1	0	0	0	1	0	1	2	2	0	1
	FA203 inlet & casing @ 2m	339	2	1	0	1	2	1	0	2	3	2	0	0	0	0	1	1	0	1	1	0	1	2	1	1	1	2	0	1
	FA203,FA204 & FA205 @ 1m	340	5	1	2	2	2	0	1	2	1	0	1	2	1	0	1	0	1	2	1	0	2	5	1	1	2	0	0	3
	Between inlet filters FA206 & FA207 on walkway	341	1	1	1	0	2	1	2	1	1	2	1	0	0	0	1	0	1	3	1	0	1	3	0	1	2	0	1	2
Grate area N side	Centre between Grate & CM blower room roll door	342	1	3	2	0	0	2	2	0	1	1	0	2	2	1	3	3	1	0	1	1	0	1	0	0	1	1	1	1
	Coal Mill Building N roll door @ 2m	403	3	3	2	1	2	3	1	0	1	1	2	0	0	1	2	2	0	0	0	0	0	1	0	1	1	1	2	1
Kiln Firing Floor N side	Centre N side opening face E	370	1	2	4	0	2	2	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0	1	0	1	1	0	1	2
	Centre N side opening face W	371	1	3	5	0	2	2	1	0	0	1	1	1	1	0	1	1	0	1	1	0	0	0	0	2	1	0	2	1
	FA209 E side inlet & filter silencer	372	1	0	1	4	1	1	1	0	1	1	1	3	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	1
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	373	0	2	1	2	1	1	0	1	1	0	2	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	2
	Eastern KSCF @ 1m	374	2	1	1	1	1	1	1	3	1	1	1	2	2	1	0	2	1	1	0	0	0	0	0	1	0	1	1	1
	Eastern KSCF @ 1m	375	1	0	1	1	1	2	2	3	1	2	0	2	1	2	0	1	0	0	0	0	0	0	0	0	0	0	1	1
Kiln Firing Floor S side	Centre S side opening face E	376	2	2	3	1	1	0	1	0	2	2	1	1	0	0	1	0	1	0	0	0	0	1	1	2	2	0	1	2
	Centre S side opening face W	377	2	2	4	0	1	1	0	0	2	2	1	1	0	0	1	0	1	0	0	0	0	0	1	2	2	1	1	2
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	378	1	1	1	1	3	2	1	0	2	1	1	1	1	1	3	1	0	0	0	1	0	0	0	1	0	0	1	1
	FA200 inlet side @ 1.5m	379	1	0	1	1	0	0	0	3	2	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	1
	FA210 S side seal fan inlet W side & casing @ 1m	380	2	2	5	0	2	1	3	0	0	0	1	3	1	1	1	2	2	0	1	0	0	0	1	0	0	0	1	1
	New replacement FA211 centre under kiln, inlet @ 1m	381	2	0	1	2	1	1	1	1	1	1	0	0	1	1	1	0	1	1	0	0	0	1	0	0	1	1	1	1
Kiln Firing floor inside	Kiln floor centre E S of duct/clinker elevator	382	0	0	1	0	0	1	1	0	1	1	1	1	1	0	1	1	3	1	1	0	0	1	1	2	2	1	0	4
	KFF burner air cannon N side @ 2m	383	1	0	2	3	1	1	2	0	1	2	1	1	1	1	0	1	0	1	1	1	1	1	0	3	1	1	0	2
	KFF burner by air cannon S side @ 2m	384	1	1	0	1	1	0	1	0	1	0	0	1	1	1	0	1	2	0	1	0	1	1	1	1	1	1	1	1
Radicon Cooler	RC L1 centre fan @ 1m	385	0	2	2	5	2	4	4	1	1	0	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	1	1
	RC L1 centre fan @ 1m lower speed	402	1	1	2	2	1	2	0	0	0	0	0	1	1	0	0	1	0	3	0	2	0	2	0	1	3	0	0	2
	RC L1 S fan @ 0.5m	386	1	2	4	6	2	3	2	1	0	1	0	0	1	0	0	0	0	2	3	1	1	2	0	1	1	0	1	1
	RC L1 N fan @ 1m	387	0	1	3	6	0	3	3	1	1	1	0	1	2	1	1	0	0	1	1	1	1	2	0	1	1	1	0	1
	RC L2 centre fan @ 1m	388	0	1	3	6	2	4	3	0	0	0	0	1	2	1	2	0	1	1	1	1	1	1	0	1	1	0	1	1
	RC L2 S fan @ 0.7m	389	0	1	4	9	0	4	3	1	1	1	0	1	2	1	2	0	1	2	3	1	0	3	1	1	1	0	1	1
	RC L2 N fan @ 1m	390	1	2	3	7	1	3	2	1	0	0	0	0	2	0	1	1	1	1	1	2	1	1	0	0	0	0	1	1
	RC L3 Centre fan @ 1m	391	1	3	1	6	1	4	2	0	0	0	1	1	2	0	0	0	1	5	4	7	8	2	2	2	1	1	0	2
	RC L3 S fan @ 0.7m	392	1	1	4	8	1	4	3	1	0	1	0	1	1	0	1	0	1	5	6	2	5	3	0	1	0	0	1	1
	RC L3 N fan @ 1m	393	1	3	1	6	0	3	2	0	0	1	0	1	1	0	1	0	0	2	1	4	3	0	1	0	1	0	0	1
	RC L4 Centre fan @ 1m	394	2	1	1	5	1	2	2	0	0	0	0	0	1	0	0	0	2	6	8	8	12	5	2	1	1	1	0	3
	RC L4 S fan @ 0.7m	395	1	3	2	6	1	3	2	0	0	0	1	1	1	0	0	1	4	4	11	3	11	8	2	3	2	1	2	1
	RC L4 N fan @ 1m	396	1	3	3	0	3	1	0	0	0	0	2	2	1	1	2	1	1	3	2	7	6	2	2	1	0	0	1	2
	RC L5 face E	397	1	0	1	3	1	2	1	0	0	1	1	0	0	1	1	0	1	5	6	5	7	2	4	2	2	0	0	3
	RC L5 face W	398	2	0	1	3	0	2	3	0	2	1	0	0	1	0	0	0	1	5	5	6	8	2	4	3	3	1	0	3
	L1 E side 2.4m	399	2	1	1	3	1	2	2	1	0	1	0	0	2	0	1	1	1	4	4	2	0	2	2	1	1	1	1	1
	L1 E side 6m	400	1	1	4	1	2	1	0	0	2	1	1	1	0	1	1	0	1	2	1	0	0	0	0	2	0	0	0	2
	L1 E side 12m	401	2	5	1	0	1	0	1	1	5	2	1	2	1	1	0	0	2	5	2	0	1	2	0	0	0	0	1	2
FA215	Motor S end @ 2.5m	404	8	3	1	0	2	1	2	2	3	1	0	0	1	0	2	2	1	1	1	2	2	2	1	2	3	2	4	0
	Platform E side drive coupling @ casing @ 1m	405	4	3	1	1	1	1	1	1	6	4	0	3	2	1	1	4	0	2	0	2	3	2	2	2	3	2	3	1
	Platform E side drive coupling @ casing @ 1m	406	3	2	0	2	1	1	1	1	6	4	1	3	2	0	1	4	0	2	0	2	3	4	1	3	3	2	3	0
	W side platform @ 1m to coupling & casing	407	3	4	4	1	0	1	0	2	5	3	1	2	0	1	1	2	1	2	0	0	1	2	1	2	3	1	3	0
	Under expansion joint discharge duct to stack @ 1m	408	1	2	3	1	1	0	0	3	6	1	1	2	1	1	1	0	2	2	0	0	1	3	1	3	4	2	3	1
	N side inlet box platform @ 1m to discharge duct & inlet box	409	6	7	7	2	2	3	0	2	4	3	0	1	0	1	0	0	1	1	1	0	2	1	1	2	1	1	1	2
	Platform centre N side inlet box	410	5	4	3	2	2	1	2	3	8	4	1	2	0	0	1	0	1	0	0	2	1	3	2	2	1	1	4	2

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Under Inlet box W side entry duct	411	1	2	2	0	2	0	0	4	6	1	2	1	0	1	1	1	1	1	0	1	0	3	1	2	3	2	3	1
	Inlet box N side ground level @ 1m	412	6	5	7	3	2	0	2	3	7	3	2	2	0	0	1	0	0	0	0	1	0	3	0	2	3	1	2	1
Admin Roof	Admin Roof SW	3	5	3	1	4	3	0	1	3	1	2	0	1	1	0	1	1	1	0	0	1	1	1	0	2	0	1	3	0
	Admin Roof SW	321	6	4	1	3	2	0	0	1	3	3	0	1	0	0	1	1	0	0	1	1	1	1	0	1	0	1	1	1
	Admin Roof SE	8	6	2	5	7	3	0	0	2	2	3	0	2	1	1	1	0	1	1	0	0	0	0	0	1	1	2	1	2
	Admin Roof SE	320	5	2	4	6	3	1	0	2	1	3	1	2	0	0	1	1	1	0	0	1	1	1	0	1	0	1	2	0
	Admin Roof NE	318	6	2	0	1	1	0	0	2	0	1	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
	Admin Roof NE	319	7	2	1	1	1	0	0	2	1	2	0	1	1	0	0	0	1	0	1	0	0	1	1	1	1	0	1	0
Fenceline S	Former Gate site opp W end Firing floor	256	3	2	0	3	2	1	0	0	2	3	0	1	1	1	1	1	1	0	1	0	2	3	0	0	0	0	0	1
	Former Gate site opp W end Firing floor	257	4	2	1	2	2	1	0	0	3	3	1	1	0	1	1	1	1	0	0	1	0	1	0	1	0	0	0	0
	Former Gate site opp W end Firing floor	447	3	2	0	2	2	2	0	0	3	4	1	2	2	1	1	1	0	0	0	1	0	1	0	1	0	1	0	2
	Former Gate site opp W end Firing floor	448	2	2	0	2	2	2	0	0	3	4	0	2	1	2	0	1	0	0	0	1	0	1	1	0	1	0	0	0
	Top N edge of bank 21m S of centre Alt Fuels Building	258	5	4	1	1	2	3	1	1	4	5	0	3	2	3	2	0	0	0	0	1	1	1	0	2	0	2	0	0
	Top N edge of bank opposite centre pedestal	259	1	3	1	1	1	4	2	3	2	3	3	2	2	0	0	0	0	1	0	1	0	1	0	1	1	0	0	0
	Top N edge bank Opposite E side old PHT	260	1	1	2	3	4	3	2	2	3	5	1	2	2	1	0	1	0	0	0	0	2	4	3	0	5	3	0	2
	Top N edge bank Opposite E side old PHT	261	0	1	2	3	4	3	2	2	4	5	0	3	1	1	1	1	0	1	0	0	1	4	2	0	3	2	0	3
	Bottom N edge of bank 13m S of centre Alt Fuels Building	262	1	2	0	1	2	3	3	2	4	5	2	1	0	0	0	0	0	0	2	2	1	1	2	0	3	2	0	1

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
PHT Level 8	PHT L8 Top platform level with top of stack	78	79	76	79	79	80	80	81	80	80				-1	2	-1	-1	-2	-2	-3	-2	-2					
	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	83	80	79	80	80	81	82							3	4	3	3	2	1							
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	84	79	78	82	79	82	80							5	6	2	5	2	4							Gearbox is higher than past
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	79	77	78	77	73	78	81							1	1	1	5	0	-2							
	PHT L8 Top platform EL16 Gbox @ 1m to NE side	78	79	78	79	80	79	82							-1	-1	-2	-3	-2	-5							
	PHT L8 Top Platform S side BE	72	73												-1												
	PHT L8 Lower platform	76	81	74	76	76	78	80	80	80	79	77			-6	2	-1	-1	-2	-5	-5	-5	-4	-2			
	PHT L8 Lower platform EL16 Gbox @ 3m to N side	76	78	75	77	77	76								-2	0	-1	-2	0								
	PHT L8 proper FA263 motor & casing @ 1m	85	90	88	89	84	85	86	89	85	81				-5	-3	-4	1	0	-1	-5	0					
	PHT L8 proper 1m to vent on FA263 filter room	77	80	77	77	77	74	80							-3	0	0	0	3	-3							
	PHT L8 centre tower W side	79	81	74	78	78	76	76							-3	5	1	1	3	2							
	L8 new PHT centre	74	74	72	74	73									0	2	1	1									
	PHT L8 centre tower N side	74	74	72	72	73	71	75	74						1	2	2	2	3	0	0						
	PHT L8 centre tower E side	74	73	72	72	73	71	74							1	2	2	1	3	0							
	PHT L8 centre tower S side	69	68	67	67	68	67	69							1	2	2	1	2	0							
PHT Level 7 new	PHT L7 New S side centre	71	70	70	69	70	70	70							1	2	2	1	2	1							
	PHT L7 New E side centre	75	74	71	70	73	72	72							2	4	5	3	3	3							No significant change
	PHT L7 New N side centre	74	72	72	72	72	71	72							2	2	3	2	3	2							
PHT L7 Alt Fuels Platform L1	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	76	75	72											1	4											Alt Fuels not operating
	PHT L7 Alt Fuels 1m to base of Alt Fuel chute, 1m to bin W, 1m to W side of feeder	76	74	71	70										2	5	6										at full load in 2019
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	76	74	73											3	4											
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	76	74												2												
	PHT L7 Alt Fuels Platform L1: 3m N of feeder	75	74												2												
PHT L7 Alt Fuels Platform L2	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	77	76	74											2	4											
	PHT L7 Alt Fuels Platform L2: 1m E side of chute inlet	75	74	73											1	3											
	PHT L7 Alt Fuels Platform L2: 1m E side of conveyor 3m from entry to chute	75	73	72											2	3											
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	79	77	73											2	6											
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	77	76	72											1	4											

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
PHT Level 7	PHT L7 New centre between towers faces S	76	73	72	73	73	75	73	75	71					3	4	3	3	2	3	2	5					No significant change
	L7 between PHTs centre facing W	76	73	72	72	73									4	4	4	3									No significant change
	PHT L7 Old S side centre, faces W	76	75	74	74	74	75	73							1	2	2	1	1	3							
	PHT L7 under EL13 platform E side	76	75	75	76	74	75	76							1	1	0	2	1	0							
	EL13 platform E side Gbox & coupling @ 0.5m	82	84	82	80	80	81	83							-2	0	3	2	1	-1							
	EL13 platform N side GB end & side EL @ 1m	79	78	77	77	77	77	79	79	79	80				1	2	2	2	2	1	1	0	0				
	L7 BE drive platform N side @ 1m to BE	76	76	74	74	76									0	2	1	0									
	EL13 platform SW side motor & EL & coupling @ 1m	83	83	81	79	78	79								0	2	4	5	4								No significant change
	EL13 platform W side 0.5m	75	77	77	76	75	75								-2	-2	-1	0	0								
					80		78	78							0	0		0			0	0	0	0	0	0	
	EL13 platform motor end @ 0.6m	83	85	85	*80*		*78*	*78*							-2	-1	4		5	5							Similar to and lower than past 2 years
	L7 centre between cylinders	75	75	73	74	74									0	2	2	1									
	PHT L7 old NW corner 1.5m to stack	73	73	72	72	74	71	74	77	77	77	77	77		0	2	1	-1	2	-1	-3	-4	-4	-4	-4		
	PHT L7 old centre N side	73	75	73	73	74	74	74							-2	0	1	0	-1	-1							
	PHT L7 old centre N side on new platform	75	75	71	73	0	69								0	4	2		6								General area sound
	PHT Level 7: FA213 @ 1m, door closed	76	76	81											0	-5											
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	83	83	79	86	83	87	90	86	87	85	85	86	85	0	4	-3	0	-4	-7	-3	-4	-2	-1	-3	-2	
	PHT L6 RM silo Top FA260 NE side @ 1m casing & motor	85	90	86	88	87	89	88		85					-5	-2	-3	-2	-5	-3		0					
	PHT L6 RM Silo top EL15 platform motor side 0.6m	81	82	80	82	87	80								-1	1	-1	-6	1								
	EL15 W side @ 1m	72	74	73	74	74	74	74	81	81	80	80	75		-2	0	-2	-1	-2	-1	-8	-8	-8	-7	-3		
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	74	73	70	77	76									0	4	-3	-2									
	EL15 S side Gbox @ 1m	81	81	77	80	80	80	77	78	80					0	4	1	1	1	4	3	1					No significant change
	RM silo top baghouse fan DC30 discharge @ 1.5m	87	86	87	87	89	88	90	87	86					1	-1	-1	-3	-2	-4	0	1					
	RM Silo top E side 12.7m to FA260	75			89		74										-15		0								
	RM Silo top N side 12.7m to FA260	75	74	74	*89*		*74*								1	1	-14		1								
PHT Level 6	PHT L6 centre W side	76	74	74											1	2											
	PHT L6 stack test port 100mm diam @ 200mm S side	86	88	87	91	90	86		90	90	90				-2	-1	-5	-4	1		-3	-4	-4				
	PHT L6 stack test port 100mm diam @ 200mm W side	90	90	87	91	90	86		90	90	90				1	3	-1	0	5		1	0	0				
	PHT L6 stack test port 200mm diam @ 200mm W side	91	96												-5												
	PHT L6 NW corner 1m to stack	79	77	77	78	77	75	83	90	90	90				2	2	1	2	4	-4	-10	-11	-11				
	PHT L6 centre N side by platform	74	73	72	72	73	72	73							1	2	2	2	2	1							
	PHT L6 centre N side on platform	74	72	73	*72*	*73*	*72*	*73*							1	1	1	1	1	1							
	PHT L6 centre between towers	74	73	72	72	74	73	73	74	74					1	2	2	-1	1	0	0	0					
	PHT L6 new N side centre	74	73	73	73	73	73	74							2	1	1	1	2	1							
	PHT L6 new E side centre	75	72	73	72	73	74	74							3	2	3	2	1	1							
	PHT L6 new S side centre	76	72	74	74	72	86	73							4	2	2	4	-10	3							Air discharge
	L6 centre S side old PHT by elevator	73	74	73	73	73									-1	0	-1	-1									
PHT Level 6 Inside RM Silo Top	L6 inside doorway to top RM silo room	81	81	81	83	83									0	0	-2	-3									
	RM Silo top inside centre	86	87	82	89	87	89	89	91	87					-2	4	-3	-1	-4	-3	-6	-2					
	RM silo top inside E doors open	83	84	80	88	85	84	85	86	83	86	83	84	86	-1	3	-4	-2	0	-2	-2	1	-3	1	-1	-3	
	L6 RM silo top room inside S man door	84	84	81	86	86									0	3	-2	-2									
	RM silo top outside S man door	73	76	73	73	73	74	74	84	82					-3	-1	0	-1	-1	-2	-11	-9					

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
PHT Level 5	PHT Level 5 old centre S side by stairs	74	74	75	73	75	74								0	0	1	0	0								
	PHT Level 5 old centre W side by gas valves @ 1m	78	77	79	78	81	78	80	80	80					0	-2	0	-3	0	-2	-3	-2					
	PHT Level 5 old NW corner @ 1m to stack	79	75	74	74	75	74	76							4	5	5	4	5	3							Non specific source
	PHT Level 5 old centre N side	75	74	74	74	74	73	75							1	1	1	1	1	0							
	PHT Level 5 centre between towers	76	73	73	72	74	73	74	75	74	79	78	75		3	3	3	2	3	2	0	2	-3	-2	1		Non specific source
	PHT Level 5 New centre N side	75	73	74	73	73	73	74							2	1	3	2	2	1							
	PHT Level 5 New centre E side above kiln	75	72	74	72	75	75	74							3	1	3	0	1	1							
	PHT Level 5 New centre S side	73	71	73	70	71	70	72							2	0	3	2	3	1							
PHT Level 4	PHT Level 4 old centre S side by stairs	76	76	82	76	76	77								1	-5	1	0	-1								
	PHT Level 4 old SW corner by water pumps SV09 @ 1m N	79	79	80	78	80	79	80	80	79					1	-1	1	-1	0	0	0	0					
	PHT Level 4 old centre W side	77	77	77	76	77	76	77							1	0	1	0	1	0							
	PHT Level 4 old NW corner @ 1.2m to stack	78	75	75	75	75	75	75							3	3	3	3	3	3							
	PHT Level 4 old centre N side	76	74	75	73	72	72	74							3	1	3	4	4	3							General variation
	PHT Level 4 centre between towers by air cannon @ 2m	74	73	77	73	73	77	75	75	75					2	-3	1	1	-3	-1	-1	-1					
	PHT Level 4 new centre N side	75	73	75	73	73	73								2	0	2	2	2								
	PHT Level 4 new centre E side above kiln	75	73	74	73	73	75								2	0	2	2	0								
	PHT Level 4 new centre S side - air cannon in Leq	78	77	76	72	71	72								1	2	6	7	6								Air cannon
ESP	ESP Centre E side top walkway looking E to PHT	76	74	75	75	73	74	74							2	1	1	2	2	1							
	ESP top SE corner at barrier	75	73	75	74	74	75	72							2	0	1	1	0	3							
	ESP top SE corner at barrier - facing ESP	73	71	72											3	1											
				75	74	73									0				0	0	0	0	0	0	0	0	
	ESP top NE corner at barrier	75	73	73	73	73	70	71							2	2	2	2	5	4							General increase in area
	ESP top NE corner at barrier - facing west	73	71	71											2	2											
PHT Level 3	L3 old PHT centre S side @ 2m to edge facing centre	77	77	79	78	78									0	-1	0	-1									
	PHT Level 3 old centre W side above FA39 face E	81	79	79	78	78	78								2	2	3	2	2								
	PHT Level 3 old centre W side above FA39 face W	81																									
	PHT Level 3 old centre N side	78	76	78	77	76	76								2	0	2	2	3								
	PHT Level 3 old centre E side above kiln	77	75	79	76	74	76	77	77	77					2	-3	1	2	0	0	0	0					
	PHT Level 3 old NW corner by stack @ 1.5m, above FA39 inlet	82	78	80	89	92	87	86	86	88					3	2	-7	-11	-6	-4	-4	-7					
PHT L2.5	PHT Level 2.5 by DC31 drives @ 0.6m	93	89	88	*89*	*92*	*87*	*86*	*86*	*88*					4	5	5	1	6	7	7	5					High 63 Hz
	PHT Level 2.5 by centre by kiln entry W side, air cannon	86	88		88	83	86	84	82						-3		-2	3	0	2	4						
	PHT Level 2.5 by DC31 discharge @ 1m	92	87	88	89	92	87	86		85					4	4	2	0	4	6		7					
	PHT Level 2.5 by Radicon Gbox drive E end @ 1.5m	86			86	91	88	84									0	-4	-2	2							
PHT Level 2.25	PHT Level 2.25 by centre by kiln entry Air cannons	87	86	88	*88*	*83*	*86*	*84*	*82*						0	-1	-2	3	0	3	5						
	PHT Level 2.25 centre	89	80	84											9	6											
	PHT Level 2.5 by Radicon Gbox drive E end @ 1.5m	86	87	87	*86*	*91*	*88*	*84*							-1	-1	0	-4	-2	2							
	L2.25 PHT centre W side facing fan discharge DC70 FA63 @ 4.66m, stack @ 6.35m and stack entry duct @ 6.23m	89	88	88	89	89									1	1	1	0									

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results												Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	88	87		86	86	86	84	85	85					1		2	2	2	4	4	3					DC70 high
	L2 PHT FA03 casing @ 1m E side	88	87	85	86	87	*86*	*84*	*85*	*85*					1	3	2	1	1	4	3	2					
	PHT Level 2 @ 1m to south side FA39 stack entry duct	89	87		87	89	85	91							2		2	1	4	-2							
	PHT Level 2 FA03 discharge @ 1.5m	91	91	89	90	92	89	86	85	86	88	91	89	91	0	2	1	-1	2	5	6	5	3	0	2	0	Difference unclear
	PHT Level 2 @ 1m to south side FA39 stack entry duct & stack	90	87	87	*87*	*89*	*85*	*91*							2	3	3	1	5	-1							
	PHT Level 2 FA65 inlet filter @ 1m in front	91	88	87	88	88	87	84	84	84					3	3	2	2	4	6	7	6					Other sources
	PHT Level 2 @ 1m to north side FA39 stack entry duct	89	0		88	86											2	3									
	PHT Level 2 FA65 rear side 1m	88	87	87	87	87	86	83	83	83					2	2	1	1	2	5	5	5					Other sources
	L2 PHT centre N side edge @ 2m facing centre	85	83	83	82	84									2	2	3	1									
	PHT Level 2 @ 1m to north side FA39 stack entry duct	89	87	86	*87*	*88*									2	3	2	2									
	PHT Level 2 south side by Lift	82																									
PHT Level 1	PHT Level 1 RM silo base blower room N side man door @ 1m	80	79	81	80	79	79	79							1	-1	-1	1	1	1							
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	82	78	83											3	-1											Load variation. No effect
	PHT Level 1 FA92 silo vent fan casing & drive @ 1m E side	83	81	83											2	0											
	PHT Level 1 FA92 silo vent fan inlet duct @ 1m SE side	78	76	80											2	-2											
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	78	75	80											4	-2											
FA39	FA39 E side at concrete line 5.4m to motor	85	87	83	85	86	87								-2	2	0	-1	-2								
	FA39 E side @2.3m in line with columns	87	91	84	91	87									-4	3	-3	0									
	FA39 under discharge duct @ 1m	91	84	85	84	85	85								7	7	8	7	7								Reason unclear. Quieter more distant.
	FA39 E side motor platform @ 0.82m to coupling cover	95	94	91	94	98									1	4	1	-3									
	FA39 motor platform centre E side@ 1m	85	98	90	93	95									-13	-5	-8	-10									
	FA39 motor platform centre E side@ 1m & vent @ 0.5m	96	96												-1	96											
	FA39 motor N end @ 2.7 to end plates at line	82	83	80	*85*	*83*									0	3	-2	-1									
	FA 39 N side on kerb	80	81	79	80	81	80	81	81	86	85				-1	1	0	-1	0	-1	-1	-6	-5				
	FA39 W side at metal strip 5.25m to motor	87	87	84	86	88	88	91							0	3	1	-1	-1	-4							
	FA39 W side at columns @2.7m to plinth	88	88	87	90	89									0	1	-2	-1									
	FA39 W side motor platform at 0.8m to coupling cover & 1m to coupling	92	93	90	94	99									-2	2	-3	-8									
	FA39 W side @ 1m to cladding door closed, 1.33m to casing	86	88	86	87	88									-2	0	0	-2									
	FA39 S side @ columns 2.7m to bearing	87	84	87	83	83									2	0	4	3									Reason unclear.
	FA39 S side platform bearing cover @ 0.8m	88	86	88	84	86									1	0	3	2									
	Centre between FA38 & FA39 @ 11.2m at line facing E	86			85	88	91									86	1	-2	-5								
	Centre between FA38 & FA39 @ 11.2m at line facing E	86	88	83	*85*	*88*	*91*								-2	3	1	-2	-5								

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
FA38	Centre between FA38 & FA39 @ 7.7 m facing FA 38	86	88	82	*85*	*88*	*91*								-2	5	1	-2	-5								
	FA38 @ 3.9m to E side	89	91	82	87	92	93	89							-2	7	3	-2	-3	0							
	FA38 @ 3m to N side	87	88	82	86	88	87								-1	6	1	-1	0								
	FA38 @ 5m to NW side at NW column	87	87	81	91	91	88	88							-1	5	-4	-4	-2	-2							
	FA38 @ 5m to W side at W column	85	88												-3												
	In centre opening of wall on W side	83	86	81	83	87	82								-3	2	0	-4	1								
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	92	97	88	92	100									-5	5	0	-8									
	FA38 at opening on S side of road facing FA38 opening	79	81	78	80	82									-2	2	-1	-3									
	56' Road kerb N side opp. Opening to FA38	75	77	75	76	78	77	79	82	84	86				-1	0	-1	-3	-1	-4	-7	-8	-11				
	57 Road N side opp FA38 doorway	79	79	77	79	82	79	80	83	84	89				0	2	0	-3	0	-1	-4	-6	-10				
	58 Road N side between FA38 & FA39	78	80	77	79	81	79								-1	2	0	-3	-1								
RM6	1 RM6 W door @ 1m	75	76	78	81	77	78	81	87	70	70	73	72		-1	-4	-6	-2	-3	-6	-12	5	4	2	3		RM6 off in 2013 & 2012
	1' RM6 W door at kerb W side @ 13.3m	69	69	70	72	69	70	72	76	76	80	83	82	82	-1	-2	-3	0	-2	-3	-7	-8	-11	-14	-13	-13	
RM7 Building Ground Level	1 RM7 at roadside kerb ~32m	69	67	67	68	69	69	70	69	68	70	69	69	70	2	2	1	0	-1	-1	0	1	-1	-1	0	-1	
	2 Rm7 @ 12m to W door	74	72	72	73	73	72	72	73	73	76	75	75	74	2	2	1	1	3	3	1	1	-1	-1	-1	0	
	3 RM7 W wall door @ 1m	78	78	78	80	82	79	80	80	79	82	81	80	78	0	0	-2	-4	0	-2	-2	-1	-3	-2	-2	0	
	4 RM7 NE corner wall vents 2 1m	80	79	80	81	80	81	82	83	81	83	83	82	83	1	0	-2	-1	-1	-3	-3	-2	-4	-3	-2	-3	
	5 RM7 N side NW roll door @ 1m	81	78	80	79	86	79	80	78	81	81	81	81	79	2	1	2	-5	1	1	2	0	0	0	0	2	
	6 RM7 N wall vents centre next to Roll door	83	81	82	82	81	82	83	84	84	85	85	83	83	2	1	0	2	0	-1	-1	-2	-3	-2	-1	-1	
	RM7 vents N wall W of man door	84	81	83	82										3	2	2										
	7 RM7 N wall man door	83	80	80	80	79	83	80	79	83	82	82	81		4	3	3	4	1	3	4	0	2	2	2		
	8 RM7 E wall vents NE corner @ 1m	84	80	83	83	82	85	84	83	84	85	82	83	84	4	1	1	3	-1	1	1	0	-1	2	1	0	
	9 RM7 E side under duct	81	77	81	80	78	81	81	79	81	82	81	80	80	5	1	2	4	1	1	2	1	0	1	1	1	
	10 RM7 By E door RM7 floor	79	76	78											3	1											
	10' RM7 By E door Hydraulics room closed	75	71	73	72	72	74	73	73	72	74	74	73	74	4	1	3	3	1	1	2	3	0	1	2	1	
	11 RM7 Centre Compressor room door @ 1m closed	74	71	72	73	74	74	74	73	71	72	71	73		2	1	1	0	0	-1	0	3	2	3	1		
RM7 Ground Level Compressor area	11A RM7 compressor room W door @ 1m closed	73	76	71	72										-4	1	1										
	12 RM7 Under E inlet for switchroom fan	86	82	84	85	84	84	87	83						4	2	1	2	2	-2	3						
	12B Under switchroom fan duct W	87	75	78	78	89									12	10	10	-1									Is similar level to W inlet
	12 RM7 E inlet for switchroom fan @ 1m to N side and 0.6m below	78	75	77											3	1											
FA249	13 FA249 under inlet duct W side	79	76	81	75	78	78	78	80	80					3	-3	4	1	0	1	-2	-2					Screw conveyor squeal
	14 FA249 2m W side ground level	82	79	84	77	79	82	80	80	80					3	-2	4	3	0	2	2	2					As above
	14' FA249 motor platform fan coupling & casing W side @ 1m	82	82	82	80	81	82	82	80	81	82	81	79	79	0	0	2	2	0	0	2	1	1	2	3	3	As above
	15 FA249 1m motor end	83	81	84	79	81	82	81	80	81	81				2	-1	4	2	1	2	3	2	2				As above
	16 FA249 end at column 4.3m N of motor plinth	82	78	84	77	79	80	79	77	79	81	82	82		4	-2	5	4	2	4	5	3	2	1	0		As above
	17 FA249 motor platform E side coupling & casing 1m	82	83	82	81	82	84	82	81	82	84	82	89	83	-1	0	2	1	-2	0	2	1	-1	0	-7	-1	
	18 FA249 Platform S side centre @ 1m	75	75	74	76	76	78	78	78	78	76	77	83	79	0	1	-1	-1	-3	-3	-3	-3	-2	-2	-8	-4	
	18' FA249 platform S side under discharge duct E side	77	75	77	73	75	74								2	0	5	2	3								As above
	19 FA249 S side @ 5.5m at S edge barrier	74	71	73	*71*	*71*	*73*	*72*	*72*	*73*	*73*	*73*	*74*		3	0	3	2	1	2	2	1	0	1	0		
	20 FA 249 S side @ 10.9m	74	72	75	*71*	*72*	*73*	*72*	*72*	*73*	*73*	*73*			3	-1	3	2	2	2	2	1	1	1			
	21 FA249 E side of fan casing ground level @ 2m	77	73	75	71	77	76	76	76	76	77	76	79		4	2	6	0	1	1	1	1	0	1	-2		As above

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
FA250	22 FA250 S side 4.2 m to motor end at columns	85	80	86	79	80	83	79	78						5	-1	6	5	2	6	7						Screw conveyor squeal
	22' FA250 Motor end S side @ 1m	86	81	84	81	81	84	82	80	82	83	82	83		5	2	5	5	2	4	5	4	3	4	3		As above
	23 FA250 E side platform coupling & casing	86	83	86	85	85	86	84	83	83	85	84			3	0	2	1	1	2	3	3	1	2			
	23' FA250 E side centre motor @ 1m	85	83	84	83	82	84	85	80	85	86				3	2	2	3	2	0	6	1	0				As above
	FA250 W side motor shaft @ casing @ 1m	88	84	86	87	85									3	2	1	3									
	25 FA250 coupling & casing W side motor centre @1m	88	84	84	84	82	86	84	80	85	86				3	4	4	5	2	4	8	3	2				As above
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	84	82	84	80	81	82	82							2	0	4	3	3	2							As above
	26 FA250 W side casing @ 1m & coupling @ 3m	86	82	83	81	82	83	81	79	83	83	84	85	81	4	3	5	4	3	4	7	3	3	2	1	5	As above
	27 FA250 W side 1m under inlet casing expansion joint	86	81	82	79	79	83	80	78	85	84				5	4	7	7	4	6	8	1	2				As above
	28 FA250 N side casing shaft platform @ 1m	84	83	84	81	81	85	84	84	91	86	85	93	83	1	0	3	3	0	0	0	-6	-2	-1	-9	1	
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	87	90	90	92	89	86	89	83	88	87	85	88	90	-3	-3	-5	-2	1	-2	4	-2	0	2	-1	-3	Lower than past 6 years
	Lower platform S side @ 1m to magnete plate	88	91	91	93	92	89	90	82	91	91	87	91	93	-3	-3	-5	-4	-1	-1	7	-3	-3	1	-3	-5	As above
	Lower platform W side @ 0.9m to magnete plate	87	88	90	91	89	86	88	81	87	85				-1	-3	-4	-2	1	-1	6	0	2				
	Lower platform N side @ 2m to magnete plate (scaffolding)	86	86	89	91	90	88		84	92	84	85	84	86	0	-3	-5	-5	-2		2	-6	2	1	2	0	
	Lower platform N side @ 1m to BE casing	83	83	85	86	85	83	84	83	86	81				1	-2	-3	-2	1	-1	1	-3	2				
	Platform S of Magnete 2m to S side	85	84	86	88	78	85	87							1	-1	-2	7	1	-1							Similar to previous years
	Upper Platform Gbox @ 1m E side & 0.5m casing	80	79	82	81	82	80	81	77	80	79				1	-2	-1	-2	0	-1	3	0	1				
	Upper Platform Gbox @ 1m N side	81	80	82	81	82	81	83	81	83					0	-1	-1	-1	0	-2	-1	-3					
	Upper Platform motor end @ 1m W side	80	79	82	82	82	80	81							1	-2	-2	-2	0	-1							
	Upper Platform BE casing @ 0.9m W side	78	78	82	81	80	78	79	78	81	79	78	81	82	1	-3	-3	-2	1	-1	1	-2	-1	0	-3	-4	
	Upper Platform BE casing @ 1m S side	82	80	85	88	87	84	81	83	85	83	78	80	85	2	-4	-6	-5	-2	1	-1	-3	-2	4	2	-4	General area level
	Upper Platform BE casing @ 1m E side	80	79	82	80	80	79	79							1	-2	0	-1	1	1							
RM7 Baghouse	On tower to baghouse top S side above FA249 same level as roof RM7	71	68	72	68	71	74	70	69	70	71	71			2	-2	2	-1	-3	1	2	1	0	0			
	On tower to baghouse top S side above FA249 halfway up level	75	71												4												
	On tower to baghouse top S side above FA249 top level facing tower	71	69	69	68	82	70	69	71	68					2	2	3	-11	1	2	0	2					
	Baghouse S doorway open, discharges	86	80	81	78	80	81	80	78	72	87	96	73		6	5	8	5	5	6	8	13	-1	-11	13		Different discharge cycle
	Inside centre baghouse top, discharges every 5s	88	81	83	82	82	82	83	81						7	5	6	6	6	4	7						

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results												Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
RM7 Inside Top level	Top floor E open doorway	83	82	85	86	89	85	86							1	-3	-3	-7	-3	-4								
	Centre top 2m N of BE casing	86	86	88	90	89	89	92							0	-2	-4	-3	-3	-5								
	Top level 1m E side entry of conveyor to chute	89	90	91	93	94	90	89							-1	-3	-4	-5	-1	-1								
	Top level by top of RM7	89	90	92	93	92	94	92	94	96	98	95	93	94	-1	-3	-3	-3	-5	-3	-5	-7	-9	-5	-4	-5	
	Top level W side of chute entry end of conveyor	91	90	92	94	94	92	93	92	94					1	-1	-3	-3	-1	-2	-1	-3						
	Top level W side of chute opening entry of conveyor	90	89	92	93	93									1	-2	-3	-2										
	Top level centre W side platform	87	87	89	91	89	89	91							0	-3	-4	-2	-2	-4								
	Top level in doorway of conveyor from RM6	84	84	86	87	87	86	86	85	88	88				0	-3	-4	-3	-2	-3	-2	-5	-5					
	On conveyor walkway on centre from RM6 at centre light	78	80	79	77	80	78	78	76	79	78	87	88	84	-2	-1	1	-2	0	0	2	-2	-1	-9	-10	-6	
RM7 Inside L3	Level 3 2m N of BE casing	87	87	89	90	89	90	91							0	-2	-3	-2	-4	-4								
	Level 3 between chute & duct on platform on top of Mill	92	93	93	94	95	94	94							-1	-2	-2	-4	-3	-3								
RM7 Inside Level 2	Level 2 2m N side of BE casing	87	87	90	91	89	90	92							0	-3	-4	-2	-4	-5								
	Level 2 1m N of cone top of Mill by entry door	90	90	92	92	91	92	94							-1	-3	-3	-2	-2	-4								
RM7 inside Level 1	Level 1 2m N of BE casing is work bench	89	87	91	92	89	91	94							2	-2	-3	0	-2	-5								
	Level 1 2m to RM7 body N side	90	91	92	94	93	93	97							0	-2	-4	-3	-3	-6								
	Level 1 2m W side of RM7 on platform	90	90	92	94	92	94								1	-2	-4	-1	-3									
RM7 inside Level 0	L0 1m E side of feeder VF100 inlet chute & RM7 body	95	95	97	99	94	95								0	-2	-3	1	0									
	L0 Ground Floor 3m N of BE casing	90	90	92	93	90	95								0	-2	-3	0	-5									
	L0 Inside man door N side	90	90	92	93	88	94								1	-2	-2	3	-4									
	L0 Inside W roll door @ 1m	89	88	91	92	91	92	93							1	-2	-3	-2	-3	-4								
	L0 Drive motor N @ 2m to N side & 3m to mill body	91	91	94	95	93	94	97							0	-2	-3	-2	-3	-6								
	L0 Drive motor S side @ 2m and RM7 body @ 2m	92	90	92	94	93	93								2	1	-2	0	-1									
	L0 RM7 body S side @ 2m	92	89	91	93	92	93								2	1	-2	0	-2									
	L0 NW corner 1.5m to roll door and vents	87	87	89	91										0	-2	-4											

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
RM7 baghouse hopper area	On screw conveyor SC212 platform Level 1 W end side by fan motor @ 1m	80	84	79	79	82	81								-5	1	1	-2	-1								
	Centre S side of screw in line with motor FA250	81	91	78	77	80	80								-10	3	4	0	1								Other screw conveyor squeal
	E end of SC212 body @ 2m and other N-S aligned screw	83	89	78	76	79	95								-6	5	7	4	-12								Ditto
	Centre E side - on	91	0	79	79	79	83	79	78	77	78				91	12	12	12	8	12	14	14	13				Screw conveyor squeal
	Main platform of baghouse hopper screws S end chute W side between SC211 & gate valve	79	86	78	77	77	85								-7	1	2	2	-6								
	Centre W side	79	0	79	78	78	91	80	78	79	79	80			79	0	1	1	-12	-1	1	0	0	-1			
	N end Sc211 but S of duct	79	84	80	78	76	84								-5	-1	1	3	-5								
	By FA252 @ 0.8m shaft S side, casing & discharge box	85	83	79	76		83	83							2	6	8		2	2							Screw conveyor squeal
	By FA252 @ 0.8m shaft N side, casing & inlet	84	85	81											0	4											
	Baghouse hopper platform level N end	78	87	78	77	77	80	78	76						-9	0	1	1	-2	0	2						
	Baghouse hopper centre platform	77	84	78	75	76	81	76	78	77	78				-7	0	2	1	-4	1	0	0	-1				
	By FA252 @ 1m to side discharge box top grill	82	93	79											-10	3											
Kiln 6 South side coal road	30 Coal Road S side in line W side RM7	68	86	66	67	65	66	67	66	65	67	65	66		-18	2	1	3	2	1	2	3	1	3	2		
	31 Coal Road S side in-line E side RM7	67	66	67	65	71	66	66	66	66	68	66	67	68		0	2	-4	1	2	1	1	-1	1	0	-1	
	32 Coal Road S side in-line FA249	68	67	69	67	66	68	67	67	68	70	68	69	69		-1	1	2	-1	0	1	0	-2	0	-2	-2	
	33 Coal Road S side Centre Blending Silo	69	68	70	69	67	68	68	69	69	71	69	71	69		-1	0	3	1	1	0	1	-2	0	-2	0	
	34 Coal Road S side E side PHT	69	70	70	68	67	67	68	71	69	70	69	70		-1	-1	1	2	2	2	-2	1	-1	0	-1		
	35 Coal Road S side E side new PHT	70	69	71	68	67	68	68	70	68	71	70	70	69		0	2	3	2	2	1	2	0	1	0	1	
	36 Coal Road S side E side drive platform	70	69	72	67	67	69	68	70	69	70	70	71	70	1	-2	3	3	2	2	0	1	0	1	-1	0	
	37 Coal Road S side centre column W support duct	70	69	69	67	68	69	69	69	69	70	70	71	71	1	1	3	2	0	1	1	1	-1	0	-1	-1	
	38 Coal Road S side centre pedestal	69	69	69	68	69	69	68	69	68	71	69	71	71	0	0	1	1	0	1	0	1	-2	0	-2	-2	
	39 Coal Road S side Between centre & E pedestal	70	69	70	69	68	69	68	69	68	69	69	71	71	1	-1	1	2	1	1	1	1	1	1	-2	-2	
	40 Coal Road S side E pedestal	70	68	69	68	68	69	68	68	68	70	69	70	74	1	0	2	2	1	2	2	2	0	0	-1	-5	
	41 Coal Road S side W end Firing floor building	68	67	69	66	66	68	66	67	67	70	69	69		1	0	2	3	1	2	2	2	-2	0	-1		
			0	68	66	66	68	66	67	67	70	69	69		0	-68	-66	-66	-68	-66	-67	-67	-70	-69	-69	0	
	42 Coal Road S side opposite grate	69	69	68	67	67	69	66							0	1	2	2	1	3							
	43 Coal Road S side W side coal receival bin 25m to truck	66	65	62	68	64	67	64							2	4	-2	2	-1	2							Not a significant change
Fenceline South	Former Gate site opp W end Firing floor	62	60	57	58										2	5	4										Not a significant change
	Top N edge of bank 21m S of centre Alt Fuels Building	56	60	59	60										-4	-3	-4										
	Top N edge of bank opposite centre pedestal	61	52	51	54										9	10	7										Possibly Alt Fuels building. Not significant
	Top N edge bank Opposite E side old PHT	59	58	60	56										2	-1	3										
	Bottom N edge of bank 13m S of centre Alt Fuels Building	52	50	50											2	2											

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		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
Kiln 6 S side - Coal Mill Room Area	43A Kerb E side CM opp CM fan discharge	72	78	77	72	75	80	77	78	79	78				-6	-5	0	-3	-8	-5	-6	-6	-6				
	43A Kerb E side CM opp CM fan discharge	79	0	77	81	*75*	*80*	*77*	*78*	*79*	*78*				79	2	-2	4	-1	1	1	0	1				
	44A Under Coal Mill fan discharge	90	88	88	*88*										2	2	2										
	44 CM fan room roll door @ 2m	88	88	84	83	85	84	84	85	83					0	3	5	3	3	3	3	5					Main fan room door open
	44' CM S wall E door @2m, large swing door	83		82	83	85	84	84								1	0	-2	-1	-1							
	44' CM S wall E door @1m, at line in concrete	87	88	88	*85*	*92*	*83*								-1	0	2	-5	5								Main fan room door open
															0	0	0	0	0	0	0	0	0	0	0	0	
	45 CM S roll door and wall vent @ 14.6m S side	77	80	80	*75*	*78*	*78*	*76*	*79*	*78*					-2	-2	2	-1	0	1	-1	0					
	45 CM S roll door and wall vent @ 9.9m S side	80																									
	46 CM room wall vent @ 2m	84	85	84	80	77	82	81	86	80	83	89	90		-1	0	4	7	3	4	-2	4	1	-5	-6		Main fan room door open
	46A Coal Mill Room S roll door W @ 1m	84	90	84	81										-6	0	3										
	47B Centre between Grate & CM blower room roll door	86	88	87	87	86	86	89	89	92					-2	-1	-1	-1	-1	-3	-4	-6					
Kiln 6 S side by firing floor	47A Centre between CM Room and grate	83	83	80	78	79	79	78	81	82					-1	3	5	4	4	5	2	1					Reason unclear
	47 Opp FA264 @ 3.2m	84	83	81	*85*	*81*	*80*	*80*	*81*	*81*					1	3	-2	2	4	4	2	2					Similar to past 2 years
	47 Opp FA264 @ 8m	81																									
	47C Between FA264 & FA200 on kerb	81	82	81	82		80								-1	0	-1		1								
	47D FA 200 S Side @ 3.2m	84	83	83	84	82	82	81							1	1	0	2	2	3							
Kiln 6 S side 13.5m to kiln at kerb	48 Opp. E pedestal roller	83	83	83	84	83	81	81	81	80	83	81	83	83	0	-1	-1	0	2	2	2	2	0	1	0	0	
	49 Half way between centre & E pedestals	83	83	84	83	83	81	82							0	-1	0	0	2	1							
	50 Opp. Centre pedestal	82	80	82	80	80	81	81	80	81	85	84	83	83	1	0	1	2	1	1	2	1	-3	-3	-1	-1	
	51 Half way between Centre & Western pedestals, by duct su	82	79	81	79	76	77	81	80	80	83	82	81	80	2	1	3	6	5	1	2	2	-1	-1	1	2	Additional KSCFs
	52A Opp E end of kiln drive platform	80	78	81	76	77	78	79	78	78	83	80	80	80	2	-1	4	3	2	1	2	2	-3	1	0	0	KSCFs may be at higher load
	52 Opp W pedestal roller	80	79	82	76	76	76	79	76	76					1	-3	4	4	4	1	4	3					
	53 Kiln drive platform Centre E end on platform (ground level	85	84	85	81	74	87	88	88						1	-1	4	11	-3	-3	-3						Assume different location to 2017
Kiln Drive platform	S side S motor end @ 1.5m S side kiln drive, 2m GB	85	83	84	81	84									2	1	4	2									Possibly different location to 2018
	S side of S Gbox @ 1.5m	84	82	85	83	88	87	88							1	-1	1	-4	-3	-4							
	E side of S drive motor @ 1.5m, 2m to Gbox	86	85	86	84	88	86								1	0	2	-2	0								
	53 Kiln drive platform Centre E end on platform between motors	87	86	88	86	89	87	88	88						1	-1	1	-1	0	-1	-1						
	53 Kiln drive platform Centre E end on platform between gearboxes	87	85	86	87										2	0	-1										
	N side motor end @ 1m kiln drive	88	86	85	85	86									3	3	3	2									
	N side motor N end @ 1.5m kiln drive	86	84	85	84	84									2	1	1	2									
	N side of N drive & Gbox @ 1.5m	86	85	86	85	86	86	87	88						2	0	1	0	0	-1	-2						

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
Kiln 6 road Northern side at kerb	54 W end RM6	71	0	70	71	69	70	73	76	76	80	83	82	82		1	0	1	1	-2	-6	-6	-9	-12	-11	-11	
	55 Centre RM6	72	0	71	72	71	72	74	73	75	74					1	0	0	0	-2	-1	-3	-2				
	56 E End RM6	76	0	76	76	76	76	78	79	80	81					0	0	0	-1	-2	-3	-4	-6				
	56' Between RM6 & New wall for FA38	77	0	77	75	78	82	79	82	84	86					0	3	-1	-4	-2	-5	-6	-9				
	57 Door opp FA38	78	0	77	79	79	79	80	83	84	89					1	-1	-1	-1	-2	-5	-6	-11				
	58 Half way between FA38 & FA39, by big column	79	0	78	*80*	*82*	*79*	*81*	*81*	*86*	*85*					1	-1	-3	0	-2	-3	-8	-6				
	59 Opp FA39 end	80	0	79	80	82	79	81	81	86	85					2	0	-2	1	0	-1	-6	-4				
	60 Opp Conditioning Tower	81	84	78	81	81	80	84	80	82	81	84	83	83	-3	2	0	0	1	-3	1	-1	0	-3	-2	-2	
	60' Opp. Stack	80	79	79	79										0	1	0										
	61 Opp. Centre PHT	80	80		78	77	77								1		2	3	3								
	62 Opp E side of old PHT	79	78		78	78	76	78	78	78	79	79	79		1		1	1	3	1	1	1	0	0	0		
	63 Opp. W pedestal	81	78		77	77	77	80	77	78	79	81	80		3		4	5	4	1	4	3	2	1	1		KSCFs may be at higher load
	64 E end drive platform	83	81	83	79	78	79	82	78	80	82	82			2	0	3	5	3	1	5	3	0	0			
	65 Opp column for return duct W side	85	83	85	81	80	81	85	81	86	85	85	82	83	1	0	3	4	3	0	4	-2	0	0	3	2	
	66 Opp centre pedestal	88	86	88	86	85	85	87	84	83	88	88	85	85	1	0	2	3	3	1	4	5	0	-1	3	3	KSCFs may be at higher load
	67 Half way between centre & e pedestals	88	86	87	86	85	85	87	87	87	87	88	89	88	2	1	2	3	3	1	1	1	0	0	-2	-1	
	68 Opp E pedestal	87	86	89	86	86	86	86	86	87	88	88	88	88	1	-2	1	1	1	0	1	0	-1	-1	-1	-1	
Grate Cooler Fan Courtyard	69 Centre courtyard - opposite F201	88	87	93	*88*	*85*	*89*	*89*	*88*	*88*	*88*	*89*	*87*	*88*	1	-5	0	3	0	-1	1	1	1	-1	1	0	
	69' Centre courtyard - opposite F203	90	87	93	*88*	*85*	*89*	*89*	*88*	*88*	*88*	*89*	*87*	*88*	3	-3	2	5	2	1	2	3	2	1	3	2	Possibly different location to 2017
	FA201 @ 2m to motor & casing	91	90	96	90	90	90	91							2	-5	1	1	1	0							
	FA201 N side inlet & casing @ 1m	93	91	98	91	92									2	-5	2	2									
	Between FA201 & 203 & 202	90	92	99	93	94	93	93	93	87	88	89	87	88	-2	-9	-3	-4	-3	-3	-3	3	2	1	3	2	
	FA203 inlet & casing @ 2m	90	88	93	89	89	89	90							1	-4	0	1	1	0							
	FA203,FA204 & FA205 @ 1m	85	88	92	89										-3	-7	-4										
	Between inlet filters FA206 & FA207 on walkway	87	85	88	85	89	85	89	89						3	0	3	-1	2	-1	-1						
Grate area north	Centre between Grate & CM blower room roll door	86	86	87	87	86	86	89	89	92					1	0	-1	0	0	-2	-3	-5					
	Coal Mill Building N roll door @ 2m	86	86	86	83	86	84	84	90	88					1	1	3	1	3	2	-3	-2					Door open at bottom effect
Kiln Firing Floor	Centre N side opening face E	83	82	85	85	85	82	83	83	81		86	83		1	-2	-2	-1	2	0	0	2		-3	0		
	Centre N side opening face W	83	82		88	85	89	89	88	88	88	89	87	88	0		-5	-3	-6	-6	-5	-5	-5	-6	-4	-5	
	FA209 E side inlet & filter silencer	87		83	82											3	4										
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	93			88	89	89	89	88	88	88	89	87	88			5	4	4	4	5	5	5	4	6	5	Depends on KSCFs
	Eastern KSCF @ 1m	97	86	87	86	86									11	10	11	11									Depends on KSCFs load
	Eastern KSCF @ 1m	98	91	93	94	93	92	93	92	90		94	92		6	5	4	5	5	5	6	7		4	6		
	Centre S side opening face E	82	81	82	82	83	82	84	82	81		81	81		1	0	0	-1	0	-2	0	1		1	1		
	Centre S side opening face W	81	81	81	81										0	0	0										
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	93	93	92	*92*	*92*	*94*	*95*	*85*	*96*	*94*	*96*	*92*		-1	0	1	0	-2	-2	7	-3	-2	-4	1		2014 was anomolous
	FA200 inlet side @ 1.5m	87	87	86	85	85									0	1	2	2									
	FA210 S side seal fan inlet W side & casing @ 1m	87	85	89	87	87	85	87							2	-2	1	0	2	0							
	New replacement FA211 centre under kiln, inlet @ 1m	97	97	97	96	96			96						0	-1	1	0			1						
	Kiln floor centre E S of duct/clinker elevator	81	80	82	81	81	79	81	82	85	82	84			0	-1	0	-1	1	0	-1	-4	-1	-3			
	KFF burner air cannon N side @ 2m	87	87	88	89	90									1	0	-2	-3									
	KFF burner by air cannon S side @ 2m	86	83	85	89	90									3	2	-2	-4									

Table 3.3: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
Radicon Cooler	RC L1 centre fan @ 1m	92	83	86	83	92	91	84	93	93	83	93	85	84	8	6	8	-1	1	8	-2	-2	8	-1	7	8	Higher load & speed
	RC L1 centre fan @ 1m lower speed	84	83	86	83	92	91	84	93	93	83	93	85	84		-2	1	-8	-7	0	-9	-10	0	-9	-1	0	Same fan at low speed
	RC L1 S fan @ 0.5m	92	84	87	83	90	92	84		95					7	5	9	2	0	7		-3					
	RC L1 N fan @ 1m	87	82	86	83	89	90	85	94	97					6	2	5	-2	-3	2	-7	-10					
	RC L2 centre fan @ 1m	93	82	85	83	94	94	85	96	96	84	95	86	85	11	8	10	-1	-1	8	-2	-3	10	-1	7	8	
	RC L2 S fan @ 0.7m	93	84	86	84	95	95	84		95					9	7	9	-2	-2	8		-2					
	RC L2 N fan @ 1m	92	81		92	92	94	95	85	96	94	96	92		11		0	0	-2	-2	7	-3	-2	-4	0		
	RC L3 Centre fan @ 1m	93	83	85	85	94	95	85	95	96	83	94	86	83	10	8	9	-1	-1	8	-1	-2	10	0	7	10	
	RC L3 S fan @ 0.7m	93	83	85	83	94	93	83		93					10	8	10	-1	0	10		0					
	RC L3 N fan @ 1m	91	81	85	84	95	94	91	97	97					10	7	7	-3	-3	1	-6	-6					
	RC L4 Centre fan @ 1m	99	84	85	85	95	92	92	92	88	82	88	85	84	14	14	14	4	6	6	7	10	17	11	14	15	Drive belt squeal
	RC L4 S fan @ 0.7m	101	85	86	87	93	91	90	86	89					16	15	14	7	9	11	15	12					Adjacent drive belt
	RC L4 N fan @ 1m	94	82	82	84	90	93	91	97	97					12	13	10	5	1	4	-3	-3					
	RC L5 face E	85	78	80	79	85	84	86	84						7	4	6	0	1	-1	1						
	RC L5 face W	86	79	81	80	86	85	87							7	5	7	1	1	-1							
	L1 E side 2.4m	85	78	77	77										7	8	8										
	L1 E side 6m	79	77	75	75										2	4	4										
	L1 E side 12m	78	74	72	73										4	6	5										EL215 fan contribution
FA215	Motor S end @ 2.5m	82	79	78	80	81	80	81	87	85	85	86	85	84	3	4	2	1	2	1	-5	-3	-3	-4	-3	-2	Appears to be a new motor
	Platform E side drive coupling @ casing @ 1m	86	83	81	84	84	85	85	85	85					3	5	2	2	1	1	1	1					
	W side platform @ 1m to coupling & casing	87	81	81	85	85	85	86	87	85	86	87			5	5	2	1	1	0	0	2	1	0			
	Under expansion joint discharge duct to stack @ 1m	81	82	75	79	79	79	80	81	78	81	80	78	79	-1	6	2	2	2	1	0	2	0	1	3	2	
	N side inlet box platform @ 1m to discharge duct & inlet box	80	76	71	74	78	77	79	79	75					4	9	5	2	3	1	1	5					
	Platform centre N side inlet box	79	81	72	73	77	76	79	79	74	78	78	78	74	-1	7	6	3	3	1	0	5	1	1	1	5	
	Under Inlet box W side entry duct	82	79	76	78	80	79	81	83						3	6	4	2	3	1	-1						
	Inlet box N side ground level @ 1m	78	77	73	74		75	78	77						1	6	4		3	1	1						
Control Building Roof	Admin Roof SW	72	70	71	71	72	69								1	0	1	0	2								
	Admin Roof SW	71	71	71	70	72	69								0	0	1	-1	2								
	Admin Roof SE	72	71	72	72	72	71								1	-1	0	-1	1								
	Admin Roof SE	72	71	72	72	72	71								1	0	1	0	2								
	Admin Roof NE	71	72	72	70	72	68								-1	-1	0	-1	2								
	Admin Roof NE	72	71	72	71	72	68	69							1	0	1	0	4	3							2016 may have been CM7 off

Table 3.3A: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade - increases only

Area	2021 location	SPL													Difference 2021 to Previous LAeq results												Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
PHT Level 8	PHT L8 Top platform EL16 Gbox @ 1m to coupling NW side	83	80	79	80	80	81	82							3	4	3	3	2	1							
	PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	84	79	78	82	79	82	80							5	6	2	5	2	4							Gearbox is higher than past
	PHT L8 Top platform EL16 Gbox @ 2m to motor S side	79	77	78	77	73	78	81							1	1	1	5	0	-2							
	PHT L8 centre tower W side	79	81	74	78	78	76	76							-3	5	1	1	3	2							
PHT Level 7 new	PHT L7 New E side centre	75	74	71	70	73	72	72							2	4	5	3	3	3							No significant change
PHT L7 Alt Fuels Platform L1	PHT L7 Alt Fuels Platform L1: E side of feeder @ 1m	76	75	72											1	4											Alt Fuels not operating
	PHT L7 Alt Fuels 1m to base of Alt Fuel chute, 1m to bin W, 1m to W side of feeder	76	74	71	70										2	5	6										at full load in 2019
	PHT L7 Alt Fuels Platform L1: E side of mixer @ 1m	76	74	73											3	4											
PHT L7 Alt Fuels Platform L2	PHT L7 Alt Fuels Platform L2: N side of conveyor discharge	77	76	74											2	4											
	PHT L7 Alt Fuels Platform L2: 1m NW side of conveyor drive motor	79	77	73											2	6											
	PHT L7 Alt Fuels Platform L2: 1m SW side of conveyor drive gearbox	77	76	72											1	4											
PHT Level 7	PHT L7 New centre between towers faces S	76	73	72	73	73	75	73	75	71					3	4	3	3	2	3	2	5					No significant change
	L7 between PHTs centre facing W	76	73	72	72	73									4	4	4	3									No significant change
	EL13 platform SW side motor & EL & coupling @ 1m	83	83	81	79	78	79								0	2	4	5	4								No significant change
	EL13 platform motor end @ 0.6m	83	85	85	*80*		*78*	*78*							-2	-1	4		5	5							Similar to and lower than past 2 years
	PHT L7 old centre N side on new platform	75	75	71	73	0	69								0	4	2		6								General area sound
PHT Level 6 RM Silo Top	PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	83	83	79	86	83	87	90	86	87	85	85	86	85	0	4	-3	0	-4	-7	-3	-4	-2	-1	-3	-2	
	L6 RM silo top on BE EL15 platform SW side @ 0.8m	74	73	70	77	76									0	4	-3	-2									
	EL15 S side Gbox @ 1m	81	81	77	80	80	80	77	78	80					0	4	1	1	1	4	3	1					No significant change
PHT Level 6	PHT L6 stack test port 100mm diam @ 200mm W side	90	90	87	91	90	86		90	90	90				1	3	-1	0	5		1	0	0				
	PHT L6 NW corner 1m to stack	79	77	77	78	77	75	83	90	90	90				2	2	1	2	4	-4	-10	-11	-11				
	PHT L6 new S side centre	76	72	74	74	72	86	73							4	2	2	4	-10	3							Air discharge
PHT Level 5	PHT Level 5 old NW corner @ 1m to stack	79	75	74	74	75	74	76							4	5	5	4	5	3							Non specific source
	PHT Level 5 centre between towers	76	73	73	72	74	73	74	75	74	79	78	75		3	3	3	2	3	2	0	2	-3	-2	1		Non specific source
PHT Level 4	PHT Level 4 old centre N side	76	74	75	73	72	72	74							3	1	3	4	4	3							General variation
	PHT Level 4 new centre S side - air cannon in Leq	78	77	76	72	71	72								1	2	6	7	6								Air cannon
ESP	ESP top NE corner at barrier	75	73	73	73	73	70	71							2	2	2	2	5	4							General increase in area
PHT L2.5	PHT Level 2.5 by DC31 drives @ 0.6m	93	89	88	*89*	*92*	*87*	*86*	*86*	*88*					4	5	5	1	6	7	7	5					High 63 Hz
	PHT Level 2.5 by centre by kiln entry W side, air cannon	86	88		88	83	86	84	82						-3		-2	3	0	2	4						
	PHT Level 2.5 by DC31 discharge @ 1m	92	87	88	89	92	87	86		85					4	4	2	0	4	6		7					
PHT Level 2.25	PHT Level 2.25 by centre by kiln entry Air cannons	87	86	88	*88*	*83*	*86*	*84*	*82*						0	-1	-2	3	0	3	5						
	PHT Level 2.25 centre	89	80	84											9	6											
PHT Level 2	PHT Level 2 by E side drive coupling & casing DC70 FA03 centre N side	88	87		86	86	86	84	85	85					1		2	2	2	4	4	3					DC70 high
	L2 PHT FA03 casing @ 1m E side	88	87	85	86	87	*86*	*84*	*85*	*85*					1	3	2	1	1	4	3	2					
	PHT Level 2 @ 1m to south side FA39 stack entry duct	89	87		87	89	85	91							2		2	1	4	-2							
	PHT Level 2 FA03 discharge @ 1.5m	91	91	89	90	92	89	86	85	86	88	91	89	91	0	2	1	-1	2	5	6	5	3	0	2	0	Difference unclear
	PHT Level 2 @ 1m to south side FA39 stack entry duct & stack	90	87	87	*87*	*89*	*85*	*91*							2	3	3	1	5	-1							
	PHT Level 2 FA65 inlet filter @ 1m in front	91	88	87	88	88	87	84	84	84					3	3	2	2	4	6	7	6					Other sources
	PHT Level 2 FA65 rear side 1m	88	87	87	87	87	86	83	83	83					2	2	1	1	2	5	5	5					Other sources

Table 3.3A: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade - increases only

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
PHT Level 1	PHT Level 1 FA92 silo vent fan casing & drive @ 1m NW side	82	78	83											3	-1										Load variation. No effect
	PHT Level 1 FA92 silo vent fan inlet front @ 1m	78	75	80											4	-2										
FA39	FA39 under discharge duct @ 1m	91	84	85	84	85	85								7	7	8	7	7							Reason unclear. Quieter more distant.
	FA39 E side motor platform @ 0.82m to coupling cover	95	94	91	94	98									1	4	1	-3								
	FA39 S side @ columns 2.7m to bearing	87	84	87	83	83									2	0	4	3								Reason unclear.
FA38	Centre between FA38 & FA39 @ 7.7 m facing FA 38	86	88	82	*85*	*88*	*91*								-2	5	1	-2	-5							
	FA38 @ 3.9m to E side	89	91	82	87	92	93	89							-2	7	3	-2	-3	0						
	FA38 @ 3m to N side	87	88	82	86	88	87								-1	6	1	-1	0							
	FA38 @ 5m to NW side at NW column	87	87	81	91	91	88	88							-1	5	-4	-4	-2	-2						
	FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	92	97	88	92	100									-5	5	0	-8								
RM6	1 RM6 W door @ 1m	75	76	78	81	77	78	81	87	70	70	73	72		-1	-4	-6	-2	-3	-6	-12	5	4	2	3	RM6 off in 2013 & 2012
RM7 Building Ground Level	7 RM7 N wall man door	83	80	80	80	79	83	80	79	83	82	82	81		4	3	3	4	1	3	4	0	2	2	2	
	8 RM7 E wall vents NE corner @ 1m	84	80	83	83	82	85	84	83	84	85	82	83	84	4	1	1	3	-1	1	1	0	-1	2	1	0
	9 RM7 E side under duct	81	77	81	80	78	81	81	79	81	82	81	80	80	5	1	2	4	1	1	2	1	0	1	1	1
	10' RM7 By E door Hydraulics room closed	75	71	73	72	72	74	73	73	72	74	74	73	74	4	1	3	3	1	1	2	3	0	1	2	1
RM7 Compressor area	12 RM7 Under E inlet for switchroom fan	86	82	84	85	84	84	87	83						4	2	1	2	2	-2	3					
	12B Under switchroom fan duct W	87	75	78	78	89									12	10	10	-1								Is similar level to W inlet
FA249	13 FA249 under inlet duct W side	79	76	81	75	78	78	78	80	80					3	-3	4	1	0	1	-2	-2				Screw conveyor squeal
	14 FA249 2m W side ground level	82	79	84	77	79	82	80	80	80					3	-2	4	3	0	2	2	2				As above
	15 FA249 1m motor end	83	81	84	79	81	82	81	80	81	81				2	-1	4	2	1	2	3	2	2			As above
	16 FA249 end at column 4.3m N of motor plinth	82	78	84	77	79	80	79	77	79	81	82	82		4	-2	5	4	2	4	5	3	2	1	0	As above
	18' FA249 platform S side under discharge duct E side	77	75	77	73	75	74								2	0	5	2	3							As above
	21 FA249 E side of fan casing ground level @ 2m	77	73	75	71	77	76	76	76	76	77	76	79		4	2	6	0	1	1	1	1	0	1	-2	As above
FA250	22 FA250 S side 4.2 m to motor end at columns	85	80	86	79	80	83	79	78						5	-1	6	5	2	6	7					Screw conveyor squeal
	22' FA250 Motor end S side @ 1m	86	81	84	81	81	84	82	80	82	83	82	83		5	2	5	5	2	4	5	4	3	4	3	As above
	23' FA250 E side centre motor @ 1m	85	83	84	83	82	84	85	80	85	86				3	2	2	3	2	0	6	1	0			As above
	FA250 W side motor shaft @ casing @ 1m	88	84	86	87	85									3	2	1	3								
	25 FA250 coupling & casing W side motor centre @1m	88	84	84	84	82	86	84	80	85	86				3	4	4	5	2	4	8	3	2			As above
	29 FA250 E side under discharge duct @ 1.5m, at lower step of concrete	84	82	84	80	81	82	82							2	0	4	3	3	2						As above
	26 FA250 W side casing @ 1m & coupling @ 3m	86	82	83	81	82	83	81	79	83	83	84	85	81	4	3	5	4	3	4	7	3	3	2	1	5	As above
	27 FA250 W side 1m under inlet casing expansion joint	86	81	82	79	79	83	80	78	85	84				5	4	7	7	4	6	8	1	2				As above
RM7 Roof Platform	Lower platform E side 1m to Magnete plate	87	90	90	92	89	86	89	83	88	87	85	88	90	-3	-3	-5	-2	1	-2	4	-2	0	2	-1	-3	Lower than past 6 years
	Lower platform S side @ 1m to magnete plate	88	91	91	93	92	89	90	82	91	91	87	91	93	-3	-3	-5	-4	-1	-1	7	-3	-3	1	-3	-5	As above
	Lower platform W side @ 0.9m to magnete plate	87	88	90	91	89	86	88	81	87	85				-1	-3	-4	-2	1	-1	6	0	2			
	Platform S of Magnete 2m to S side	85	84	86	88	78	85	87							1	-1	-2	7	1	-1						Similar to previous years
	Upper Platform BE casing @ 1m S side	82	80	85	88	87	84	81	83	85	83	78	80	85	2	-4	-6	-5	-2	1	-1	-3	-2	4	2	-4	General area level
RM7 Baghouse	On tower to baghouse top S side above FA249 halfway up level	75	71												4											
	Baghouse S doorway open, discharges	86	80	81	78	80	81	80	78	72	87	96	73		6	5	8	5	5	6	8	13	-1	-11	13		Different discharge cycle
	Inside centre baghouse top, discharges every 5s	88	81	83	82	82	82	83	81						7	5	6	6	6	4	7						

Table 3.3A: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade - increases only

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
RM7 baghouse hopper area	Centre S side of screw in line with motor FA250	81	91	78	77	80	80								-10	3	4	0	1								Other screw conveyor squeal
	E end of SC212 body @ 2m and other N-S aligned screw	83	89	78	76	79	95								-6	5	7	4	-12								Ditto
	Centre E side - on	91		79	*79*	*79*	*83*	*79*	*78*	*77*	*78*					12	12	12	8	12	14	14	13				Screw conveyor squeal
	By FA252 @ 0.8m shaft S side, casing & discharge box	85	83	79	*76*		*83*	*83*							2	6	8		2	2							Screw conveyor squeal
	By FA252 @ 0.8m shaft N side, casing & inlet	84	85	81											0	4											
Kiln 6 South side coal road	43 Coal Road S side W side coal receival bin 25m to truck	66	65	62	68	64	67	64							2	4	-2	2	-1	2							Not a significant change
Fenceline South	Former Gate site opp W end Firing floor	62	60	57	58										2	5	4										Not a significant change
	Top N edge of bank opposite centre pedestal	61	52	51	54										9	10	7										Possibly Alt Fuels building. Not significant
Kiln 6 S side - Coal Mill Room Area	43A Kerb E side CM opp CM fan discharge	79	78	77	81	*75*	*80*	*77*	*78*	*79*	*78*				1	2	-2	4	-1	1	1	0	1				
	44 CM fan room roll door @ 2m	88	88	84	83	85	84	84	85	83					0	3	5	3	3	3	3	5					Main fan room door open
	44' CM S wall E door @1m, at line in concrete	87	88	88	*85*	*92*	*83*								-1	0	2	-5	5								Main fan room door open
	46 CM room wall vent @ 2m	84	85	84	80	77	82	81	86	80	83	89	90		-1	0	4	7	3	4	-2	4	1	-5	-6		Main fan room door open
Kiln 6 S side by firing floor	47A Centre between CM Room and grate	83	83	80	78	79	79	78	81	82					-1	3	5	4	4	5	2	1					Reason unclear
	47 Opp FA264 @ 3.2m	84	83	81	*85*	*81*	*80*	*80*	*81*	*81*					1	3	-2	2	4	4	2	2					Similar to past 2 years
	51 Half way between Centre & Western pedestals, by duct support trestle	82	79	81	79	76	77	81	80	80	83	82	81	80	2	1	3	6	5	1	2	2	-1	-1	1	2	Additional KSCFs
Kiln 6 S side 13.5m to kiln at kerb	52A Opp E end of kiln drive platform	80	78	81	76	77	78	79	78	78	83	80	80	80	2	-1	4	3	2	1	2	2	-3	1	0	0	KSCFs may be at higher load
	52 Opp W pedestal roller	80	79	82	76	76	76	79	76	76					1	-3	4	4	4	1	4	3					
	53 Kiln drive platform Centre E end on platform (ground level	85	84	85	81	74	87	88	88						1	-1	4	11	-3	-3	-3						Assume different location to 2017
Kiln Drive platform	S side S motor end @ 1.5m S side kiln drive, 2m GB	85	83	84	81	84									2	1	4	2									Possibly different location to 2018
Kiln 6 road Northern side at kerb	63 Opp. W pedestal	81	78		77	77	77	80	77	78	79	81	80		3		4	5	4	1	4	3	2	1	1		KSCFs may be at higher load
	64 E end drive platform	83	81	83	79	78	79	82	78	80	82	82			2	0	3	5	3	1	5	3	0	0			
	65 Opp column for return duct W side	85	83	85	81	80	81	85	81	86	85	85	82	83	1	0	3	4	3	0	4	-2	0	0	3	2	
	66 Opp centre pedestal	88	86	88	86	85	85	87	84	83	88	88	85	85	1	0	2	3	3	1	4	5	0	-1	3	3	KSCFs may be at higher load
Grate area north	Coal Mill Building N roll door @ 2m	86	86	86	83	86	84	84	90	88					1	1	3	1	3	2	-3	-2					Door open at bottom effect
Kiln Firing Floor	FA209 E side inlet & filter silencer	87		83	82											3	4										
	FA209 Kiln Discharge Seal Fan N inlet W side @ 1.5m	93			88	89	89	89	88	88	88	89	87	88			5	4	4	4	5	5	5	4	6	5	Depends on KSCFs
	Eastern KSCF @ 1m	97	86	87	86	86									11	10	11	11									Depends on KSCFs load
	Eastern KSCF @ 1m	98	91	93	94	93	92	93	92	90		94	92		6	5	4	5	5	5	6	7		4	6		
	FA210 Kiln Discharge Seal Fan S inlet @ 1.5m	93	93	92	*92*	*92*	*94*	*95*	*85*	*96*	*94*	*96*	*92*		-1	0	1	0	-2	-2	7	-3	-2	-4	1		2014 was anomolous

Table 3.3A: Boral Cement Berrima Annual Noise 2020 - Comparison of LAeq results with those of Previous Years for Kiln 6 Upgrade - increases only

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
Radicon Cooler	RC L1 centre fan @ 1m	92	83	86	83	92	91	84	93	93	83	93	85	84	8	6	8	-1	1	8	-2	-2	8	-1	7	8	Higher load & speed
	RC L1 S fan @ 0.5m	92	84	87	83	90	92	84		95					7	5	9	2	0	7		-3					
	RC L1 N fan @ 1m	87	82	86	83	89	90	85	94	97					6	2	5	-2	-3	2	-7	-10					
	RC L2 centre fan @ 1m	93	82	85	83	94	94	85	96	96	84	95	86	85	11	8	10	-1	-1	8	-2	-3	10	-1	7	8	
	RC L2 S fan @ 0.7m	93	84	86	84	95	95	84		95					9	7	9	-2	-2	8		-2					
	RC L2 N fan @ 1m	92	81		92	92	94	95	85	96	94	96	92		11		0	0	-2	-2	7	-3	-2	-4	0		
	RC L3 Centre fan @ 1m	93	83	85	85	94	95	85	95	96	83	94	86	83	10	8	9	-1	-1	8	-1	-2	10	0	7	10	
	RC L3 S fan @ 0.7m	93	83	85	83	94	93	83		93					10	8	10	-1	0	10		0					
	RC L3 N fan @ 1m	91	81	85	84	95	94	91	97	97					10	7	7	-3	-3	1	-6	-6					
	RC L4 Centre fan @ 1m	99	84	85	85	95	92	92	92	88	82	88	85	84	14	14	14	4	6	6	7	10	17	11	14	15	Drive belt squeal
	RC L4 S fan @ 0.7m	101	85	86	87	93	91	90	86	89					16	15	14	7	9	11	15	12					Adjacent drive belt
	RC L4 N fan @ 1m	94	82	82	84	90	93	91	97	97					12	13	10	5	1	4	-3	-3					
	RC L5 face E	85	78	80	79	85	84	86	84						7	4	6	0	1	-1	1						
	RC L5 face W	86	79	81	80	86	85	87							7	5	7	1	1	-1							
	L1 E side 2.4m	85	78	77	77										7	8	8										
	L1 E side 6m	79	77	75	75										2	4	4										
	L1 E side 12m	78	74	72	73										4	6	5										EL215 fan contribution
FA215	Motor S end @ 2.5m	82	79	78	80	81	80	81	87	85	85	86	85	84	3	4	2	1	2	1	-5	-3	-3	-4	-3	-2	Appears to be a new motor
	Platform E side drive coupling @ casing @ 1m	86	83	81	84	84	85	85	85	85					3	5	2	2	1	1	1	1					
	W side platform @ 1m to coupling & casing	87	81	81	85	85	85	86	87	85	86	87			5	5	2	1	1	0	0	2	1	0			
	Under expansion joint discharge duct to stack @ 1m	81	82	75	79	79	79	80	81	78	81	80	78	79	-1	6	2	2	2	1	0	2	0	1	3	2	
	N side inlet box platform @ 1m to discharge duct & inlet box	80	76	71	74	78	77	79	79	75					4	9	5	2	3	1	1	5					
	Platform centre N side inlet box	79	81	72	73	77	76	79	79	74	78	78	78	74	-1	7	6	3	3	1	0	5	1	1	1	5	
	Under Inlet box W side entry duct	82	79	76	78	80	79	81	83						3	6	4	2	3	1	-1						
	Inlet box N side ground level @ 1m	78	77	73	74		75	78	77						1	6	4		3	1	1						
Control Building	Admin Roof NE	72	71	72	71	72	68	69							1	0	1	0	4	3							2016 may have been CM7 off

Table 3.4: 2021 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ,t}$	Comments	Distance measured metres	Distance to Receivers — Distance Attenuation to receiver — Calculated LAEQ level at receiver distance only				
							Adelaide	Brisbane	Melbourne	South	Loc.20
Kiln 6 Upgrade						**Objective**	**37**	**37**	**37**	**37**	**58**
PHT L8 Top platform EL16 Gbox @ 1m to coupling SW side	**2021**	10:44 AM	21	83		**1**	666	754	745	1506	470
	2019			78	Source after directivity		**72**	**74**	**77**	**72**	**72**
Difference 2021 - 2017			*Difference*	**5**	Distance reduction		-56	-58	-57	-64	-53
					Calculated SPL without barriers		***15***	***17***	***20***	***8***	***18***
PHT L8 centre tower W side	**2021**	10:59 AM	16	78		**5**	656	748	725	1508	434
	2019			74	Source after directivity		**68**	**68**	**68**	**68**	**68**
Difference 2020 - 2019			*Difference*	**5**	Distance reduction		-42	-43	-43	-50	-39
					Calculated SPL without barriers		***25***	***24***	***25***	***18***	***29***
PHT L7 Alt Fuels 1m to base of Alt Fuel chute, 1m to bin W, 1m to W side of feeder	**2021**	11:20 AM	21	76	Distance	**1**	666	754	745	1506	438
	2018			70	Source after directivity		**65**	**68**	**71**	**65**	**65**
Difference 2020 - 2012			*Difference*	**6**	Distance reduction		-56	-58	-57	-64	-53
					Calculated SPL without barriers		***9***	***10***	***13***	***2***	***12***
EL13 platform SW side motor & EL & coupling @ 1m F48	**2021**	11:30 AM	30	83	Distance	**1**	666	754	745	1506	438
Difference 2021 - 2017	**2017**			78	Source after directivity		**64**	**64**	**64**	**63**	**64**
			Difference	**5**	Distance reduction		-56	-58	-57	-64	-53
					Calculated SPL without barriers		***8***	***7***	***7***	***-1***	***11***
PHT L6 RM silo above baghouse discharge @ 2m at base of stairs to EL, level with floor	**2021**	11:39 AM	30	83	Distance	**2**	692	782	765	1473	470
Difference 2021 - 2019	**2019**			79	Source after directivity		**83**	**83**	**83**	**83**	**83**
			Difference	**4**	Distance reduction		-51	-52	-52	-57	-47
					Calculated SPL without barriers		***32***	***31***	***32***	***26***	***36***
PHT Level 5 old NW corner @ 1m to stack	**2021**	12:10 PM	30	79	Distance	1	656	748	725	1508	434
	2019			74	Source after directivity		**76**	**76**	**76**	**76**	**76**
Difference 2021 - 2019			*Difference*	**5**	Distance reduction		-56	-57	-57	-64	-53
					Calculated SPL without barriers		***14***	***13***	***13***	***7***	***18***
ESP top NE corner at barrier F103	**2021**	12:30 PM	31	75	Distance	10	642	730	711	1485	417
	2016			70	Source after directivity		**60**	**63**	**63**	**63**	**63**
Difference 2021 - 2016			*Difference*	**5**	Distance reduction		-36	-37	-37	-43	-32
					Calculated SPL without barriers		***24***	***26***	***26***	***20***	***31***
PHT Level 2.5 by DC31 drives @ 0.6m	**2021**	12:42 PM	44	93	Distance	0.6	666	754	745	1506	438
	2015			*86*	Source after directivity		**93**	**93**	**93**	**93**	**93**
Difference 2021 - 2015			*Difference*	**7**	Distance reduction		-61	-62	-62	-68	-57
Air cannon operation included, normal is 82					*Calculated SPL without barriers*		***32***	***31***	***31***	***25***	***36***
PHT Level 2.25 centre	**2021**	12:48 PM	30	89	Distance	2	666	754	745	1506	438
	2020			80	Source after directivity		**90**	**90**	**90**	**90**	**90**
Difference 2021 - 2020			*Difference*	**9**	Distance reduction		-50	-52	-51	-58	-47
Air cannon event in period. LA90 86 less than in 2014					*Calculated SPL without barriers*		***39***	***38***	***38***	***32***	***43***
PHT Level 2 FA03 discharge @ 1.5m faces WSW F122	**2021**	12:54 PM	21	91	Distance	1.5	666	754	745	1506	438
	2014			85	Source after directivity		**83**	**83**	**85**	**91**	**85**
Difference 2021-2014			*Difference*	**6**	Distance reduction		-53	-54	-54	-60	-49
					Calculated SPL without barriers		***30***	***29***	***31***	***31***	***36***
PHT Level 2 FA65 inlet filter @ 1m in front F124	**2021**	12:56 PM	30	91	Distance	1	666	754	745	1506	438
	2014			84	Source after directivity		**91**	**91**	**91**	**77**	**91**
Difference 2021 - 2014			*Difference*	**7**	Distance reduction		-56	-58	-57	-64	-53
This source is not causing the sound level - it is other sources, lower than 2018					*Calculated SPL without barriers*		***34***	***33***	***33***	***14***	***38***
FA39 E side motor platform @ 0.82m to coupling cover	**2021**	2:08 PM	30	95	Distance	0.82	643	731	715	1512	425
	2019			91	Source after directivity		**80**	**80**	**76**	**76**	**76**
Difference 2021 - 2019			*Difference*	**4**	Distance reduction		-58	-59	-59	-65	-54
					Calculated SPL without barriers		***22***	***21***	***17***	***11***	***22***
FA39 S side @ columns 2.7m to bearing	**2021**	2:18 PM	33	87	Distance	2.7	643	731	715	1512	425
	2018			83	Source after directivity		**61**	**61**	**61**	**87**	**60**
Difference 2021 - 2018			*Difference*	**4**	Distance reduction		-48	-49	-48	-55	-44
					Calculated SPL without barriers		***14***	***12***	***13***	***32***	***16***
FA38 @ 3.9m to E side	**2021**	2:21 PM	30	89	Distance	3.9	645	730	713	1505	423
	2019			82	Source after directivity		**75**	**75**	**75**	**67**	**75**
Difference 2021 - 2019			*Difference*	**7**	Distance reduction		-44	-45	-45	-52	-41
Fan cover open.					*Calculated SPL without barriers*		***30***	***29***	***29***	***16***	***34***
FA38 motor platform W side @ 1m to coupling cover, 1.9m to casing, 0.7m to motor side	**2021**	2:26 PM	33	92	Distance	0.7	645	730	713	1505	423
	2019			88	Source after directivity		**77**	**77**	**81**	**77**	**77**
Difference 2021 - 2019			*Difference*	**5**	Distance reduction		-59	-60	-60	-67	-56
Fan cover open.					*Calculated SPL without barriers*		***18***	***17***	***21***	***11***	***22***

Table 3.4: 2021 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers Distance Attenuation to receiver Calculated LAEQ level at receiver distance only Adelaide	Brisbane	Melbourne	South	Loc.20
Kiln 6 Upgrade						**Objective**	**37**	**37**	**37**	**37**	**58**
8 RM7 E wall vents NE corner @ 1m	**2021**	2:41 PM	30	84	Distance	1	695	771	748	1447	461
	2020			80	Source after directivity		**84**	**84**	**84**	**56**	**84**
Difference 2021 - 2020			*Difference*	**4**	Distance reduction		-57	-58	-57	-63	-53
Does not include barrier of RM6 to northern receivers					*Calculated SPL without barriers*		***27***	***26***	***27***	***-7***	***31***
12B Under switchroom fan duct W 0.5m	**2021**	2:47 PM	30	87	Distance	0.5	703	792	772	1455	484
	2020			75	Source after directivity		**81**	**81**	**81**	**81**	**81**
Difference 2021 - 2020			*Difference*	**12**	Distance reduction		-63	-64	-64	-69	-60
					Calculated SPL without barriers		***18***	***17***	***17***	***12***	***21***
16 FA249 end at column 4.3m N of motor plinth	**2021**	2:53 PM	30	82	Distance	4.3	677	765	751	1483	463
	2018			77	Source after directivity		**82**	**82**	**82**	**60**	**82**
Difference 2021 - 2018			*Difference*	**5**	Distance reduction		-44	-45	-45	-51	-41
Increases in all FA249 & 250 area from screw conveyor noise					*Calculated SPL without barriers*		***38***	***37***	***37***	***9***	***42***
18' FA249 platform S side under discharge duct E side	**2021**	2:56 PM	31	77	Distance	1	703	792	772	1455	484
	2018			73	Source after directivity		**66**	**66**	**66**	**66**	**66**
Difference 2021 - 2018			*Difference*	**5**	Distance reduction		-57	-58	-58	-63	-54
Increases in all FA249 & 250 area from screw conveyor noise					*Calculated SPL without barriers*		***9***	***8***	***8***	***3***	***12***
27 FA250 W side 1m under inlet casing expansion joint	**2021**	3:07 PM	30	86	Distance	1	677	765	751	1483	463
	2014			78	Source after directivity		**75**	**75**	**75**	**75**	**75**
Difference 2021 - 2014			*Difference*	**8**	Distance reduction		-57	-58	-58	-63	-53
Increases in all FA249 & 250 area from screw conveyor noise					*Calculated SPL without barriers*		***18***	***17***	***17***	***11***	***22***
RM7 Roof Lower platform S side @ 1m to magnete plate F203	**2021**	3:14 PM	30	88	Distance	1	692	778	758	1459	464
	2014			82	Source after directivity		**58**	**58**	**60**	**69**	**60**
Difference 2020 - 2014			*Difference*	**7**	Distance reduction		-57	-58	-58	-63	-53
Is lower than all since 2015					*Calculated SPL without barriers*		***1***	***0***	***2***	***6***	***7***
RM7 Baghouse S doorway open F217	**2021**	3:30 PM	60	86	Distance	1	695	771	748	1447	461
	2013			72	Source after directivity		**49**	**49**	**51**	**85**	**49**
Difference 2021 - 2013			*Difference*	**13**	Distance reduction		-57	-58	-57	-63	-53
					Calculated SPL without barriers		***-8***	***-9***	***-7***	***22***	***-4***
Significant barriers in place for receivers N. LAeq is mostly discharges.											
F250 Baghouse hopper area E side of SC210 on @ 1m F246	**2021**	4:05 PM	30	91	Distance	1	677	765	751	1483	463
	2018			76	Source after directivity		**78**	**78**	**73**	**78**	**73**
Difference 2021- 2018			*Difference*	**15**	Distance reduction		-57	-58	-58	-63	-53
Screw conveyor HF squeal					*Calculated SPL without barriers*		***22***	***21***	***16***	***15***	***20***
Significant barriers in place for all village receivers and air absorption for higher frequencies of source											
Top N edge bank Opposite E side old PHT	**2021**	4:31 PM	0	61	Distance	21	860	950	930	1350	620
	2019			51	Source after directivity		**25**	**25**	**28**	**61**	**28**
Difference 2021 - 2019			*Difference*	**10**	Distance reduction		-32	-33	-33	-36	-29
Assumes source is Alt Fuels					*Calculated SPL without barriers*		***-7***	***-8***	***-5***	***25***	***-1***
43A Kerb E side CM opp CM fan discharge F343	**2021**	10:10 AM	30	79	Distance	18	715	810	820	1545	536
	2018			72	Source after directivity		**66**	**64**	**62**	**64**	**62**
Difference 2021 - 2018			*Difference*	**6**	Distance reduction		-32	-33	-33	-39	-29
Significant barriers in path to village receivers					*Calculated SPL without barriers*		***34***	***31***	***29***	***26***	***32***
44 CM fan room roll door @ 2m F345	**2021**	10:11 AM	31	88	Distance	2	715	810	820	1545	536
	2018			83	Source after directivity		**62**	**64**	**64**	**85**	**64**
Difference 2021 - 2018			*Difference*	**5**	Distance reduction		-51	-52	-52	-58	-49
Significant barriers in place for all village receivers					*Calculated SPL without barriers*		***11***	***12***	***12***	***27***	***16***
K6 S side 51 Half way between Centre & Western pedestals, by duct support trestle	**2021**	10:22 AM	31	82	Distance	13	700	799	801	1518	514
	2017			76	Source after directivity		**52**	**55**	**55**	**82**	**55**
Difference 2021 - 2017			*Difference*	**6**	Distance reduction		-35	-36	-36	-41	-32
Significant barriers in place for all village receivers.					*Calculated SPL without barriers*		***18***	***19***	***19***	***41***	***23***
K6 S side #53 Kiln drive platform Centre E end on platform (ground level) F361	**2021**	10:25 AM	30	86	Distance	5	676	773	770	1521	484
	2017			74	Source after directivity		**49**	**49**	**56**	**86**	**56**
Difference 2021 - 2017			*Difference*	**12**	Distance reduction		-43	-44	-44	-50	-40
Reason for difference unclear, potentially more KSCFs, no consequence					*Calculated SPL without barriers*		***6***	***5***	***13***	***36***	***17***
K6 N side #66 Opp centre pedestal F331	**2021**	9:58 AM	33	88	Distance	13	664	761	758	1533	472
	2013			83	Source after directivity		**88**	**88**	**88**	**58**	**88**
Difference 2021 - 2013			*Difference*	**5**	Distance reduction		-34	-35	-35	-41	-31
Increase may be more new centre fans operating and include reflection					*Calculated SPL without barriers*		***53***	***52***	***52***	***16***	***56***
Coal Mill Building N roll door @ 2m	**2021**	11:08 AM	0	86	Distance	2	684	789	797	1571	508
	2018			83	Source after directivity		**86**	**86**	**86**	**56**	**86**
Difference 2021 - 2018			*Difference*	**3**	Distance reduction		-51	-52	-52	-58	-48
Significant barriers to receivers					*Calculated SPL without barriers*		***36***	***34***	***34***	***-2***	***38***

Pink shaded cells and red text indicates exceeds contribution objective by 3dB+

Table 3.4: 2021 Annual Environmental Noise Assessment for Kiln 6 Upgrade -
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ.t}$	Comments	Distance measured metres	Distance to Receivers Distance Attenuation to receiver Calculated LAEQ level at receiver distance only				
							Adelaide	Brisbane	Melbourne	South	Loc.20
Kiln 6 Upgrade						**Objective**	**37**	**37**	**37**	**37**	**58**
Kiln 6 North side Eastern KSCF @ 1m	**2021**	10:39 AM	30	98	Distance 1	1	674	773	775	1544	488
	2020			86	Source after directivity		**98**	**98**	**98**	**74**	**98**
Difference 2021 - 2020			*Difference*	**11**	Distance reduction		-57	-58	-58	-64	-54
Probably fans on higher load					*Calculated SPL without barriers*		***41***	***40***	***40***	***11***	***44***
FA210 Kiln Discharge Seal Fan S inlet @ 1.5m E side F351	**2021**	10:42 AM	30	93	Distance	1.5	683	784	787	1545	496
	2014			85	Source after directivity		**76**	**75**	**75**	**69**	**75**
Difference 2021 - 2014			*Difference*	**7**	Distance reduction		-53	-54	-54	-60	-50
Barrier to village side					*Calculated SPL without barriers*		***23***	***20***	***20***	***9***	***24***
Radicon Cooler L4 S fan @ 0.7m	**2021**	10:58 AM	20	101	Distance	0.7	672	773	778	1562	489
	2020			85	Source after directivity		**86**	**86**	**90**	**86**	**90**
Difference 2021 - 2020			*Difference*	**16**	Distance reduction		-60	-61	-61	-67	-57
					Calculated SPL without barriers		***26***	***25***	***29***	***19***	***33***
FA215 W side platform, 1m to coupling & casing F 407	**2021**	11:12 AM	30	87	Distance	1	680	785	793	1575	504
	2020			81	Source before directivity		**87**	**87**	**87**	**87**	**87**
Difference 2021 - 2020			*Difference*	**5**	Distance reduction		-57	-58	-58	-64	-54
					Source after DIR		***79***	***79***	***64***	***58***	***65***
					Calculated SPL without barriers		***23***	***21***	***6***	***-6***	***11***

Pink shaded cells and red text indicates exceeds contribution objective by 3dB+

3.2 No.7 Cement Mill sound levels

Figure 3.6 shows an aerial view of the area around the No. 7 Cement Mill and Cement Mill No.6. Figure 3.7 shows a plan view of the buildings and measurement locations used. Figure 3.8 and Figures 3.8A, 3.8B and 3.8C show these locations on an aerial view.

Results of sound levels measured around Cement Mill No.7 are shown in Table 3.5. Measurements were taken with CM7 mill operating on 22 October and 4 November 2021. Measurements in previous years have shown that at some locations, especially on the southern side of CM7, other Cement Plant sources are the main source of noise at the location – for example the kiln shell cooling fans, PHT fans and fan emissions from CM5 and CM6 buildings.

Measurements of sound levels around the Cement Mill No.6 area were also obtained on the same days as for CM7 and are also shown in Table 3.5. Measurement results inside CM7 are shown in Table 3.5A.

The Mineral Addition Plant, located north of CM6, was operating during this survey and was measured for the first time since 2014, with locations shown in Figures 3.8A to 3.8C. The results are included in Table 3.5.

One-third octave band frequency sound levels for CM7, CM6 and Mineral Addition are shown in Table 3.6 and calculation of the tonality of the measured sound levels is shown in Table 3.6A. Spectra for locations inside CM7 are shown in Table 3.6#. Graphs of the spectra and tonality for the areas of No.7 Cement Mill and surrounds are shown in Appendix A Figures A44 to A49. Figures for spectra inside of CM7 are shown in Figures A57 to A58. CM6 spectra are shown in Figures A50 to A53. Mineral Addition Plant spectra are shown in Figures A54 to A56.

The difference in sound levels at the same locations between the 2021 operating sound levels and 2010 to 2019 operating sound levels of CM7 for external locations are shown in Table 3.7. If the differences in sound levels between 2018 and those of previous years are greater than 3 dB, the difference is highlighted (as was done for the Kiln 6 Upgrade assessment shown in Table 3.3).

Locations with an increased sound level are shown in Table 3.7A. Table 3.8 provides a calculation of the contribution sound level at residential locations and a comparison of that with the previous residential receiver objectives for CM7

CM7

For sound levels outside around the CM7 building and its associated plant, Table 3.7A shows there were very few locations with increased sound levels compared to those for 2012 to present. Four locations had sound levels 4 to 5 dB above those of 2011 or earlier but these were sound levels of 72 to 73dBA, which would not cause any significant sound levels at residential receivers or Location 20. It is likely that these sound levels were caused by contributions from other site sources, such as the rail dump station or site moving sources, given that other locations did not have increased sound levels.

Sound levels on the northern side of the first level of Transfer Station TS3 were 4 dB above those of 2016. The contribution from this location to residential receivers is shown in Table 3.8 to be more than 15 dB below objectives.

Assessment for No.7 Cement Mill Project

The comparison of sound levels measured in 2021 with those of previous measurements was found to not be significantly different to those measured in the initial assessment of 2008. Many locations had not increased in sound levels. Some locations had increased sound levels but these are considered to have been from sources other than CM7. Predicted contribution sound levels from measurement locations with higher sound levels were calculated to not cause sound levels above the objectives for Location 20. They are also considered to not exceed residential receiver objectives when they were solely CM7 sources. The main contributors to sound levels around CM7, as identified also in previous surveys, include CM6 western wall fan and doorway emissions, Kiln 6 and the PHT, rail unloading operations at the bin north of CM7 and site truck movements.

Based on these results, as well as noting that most internal sound levels in CM7 have not significantly 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 while the No.7 Cement Mill is a major source which affects total received sound levels at Location 20 and residential receivers, the sound level objectives applied to it are achieved.

No.6 Cement Mill

For CM6, there were 15 locations with increased sound levels compared to previous measurements. Many of these were caused by emissions from open or partly open doorways, at the north-western corner and along the eastern side of the building. Five of these locations have been calculated in Table 3.8.

For Location 2 in front of the open large roller door at the north-western corner of the CM6 building, the sound levels were 10 dB above those of 2019 when it was closed. The contribution from this source was calculated to be close to the objectives for residential receivers in the village and 2 dB above that for Melbourne St. Additional attenuation from atmospheric absorption would reduce this to less than the objective. The contribution at Location 20 was calculated to be well below the objective.

A similar calculation for Location 5 in front of a similarly partially open door with 5 dB higher sound levels had calculated contribution levels close to the objectives and 1 dB above for the 4 Melbourne St receiver. This did not include atmospheric attenuation or barrier attenuation from the CM5 building and the actual contribution sound level would be lower than calculated and lower than the objective. The contribution at Location 20 was also less than the objective.

Calculations for doorways on the eastern side of CM6 building with 15 and 12 dB higher sound levels are also shown in Table 3.8. The calculations show the contributions from these locations are well below the objectives.

Sound levels at Location 25 on the northern side of CM6 were 4 dB above those of 2017. These sound levels were considered to have been caused by sources other than CM6 adding to the sound level, for example the Mineral Addition plant. Table 3.8 shows that if it was assumed that all the sound at location 25 was caused by CM6, the calculated contribution at residential receivers would be above the objectives, but below that for compliance Location 20.

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ABN: 25 153 946 064
ACN: 153 946 064

As discussed in the 2020 report, it is recommended that the large doors on CM6 – roll doors on both sides of the building and wall openings on the northern side of the building, be kept closed during normal operations. Improved sealing around these doors is recommended; this can be by:

- cleaning the bottom seal area of the roll doors so they close all the way to the ground;
- cleaning the bottom seal area of the man-doors so they are able to be closed against the door jamb seals; and,
- adding sound barrier insulation strips around the edges of the wall doors on Level 1. This could be 300mm wide strips of flexible loaded vinyl material such as 8kg/m^2 4mm thick Wavebar© or similar material, so that the strips overlap the wall edges.

Mineral Addition Plant

As the Mineral Addition plant has not been surveyed since 2014, and measurement locations were at some different pots to those of 2014, all of its results have been included in Table 3.7A and three source locations calculated in Table 3.8. The major source was the DC126 baghouse fan discharge on the top level, at 100 dBA at 1m.

For sound levels on the northern side of the plant, the calculated contribution at village residential receivers was equal to or just above the residential objective of 37 dBA. This was without including air and ground attenuation and the actual contribution would be below the calculated value. The calculated contribution at compliance location 20 was well below the objective.

For the baghouse fan and its casing emissions, the calculated contributions were below the objectives for all receivers.

Given the relatively high contributions calculated from the Mineral Addition Plant, it is recommended that improved fan discharge silencing be considered to reduce its noise emissions.

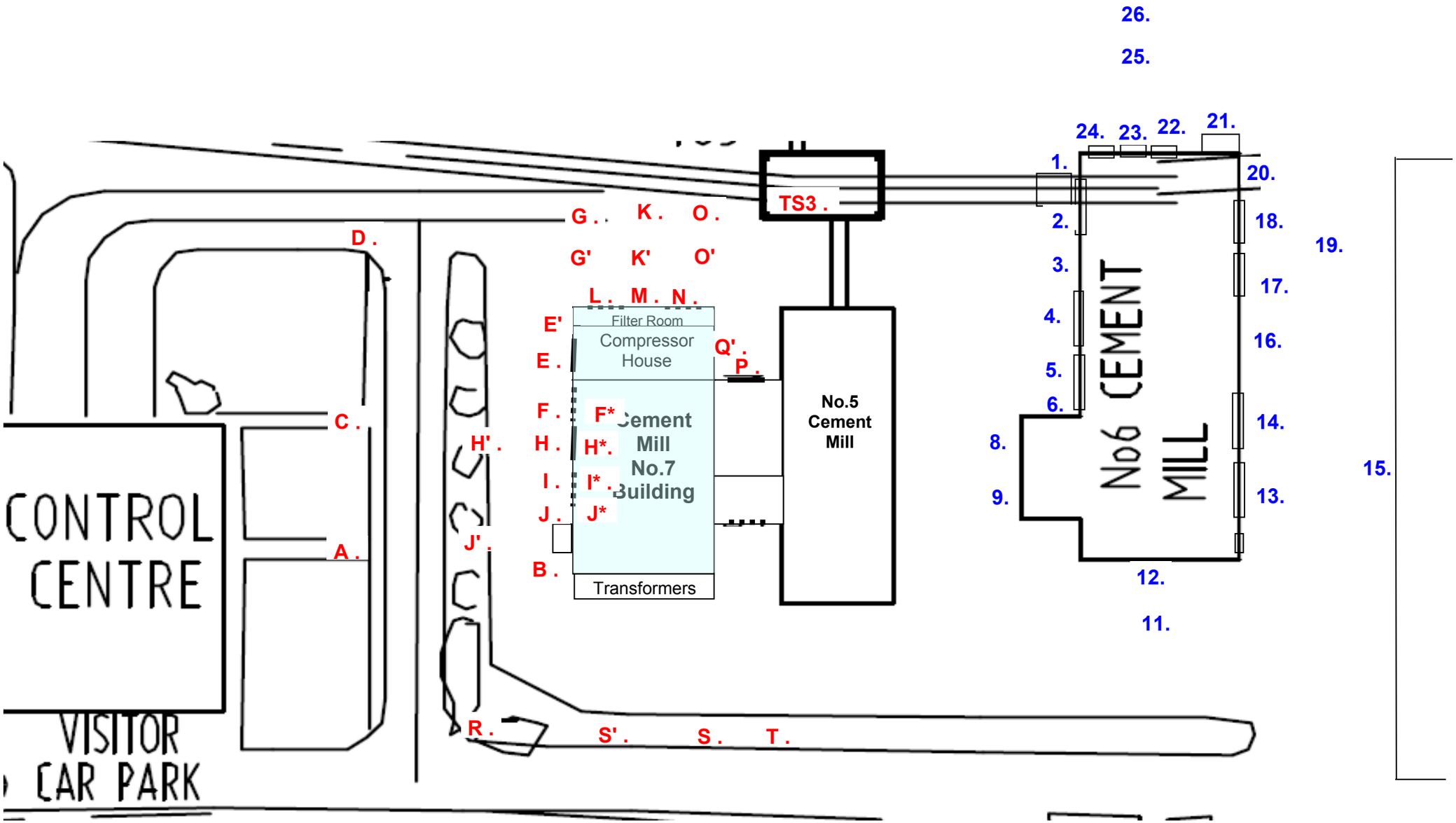

Figure 3.7: Boral Cement Berrima - Noise Assessment - Measurement locations for CM6 & CM7

Berrima Location Maps figures 2021

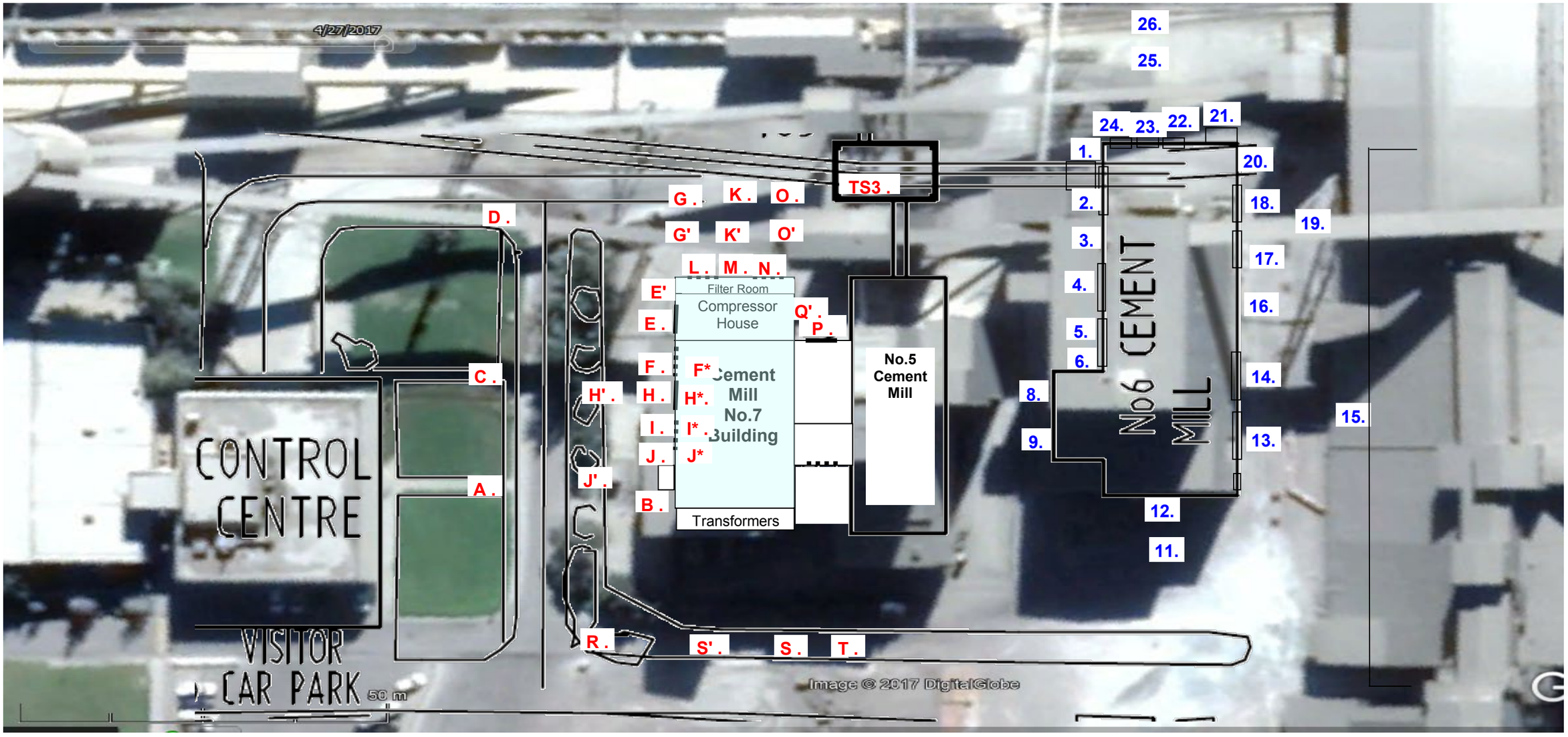

Figure 3.8: Boral Cement Berrima - Noise Assessment - Measurement locations for CM6 & CM7 with aerial overlay

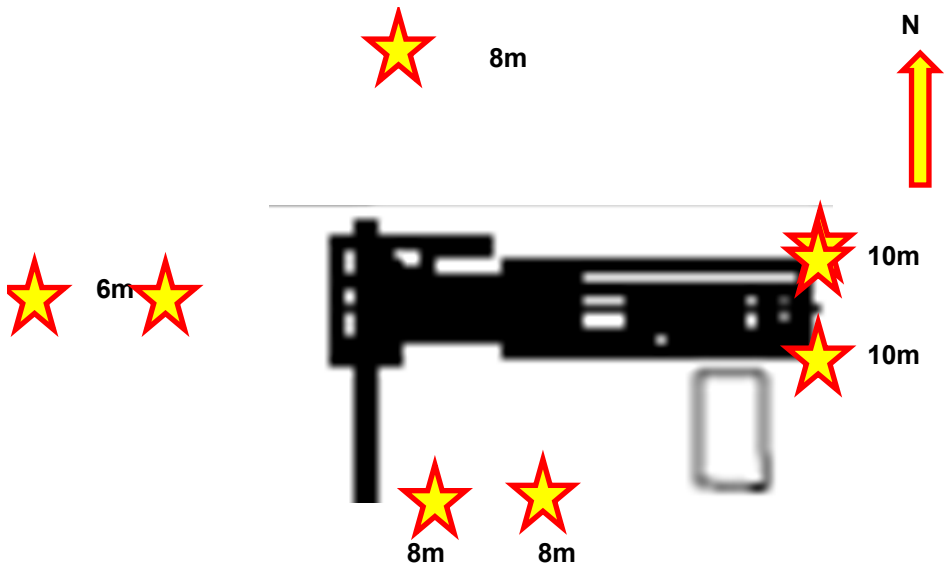

Figure 3.8A: Mineral Addition Plant - Ground Level measurement locations

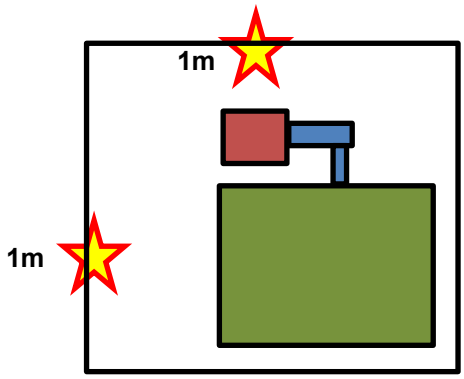

Figure 3.8B: Mineral Addition Plant - Level 1 measurement locations

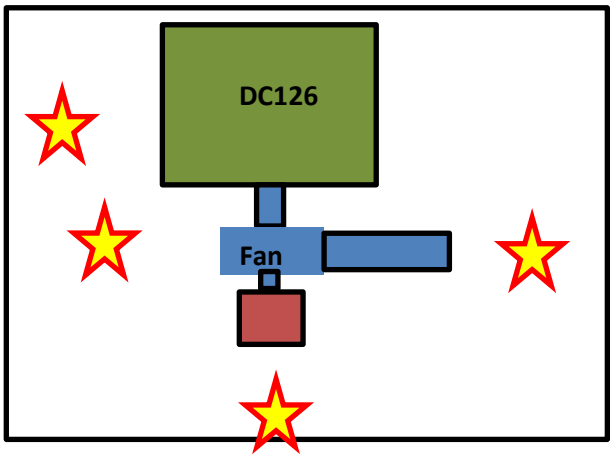

Figure 3.8C: Mineral Addition Plant - Level 2 measurement locations
All at 1m

Table 3.5: Boral Cement Berrima Annual Noise Assessment 2021 - CM7 and CM6 measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
CM7	A Top of stairs S	22/10/2021	2:02 PM	334		72	74		88	16	
	C Top of stairs N	22/10/2021	2:03 PM	335		73	74		86	13	
	B 2m W of wall, edge of barrier facing baghouse	22/10/2021	2:24 PM	335		79	80		91	13	
	D At corner N of Admin	22/10/2021	2:09 PM	336		72	76		84	12	
	E Compressor room door @ 1m	22/10/2021	2:13 PM	337		72	72		85	14	
	E' Man door to compressor filter room@ 1m	22/10/2021	2:12 PM	338		70	71		85	15	
	F Wall vents N on W side @ 1m	22/10/2021	2:15 PM	339		76	76		87	11	
	G - Line N side of transfer house 20.5m to it, in-line W edge CM	22/10/2021	2:38 PM	340		73	74		83	10	
	G - Line N side of transfer house 20.5m to it, in-line W edge CM	4/11/2021	12:19 PM	436	0:00:33	74	76	74	84	10	
	G' Line 12m N of W wall CM7	22/10/2021	2:36 PM	341		73	74		84	11	
	I Vent S of door @ 1m	22/10/2021	2:17 PM	343		77	77		88	12	
	J Vents N of baghouse	22/10/2021	2:20 PM	344		77	78		93	16	
	J' Edge of concrete opp, J.	22/10/2021	2:05 PM	346		73	74		89	15	
	J" under baghouse & 1.1m to wall vent	22/10/2021	2:22 PM	347		81	82		94	14	
	H W roller door @ 1m	22/10/2021	2:16 PM	348		79	79		90	11	
	H' Edge concrete opp door H	22/10/2021	2:07 PM	348		74	76		86	13	
	K Line level with M centre 20.9m from compressor house	22/10/2021	2:39 PM	348		72	73		84	11	
	K Line level with G opp centre compressor house	4/11/2021	12:20 PM	437	0:00:30	73	74	72	83	10	Dump station noise
	K' 11.9m from centre of N wall comp house	22/10/2021	2:35 PM	349		73	74		83	10	
	L N wall vent W side @ 1m	22/10/2021	2:26 PM	349		72	73		85	13	
	M Between wall vents @ 1m to wall	22/10/2021	2:27 PM	350		71	74		85	14	
	N Wall vents N wall E side @ 1m	22/10/2021	2:29 PM	351		72	73		84	12	
	O Line E side of Comp House 21.5m to control point	22/10/2021	2:40 PM	352		74	75		85	11	
	O Line E side of Comp House 21.5m to control point	4/11/2021	12:21 PM	438	0:00:30	73	74	73	86	13	
	O' 12.2m from Compressor house wall in line E wall Comp Hou	22/10/2021	2:33 PM	353		73	74		84	11	
	P 1m N roll door CM7	22/10/2021	2:31 PM	353		79	80		90	11	
	P 1m N roll door CM7	4/11/2021	12:22 PM	439	0:00:30	80	81	80	89	9	Door open bottom 60mm
	Q 1m Roll door E side Compressor Room	4/11/2021	12:23 PM	440	0:00:42	77	78	76	88	11	
	Transfer Station #TS3 Level 1 N side opening	22/10/2021	2:42 PM	354		74	79		88	14	
	Transfer Station #TS3 Level 1 N side opening	4/11/2021	12:07 PM	431	0:00:30	75	77	74	88	13	
	TS3 Top Platform opp CM5 fan discharge	22/10/2021	2:44 PM	355		77	77		90	13	
	TS3 Top Platform opp CM5 fan discharge	4/11/2021	12:09 PM	432	0:00:30	76	77	76	90	14	
	TS3 Top Platform opp CM5 fan discharge	4/11/2021	12:11 PM	433	0:00:30	76	77	76	91	14	
	TS3 stairway opp fan discharge from annex on CM5 building	22/10/2021	2:47 PM	356		85	86		101	16	
	TS3 stairway opp fan discharge from annex on CM5 building	4/11/2021	12:12 PM	434	0:00:30	78	79	78	92	14	
	TS3 E conv platform opp fan discharge CM6 @7.5m	4/11/2021	12:14 PM	435	0:00:30	85	86	84	102	17	
	R corner SW of CM7	22/10/2021	3:44 PM	357		75	76		91	16	
	S' Kerb Opp W wall CM7	22/10/2021	3:43 PM	358		75	76		90	15	
	S Kerb opp W side CM7 tower	22/10/2021	3:42 PM	359		76	77		90	14	
	T Kerb Opp W wall CM5	22/10/2021	3:41 PM	360		76	77		88	12	
CM7 Compressor Building filter room	Compressor house filter room Inside W	22/10/2021	5:31 PM	305	0:00:33	71	73	70	84	13	
	Compressor house filter room Inside centre	22/10/2021	5:31 PM	306	0:00:24	75	76	74	85	11	
	Compressor house filter room Inside E vent	22/10/2021	5:32 PM	307	0:00:32	71	73	70	83	12	
	Compressor house filter room Inside W vent	22/10/2021	5:33 PM	308	0:00:29	75	75	74	84	9	

Table 3.5: Boral Cement Berrima Annual Noise Assessment 2021 - CM7 and CM6 measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
CM6	1 North West Corner @ 1m	22/10/2021	2:55 PM	500		85	86		97	12	
	2 Front of Roller Door @ 1m	22/10/2021	2:56 PM	501		91	91		97	6	
	3 Between Door @ 1m	22/10/2021	2:57 PM	502		82	83		92	10	
	4 Front of Roller Door @ 1m	22/10/2021	2:58 PM	503		84	85		93	9	
	5 Front of Southern Roller Door @ 1m	22/10/2021	3:00 PM	504		85	86		94	9	
	6 Northern face of western ext @ 1m	22/10/2021	3:02 PM	505		82	83		91	9	
	7 On CM5 Platform (N) @ 8m	22/10/2021	3:06 PM	506		79	79		89	10	
	7 On CM5 Platform (N) @ 8m	4/11/2021	12:24 PM	441	0:00:25	78	78	77	90	12	
	8 Western face (N) of western ext @ 1m	22/10/2021	3:03 PM	507		78	79		92	14	
	9 Western face(S) of western ext @ 1m	22/10/2021	3:04 PM	508		78	79		91	14	
	10 On CM5 Platform (S) @ 8m	22/10/2021	3:08 PM	520		77	79		88	11	
	10 On CM5 Platform (S) @ 8m	4/11/2021	12:25 PM	442	0:00:28	76	77	76	89	13	
	11 15.4m from S wall at joint	22/10/2021	3:09 PM	521		77	79		85	8	
	11 15.4m from S wall at joint	4/11/2021	12:26 PM	443	0:00:30	78	79	77	85	7	
	12 1m from S wall CM6 at joint	22/10/2021	3:11 PM	522		82	83		88	6	
	12 1m from S wall CM6 at joint	4/11/2021	12:27 PM	444	0:00:30	82	84	82	87	5	
	12 1m from S wall CM6 at joint	4/11/2021	12:27 PM	445	0:00:30	82	84	82	87	4	
	13 E side S roll door @ 1m	22/10/2021	3:12 PM	523		77	78		85	9	
	14 CM6 E side centre door @ 1m	22/10/2021	3:14 PM	524		89	89		95	6	
	15 2m from Clinker Building opp 13 & 14	22/10/2021	3:36 PM	525		73	75		83	10	
	16 E wall centre @ 1m	22/10/2021	3:16 PM	526		78	79		86	8	
	17 E roll door opp Mill	22/10/2021	3:17 PM	527		86	87		91	5	
	18 Door opp Comp Room @ 1m	22/10/2021	3:18 PM	528		76	78		84	8	
	19 Clinker Building @ 2m opp 18	22/10/2021	3:34 PM	529		72	79		80	9	
	20' Inside Filter Room @0.3m	22/10/2021	3:21 PM	530		71	72		86	14	
	20 Man door - adjar	22/10/2021	3:20 PM	530		77	81		85	8	
	21 1m Outside vent fan filter louvre	22/10/2021	3:23 PM	531		69	70		83	14	
	22 E side N wall vent @ 1m	22/10/2021	3:24 PM	532		70	72		84	13	
	23 Centre N wall vent @ 1m	22/10/2021	3:25 PM	533		71	71		83	12	
	24 W side N wall vent @ 1m	22/10/2021	3:27 PM	534		68	69		82	14	
	24 W side N wall vent @ 1m	4/11/2021	12:06 PM	430	0:00:30	79	80	79	89	10	
	25 11m N of CM6 at joint	22/10/2021	3:28 PM	535		69	71		79	10	
	25 11m N of CM6 at joint	4/11/2021	12:05 PM	429	0:00:30	74	74	73	86	12	
	26 17m N of CM6	22/10/2021	3:29 PM	536		69	71		79	10	
	26 N side of rail N of CM6 under conveyor	4/11/2021	12:03 PM	428	0:00:35	70	73	69	82	12	
	27 4m N of Conveyor transfer out of Clinker Building	4/11/2021	11:37 AM	413	0:00:53	73	74	72	80	7	Conveyors off. Noise from Mineral Addition plant
	28 4m N of dust collector DC120 on next building W , conveyo	4/11/2021	11:38 AM	414	0:00:30	69	71	69	78	9	as above
Mineral Addition Plant	1 Ground Level 6m W of hopper	4/11/2021	11:42 AM	415	0:00:38	70	71	69	79	10	
	2 Ground level 8m S of hopper	4/11/2021	11:44 AM	416	0:00:39	77	78	76	83	6	
	3 Ground level 8m S of E end of building	4/11/2021	11:45 AM	417	0:00:30	78	79	78	85	7	
	4 S Side of ramp 10m from E end of building	4/11/2021	11:46 AM	418	0:00:35	71	73	70	83	12	Fan on top level is noisy
	5 N Side of ramp 10m from E end of building	4/11/2021	11:47 AM	419	0:00:37	69	71	69	81	12	Loco moving 40m S
	6 Ground Level 8m N side of centre of feeder	4/11/2021	11:48 AM	420	0:00:43	73	78	69	78	5	Feeder squeals
	7 Level 1 Feeder drive level, 1m N side of drive	4/11/2021	11:50 AM	421	0:00:31	76	81	71	79	3	
	8 Level 1 W side of hopper @ 1m	4/11/2021	11:50 AM	422	0:00:31	69	72	68	80	11	
	9 Level 2 DC126 and fan level - W side of DC126	4/11/2021	11:53 AM	423	0:00:32	82	91	80	90	7	
	10 Level 2 DC126 and fan level - W side of fan casing	4/11/2021	11:54 AM	424	0:00:13	84	85	84	90	6	
	11 Level 2 DC126 and fan level - S side of fan motor & casing	4/11/2021	11:55 AM	425	0:00:21	87	88	87	93	6	
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	4/11/2021	11:55 AM	426	0:00:30	100	101	100	103	3	Fan needs a silencer
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	4/11/2021	11:56 AM	427	0:00:30	100	101	99	103	3	

Table 3.5A: Boral Cement Berrima Annual Noise Assessment 2021 - CM7 inside measurement results

Area	Location	Date	Start	File No.	Period mm:ss	Statistical Sound Level - dBA					Comments
						$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
Inside CM7 building	H* Inside main W roll door @ 1m	22/10/2021	4:49 PM	263	0:00:24	95	96	95	100	5	
	F* Inside NW corner	22/10/2021	4:50 PM	264	0:00:32	93	96	92	98	5	
	I* W side by hydraulics bench	22/10/2021	4:51 PM	265	0:00:31	94	94	93	99	5	
	J* inside vents	22/10/2021	4:51 PM	266	0:00:30	93	94	93	99	6	
	J'* SW corner by vents at baghouse	22/10/2021	4:52 PM	267	0:00:31	89	90	88	96	7	
	N end under centre axis, ground level	22/10/2021	4:54 PM	268	0:00:31	98	99	97	101	3	
	N end ground @ 2m to Mill N end	22/10/2021	4:55 PM	269	0:00:30	99	99	98	102	3	
	Inside Door P N end of mill building @ 1m	22/10/2021	4:56 PM	270	0:00:36	96	97	96	100	4	
	Inside E side mill centre at columns N end	22/10/2021	4:57 PM	271	0:00:31	94	95	94	98	4	
	Inside E side mill centre at columns S end	22/10/2021	4:58 PM	272	0:00:30	101	102	100	103	2	
	Inside NE corner mill room	22/10/2021	4:59 PM	273	0:00:31	98	99	98	102	4	
	Centre axis N end @ 2m at L1	22/10/2021	4:59 PM	274	0:00:32	94	95	94	98	4	
	C701 platform 1.5m to N wall	22/10/2021	5:01 PM	275	0:00:31	92	93	91	97	5	
	Platform above centre centre mill	22/10/2021	5:02 PM	276	0:00:31	93	93	92	98	6	
	Inside, above Mill drive gear S end	22/10/2021	5:03 PM	277	0:00:30	91	92	91	98	6	
	Tower stairs at roof level	22/10/2021	5:04 PM	278	0:00:30	89	90	89	95	6	
	1st platform above roof level in BE tower W side	22/10/2021	5:05 PM	279	0:00:30	86	87	86	94	7	
	2nd platform in BE tower by fans FA703 & FA720, W side wall @ 1m	22/10/2021	5:06 PM	280	0:00:34	82	83	82	92	10	
	Between Fans FA703 on & FA720 off	22/10/2021	5:07 PM	281	0:00:22	83	84	83	94	10	
	At crossway to CM5 level, N side at transfer to conveyor	22/10/2021	5:08 PM	282	0:00:27	81	82	81	90	9	
	At crossway to CM5 level, W side by wall @ 1m, BE @ 1.8m	22/10/2021	5:08 PM	283	0:00:23	81	82	81	90	9	
	At W end crossway to CM5 by vent in S wall	22/10/2021	5:09 PM	284	0:00:29	77	78	77	89	11	
	Crossway to CM5 by centre S wall vent	22/10/2021	5:12 PM	287	0:00:32	82	84	82	91	9	
	Top level BE tower W side NW corner	22/10/2021	5:13 PM	288	0:00:26	80	81	80	91	11	
	Top level BE tower S side BE @ 0.8m	22/10/2021	5:14 PM	289	0:00:20	84	84	83	92	9	
	Top level BE tower E side by drive motor end @ 0.8m & door @ 0.5m	22/10/2021	5:14 PM	290	0:00:27	83	83	82	92	10	1m N of Gbox
	Top level BE tower N side by drive motor end @ 0.8m	22/10/2021	5:10 PM	285	0:00:27	76	76	75	90	14	
	Top level BE tower N side by G'box @ 0.8m NE	22/10/2021	5:11 PM	286	0:00:29	75	76	75	89	13	
	Crossway to CM5 E end by opening in floor, fan @ 3m	22/10/2021	5:15 PM	291	0:00:30	83	83	83	93	10	
	Main baghouse NE corner top, 4m to E wall	22/10/2021	5:19 PM	292	0:00:30	84	86	83	93	9	
	Main baghouse SE corner top, 4m to E wall	22/10/2021	5:19 PM	293	0:00:29	85	88	85	96	11	
	Base of main baghouse SE corner	22/10/2021	5:21 PM	294	0:00:30	86	87	86	94	7	
	Base of main baghouse SW corner	22/10/2021	5:23 PM	297	0:00:19	86	87	86	96	10	
	CM7 FA701 motor & casing NE side @ 1.5m	22/10/2021	5:24 PM	298	0:00:38	89	90	89	97	8	
	CM7 SW corner 1m to FA701 discharge duct	22/10/2021	5:22 PM	296	0:00:30	86	87	86	99	12	
	CM7 FA701 inlet & casing SE side @ 1.m	22/10/2021	5:22 PM	295	0:00:30	87	88	87	95	8	
	CM7 Mill g'box W side @ 1m	22/10/2021	5:25 PM	299	0:00:30	97	98	96	100	4	
	J'* S end 1m to wall	22/10/2021	5:27 PM	300	0:00:26	92	93	92	101	9	
CM7 Compressor house	Compressor house inside W man door	22/10/2021	5:28 PM	301	0:00:30	76	77	76	86	10	
	Compressor house inside by purge filter	22/10/2021	5:28 PM	302	0:00:29	77	77	76	87	10	
	Compressor house inside E man door	22/10/2021	5:29 PM	303	0:00:30	76	77	75	86	11	
	Compressor house inside centre	22/10/2021	5:30 PM	304	0:00:31	76	78	75	86	10	

Table 3.6: Boral Cement Berrima Annual Noise Assessment 2021 **- CM7 and CM6 measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
CM7	A Top of stairs S	334	72				31	49	47	42	49	50	52	55	58	59	58	60	61	64	62	62	62	61	59	60	58	53	50	46	40	27	19	14	9	
	C Top of stairs N	335	73				35	45	44	43	48	48	53	55	58	59	59	61	62	65	63	62	63	62	60	58	57	56	52	47	42	28	21	16	10	
	B 2m W of wall, edge of barrier facing baghouse	335	79				43	47	47	54	53	54	58	62	68	67	66	70	68	66	67	67	69	66	67	66	61	59	57	55	51	44	39	37	29	
	D At corner N of Admin	336	72				39	39	40	43	48	48	53	54	56	57	58	58	60	64	64	62	62	60	57	56	62	51	52	45	39	31	25	15	10	
	E Compressor room door @ 1m	337	72				37	44	44	43	47	48	53	56	59	59	60	61	61	62	62	63	63	59	57	55	52	49	48	44	40	29	19	10	5	
	E' Man door to compressor filter room@ 1m	338	70				39	42	43	45	48	49	52	54	57	58	57	59	59	61	60	60	60	58	56	54	51	50	48	44	41	31	21	12	5	
	F Wall vents N on W side @ 1m	339	76				33	41	43	44	47	53	60	58	63	64	65	64	65	66	66	66	66	63	62	61	58	55	51	46	40	27	21	13	5	
	G - Line N side of transfer house 20.5m to it, in-line W edge CM	340	73				27	32	42	46	46	51	53	53	56	60	61	59	60	66	65	62	61	61	59	58	57	55	53	47	41	26	19	12	7	
	G - Line N side of transfer house 20.5m to it, in-line W edge CM	436	74	10	19	25	36	35	40	44	47	48	51	52	57	59	60	58	65	69	64	62	64	62	61	60	60	59	57	52	48	43	35	28	20	9
	G' Line 12m N of W wall CM7	341	73				36	36	40	44	45	49	53	52	56	59	60	57	62	66	65	62	62	61	59	60	58	57	55	51	49	37	25	14	6	
	I Vent S of door @ 1m	343	77				34	45	46	45	49	53	58	60	65	64	66	65	67	68	67	66	65	62	63	61	58	54	52	47	41	29	22	15	10	
	J Vents N of baghouse	344	77				34	53	52	50	55	56	58	60	66	66	65	67	65	66	68	67	65	62	64	59	56	52	49	45	40	30	23	17	12	
	J' Edge of concrete opp, J.	346	73				35	49	47	42	53	51	53	55	59	62	60	62	59	61	64	64	64	63	61	59	57	55	52	49	44	36	30	26	24	
	J" under baghouse & 1.1m to wall vent	347	81				36	53	53	53	55	57	63	65	68	72	71	72	70	71	70	69	68	66	71	64	60	55	52	49	42	35	28	21	17	
	H W roller door @ 1m	348	79				34	49	48	45	50	55	58	61	66	66	65	66	67	69	69	69	70	69	67	65	64	62	58	51	45	32	23	15	7	
	H' Edge concrete opp door H	348	74				31	45	44	43	49	50	55	56	60	61	60	60	62	63	64	66	63	62	61	59	58	56	53	47	42	29	21	16	9	
	K Line level with M centre 20.9m from compressor house	348	72				34	32	42	46	46	50	52	53	57	61	63	60	60	64	64	62	61	61	59	58	56	54	51	46	41	31	29	18	16	
	K Line level with G opp centre compressor house	437	73	9	17	23	32	36	43	45	46	48	51	53	58	61	61	56	61	64	66	61	62	60	60	59	58	57	55	51	47	42	37	32	20	10
	K' 11.9m from centre of N wall comp house	349	73				32	36	41	44	46	50	52	54	57	60	62	57	60	64	67	61	61	60	59	58	56	55	52	47	42	26	18	9	2	
	L N wall vent W side @ 1m	349	72				37	37	43	47	45	48	51	60	58	62	60	60	61	65	62	62	61	59	56	54	52	50	48	44	40	30	24	15	12	
	M Between wall vents @ 1m to wall	350	71				39	34	46	48	45	47	53	56	57	59	58	59	59	63	62	62	61	60	57	56	54	52	52	48	45	33	24	14	7	
	N Wall vents N wall E side @ 1m	351	72				28	33	42	45	46	51	53	57	59	61	63	59	60	62	63	62	60	59	56	54	51	50	46	41	37	25	19	12	7	
	O Line E side of Comp House 21.5m to control point	352	74				38	32	41	47	46	50	53	55	58	61	62	60	62	67	67	63	63	63	60	59	57	54	52	47	44	37	31	24	18	
	O Line E side of Comp House 21.5m to control point	438	73	9	14	28	40	35	40	46	46	48	52	54	58	62	63	58	66	66	62	60	61	60	59	57	56	55	53	49	44	42	36	31	25	17
	O' 12.2m from Compressor house wall in line E wall Comp Hou	353	73				34	34	39	46	46	51	56	55	58	62	64	58	60	64	65	61	62	60	58	57	54	53	51	46	42	31	22	12	12	
	P 1m N roll door CM7	353	79				42	42	47	54	49	51	57	61	66	67	66	67	68	71	71	70	70	68	66	65	63	60	55	50	43	29	22	17	10	
	P 1m N roll door CM7	439	80	12	22	32	42	40	43	48	48	56	60	61	66	67	67	66	69	72	71	71	70	69	68	66	64	61	57	52	46	43	34	26	17	7
	Q 1m Roll door E side Compressor Room	440	77	11	22	34	45	40	43	50	50	51	54	61	64	64	64	64	66	68	68	67	67	66	64	63	60	58	54	49	44	40	33	26	18	8
	Transfer Station #TS3 Level 1 N side opening	354	74				40	34	50	53	46	57	56	52	55	57	61	59	62	64	66	64	64	65	62	60	59	58	57	55	53	48	44	38	31	
	Transfer Station #TS3 Level 1 N side opening	431	75	4	14	27	39	35	53	52	46	48	50	52	57	58	61	61	63	65	66	65	66	66	63	62	60	60	57	53	50	46	41	35	27	17
	TS3 Top Platform opp CM5 fan discharge	355	77				47	36	47	51	48	51	56	58	62	63	65	64	64	66	69	68	67	67	64	62	60	57	53	48	43	32	27	20	14	
	TS3 Top Platform opp CM5 fan discharge	432	76	12	25	32	44	37	52	51	46	49	55	58	60	63	64	63	65	67	67	68	66	66	64	62	60	58	55	51	46	42	36	29	21	12
	TS3 Top Platform opp CM5 fan discharge	433	76	11	24	30	42	38	54	52	48	48	51	58	62	65	66	64	66	67	68	67	65	65	63	61	59	58	55	52	52	55	37	29	22	11
	TS3 stairway opp fan discharge from annex on CM5 building	356	85				60	49	55	62	62	66	62	61	64	65	67	67	73	77	78	76	76	77	75	71	67	64	62	61	57	47	41	35	27	26
	TS3 stairway opp fan discharge from annex on CM5 building	434	78	8	20	36	48	39	50	51	50	52	55	58	62	63	66	64	68	69	70	69	69	68	66	64	60	58	55	51	46	41	35	27	19	8
	TS3 E conv platform opp fan discharge CM6 @7.5m	435	85	27	33	49	60	50	56	61	63	65	61	61	62	64	66	66	73	76	76	76	75	77	75	72	67	65	64	62	59	55	49	42	35	25
	R corner SW of CM7	357	75				35	52	52	45	52	49	54	56	60	61	58	63	69	70	63	64	63	62	61	60	59	56	52	48	43	36	29	24	16	
	S' Kerb Opp W wall CM7	358	75				38	50	50	43	49	51	54	58	62	64	59	64	64	68	66	65	64	63	63	62	61	57	54	50	43	32	24	16	9	
	S Kerb opp W side CM7 tower	359	76				35	50	50	42	49	51	55	59	63	64	62	65	66	68	67	65	65	64	63	64	63	57	54	51	45	36	28	20	14	
	T Kerb Opp W wall CM5	360	76				35	45	46	44	50	53	55	60	63	63	61	64	65	66	67	66	67	64	63	63	63	58	54	51	45	34	26	18	10	
CM7 Compressor Building filter room	Compressor house filter room Inside W	305	71	15	23	27	37	33	40	40	41	47	53	59	55	60	62	60	62	62	58	63	59	58	57	55	53	49	47	44	41	37	31	25	17	8
	Compressor house filter room Inside centre	306	75	14	23	27	35	31	40	43	46	51	52	61	57	65	67	67	61	63	63	64	63	61	58	54	50	47	45	42	40	37	33	21	12	5
	Compressor house filter room Inside E vent	307	71	15	24	25	27	29	37	43	47	50	52	57	57	60	65	61	62	59	61	61	59	56	54	52	50	46	43	40	36	31	26	20	13	5
	Compressor house filter room Inside W vent	308	75	13	19	22	32	35	42	44	46	46	52	55	56	64	63	67	62	65	64	66	65	62	57	54	53	49	44	40	36	32	25	15	6	5

Table 3.6: Boral Cement Berrima Annual Noise Assessment 2021 **- CM7 and CM6 measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
CM6	1 North West Corner @ 1m	500	85				55	45	50	57	53	54	57	59	66	70	71	72	72	74	77	74	76	75	75	75	74	71	66	61	55	40	32	24	16	
	2 Front of Roller Door @ 1m	501	91				51	41	45	54	54	58	62	66	71	75	77	76	76	79	82	80	80	81	81	80	80	77	72	68	62	53	45	38	28	
	3 Between Door @ 1m	502	82				38	43	50	56	50	54	58	62	66	68	72	72	71	71	74	73	71	71	70	68	67	64	60	55	49	36	29	23	14	
	4 Front of Roller Door @ 1m	503	84				44	41	48	56	53	57	60	64	69	71	73	74	75	76	76	75	73	72	70	68	69	68	65	61	54	42	35	28	20	
	5 Front of Southern Roller Door @ 1m	504	85				45	39	47	54	52	59	62	67	70	74	76	74	73	74	76	76	74	73	72	71	69	68	67	62	57	45	39	31	22	
	6 Northern face of western ext @ 1m	505	82				42	40	48	52	47	55	60	61	65	70	73	73	72	72	73	73	71	70	69	67	65	63	60	55	49	36	28	21	13	
	7 On CM5 Platform (N) @ 8m	506	79				45	36	42	50	49	51	56	58	63	66	66	67	66	69	72	69	68	68	67	64	62	60	57	53	47	33	26	18	9	
	7 On CM5 Platform (N) @ 8m	441	78	15	22	35	46	38	43	48	50	52	54	59	62	64	64	65	65	68	70	69	67	67	67	64	62	60	57	53	48	43	35	26	16	5
	8 Western face (N) of western ext @ 1m	507	78				49	42	48	54	53	52	54	56	62	66	66	67	67	68	70	68	69	68	66	65	63	59	55	51	45	32	24	17	12	
	9 Western face(S) of western ext @ 1m	508	78				49	43	45	52	52	51	52	57	61	64	65	67	67	68	70	67	67	68	66	64	63	59	55	51	45	31	23	17	11	
	10 On CM5 Platform (S) @ 8m	520	77				43	37	43	51	49	51	54	58	61	64	64	65	65	67	69	68	68	67	65	63	61	58	56	51	44	36	35	29	12	
	10 On CM5 Platform (S) @ 8m	442	76	9	21	33	45	37	42	49	48	50	54	57	61	62	61	63	63	64	67	67	67	66	65	63	61	59	56	52	47	41	34	25	14	4
	11 15.4m from S wall at joint	521	77				35	35	38	44	48	50	53	58	63	63	63	64	61	63	66	70	71	66	63	62	63	59	57	53	45	30	23	15	12	
	11 15.4m from S wall at joint	443	78	14	19	24	33	34	38	45	51	51	53	59	63	62	62	63	63	63	65	71	72	65	63	62	64	60	58	54	48	42	35	26	15	4
	12 1m from S wall CM6 at joint	522	82				37	37	41	47	48	47	57	58	65	66	65	69	63	63	68	76	77	69	67	67	68	64	64	57	50	36	26	17	10	
	12 1m from S wall CM6 at joint	444	82	12	19	26	34	32	36	42	54	54	55	60	64	63	64	63	63	64	74	74	76	72	68	69	70	67	67	62	53	48	40	30	20	8
	12 1m from S wall CM6 at joint	445	82	12	19	26	34	32	36	42	54	54	55	60	64	63	64	63	63	64	74	74	76	72	68	69	70	67	67	62	53	48	40	30	20	8
	13 E side S roll door @ 1m	523	77				31	36	39	46	49	49	52	54	62	67	66	69	66	65	65	67	67	64	62	61	59	56	53	48	43	29	23	16	14	
	14 CM6 E side centre door @ 1m	524	89				40	37	42	50	53	57	63	68	72	76	78	76	76	79	81	79	78	76	76	75	74	73	70	66	60	49	45	39	32	
	15 2m from Clinker Building opp 13 & 14	525	73				30	35	38	44	44	46	50	55	61	63	60	62	60	61	63	64	64	64	61	62	58	56	54	49	44	31	24	18	10	
	16 E wall centre @ 1m	526	78				32	33	38	45	46	51	54	58	64	67	68	68	68	67	67	67	67	66	65	63	61	60	56	51	46	34	27	20	12	
	17 E roll door opp Mill	527	86				37	35	42	47	49	53	58	62	67	69	72	75	73	75	76	76	76	78	76	74	70	68	65	59	55	43	35	28	20	
	18 Door opp Comp Room @ 1m	528	76				30	32	40	47	45	48	50	55	60	63	65	65	65	66	66	66	66	65	63	62	60	57	53	49	45	31	25	21	17	
	19 Clinker Building @ 2m opp 18	529	72				26	30	40	43	41	41	48	50	54	57	58	59	60	65	60	61	61	62	60	59	58	55	53	48	44	35	29	21	14	
	20' Inside Filter Room @0.3m	530	71				36	36	39	47	43	48	53	58	58	60	61	62	61	61	61	60	61	60	55	54	51	50	48	45	43	29	25	18	13	
	20 Man door - adjar	530	77				33	33	40	45	47	49	54	57	60	64	66	65	67	69	66	65	66	66	65	65	63	60	57	52	46	33	26	18	9	
	21 1m Outside vent fan filter louvre	531	69				38	33	41	48	45	48	48	49	53	55	56	57	56	59	61	58	58	59	57	54	50	50	50	45	36	29	23	16	9	
	22 E side N wall vent @ 1m	532	70				41	36	43	43	42	46	47	49	54	56	56	57	58	63	65	60	59	59	57	53	51	49	45	40	35	26	20	13	5	
	23 Centre N wall vent @ 1m	533	71				36	35	43	45	45	46	48	50	56	57	59	57	59	62	64	60	60	60	57	55	53	50	48	47	43	29	22	15	7	
	24 W side N wall vent @ 1m	534	68				29	34	43	46	44	44	46	49	53	55	56	57	57	60	61	58	58	56	54	51	48	46	45	43	44	27	21	14	7	
	24 W side N wall vent @ 1m	430	79	9	17	29	41	38	43	52	48	52	54	59	63	67	67	69	71	71	70	69	67	66	65	63	60	57	55	52	50	48	45	38	30	17
	25 11m N of CM6 at joint	535	69				25	30	39	44	41	43	47	49	53	54	56	56	57	60	64	59	58	58	55	53	50	49	50	44	39	29	22	15	8	
	25 11m N of CM6 at joint	429	74	5	13	30	42	37	37	46	46	50	52	55	60	60	60	62	64	63	63	63	63	64	64	61	60	57	51	48	44	44	31	24	15	5
	26 17m N of CM6	536	69				30	32	38	42	40	45	48	49	52	55	56	55	56	61	62	59	59	60	57	54	52	48	48	43	42	36	30	22	15	
	26 N side of rail N of CM6 under conveyor	428	70	4	13	27	39	36	38	42	43	48	50	54	56	57	56	58	60	59	60	59	59	60	58	57	55	52	58	47	41	54	41	29	24	12
	27 4m N of Conveyor transfer out of Clinker Building	413	73	5	13	23	34	32	33	43	41	49	49	52	54	53	54	56	55	62	66	63	61	62	60	60	63	61	60	60	57	55	52	49	42	35
	28 4m N of dust collector DC120 on next building W , conveyo	414	69	4	13	18	27	27	31	41	43	45	47	50	52	54	53	54	55	60	64	59	58	59	58	55	54	53	48	46	43	41	36	29	20	10
Mineral Addition Plant	1 Ground Level 6m W of hopper	415	70	3	11	19	30	33	33	40	44	47	48	48	51	54	54	55	56	58	61	60	60	59	58	57	60	55	49	48	44	43	38	38	23	11
	2 Ground level 8m S of hopper	416	77	4	11	24	36	34	38	46	46	50	49	56	57	57	54	57	58	67	69	66	66	68	66	66	67	62	58	57	55	55	51	50	35	21
	3 Ground level 8m S of E end of building	417	78	4	11	25	37	31	39	46	47	51	50	59	62	64	57	56	61	68	71	69	67	71	66	68	68	63	59	57	55	55	50	53	36	21
	4 S Side of ramp 10m from E end of building	418	71	4	13	22	32	32	41	49	46	51	51	53	57	59	57	55	59	63	63	60	62	60	58	57	57	54	50	50	42	41	34	29	16	7
	5 N Side of ramp 10m from E end of building	419	69	2	10	20	31	33	37	47	48	52	49	50	54	55	54	57	56	60	62	57	58	59	56	57	58	55	45	44	40	37	31	33	17	6
	6 Ground Level 8m N side of centre of feeder	420	73	5	11	19	28	31	31	38	41	44	44	48	51	52	48	49	48	53	58	54	54	56	54	63	71	61	52	56	46	45	41	47	32	20
	7 Level 1 Feeder drive level, 1m N side of drive	421	76	4	9	19	31	34	31	38	42	45	49	52	54	53	54	58	52	56	59	58	56	57	56	62	75	66	53	61	51	49	44	50	33	21
	8 Level 1 W side of hopper @ 1m	422	69	4	10	19	29	36	34	40	44	47	50	51	53	56	51	51	53	56	59	58	57	59	57	56	63	58	51	48	44	43	38	39	25	15
	9 Level 2 DC126 and fan level - W side of DC126	423	82	4	14	23	33	40	43	50	56	59	58	61	64	64	62	64	63	71	74	71	71	74	71	69	67	67	66	67	69	69	67	64	61	55
	10 Level 2 DC126 and fan level - W side of fan casing	424	84	2	11	23	34	37	40	50	53	56	57	68	70	67	61	63	64	72	78	74	73	76	74	73	69	67	64	62	62	60	56	50	47	32
	11 Level 2 DC126 and fan level - S side of fan motor & casing	425	87	6	15	24	35	39	45	55	57	60	67	72	69	66	66	68	71	77	80	79	77	79	76	75	71	68	66	65	64	65	61	51	43	31
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	426	100	23	30	35	39	44	51	60	64	71	74	77	76	77	74	74	85	91	93	90	90	92	89	87	84	82	80	79	79	80	76	66	56	47
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	427	100	21	29	33	39	43	51	60	64	71	74	77	76	77	74	74	85	91	93	90	90	92	89	87	84	82	80	79	79	80	76	66	57	47

Table 3.6#: Boral Cement Berrima Annual Noise Assessment 2021 **- CM7 inside measurement results - One-third Octave Band Spectra**

Area	Location		LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																																	
		File	Total A	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
Inside CM7 building	H* Inside main W roll door @ 1m	263	95	17	24	32	38	51	49	54	59	63	66	70	77	79	80	81	85	88	86	86	85	84	83	82	82	81	78	74	69	63	56	48	38	28
	F* Inside NW corner	264	93	18	27	36	39	54	49	51	52	56	63	67	73	77	79	80	80	84	84	84	84	83	82	80	79	77	74	71	67	64	60	54	47	37
	I* W side by hydraulics bench	265	94	19	26	30	38	45	48	53	54	61	70	72	77	78	79	83	82	85	85	83	86	82	81	80	81	78	78	72	66	59	53	45	39	30
	J* inside vents	266	93	19	30	32	39	53	50	54	56	60	66	68	73	76	76	86	83	84	83	82	85	79	80	77	76	74	72	69	61	55	51	40	30	22
	J'* SW corner by vents at baghouse	267	89	18	28	32	40	50	49	53	53	59	67	68	73	73	75	80	79	79	79	79	78	76	79	76	73	71	69	66	59	53	48	38	28	18
	N end under centre axis, ground level	268	98	21	28	37	36	42	43	47	56	64	70	73	79	78	81	83	84	86	87	89	90	89	89	87	85	83	79	74	69	62	55	48	41	28
	N end ground @ 2m to Mill N end	269	99	21	28	37	37	47	46	47	55	65	73	74	80	79	82	83	84	87	88	91	90	90	89	88	86	84	79	74	69	63	55	48	40	28
	Inside Door P N end of mill building @ 1m	270	96	19	25	34	34	43	43	47	51	62	72	72	75	78	79	80	81	86	87	88	87	87	86	85	83	82	77	72	67	61	54	47	39	29
	Inside E side mill centre at columns N end	271	94	18	25	32	36	48	45	50	53	62	66	71	75	77	78	79	83	87	85	86	85	84	83	82	81	79	77	72	66	59	52	44	35	24
	Inside E side mill centre at columns S end	272	101	17	22	32	35	48	45	52	56	63	68	72	77	79	81	84	86	89	89	91	90	92	92	92	92	90	87	83	78	72	65	56	47	37
	Inside NE corner mill room	273	98	16	24	29	36	50	49	53	59	66	68	73	77	79	83	86	87	89	90	90	89	88	87	86	86	84	82	78	73	69	63	57	48	35
	Centre axis N end @ 2m at L1	274	94	17	26	29	35	40	41	49	54	62	66	70	74	76	78	78	81	85	86	85	85	85	83	82	82	80	77	72	66	59	52	44	35	24
	C701 platform 1.5m to N wall	275	92	14	21	30	35	45	43	48	54	60	67	69	75	76	78	79	79	82	82	83	83	82	81	79	79	76	73	68	62	55	48	41	41	26
	Platform above centre centre mill	276	93	12	21	27	36	48	44	49	57	65	70	72	77	77	79	80	81	83	83	83	83	82	81	80	80	78	75	70	65	58	52	44	33	23
	Inside, above Mill drive gear S end	277	91	11	20	25	35	49	48	51	56	66	68	70	75	76	78	80	80	81	82	82	83	80	79	78	77	75	72	68	63	57	52	44	34	25
	Tower stairs at roof level	278	89	15	25	28	41	48	45	48	52	58	65	66	71	74	77	80	79	79	80	79	81	78	78	76	74	72	69	65	58	52	47	38	30	25
	1st platform above roof level in BE tower W side	279	86	16	24	28	40	48	45	48	52	57	62	63	70	72	72	80	77	76	76	75	76	74	73	71	70	67	64	61	54	49	45	35	27	23
	2nd platform in BE tower by fans FA703 & FA720, W side wall @ 1m	280	82	15	25	27	35	52	46	46	49	56	60	63	69	70	71	73	72	73	73	72	71	70	70	68	67	65	61	60	55	51	45	39	32	23
	Between Fans FA703 on & FA720 off	281	83	16	24	28	38	55	49	47	49	57	64	63	66	70	70	72	73	73	74	73	72	72	72	71	69	67	65	64	61	58	54	49	44	35
	At crossway to CM5 level, N side at transfer to conveyor	282	81	17	24	29	36	44	41	47	51	57	62	63	67	68	69	71	72	71	71	72	70	69	68	67	66	64	61	62	56	53	45	37	29	20
	At crossway to CM5 level, W side by wall @ 1m, BE @ 1.8m	283	81	17	26	32	40	42	42	49	51	55	61	61	67	68	68	70	72	72	71	71	69	69	68	67	66	65	62	61	56	52	44	37	28	18
	At W end crossway to CM5 by vent in S wall	284	77	19	28	30	39	39	41	49	52	57	61	59	64	64	64	70	68	67	66	67	66	65	65	63	62	60	57	56	50	46	39	32	24	13
	Crossway to CM5 by centre S wall vent	287	82	22	26	32	38	50	45	46	48	54	60	62	67	68	67	70	75	70	70	72	71	71	70	68	70	68	65	68	63	60	52	43	34	23
	Top level BE tower W side NW corner	288	80	22	25	32	45	46	45	48	50	58	62	63	67	66	66	68	70	68	69	69	69	69	69	68	67	67	68	66	61	58	53	43	37	27
	Top level BE tower S side BE @ 0.8m	289	84	24	24	27	34	52	46	48	50	60	63	63	67	65	68	71	77	70	71	73	73	72	71	71	72	70	66	68	63	61	53	45	37	29
	Top level BE tower E side by drive motor end @ 0.8m & door @ 0.5m	290	83	22	25	28	37	53	47	45	49	57	62	61	64	67	67	72	76	72	71	73	73	72	70	69	69	68	64	66	61	57	50	42	34	23
	Top level BE tower N side by drive motor end @ 0.8m	285	76	26	29	31	37	41	43	52	55	57	60	62	67	66	66	65	66	65	64	62	61	61	60	59	57	56	55	55	50	45	41	34	26	15
	Top level BE tower N side by G'box @ 0.8m NE	286	75	25	31	33	39	39	43	50	52	56	60	57	61	63	64	66	65	65	65	65	64	63	62	60	58	56	53	51	46	42	35	29	21	12
	Crossway to CM5 E end by opening in floor, fan @ 3m	291	83	22	24	28	38	54	47	44	48	54	62	63	69	65	68	73	74	71	70	73	72	72	70	69	70	68	65	67	62	58	50	42	32	22
	Main baghouse NE corner top, 4m to E wall	292	84	20	28	27	35	51	46	48	51	53	59	64	71	71	73	74	74	74	74	74	73	72	72	69	67	65	63	64	63	63	63	52	51	50
	Main baghouse SE corner top, 4m to E wall	293	85	16	26	30	40	58	51	49	53	54	60	67	74	73	74	75	74	75	75	75	75	73	73	71	69	67	65	65	64	64	64	56	54	53
	Base of main baghouse SE corner	294	86	19	28	29	39	49	47	47	56	57	61	65	72	72	74	77	77	77	77	76	78	74	73	71	69	66	63	62	58	52	50	41	35	32
	Base of main baghouse SW corner	297	86	18	26	32	39	57	52	52	57	59	61	65	69	72	74	76	76	77	77	76	76	75	75	72	70	67	65	65	61	54	52	44	37	34
	CM7 FA701 motor & casing NE side @ 1.5m	298	89	13	23	28	39	51	50	54	63	63	69	66	73	74	75	78	78	78	79	81	79	77	77	74	73	71	71	76	72	63	62	56	45	36
	CM7 SW corner 1m to FA701 discharge duct	296	86	21	31	35	44	61	56	52	60	58	62	66	72	71	72	75	76	76	76	76	77	75	78	73	70	68	66	67	62	55	53	45	35	30
	CM7 FA701 inlet & casing SE side @ 1.m	295	87	15	26	30	37	51	48	55	60	57	64	66	72	72	73	77	77	77	77	78	77	76	77	73	72	70	68	69	65	58	57	52	45	37
	CM7 Mill g'box W side @ 1m	299	97	16	23	28	35	47	47	53	58	63	69	72	77	77	77	84	83	83	86	84	94	83	83	78	76	74	72	70	62	57	55	45	36	26
	J'* S end 1m to wall	300	92	18	24	32	42	59	54	62	58	60	75	70	77	75	76	82	81	81	82	82	83	80	83	80	76	75	72	70	67	64	60	55	49	40
CM7 Compressor house	Compressor house inside W man door	301	76	13	21	26	32	35	34	42	43	50	58	64	64	64	63	64	65	65	65	68	67	66	64	61	60	56	51	47	44	41	40	33	25	20
	Compressor house inside by purge filter	302	77	10	18	26	36	34	36	42	43	54	61	65	63	63	63	62	64	67	65	68	68	67	65	63	60	57	52	46	41	40	42	36	32	26
	Compressor house inside E man door	303	76	15	20	29	35	37	36	43	44	50	60	63	63	63	63	62	63	65	64	67	67	65	64	62	60	56	51	45	39	37	35	28	20	14
	Compressor house inside centre	304	76	11	18	24	33	35	36	41	43	52	61	66	62	61	62	62	64	64	64	67	67	66	65	63	60	57	54	52	51	48	47	46	38	29

Table 3.6A: Boral Cement Berrima Annual Noise Assessment 2021 - **CM7 and CM6 measurement results - Tonality Assessment**

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM7 Western side	A Top of stairs S	334	10	2	6	3	0	1	0	1	1	2	1	1	2	1	0	1	0	1	1	1	1	1	1	4	3	1	0	
	C Top of stairs N	335	5	0	3	2	2	2	1	1	1	1	1	1	3	0	1	1	1	0	0	0	1	1	0	4	3	1	0	
	B 2m W of wall, edge of barrier facing baghouse	335	2	4	4	1	1	0	1	4	1	3	3	0	1	1	1	2	1	1	2	2	0	1	0	2	1	2	3	
	D At corner N of Admin	336	0	1	1	2	2	2	1	1	0	1	1	1	2	1	1	1	0	1	3	8	6	4	1	2	1	1	2	
	E Compressor room door @ 1m	337	4	0	2	1	1	1	0	2	0	0	1	1	0	0	0	2	0	0	0	0	1	1	0	4	0	1	1	
	E' Man door to compressor filter room@ 1m	338	1	1	0	1	1	1	1	1	1	2	1	1	1	1	0	1	0	0	1	1	0	1	1	4	0	0	1	
	F Wall vents N on W side @ 1m	339	3	0	0	2	1	5	3	2	0	1	1	0	0	0	0	1	1	0	1	0	0	1	0	3	3	1	0	
	I Vent S of door @ 1m	343	5	1	2	0	0	1	1	3	1	1	1	0	1	0	0	1	1	1	1	0	0	1	1	3	3	0	1	
	J Vents N of baghouse	344	10	1	4	2	0	0	2	3	1	2	2	1	1	2	1	0	2	3	1	0	0	1	0	3	2	0	1	
	J' Edge of concrete opp, J.	346	8	2	8	6	2	1	1	1	2	2	2	2	0	1	1	0	1	0	0	0	0	0	1	2	1	1	2	
	J" under baghouse & 1.1m to wall vent	347	9	0	2	0	2	2	0	0	2	1	1	1	1	0	1	1	4	6	1	1	1	0	2	0	0	0	1	
	H W roller door @ 1m	348	8	1	3	1	1	0	1	3	0	1	0	1	1	0	0	1	1	0	0	0	1	1	0	3	2	0	0	
	H' Edge concrete opp door H	348	7	1	4	3	3	2	2	2	1	0	1	0	1	1	3	1	0	0	0	0	1	1	1	4	3	2	1	
CM7 Northern side	G - Line N side of transfer house 20.5m to it, in-line W edge CM	340	2	3	1	2	1	1	1	1	2	2	2	3	4	1	1	0	1	0	0	0	0	1	1	0	5	5	1	2	
	G - Line N side of transfer house 20.5m to it, in-line W edge CM	436	3	1	1	0	1	1	2	1	1	1	5	2	4	2	1	2	0	0	0	1	0	1	0	0	1	0	0	2
	G' Line 12m N of W wall CM7	341	2	0	2	1	0	3	2	1	1	2	4	1	2	1	2	1	0	1	1	0	0	1	1	5	0	0	2	
	K Line level with M centre 20.9m from compressor house	348	6	3	1	2	1	0	1	0	1	2	2	2	2	1	1	0	1	0	0	1	0	1	0	3	4	4	4	
	K Line level with G opp centre compressor house	437	2	3	0	1	0	0	1	1	2	2	5	1	1	4	3	1	0	0	0	0	1	1	0	1	0	0	4	1
	K' 11.9m from centre of N wall comp house	349	0	1	1	1	1	0	1	0	0	3	4	0	0	5	3	1	0	0	1	0	1	1	0	5	3	0	1	
	L N wall vent W side @ 1m	349	3	1	4	3	1	3	6	3	3	0	1	1	3	1	0	1	0	1	0	1	1	1	0	3	2	1	3	
	M Between wall vents @ 1m to wall	350	8	4	3	3	1	1	1	0	2	1	0	2	2	0	0	0	1	1	0	0	0	2	0	4	1	0	1	
	N Wall vents N wall E side @ 1m	351	2	3	2	2	1	1	1	0	0	3	2	1	0	1	0	0	1	0	0	0	1	1	1	4	3	0	1	
	O Line E side of Comp House 21.5m to control point	352	7	1	4	2	0	1	1	0	1	2	2	2	3	2	2	0	1	0	0	0	0	1	1	2	1	1	1	
	O Line E side of Comp House 21.5m to control point	438	5	1	3	1	1	1	1	0	2	3	6	3	3	2	2	2	0	0	0	0	1	1	0	1	2	0	0	1
	O' 12.2m from Compressor house wall in line E wall Comp Hou	353	3	1	4	3	0	3	2	1	2	4	5	1	1	2	2	1	0	0	0	0	0	1	0	4	2	1	5	0
CM7 N side near roll door	P 1m N roll door CM7	353	2	1	6	4	2	1	1	2	1	1	0	1	1	0	0	0	0	0	0	1	1	1	1	4	4	1	1	
	P 1m N roll door CM7	439	2	1	2	4	2	2	2	2	1	0	2	0	2	1	1	0	0	0	0	1	0	1	0	1	2	0	0	1
	Q 1m Roll door E side Compressor Room	440	4	2	3	0	1	2	2	1	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1	2	0	0	1
	Transfer Station #TS3 Level 1 N side opening	354	11	6	5	9	6	2	4	1	0	2	2	0	1	1	1	1	2	1	0	1	1	0	0	1	0	1	1	
	Transfer Station #TS3 Level 1 N side opening	431	11	10	3	4	0	0	1	2	1	1	1	0	0	1	1	0	1	1	0	1	1	1	0	0	1	0	1	1
	TS3 Top Platform opp CM5 fan discharge	355	11	4	3	3	1	2	1	2	1	2	1	1	0	2	1	1	1	0	0	0	0	1	1	3	3	1	0	
	TS3 Top Platform opp CM5 fan discharge	432	11	8	2	4	1	1	1	1	1	1	1	0	1	0	1	1	1	0	1	1	1	0	0	0	1	0	1	1
	TS3 Top Platform opp CM5 fan discharge	433	10	9	2	3	1	2	1	1	1	1	2	1	0	1	1	1	1	0	0	0	1	0	2	1	10	4	1	2
	TS3 stairway opp fan discharge from annex on CM5 building	356	9	0	3	2	4	2	2	0	0	2	3	1	1	1	0	1	1	1	0	0	1	0	1	3	2	0	1	
	TS3 stairway opp fan discharge from annex on CM5 building	434	10	5	1	2	0	0	1	2	1	2	3	2	1	1	1	1	0	0	1	1	1	0	0	0	1	0	1	1
	TS3 E conv platform opp fan dischasrge CM6 @7.5m	435	8	0	2	0	3	2	1	1	0	1	3	2	2	0	0	1	1	1	1	2	1	1	0	1	1	0	0	1
CM7 South side	R corner SW of CM7	357	9	4	7	5	4	1	1	2	2	4	0	2	4	4	1	0	0	1	0	2	0	0	1	1	0	1	1	
	S' Kerb Opp W wall CM7	358	6	4	7	2	1	0	1	1	4	5	2	2	3	1	0	0	0	0	0	2	0	0	1	3	1	1	0	
	S Kerb opp W side CM7 tower	359	7	4	7	3	1	0	0	2	1	2	1	1	1	1	1	1	0	1	1	2	1	1	1	2	1	0	1	
	T Kerb Opp W wall CM5	360	4	1	4	2	1	1	1	2	1	3	1	0	0	1	1	2	1	0	0	3	1	0	1	2	1	0	0	
CM7 Compressor Building filter room	Compressor house filter room Inside W	305	6	3	0	2	0	0	5	5	1	2	2	1	2	5	5	1	0	0	0	1	1	0	1	1	1	0	1	0
	Compressor house filter room Inside centre	306	6	3	0	1	2	4	6	6	3	1	3	4	1	1	1	1	0	1	1	0	0	1	1	1	0	4	2	1
	Compressor house filter room Inside E vent	307	3	1	1	1	1	2	3	2	1	4	2	2	2	1	1	1	1	0	0	1	0	0	0	0	0	0	1	0
	Compressor house filter room Inside W vent	308	1	3	0	1	3	1	1	3	5	3	5	4	2	1	1	2	0	1	1	1	0	0	0	0	2	1	0	4
CM6 Western side	1 North West Corner @ 1m	500	8	1	6	3	1	0	2	1	2	0	0	1	1	3	2	1	1	0	1	1	1	0	1	4	3	0	0	
	2 Front of Roller Door @ 1m	501	8	2	5	3	0	0	0	1	0	2	0	2	0	2	1	0	0	0	0	1	1	0	0	2	1	0	1	
	3 Between Door @ 1m	502	1	1	6	5	0	0	0	1	1	2	0	0	1	2	0	1	0	0	0	1	1	1	1	3	3	1	1	
	4 Front of Roller Door @ 1m	503	5	0	5	3	1	1	1	1	1	0	0	0	0	1	0	0	0	0	1	1	1	0	2	3	3	0	0	
	5 Front of Southern Roller Door @ 1m	504	7	1	4	4	2	1	1	0	2	1	0	2	0	1	1	1	0	0	0	1	1	1	0	3	3	1	1	
	6 Northern face of western ext @ 1m	505	4	1	5	6	1	2	2	0	1	2	0	1	0	1	1	1	0	0	0	0	1	1	1	3	2	1	0	
	7 On CM5 Platform (N) @ 8m	506	7	1	4	2	1	1	2	1	1	0	0	2	0	3	1	0	1	1	0	0	1	0	1	3	3	0	0	
	7 On CM5 Platform (N) @ 8m	441	7	0	2	0	0	1	1	1	1	0	0	1	0	2	0	0	0	1	0	0	1	1	0	0	1	1	1	0
	8 Western face (N) of western ext @ 1m	507	6	1	4	1	1	1	1	1	2	0	0	0	1	2	2	0	1	0	0	1	0	0	1	3	3	0	1	
	9 Western face(S) of western ext @ 1m	508	4	2	3	1	1	2	0	1	1	1	1	1	0	3	2	0	1	0	0	1	0	0	1	4	3	1	0	
	10 On CM5 Platform (S) @ 8m	520	6	2	6	3	0	0	0	1	1	0	1	2	0	2	0	0	1	0	0	0	0	1	1	1	4	2	5	
	10 On CM5 Platform (S) @ 8m	442	6	2	5	1	1	0	0	2	1	1	1	1	0	1	0	1	0	1	0	0	0	1	1	0	1	1	1	1
CM6 Southern side	11 15.4m from S wall at joint	521	2	1	1	2	1	1	0	2	0	1	2	2	1	0	1	3	1	1	1	2	1	1	2	3	4	1	3	
	11 15.4m from S wall at joint	443	1	2	0	3	1	2	1	2	0	0	0	0	0	2	3	4	2	1	1	2	1	1	1	0	1	1	1	1
	12 1m from S wall CM6 at joint	522	2	1	2	2	6	4	3	3	1	3	5	3	2	1	3	5	3	1	0	2	2	3	0	4	3	0	1	
	12 1m from S wall CM6 at joint	444	3	1	3	6	0	2	1	3	1	1	0	1	4	5	1	4	1	2	0	2	2	2	2	2	1	1	1	0
	12 1m from S wall CM6 at joint	445	3	1	3	6	0	2	1	3	1	1	0	1	4	5	1	4	1	2	0	2	2	2	2	2	1	1	1	0

Table 3.6A: Boral Cement Berrima Annual Noise Assessment 2021 - CM7 and CM6 measurement results - Tonality Assessment

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM6 Eastern side	13 E side S roll door @ 1m	523	1	2	2	2	2	1	3	2	3	2	3	1	1	1	1	2	0	0	0	1	0	1	0	5	4	1	3	
	14 CM6 E side centre door @ 1m	524	4	2	3	1	1	1	0	0	1	2	1	2	1	2	0	0	1	1	0	0	1	1	1	3	3	0	1	
	15 2m from Clinker Building opp 13 & 14	525	1	1	3	1	1	1	1	2	2	3	2	2	0	1	0	1	1	2	2	1	0	1	0	4	3	0	1	
	16 E wall centre @ 1m	526	2	1	3	2	1	1	1	2	1	1	1	0	0	0	0	1	0	0	0	0	1	1	0	4	3	0	0	
	17 E roll door opp Mill	527	5	1	2	2	0	0	0	1	0	0	2	2	0	1	0	1	2	0	0	1	1	1	1	4	1	1	1	
	18 Door opp Comp Room @ 1m	528	3	0	5	3	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	5	4	1	0	
	19 Clinker Building @ 2m opp 18	529	3	3	2	0	4	2	1	0	1	1	1	2	5	3	1	0	1	1	0	1	0	1	0	3	2	1	0	
	20' Inside Filter Room @0.3m	530	2	2	6	4	0	0	3	1	0	0	1	1	1	1	2	1	2	1	0	0	0	1	0	6	5	1	1	
	20 Man door - adjar	530	3	1	1	0	1	1	0	0	1	1	1	0	2	1	1	0	0	0	1	1	0	1	1	3	3	0	1	
	21 1m Outside vent fan filter louvre	531	6	1	5	3	2	1	1	1	1	0	1	2	0	3	1	1	2	1	0	1	0	3	2	1	0	1	0	
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM6 Northern side	22 E side N wall vent @ 1m	532	5	3	1	3	2	1	2	2	1	0	0	2	2	4	2	1	1	1	1	0	1	0	0	2	2	1	0	
	23 Centre N wall vent @ 1m	533	5	3	1	0	1	0	2	2	0	2	2	0	1	3	2	0	1	0	0	0	0	1	2	5	4	0	1	
	24 W side N wall vent @ 1m	534	2	3	2	1	1	0	1	1	1	0	0	1	1	2	1	1	0	1	0	0	0	0	1	9	6	1	0	
	24 W side N wall vent @ 1m	430	4	2	6	3	1	1	0	0	2	1	0	1	1	0	0	0	0	1	0	0	1	1	1	0	1	1	1	2
	25 11m N of CM6 at joint	535	2	2	4	3	1	1	1	1	0	1	1	1	1	5	2	0	1	0	0	0	2	4	1	3	1	0	1	
	25 11m N of CM6 at joint	429	3	4	4	2	1	0	0	2	1	2	0	1	1	0	0	0	0	1	1	1	1	1	0	2	6	2	1	1
	26 17m N of CM6	536	2	1	2	3	1	1	1	1	0	1	1	2	2	2	2	0	2	0	0	1	2	2	1	2	0	1	1	
	26 N side of rail N of CM6 under conveyor	428	3	1	1	2	2	1	1	0	1	1	0	1	0	1	0	0	1	0	0	0	4	8	2	10	13	1	3	4
	27 4m N of Conveyor transfer out of Clinker Building	413	2	5	6	5	4	1	0	2	1	1	1	3	1	4	0	2	2	1	2	2	0	0	1	0	0	1	1	1
	28 4m N of dust collector DC120 on next building W , conveyo	414	2	3	4	1	0	0	0	0	2	1	0	2	1	4	2	1	1	1	1	1	2	2	0	0	1	1	1	0
Inside CM7 building	H* Inside main W roll door @ 1m	263	8	4	0	0	0	1	1	2	1	0	2	1	2	0	0	0	0	0	0	1	1	1	0	1	0	1	1	1
	F* Inside NW corner	264	10	3	1	2	2	2	1	1	2	0	0	2	2	0	1	0	1	0	0	0	1	0	0	0	0	1	1	1
	I* W side by hydraulics bench	265	2	1	2	3	1	4	2	2	0	1	2	2	2	0	2	4	2	1	2	2	1	3	0	0	0	1	1	1
	J* inside vents	266	8	3	1	1	1	2	2	1	2	5	7	2	1	1	3	5	3	2	1	1	0	0	2	1	1	4	1	1
	J'* SW corner by vents at baghouse	267	6	3	2	3	1	4	2	2	1	2	3	0	0	0	0	1	2	3	1	0	0	1	2	1	1	3	0	0
	N end under centre axis, ground level	268	3	2	3	0	1	2	2	3	2	1	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	3
	N end ground @ 2m to Mill N end	269	6	1	4	1	1	3	2	4	2	1	0	1	1	1	2	0	1	0	0	0	1	0	0	1	0	0	0	2
	Inside Door P N end of mill building @ 1m	270	4	2	0	3	0	5	2	0	1	0	0	2	2	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1
	Inside E side mill centre at columns N end	271	7	4	2	3	3	1	1	1	0	0	2	0	2	1	1	0	0	0	0	1	0	1	1	0	0	0	0	1
	Inside E side mill centre at columns S end	272	8	5	1	2	1	0	0	1	0	0	0	0	1	1	1	1	1	0	0	1	0	1	0	1	1	1	1	1
	Inside NE corner mill room	273	8	3	0	1	2	1	1	1	1	1	1	0	0	1	0	0	0	0	0	1	0	1	0	0	1	1	1	2
	Centre axis N end @ 2m at L1	274	2	4	2	1	1	0	0	1	0	1	1	1	2	1	0	0	0	0	0	1	0	1	1	0	0	0	0	1
	C701 platform 1.5m to N wall	275	6	3	1	0	1	3	2	3	1	1	0	1	2	1	1	0	0	0	0	1	1	1	1	0	0	0	4	8
	Platform above centre centre mill	276	7	4	1	0	1	2	1	2	0	0	0	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0
	Inside, above Mill drive gear S end	277	8	2	1	2	3	0	1	2	1	0	1	1	0	1	0	1	1	0	0	1	0	0	1	0	0	2	1	1
	Tower stairs at roof level	278	5	2	1	1	1	3	2	1	0	0	2	1	0	1	1	3	1	1	0	1	0	1	1	0	1	2	1	2
	1st platform above roof level in BE tower W side	279	6	4	0	0	0	2	3	3	1	4	5	1	1	1	1	1	1	1	0	1	0	0	1	0	1	3	2	2
	2nd platform in BE tower by fans FA703 & FA720, W side wall @ 1m	280	11	3	2	2	1	1	2	3	0	0	1	1	0	1	0	0	0	1	0	1	1	1	2	1	1	0	0	1
	Between Fans FA703 on & FA720 off	281	12	2	2	3	0	4	2	0	2	1	1	0	0	1	0	0	0	1	0	0	0	1	1	0	1	0	0	2
	At crossway to CM5 level, N side at transfer to conveyor	282	6	4	1	1	1	2	2	2	0	1	1	1	1	1	2	1	0	0	1	1	1	2	3	1	2	0	0	1
	At crossway to CM5 level, W side by wall @ 1m, BE @ 1.8m	283	2	4	3	1	1	3	3	3	0	1	0	1	0	1	1	1	0	0	0	0	1	1	2	1	2	0	0	1
	At W end crossway to CM5 by vent in S wall	284	1	2	2	1	0	3	4	3	0	2	4	1	0	1	0	1	1	1	0	0	1	1	2	1	1	0	1	2
	Crossway to CM5 by centre S wall vent	287	8	3	0	2	0	2	1	2	1	2	2	5	2	1	2	1	1	0	1	1	1	3	4	1	2	1	0	0
	Top level BE tower W side NW corner	288	1	2	0	3	2	2	2	3	1	1	0	2	1	0	1	1	0	0	0	1	1	2	1	1	1	2	2	2
	Top level BE tower S side BE @ 0.8m	289	12	4	0	4	3	1	2	3	3	0	1	7	4	0	1	0	0	0	1	2	1	3	3	1	2	0	0	0
	Top level BE tower E side by drive motor end @ 0.8m & door @ 0.5m	290	11	2	4	1	1	4	2	0	2	3	0	4	2	1	1	1	0	0	1	1	1	3	3	1	2	0	0	1
	Top level BE tower N side by drive motor end @ 0.8m	285	1	3	2	1	1	0	1	3	1	0	1	1	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	2
	Top level BE tower N side by G'box @ 0.8m NE	286	2	1	2	1	0	3	3	1	1	1	2	1	0	1	1	0	0	0	0	0	1	1	2	0	1	0	0	1
	Crossway to CM5 E end by opening in floor, fan @ 3m	291	11	2	3	1	1	3	2	4	3	2	2	2	2	1	2	1	1	0	1	2	1	3	3	1	2	0	1	1
	Main baghouse NE corner top, 4m to E wall	292	10	3	0	0	2	1	1	3	1	0	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	5	4	0
	Main baghouse SE corner top, 4m to E wall	293	12	2	3	1	3	1	0	4	1	0	1	1	0	0	0	1	1	1	1	1	0	1	1	0	0	4	3	0
	Base of main baghouse SE corner	294	6	1	4	4	2	0	1	3	1	0	2	0	0	1	2	3	2	1	0	0	0	1	2	1	2	3	1	2
	Base of main baghouse SW corner	297	11	2	2	1	0	0	1	1	1	0	1	1	1	0	0	1	1	2	1	0	0	1	2	1	2	3	0	2
	CM7 FA701 motor & casing NE side @ 1.5m	298	7	3	3	5	3	4	4	2	1	2	2	0	0	0	2	0	1	1	1	0	1	2	5	2	3	2	3	1
	CM7 SW corner 1m to FA701 discharge duct	296	11	0	7	6	3	0	0	3	1	1	1	0	0	0	0	1	3	4	1	0	0	2	3	1	3	3	1	2
	CM7 FA701 inlet & casing SE side @ 1.m	295	8	5	1	4	5	2	2	3	0	2	2	0	0	0	0	1	1	2	1	0	0	2	3	1	3	2	1	0
	CM7 Mill g'box W side @ 1m	299	6	3	1	1	0	1	1	3	1	3	4	0	2	3	6	11	6	3	2	0	0	1	3	1	1	3	0	0
	J'* S end 1m to wall	300	11	6	6	3	7	10	5	4	2	2	4	1	0	0	1	3	3	3	1	2	1	1	1	0	0	1	1	2

Table 3.6A: Boral Cement Berrima Annual Noise Assessment 2021 - CM7 and CM6 measurement results - Tonality Assessment

			Tonality of LAeq,t Sound Level dBA in One-third Octave Band Centre Frequency - Hz																										
Area	Location	File	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000
		Objective	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CM7 Compressor house	Compressor house inside W man door	301	2	4	3	3	0	1	3	0	1	1	0	0	0	1	1	0	0	1	1	1	0	0	1	0	1	3	0	1
	Compressor house inside by purge filter	302	2	2	3	5	2	2	3	1	0	1	1	1	2	2	2	1	0	1	0	0	1	1	1	2	1	4	0	1
	Compressor house inside E man door	303	2	4	3	2	2	3	2	0	0	1	1	1	1	2	1	1	0	1	0	1	1	1	1	1	1	3	0	1
	Compressor house inside centre	304	1	2	1	3	0	2	4	1	1	0	1	1	0	2	2	0	0	1	0	0	0	0	1	1	1	0	4	1
Mineral Addition Plant Ground level	1 Ground Level 6m W of hopper	415	1	3	2	0	1	0	1	0	1	1	0	1	0	2	0	1	0	0	1	4	0	2	1	1	2	2	7	2
	2 Ground level 8m S of hopper	416	3	2	4	2	3	4	3	1	1	3	1	4	3	2	1	1	2	1	0	3	1	1	0	1	2	2	7	1
	3 Ground level 8m S of E end of building	417	7	0	3	1	2	5	3	0	5	4	2	1	2	2	0	2	4	3	1	2	0	1	0	1	2	5	10	1
	4 S Side of ramp 10m from E end of building	418	5	1	5	4	2	1	1	0	3	1	3	0	2	1	2	1	0	1	0	1	1	2	4	3	3	1	4	2
	5 N Side of ramp 10m from E end of building	419	1	4	5	2	3	2	2	1	1	2	2	2	1	4	3	0	2	1	1	2	4	5	2	1	2	4	9	2
	6 Ground Level 8m N side of centre of feeder	420	2	4	2	0	2	2	0	1	2	2	1	3	0	5	2	1	2	6	1	9	0	7	7	4	1	5	11	2
Mineral Addition Plant level 1	7 Level 1 Feeder drive level, 1m N side of drive	421	3	5	1	1	0	0	0	1	1	2	5	5	0	2	0	2	2	4	3	11	2	10	9	4	2	6	12	2
	8 Level 1 W side of hopper @ 1m	422	4	4	1	1	0	1	0	1	4	2	1	1	0	2	0	1	2	1	3	6	1	2	1	2	2	3	8	3
Mineral Addition Plant level 2	9 Level 2 DC126 and fan level - W side of DC126	423	2	2	1	1	2	3	0	2	1	2	1	4	2	4	2	1	3	0	1	0	0	0	1	1	1	0	0	2
	10 Level 2 DC126 and fan level - W side of fan casing	424	0	3	4	0	1	5	4	3	2	4	0	4	1	5	1	2	2	0	1	1	0	1	0	0	2	1	2	6
	11 Level 2 DC126 and fan level - S side of fan motor & casing	425	1	2	4	1	1	1	4	0	1	1	1	1	1	2	0	2	2	1	1	0	0	0	0	1	3	3	1	2
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	426	1	1	2	1	1	1	2	1	2	2	6	3	2	3	2	1	2	1	1	0	0	1	0	1	3	3	0	0
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	427	1	1	3	2	2	0	2	1	2	2	5	3	1	3	2	1	3	1	1	0	0	1	0	1	3	3	0	0

Table 3.7: Boral Cement Berrima Annual Noise 2021 - Locations with an increase in LAeq results with those of Previous Years for Cement Mill No.7 and CM6

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
CM7	A Top of stairs S	72	72	73	73	72	72	73	73	72	71	73	69	70	0	-1	-1	0	0	-1	0	0	1	0	3	2	
	B 2m W of wall, edge of barrier facing baghouse	79	78	79											0	0											
	C Top of stairs N	73	72	72	73	72	72	73	71	71	71	71	70	72	1	0	0	0	1	0	2	2	2	1	3	1	
	D At corner N of Admin	72	73	74	75	71	72	72	72	70	69	68	67	73	0	-2	-3	2	0	0	0	2	3	4	5	-1	Likely other sources
	E Compressor room door @ 1m	72	73	70	72	69	71	72	74	73	74	75	76	76	-1	1	-1	3	1	-1	-3	-1	-2	-3	-4	-4	
	E' Man door to compressor filter room@ 1m	70	70	69	71	69	69	71	70	69	71	71	69	74	-1	1	-1	1	1	-1	-1	1	-1	-1	1	-4	
	F Wall vents N on W side @ 1m	76	77	75	78	76	76	76	77	77	77	75	76	77	-1	0	-2	0	-1	-1	-1	-1	-1	1	0	-1	
	G - Line N side of transfer house 20.5m to it, in-line W edge CM7	73	73	74	74	73	75	75	74	72	70	68	69	78	-1	-1	-2	-1	-2	-2	-1	0	3	5	4	-5	Likely other sources
	I Vent S of door @ 1m	77	78	76	79	77	77	78	78	79	79	87	78	78	-2	1	-2	-1	-1	-1	-1	-2	-2	-10	-2	-2	
	J Vents N of baghouse	77	80	78	80	77	78	77	79	80	86	89	83	83	-4	-2	-3	-1	-1	-1	-2	-3	-9	-13	-6	-6	
	J' Edge of concrete opp, J.	73	73	76	72	73	74	75	74	75	78	84	77	80	0	-3	1	0	0	-2	-1	-2	-5	-11	-4	-7	
	J" under baghouse & 1.1m to wall vent	81	81												-1												
	H W roller door @ 1m	79	79	81	81	82	81	80	80	81	80	77	78	78	0	-2	-2	-3	-2	-1	-1	-2	-1	2	1	1	
	H' Edge concrete opp door H	74	74	73	74	78	75	74	75	75	76	74	75	74	0	0	-1	-4	-1	-1	-1	-2	-2	0	-2	-1	
	K Line level with M centre 20.9m from compressor house	72	72	72	74	74	72	74	72	71	72	68	69	78	0	0	-2	-1	0	-1	0	1	0	5	3	-6	
	L N wall vent W side @ 1m	72	72	72	74	71	73	74	73	72	70	79	71	76	0	0	-2	1	-1	-2	-1	0	2	-7	1	-4	
	M Between wall vents @ 1m to wall	71	72	71	77	70	73	74	73	72	70	79	71	76	-1	1	-6	1	-2	-3	-2	-1	1	-8	0	-5	
	N Wall vents N wall E side @ 1m	72	73	71	73	71	71	71	71	69	69	67	70	76	-2	1	-1	1	0	1	1	2	3	5	2	-4	
	O Line E side of Comp House 21.5m to control point	74	73	72	76	72	73	75	73	72	70	67	67	78	1	2	-2	2	1	-1	1	3	5	7	7	-4	Likely other sources
	P 1m N roll door CM7	79	79	80	82	81	81	81	80	81	81	76	79	87	0	-1	-2	-1	-2	-2	-1	-2	-2	3	0	-8	
	Q 1m Roll door E side Compressor Room	77	77												0												
	R corner SW of CM7		75	75	75	77	76	75																			
	S' Kerb Opp W wall CM7	75	74	74	74	74	74	74							1	2	1	1	1	1							
	S Kerb opp W side CM7 tower	76	76	75	75	75	75	76							1	1	1	1	1	0							
	T Kerb Opp W wall CM5	76	76	73	75	74	75	76							0	3	1	2	1	0							
	Transfer Station #TS3 Level 1 N side opening	74	75	74	73	73	71	71							0	0	1	2	4	3							
	TS3 Top Platform opp CM5 fan discharge	77	77	74	74	74	75	75	77	75	77	75	74		0	3	3	3	2	2	0	2	0	2	3		
	TS3 Top Platform opp CM5 fan discharge	76	77		73	75	75	75	77	75	77	75	74		-1		3	2	2	1	-1	2	0	1	2		

Table 3.7: Boral Cement Berrima Annual Noise 2021 - Locations with an increase in LAeq results with those of Previous Years for Cement Mill No.7 and CM6

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
CM7 Inside	H* Inside main W roll door @ 1m	95	97	95	93	95									-2	1	2	0									
	F* Inside NW corner	93	94	92	90	92									-1	1	3	1									
	I* W side by hydraulics bench	94	96	94	93	95									-2	-1	1	-1									
	J* inside vents	93	93	92	91	92									0	1	2	1									
	J'* SW corner by vents at baghouse	89	90	89	90	89									-1	0	-1	0									
	N end under centre axis, ground level	98	98	96	92	94									0	2	6	4									
	N end ground @ 2m to Mill N end	99	100	94	93										-1	5	6										
	Centre axis N end @ 2m at L1	94	98	98	93	95									-4	-4	1	-1									
	Inside Door P N end of mill building @ 1m	96	96	94		94									0	3		2									
	Inside E side mill centre at columns N end	94	103	100		101									-9	-5		-7									
	Inside E side mill centre at columns S end	101	101	98											0	4											
	Inside NE corner mill room	98	96												2												
	C701 platform 1.5m to N wall	92	94	91	90	92									-2	0	2	0									
	Inside, above Mill drive gear S end	91	93	91											-2	1											
	Tower stairs at roof level	89	91	89	89	91									-2	0	0	-2									
	1st platform above roof level in BE tower W side	86	87	86	85	86									-1	1	1	0									
	Platform above centre centre mill	93	95	92	92	93									-3	1	1	-1									
	2nd platform in BE tower by fans FA703 & FA720, W side wall @ 1m	82	83	82	82	83									-1	0	0	-1									
	Between Fans FA703 on & FA720 off	83	84	84	83	84									-1	0	0	-1									
	At crossway to CM5 level, N side at transfer to conveyor	81	82	82	81	82									-1	-1	0	-1									
	At crossway to CM5 level, W side by wall @ 1m, BE @ 1.8m	81	81	82	81	82									0	-1	0	-1									
	At W end crossway to CM5 by vent in S wall	77	79	79	79	77									-2	-1	-1	0									
	Top level BE tower W side NW corner	80	82	83	82	82									-2	-3	-1	-2									
	Top level BE tower S side BE @ 0.8m	84	81	82	81	81									3	2	2	3									
	Top level BE tower E side by drive motor end @ 0.8m & door @ 0.5m	83	83	84	80	84									0	-1	2	-1									
	Top level BE tower N side by drive motor end @ 0.8m	76	82	83											-6	-8											
	Top level BE tower N side by G'box @ 0.8m NE	75																									
	Crossway to CM5 E end by opening in floor, fan @ 3m	83	77	76	77	77									6	7	6	6									
	Crossway to CM5 by centre S wall vent	82	77	77											5	6											
	Main baghouse SE corner top, 4m to E wall	85	85	83	86										0	2	-1										
	Main baghouse NE corner top, 4m to E wall	84	87	84	86	86									-3	0	-2	-2									
	Base of main baghouse SW corner	86	87	85	86	86									-1	1	1	0									
	Base of main baghouse SE corner	86	87	85	86	86									-1	1	1	0									
	CM7 FA701 motor & casing NE side @ 1.5m	89	90	89		89									-1	0		0									
	CM7 SW corner 1m to FA701 discharge duct	86	86	86	87										0	1	-1										
	CM7 FA701 inlet & casing SE side @ 1.m	87	88												-1												
	CM7 Mill g'box W side @ 1m	97	98												-2												
	J'* S end 1m to wall	92	78												14												
CM7 Compressor house inside	Compressor house inside W man door	76	76	95											0	-19											
	Compressor house inside by purge filter	77	77	90											0	-13											
	Compressor house inside E man door	76	76	75											0	1											
	Compressor house inside centre	76	76	76											0	0											

Table 3.7: Boral Cement Berrima Annual Noise 2021 - Locations with an increase in LAeq results with those of Previous Years for Cement Mill No.7 and CM6

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
CM6	1 North West Corner @ 1m	85	84	79	85	79		80	82	80	81				1	6	0	7		5	3	5	5				
	2 Front of Roller Door @ 1m	91	89	80	89			81	83	81	81		82		2	10	1			10	8	10	10		8		
	3 Between Door @ 1m	82	81	80	81			79	80	80	81		81		1	2	1			3	2	2	1		1		
	4 Front of Roller Door @ 1m	84	83	81	84			83	83	82	82		82		2	3	0			2	1	2	2		2		
	5 Front of Southern Roller Door @ 1m	85	81	80	82			81	81	84	81		81		4	5	4			4	4	1	4		4		
	6 Northern face of western ext @ 1m	82	80	78	79			82	79	80	79		80		2	5	3			0	3	2	3		2		
	7 On CM5 Platform (N) @ 8m	79	77	77	77			77	78	79			78		2	1	2			2	1	-1			0		
	7 On CM5 Platform (N) @ 8m	78	77	77	77			77	78	79			78		1	0	1			1	0	-1			-1		
	8 Western face (N) of western ext @ 1m	78	76	76	77			76	77	77	78		74		2	2	2			2	1	1	1		4		
	9 Western face(S) of western ext @ 1m	78	76	76	76			75	77	76	77		73		1	2	2			2	1	2	0		5		
	10 On CM5 Platform (S) @ 8m	77	76	75	77			75	78	76			74		2	2	1			2	0	1			4		
	10 On CM5 Platform (S) @ 8m	76		77	77			75	78	76			74			-1	-1			1	-2	0			2		
	11 15.4m from S wall at joint	77	77	78	76	77	78	76	78	77	79		77		1	-1	2	0	-1	2	0	0	-2		0		
	12 1m from S wall CM6 at joint	82	81	80	83										1	1	-2										
	13 E side S roll door @ 1m	77	77	77	76	73	75	80	81	82	82		83		0	0	0	3	1	-3	-5	-5	-5		-7		
	14 CM6 E side centre door @ 1m	89	88	84	80	75	76	74	75	77	74		74		0	4	9	14	13	14	14	11	15		14		Difference depends on door open status
	15 2m from Clinker Building opp 13 & 14	73	78	75	76	72	73	78	78	89	79				-5	-1	-3	1	1	-5	-5	-16	-5				
	16 E wall centre @ 1m	78	77	75	80	72	73	74	75	80	74		77		1	3	-2	5	5	4	3	-2	4		1		
	17 E roll door opp Mill	86	84	83	96	80	82	74	75	78	77		75		2	3	-10	6	4	12	11	8	9		11		
	18 Door opp Comp Room @ 1m	76	79	79	81	79	76	82	83	85	82		85		-4	-3	-5	-3	-1	-7	-7	-10	-7		-9		
	19 Clinker Building @ 2m opp 18	72	74	74	79	74	72	77	77	75	77		76		-3	-3	-7	-2	-1	-5	-6	-3	-5		-4		
	20' Inside Filter Room @0.3m	71	75	75											-4	-4											
	20 Man door - adjar	77		75	76	75	73	75	75	78	73		72			2	0	2	4	2	2	-2	4		5		
	21 1m Outside vent fan filter louvre	69	75	74	76	72	72	73	75	72	74		74		-6	-5	-7	-3	-3	-5	-6	-4	-6		-5		
	22 E side N wall vent @ 1m	70	78	81	84	75	82	82	84	81	83		85		-8	-10	-13	-5	-12	-12	-13	-10	-12		-14		
	23 Centre N wall vent @ 1m	71	84	84	85	80	83	84	86	84	85		86		-13	-14	-15	-10	-13	-13	-15	-13	-14		-15		
	24 W side N wall vent @ 1m	68	79	80	82	78	80	78	81	81	81		83		-11	-12	-14	-10	-12	-10	-13	-13	-13		-15		
	24 W side N wall vent @ 1m	79	79	81	82	78	80	78	81	81	81		83		0	-2	-3	2	-1	1	-2	-1	-2		-4		
	25 11m N of CM6 at joint	69	74	74	74	70	74	74	75	74					-4	-5	-4	-1	-5	-5	-6	-5					
	25 11m N of CM6 at joint	74		75	74	70	74	74	75	74						-1	0	4	-1	0	-2	0					
	26 17m N of CM6	69	70	71	71	69	80	71	72	74	75		77		-1	-2	-2	1	-11	-2	-3	-5	-6		-8		
	26 N side of rail N of CM6 under conveyor	70		71	71	69	80	71	72	74	75		77			-1	-1	1	-10	-1	-2	-4	-5		-7		
	27 4m N of Conveyor transfer out of Clinker Building	73	63	77											10	-4											Conveyors off.
	28 4m N of dust collector DC120 on next building W , conveyor transfer noise	69	61	77											8	-8											Noise from Mineral Addition Plant
	Door platform near CM6 W wall fan @ 7.5m	85	86	85											-1	0											
Mineral Addition Plant	1 Ground Level 6m W of hopper	70							67												2						2014 was 8m W
	2 Ground level 8m S of hopper	77																									
	3 Ground level 8m S of E end of building	78																									
	4 S Side of ramp 10m from E end of building	71							69												2						2014 was In door E side
	5 N Side of ramp 10m from E end of building	69																									
	6 Ground Level 8m N side of centre of feeder	73							61												12						
	7 Level 1 Feeder drive level, 1m N side of drive	76																									
	8 Level 1 W side of hopper @ 1m	69																									
	9 Level 2 DC126 and fan level - W side of DC126	82																									
	10 Level 2 DC126 and fan level - W side of fan casing	84																									
	11 Level 2 DC126 and fan level - S side of fan motor & casing	87																									
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	100																									
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	100																									

Table 3.7A: Boral Cement Berrima Annual Noise 2021 - Locations with an increase in LAeq results with those of Previous Years for Cement Mill No.7 and CM6 - increases only

Area	2021 location	SPL													Difference 2021 to Previous LAeq results											Comment
		2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2021-2020	2021-2019	2021-2018	2021-2017	2021-2016	2021-2015	2021-2014	2021-2013	2021-2012	2021-2011	2021-2010	2021-2009	
CM7	D At corner N of Admin	72	73	74	75	71	72	72	72	70	69	68	67	73	0	-2	-3	2	0	0	0	2	3	4	5	-1	Likely other sources
	G - Line N side of transfer house 20.5m to it, in-line W edge CM7	73	73	74	74	73	75	75	74	72	70	68	69	78	-1	-1	-2	-1	-2	-2	-1	0	3	5	4	-5	Likely other sources
	K Line level with M centre 20.9m from compressor house	72	72	72	74	74	72	74	72	71	72	68	69	78	0	0	-2	-1	0	-1	0	1	0	5	3	-6	
	N Wall vents N wall E side @ 1m	72	73	71	73	71	71	71	71	69	69	67	70	76	-2	1	-1	1	0	1	1	2	3	5	2	-4	
	O Line E side of Comp House 21.5m to control point	74	73	72	76	72	73	75	73	72	70	67	67	78	1	2	-2	2	1	-1	1	3	5	7	7	-4	Likely other sources
	Transfer Station #TS3 Level 1 N side opening	74	75	74	73	73	71	71							0	0	1	2	4	3							
CM6	1 North West Corner @ 1m	85	84	79	85	79		80	82	80	81				1	6	0	7		5	3	5	5				
	2 Front of Roller Door @ 1m	91	89	80	89			81	83	81	81		82		2	10	1			10	8	10	10		8		
	5 Front of Southern Roller Door @ 1m	85	81	80	82			81	81	84	81		81		4	5	4			4	4	1	4		4		
	6 Northern face of western ext @ 1m	82	80	78	79			82	79	80	79		80		2	5	3			0	3	2	3		2		
	8 Western face (N) of western ext @ 1m	78	76	76	77			76	77	77	78		74		2	2	2			2	1	1	1		4		
	9 Western face(S) of western ext @ 1m	78	76	76	76			75	77	76	77		73		1	2	2			2	1	2	0		5		
	10 On CM5 Platform (S) @ 8m	77	76	75	77			75	78	76			74		2	2	1			2	0	1			4		
	13 E side S roll door @ 1m	77	77	77	76	73	75	80	81	82	82		83		0	0	0	3	1	-3	-5	-5	-5		-7		
	14 CM6 E side centre door @ 1m	89	88	84	80	75	76	74	75	77	74		74		0	4	9	14	13	14	14	11	15		14		Difference depends on door open status
	16 E wall centre @ 1m	78	77	75	80	72	73	74	75	80	74		77		1	3	-2	5	5	4	3	-2	4		1		
	17 E roll door opp Mill	86	84	83	96	80	82	74	75	78	77		75		2	3	-10	6	4	12	11	8	9		11		
	20 Man door - adjar	77		75	76	75	73	75	75	78	73		72			2	0	2	4	2	2	-2	4		5		
	25 11m N of CM6 at joint	74		75	74	70	74	74	75	74						-1	0	4	-1	0	-2	0					
	27 4m N of Conveyor transfer out of Clinker Building	73	63	77											10	-4											Conveyors off.
	28 4m N of dust collector DC120 on next building W , conveyor transfer noise	69	61	77											8	-8											Noise from Mineral Addition Plant
Mineral Addition Plant	1 Ground Level 6m W of hopper	70							67												2						2014 was 8m W
	2 Ground level 8m S of hopper	77																									
	3 Ground level 8m S of E end of building	78																									
	4 S Side of ramp 10m from E end of building	71							69												2						2014 was In door E side
	5 N Side of ramp 10m from E end of building	69																									
	6 Ground Level 8m N side of centre of feeder	73							61												12						
	7 Level 1 Feeder drive level, 1m N side of drive	76																									
	8 Level 1 W side of hopper @ 1m	69																									
	9 Level 2 DC126 and fan level - W side of DC126	82																									
	10 Level 2 DC126 and fan level - W side of fan casing	84																									
	11 Level 2 DC126 and fan level - S side of fan motor & casing	87																									
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	100																									
	12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	100																									

Table 3.8: Boral Cement Berrima Works 2020 Annual Environmental Noise Assessment for CM7 Project - and CM6 and Mineral Addition
Measurement locations with increase in sound level > 3 dB and calculated contribution sound level at receivers

Location	Year	Time	Period sec	Sound Level dB(A) $L_{AEQ,t}$	Comments	Distance measured metres	Distance to Receivers Distance Attenuation to receiver Calculated LAEQ level at receiver distance only Adelaide	Brisbane	Melbourne	South	Loc.20
						Objective Night	40	40	40	37	58
CM7											
Transfer Station #TS3 Level 1 N side opening F431	**2021**	12:07 PM	30	75	Distance	1	**514**	**611**	**615**	**1664**	**324**
	2016			71	Source after DIR		**75**	**75**	**75**	**53**	**75**
Difference 2020 - 2016			*Difference*	**4**	Distance reduction		-54	-56	-56	-64	-50
					Calculated SPL without barriers		***21***	***19***	***19***	***-11***	***25***
CM6											
2 Front of Roller Door @ 1m	**2021**	2:56 PM	61	91	Distance	1	**532**	**633**	**639**	**1665**	**353**
	2019			80	Source after DIR		**72**	**76**	**80**	**76**	**80**
Difference 2021 - 2019			*Difference*	**10**	Distance reduction		-39	-41	-41	-49	-49
					Calculated SPL without barriers		***33***	***35***	***39***	***27***	***31***
Door is fully open											
5 Front of Southern Roller Door @ 1m	**2021**	3:00 PM	61	85	**Distance**	1	**562**	**663**	**669**	**1695**	**383**
	2019			80	**Source after DIR**		**73**	**76**	**79**	**76**	**79**
Difference 2021 - 2019			*Difference*	**5**	**Distance reduction**		-39	-41	-41	-49	-49
					Calculated SPL without barriers		***33***	***35***	***38***	***27***	***30***
Door is partially open											
14 CM6 E side centre door @ 1m F524	**2021**	3:14 PM	0	89	**Distance**	1	**541**	**653**	**658**	**1660**	**373**
	2012			74	**Source after DIR**		**66**	**64**	**60**	**65**	**60**
Difference 2020 - 2012			*Difference*	**15**	**Distance reduction**		-55	-56	-56	-64	-51
					Calculated SPL without barriers		***12***	***7***	***4***	***1***	***8***
Significant barriers also to each receiver. Door half open											
17 E roll door opp Mill - door open F527	**2021**	3:17 PM	62	86	**Distance**	1	**541**	**653**	**658**	**1660**	**373**
	2015			74	**Source after DIR**		**68**	**64**	**61**	**68**	**64**
Difference 2020 - 2015			*Difference*	**12**	**Distance reduction**		-55	-56	-56	-64	-51
					Calculated SPL without barriers		***13***	***8***	***5***	***3***	***13***
Significant barriers also to each receiver, also influenced by the open door at position 17											
25 11m N of CM6 at joint	**2021**	12:05 PM	30	74	**Distance**	11	**525**	**626**	**639**	**1677**	**350**
	2017			70	**Source after DIR**		**74**	**74**	**74**	**41**	**74**
Difference 2021 - 2017			*Difference*	**4**	**Distance reduction**		-34	-35	-35	-44	-30
					Calculated SPL without barriers		***40***	***39***	***38***	***-2***	***44***
Other sources contributing here as well as CM6											
Mineral Addition											
6 Ground Level 8m N side of centre of feeder	**2021**	11:48 AM	43	73	**Distance**	8	**453**	**560**	**577**	**1730**	**280**
	2014			61	**Source after DIR**		**74**	**74**	**74**	**43**	**74**
Difference 2021 - 2014			*Difference*	**12**	**Distance reduction**		-35	-37	-37	-47	-31
					Calculated SPL without barriers		***39***	***37***	***37***	***-4***	***43***
10 Level 2 DC126 and fan level - W side of fan casing	**2021**	11:54 AM	13	84	**Distance**	1	**453**	**560**	**577**	**1730**	**280**
	2014				**Source after DIR**		**74**	**76**	**79**	**79**	**81**
			Difference		**Distance reduction**		-53	-55	-55	-65	-49
					Calculated SPL without barriers		***21***	***21***	***24***	***15***	***33***
12 Level 2 DC126 and fan level - E side of fan discharge @ 1m	**2021**	11:55 AM	30	100	**Distance**	1	**453**	**560**	**577**	**1730**	**280**
					Source after DIR		**89**	**84**	**82**	**82**	**80**
			Difference		**Distance reduction**		-53	-55	-55	-65	-49
					Calculated SPL without barriers		***35***	***29***	***27***	***18***	***31***

3.3 Isotainer Loading Facility sound levels

The Isotainer Loading facility has been operation at Berrima works for over 12 months and there have been no issues reported with its operations. Activities at this facility include loading isotainers directly from truck to train and stack on three days a week (Monday, Wednesday and Friday from 8am to 5pm), with train loading operations from 9:30am to 4:30pm. On the other two days of the week (Tuesday, Thursday), loading to stack occurs, generally in the period from 8am to 5pm.

Measurements were taken on Friday 22 Oct 2021 with train loading and Thursday 4 Nov 2021 with stack-only operations.

Figure 3.9 describes the site layout and typical truck and loader / "Reacher" movements during operations. Figures 3.10 and 3.11 are photographs showing the overall isotainer loading operations site observed from the Pre-Heater Tower and the measurement position with respect to the stack respectively. A typical time history of sound level vs time for an unloading cycle is shown in Figure 3.12, indicating the various sound levels and activities of this typical task. The activities and sound levels summary of the survey are shown in Table 3.9. Spectra and tonality of the measurements are presented in Table 3.10 and shown in figures Appendix A57.

A period including a train runout (a train idling then departing) was also measured over 15 minutes and 12 minutes at Location 20, and is also shown in Figure 3.9. This period measured general Reacher activities while loading trains. The spectra shown are relatively broadband and non-tonal. The first measurement, shown as File 8, was above tonality limits in the 500 Hz band by 2 dB. This is not considered significant and may have been caused by a passing source, as it was not in other measurements.

These sound levels were measured to calculate the potential impacts of the operations at the Compliance Location 20 and residential receiver locations. It is noted that the $L_{A90.15\text{-minute}}$ values at Location 20 and the isotainer measurement location during the same time as these measurements were 55 dBA, indicating that the operations did not cause the sound levels at Location 20 to exceed the total site sound level limit of $L_{A90.15\text{-minute}}$ of 58 dBA. The results of these measurements are consistent with those of the 2020 compliance report and indicate that the Isotainer Loading facility does not significantly increase the sound levels at Location 20 in terms of achieving compliance with licence conditions.

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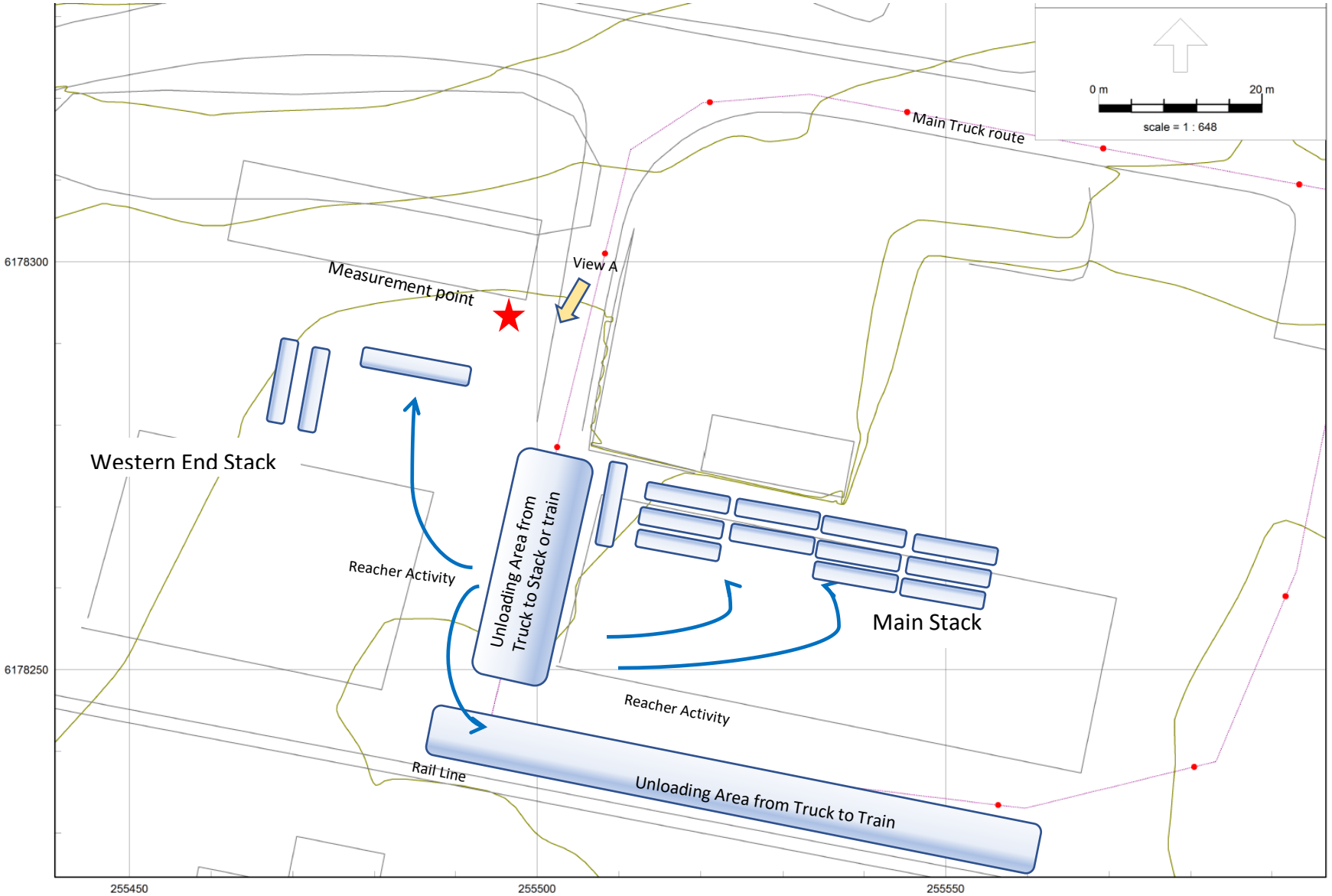

Figure 3.9 The layout of the Intermodal operations

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ACN: 153 946 064

Figure 3.10 The isotainer train loading operations site viewed from the tower

Figure 3.11 The measuring position location: View A

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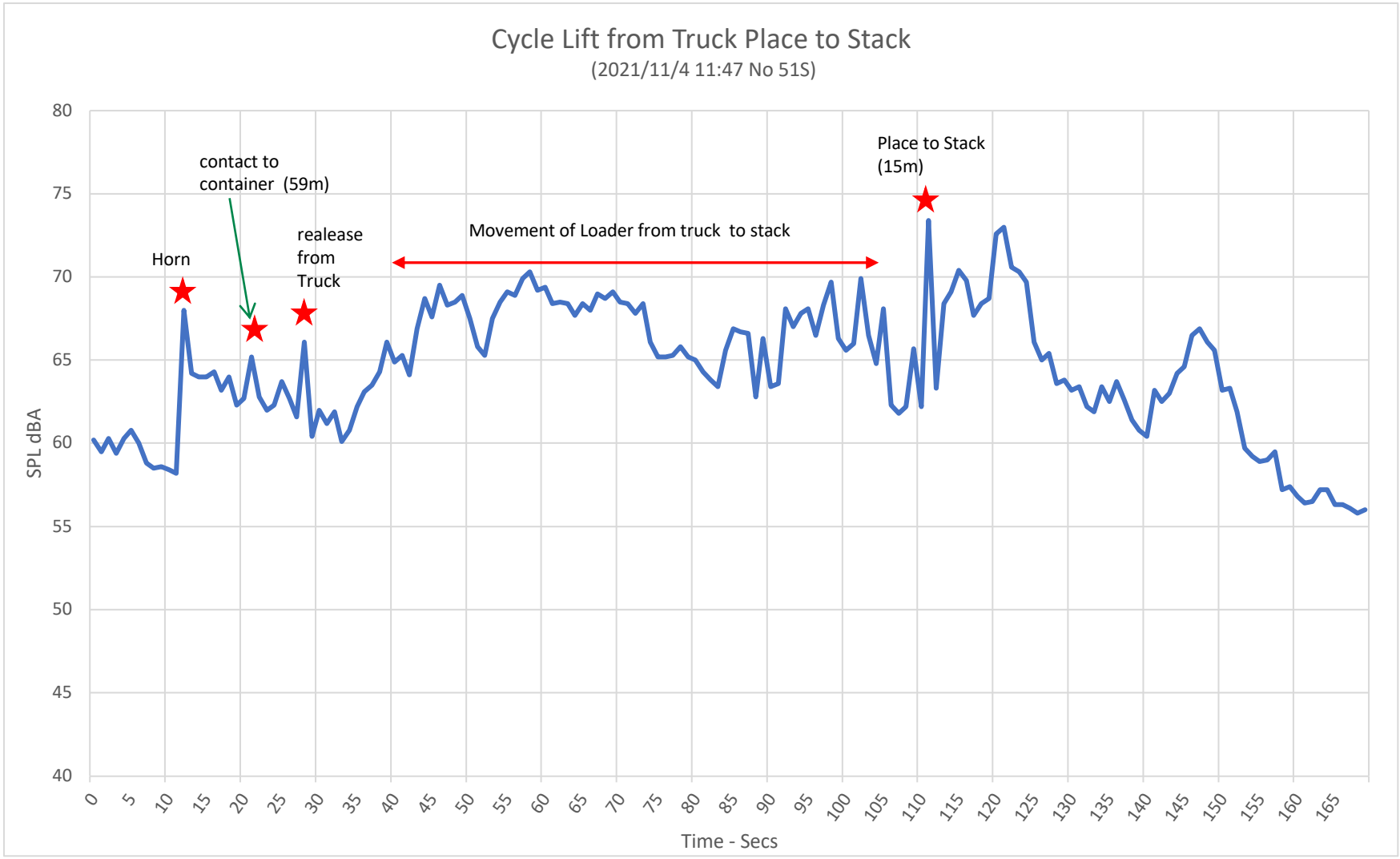

Figure 3.12 Typical Lift cycle from the Truck to Stack

Table 3.9 Berrima Cement Annual Noise Assessment 2021

Measurements of source activities at the Isotainer Loading facility

Activity	File No	Date	Time	Period min:sec	Statistical Sound Level Parameter - dBA					
					Leq	L1	L10	L90	Lceq	Lceq-Laeq
Loader up from Truck (35m) / Load to Train (56m)	8S	22/10/21	12:41 pm	2:15	66	75	70	57	77	10.4
Load from Ground (22m) / Load to Train (56m)	11S	22/10/21	12:53 pm	1:43	68	76	72	61	80	11.5
Load from Stack (22m) / Load to Train (56m)	10S	22/10/21	12:41 pm	1:29	70	77	74	61	80	10.7
	12S	22/10/21	12:56 pm	1:27	68	75	71	60	79	11
	13S	22/10/21	1:00 pm	1:30	68	76	72	64	80	11.2
Load up from Truck (35m) / Load to Stack (56m)	14S	22/10/21	1:01 pm	1:42	66	71	69	59	77	11.6
Back ground	48S	4/11/21	11:37 am	1:2	56	58	57	55	74	18
UnLoad from Truck (59m) / Load to Stack (15m)	50S	4/11/21	11:43 am	2:56	69	82	70	59	79	9.9
UnLoad from Truck (59m) / Load to Stack (15m)	51S	4/11/21	11:47 am	2:49	66	73	69	59	79	12.8
Pickup from Truck (32 m) Place to Stack Pick up Container from ground Place to Stack Pick up Container from stack Place to truck	54S	4/11/21	12:14 pm	6:37	63	70	66	57	77	14.1
Loc 20: (12min only) while iso container had Train movements ; (Rail Squeal 60-64 ; 65; Truck 72 ; raile squeal 65; Horn 82)	5S	22/10/21	11:51 am	12:8	62	70	63	**58**	76	14.1
Loc 20: (15mins) with typical iso container activity including unloading iso from train (at least 2) and reversing beacon 59	7S	22/10/21	12:22 pm	15:0	57	62	59	**55**	73	15.2

Table 3.10 Berrima Cement Annual Noise Assessment 2021

One-third Octave Band Spectra at the Isotainer Loading facility

				Sound Level $L_{Aeq,t}$ dBA in One-third octave frequency band Hz																									
	File	$L_{Ceq,t}$	$L_{Aeq,t}$	25	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000
Loader up from Truck (35m) / Load to Train (56m)	8S	77	66	73	63	69	68	66	68	65	64	65	62	57	58	57	63	56	55	55	56	56	54	50	48	46	43	40	41	36
Load from Ground (22m) / Load to Train (56m)	11S	80	68	73	64	70	71	71	76	67	68	66	64	60	59	57	61	61	57	57	60	59	56	54	52	51	48	44	42	36
Load from Stack (22m) / Load to Train (56m)	10S	80	70	73	65	70	69	71	76	69	69	67	66	63	63	61	62	62	58	59	60	59	57	54	53	51	49	45	42	37
	12S	79	68	73	65	69	69	71	72	66	69	67	63	59	58	56	60	58	57	57	58	59	56	53	52	50	47	43	40	36
	13S	80	68	75	69	68	67	69	74	69	67	69	65	60	57	58	60	58	59	58	57	59	57	54	53	52	50	49	49	49
Load up from Truck (35m) / Load to Train (56m)	14S	77	66	75	68	68	63	66	70	67	65	64	63	58	58	55	58	57	57	54	55	55	54	51	49	48	46	45	45	44
Back ground	48S	74	56	75	68	64	62	65	63	57	58	56	56	53	51	50	50	48	46	47	44	41	41	39	37	35	29	25	21	18
UnLoad from Truck (59m) / Load to Stack (15m)	50S	79	69	76	69	68	70	71	72	64	69	63	61	59	59	61	64	61	57	60	59	57	56	54	53	51	49	46	44	42
UnLoad from Truck (59m) / Load to Stack (15m)	51S	79	66	76	66	68	71	72	71	65	70	64	61	57	58	58	58	56	55	56	57	55	54	53	51	49	47	44	43	42
Pickup from Truck (32 m) Place to Stack Pick up Container from ground Place to Stack Pick up Container from stack Place to truck	54S	77	63	76	66	66	68	69	69	62	63	59	58	55	56	53	53	54	52	52	52	53	50	48	48	46	44	43	41	39

Table 3.10A Berrima Cement Annual Noise Assessment 2021

Tonality in the One-third Octave Band Spectra at the Isotainer Loading facility

	Tonality of $L_{Aeq,t}$ dB in One-third octave frequency band Hz - Red highlight indicates exceedance of Tonality objective																								
File	32	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000
Criterion	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5
8S	7.7	3.1	0.8	2.0	2.5	1.1	1.2	2.6	0.7	3.4	1.7	4.0	6.5	3.0	0.4	0.6	0.8	0.8	1.0	0.9	0.3	0.3	0.5	1.3	2.6
11S	7.3	2.8	0.3	2.6	6.7	4.9	2.0	0.4	1.0	1.6	0.6	3.0	2.2	1.5	1.8	1.1	1.7	0.8	0.5	0.1	0.3	0.4	0.9	0.9	1.8
10S	6.4	2.6	0.9	1.9	6.0	3.5	1.1	0.7	1.0	1.2	1.1	2.1	1.1	1.4	1.7	0.8	1.6	0.5	0.3	0.9	0.4	0.5	0.6	0.7	0.8
12S	6.1	2.4	1.6	0.9	3.3	4.3	2.3	1.1	0.2	1.3	0.7	3.0	2.4	0.3	0.7	0.7	0.3	1.6	0.4	1.4	0.8	0.5	0.9	1.1	0.8
13S	2.3	0.3	1.4	1.3	5.1	1.7	2.0	3.2	0.1	0.4	2.5	0.2	2.2	1.7	0.8	0.2	1.2	2.2	0.5	1.5	0.4	0.3	0.6	0.3	0.0
14S	3.6	2.6	4.0	0.2	2.8	0.0	1.0	0.0	2.3	2.8	1.6	2.9	2.0	0.3	1.0	1.8	0.4	0.8	0.8	0.9	0.2	0.0	0.3	0.7	1.0
48S	1.5	1.7	2.0	2.6	1.8	3.1	1.3	1.2	1.8	0.6	0.6	0.8	1.6	0.6	1.1	1.8	0.0	1.7	1.3	0.0	0.2	1.7	0.3	0.3	0.7
50S	3.2	1.3	0.3	0.1	4.6	6.3	5.4	1.8	0.1	1.5	0.8	0.4	3.1	0.3	3.4	2.2	0.3	0.3	0.1	0.4	0.8	0.4	0.9	1.2	0.5
51S	6.0	0.3	1.0	0.9	2.9	5.9	5.4	1.1	0.2	2.2	0.2	0.3	0.5	0.1	1.2	0.1	1.3	0.1	0.2	0.1	0.4	0.0	0.5	1.0	0.4
54S	5.1	0.8	0.3	0.6	3.1	3.4	2.1	1.5	1.5	2.4	2.1	1.5	0.1	1.2	1.3	0.3	0.3	1.5	0.2	1.1	1.2	0.3	0.1	0.0	0.2

4. Licence monitoring location and residential receiver sound levels - review for 2021

Environmental sound levels are measured at the Licence compliance monitoring Location 20 and at residential receiver locations in New Berrima. A combination of unattended and attended monitoring is used at three locations –

- Location 20 – the Store Yard Close – monitored since 2015
- North Fence – Monitored since 2007
- 4 Melbourne Street, New Berrima – monitored since 2002

Measurements are to assess changes at the locations, acceptability of received sound levels and compliance with the licence conditions.

Attended monitoring is also made at two other residential receiver locations to provide comparisons with previous measurements:

- 12 Brisbane St
- Adelaide St back 20m from Taylor Avenue top match the front façade of 72 Taylor Avenue, monitored previously

Measurements at the southern end of Argyle St opposite the General Store were not made in 2021 as the site is now adjacent to a petroleum service station and emissions from that site would affect measurements of potential contributions from the Cement Plant.

Attended measurements were made on 22 October and 4 November 2021. As the three logger monitoring locations used recording sound level meters, additional listening "attended monitoring" was done at each location for the same 15-minute periods for (daytime, evening and night-time periods). These periods were:

- Saturday 23 October – 18:00 to 18:15 Evening All plant items were off following a lightning strike
- Tuesday 26 October – 00:00 midnight to 0:15 Night-time All plant items operating
- Thursday 28 October – 19:00 to 19:15 Evening All plant items operating
- Friday 29 October – 00:00 midnight to 0:15 Night-time All plant items operating
- Wednesday 3 November – 14:00 to 14:15 Daytime All plant idle except for Kiln 6 and fans

Results of long-term unattended receiver environmental noise monitoring have also been collated for monitoring undertaken at regular intervals since 2002. Comparison of these results also indicate any trends in receiver location sound levels occurring over the monitoring period since 2002.

4.1 Unattended measurement results

Unattended measurements were made using logging sound level meters at 3 locations, shown in Figure 1.2:

- Residential:
  - 4 Melbourne Street, New Berrima (full results provided in Appendix B).
- Boral Cement industrial site:

- Northern Boundary at the north-western corner of the Stores Yard (full results provided in Appendix C).
- Location 20 at the south-western corner of the Stores Yard, north of the internal cross road north of the Fettler's Shed (full results provided in Appendix D).

Monitoring instruments measured the sound levels continuously and stored the statistical results every 15-minutes. The loggers at the Northern Boundary and Location 20 also stored all of the sound levels to allow processing of other parameters, such as $L_{A01.1\text{-minute}}$. The logger at Location 20 also stored directional information of sound level quality from which the direction of a significant source can be identified.

During the period of measurements, major plant items were idle at different times, including the Kiln. Table 1.1 shows the times of non-operation of the major plant items and Figures 1.4 to 1.6 show the non-operating periods graphically. Some of these periods will have affected measured sound levels at the residential receivers and some will not. Figure 4.1 shows the overall periods of operation of major plant items.

On the afternoon of Saturday 23 October a lightning strike during a thunder storm caused the total Cement Plant to shut-down for several hours, including the Kiln. This was noted also from the measurement results. Listening attended measurements included this period of no-operation.

Statistical sound level parameters measured include the following:

$L_{Aeq.15\text{-minute}}$ The equivalent A-weighted continuous or time averaged sound level over each 15-minute period as units of dB. This single sound level represents the equivalent of the sound energy in all of the sound levels in the period, using a logarithmic average. This value is compared with objective sound levels for amenity and intrusiveness.

$L_{A90.15\text{-minute}}$ The 90% exceedance sound level over a 15-minute period. This is the sound level exceeded for 90% of the time or 13.5 minutes in each 15-minute period. It is often referred to as the background sound level and is used for comparison with objectives.

$L_{A01.1\text{-minute}}$ The 1% exceedance sound level over a 1-minute period. This is the sound level exceeded for 1% of the time or 0.6 seconds in each minute. It is used for assessment of typical maximum night-time sound levels and for comparison of the **$L_{A01.1\text{-minute}}$ - $L_{A90.15\text{-minute}}$** difference with a maximum 15 dB difference objective for not causing sleep disturbance.

From these parameters, long-term averages are calculated for each period of day, evening and night in a 24-hour period, then averages or medians of these are obtained for the full length of the measurement periods of 14 days.

$L_{AEQ.period\ average}$ this is the energy average of the period (day, evening or night) L_{AEQ} for all of the periods monitored

$L_{A90.average}$ this is the arithmetic average of the average period $L_{A90.15\text{-min}}$ for the periods monitored.

10%$L_{A90.average}$ this is the median of the period 10% $L_{A90.15\text{-min}}$ for the monitoring period

Weather conditions

Weather is measured at the site meteorology station to the south of the Raw Materials Store.

A summary of the weather conditions for the period 22 October to 4 November when the monitoring was done is shown in Figure 4.2, with those relevant to noise propagation and measurement (wind speed, wind direction and rainfall) is shown in Figure 4.3.

Wind speed and rainfall are shown in Figure 4.4, wind direction is shown on Figure 4.5. Weather conditions for subsequent groups of three-day periods are shown in Figures 4.6 to Figure 4.10.

Daytime temperatures ranged from cool with maxima from a cool 16ºC to mild 25ºC. Night-times were cool with minimums in a range of 1 to 10ºC. Nights were also very humid to rH 100% and days 30 to 40%. – see Figure 4.10A.

Wind direction was mainly westerly and northerly. There were some days with south-easterly winds also. Near the end of the monitoring period were days with easterly to north-easterly winds. Wind speeds were mostly in the range 0 to 5m/s. The maximum wind speed was 12.8m/s on the afternoon of 29 October; other than that day, wind speeds were all less than 6 m/s.

Data for the high wind speed periods greater than 10m/s were discarded as it was likely wind speeds at or close to the microphones were above 5m/s. During very low wind speed periods the wind direction was variable. Westerly winds assist with enhancing noise propagation from the Hume freeway to New Berrima but are not significant for propagation from the Cement Plant towards New Berrima.

Rain occurred on about three days for brief periods, with the highest period having 2mm in 15-minutes on 23rd October. Rainfall was only constant for the afternoon of 4 November after completion of the monitoring. This meant that only a few periods had data removed for high wind speeds or rainfall.

Sound Level measurements

Table 4.1 provides a summary of the statistical data for all monitored sites over the full period of the monitoring. Results for 4 Melbourne St, the Northern Fence and Location 20 are based on the long-term average sound levels over two weeks, while for the other residential locations they are based on attended monitoring.

The results show that for average period L_{Aeq} values, Location 20 averaged 55 to 56 dBA. $L_{A90,period}$ averages were 52 to 53 dBA.

For the residential receivers attended monitoring, 4 Melbourne Street and Brisbane Street locations were the quietest of the three usual residential locations for the day period with 52 to 53 dBA $L_{Aeq,15\text{-}min}$, while the Northern Boundary had 51 dBA daytime averages, the same as in 2019. Evening sound levels were lowest at 4 Melbourne St with 48 dBA L_{Aeq} and 38 dBA L_{A90}, with Brisbane St having higher sound levels this year. For night-time, 4 Melbourne St had the lowest results with 47 dBA L_{Aeq} and 41 dBA L_{A90} period average levels. Brisbane St and Adelaide St were not monitored during night-time. The Adelaide St near Taylor Avenue location had the highest residential receiver results with 62 dBA daytime and 58 dBA evening.

Location 20 - Store Yard Close location had average period L_{A90} values of 52 to 53 dBA, which are below the objective of 58 dBA.

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As in previous years, these results continue to demonstrate that road traffic noise has a more significant effect on residential receiver L_{Aeq} sound levels than the Cement Plant.

The Store Yard Close - Location 20 had period average $L_{A90,period}$ sound levels of 52 dBA in daytime and evening and 53 dBA in night-time, which are all less than the licence condition objective of 58 dBA. These are similar to the results of previous measurements and the same as in 2020.

Table 4.2 compares the long-term average results for 2020 with those measured since 2002.

For Location 20, the long-term average $L_{Aeq,period}$ results were the same as in 2020 and lower than or equal to the overall average of all results since 2015.

The $L_{A90,period}$ average was 52 dBA for daytime, evening and night-time periods, compared to the 15-minute licence condition of 58 dBA and the long-term period objective of 56 dBA.

Results for the Northern Fence were a period average of 51 dBA L_{Aeq} for all periods, the same as in 2020 and 2019. The $L_{A90,period}$ average for night-time was 47 dBA, 2 dB above that of 2020 but 2 dB lower than in 2019 and equal to the long-term average of all results of 47 dBA.

Overall there were no significant changes or increases in long-term average sound levels. These are described in the following sections for each location..

Figures 4.11 to 4.15 show graphs of the long-term average results as a type of time history comparison for each site. These graphs also indicate there have been no significant increases in long-term sound levels from 2018 to 2021 or since measurements commenced in 2002. For 12 Brisbane St in Figure 4.13, the increase in Daytime $L_{Aeq,period}$ value was caused by passing vehicles during the measurement – this result and that for Taylor / Adelaide St were from attended measurements only in 2021 and 2020. The absence of significant increases in long-term average sound levels for logger monitored locations further indicates that the noise emissions from the total plant are achieving compliance with the objectives.

Figure 4.1: Times of major plant operations 22 October to 4 November 2021 - Time On

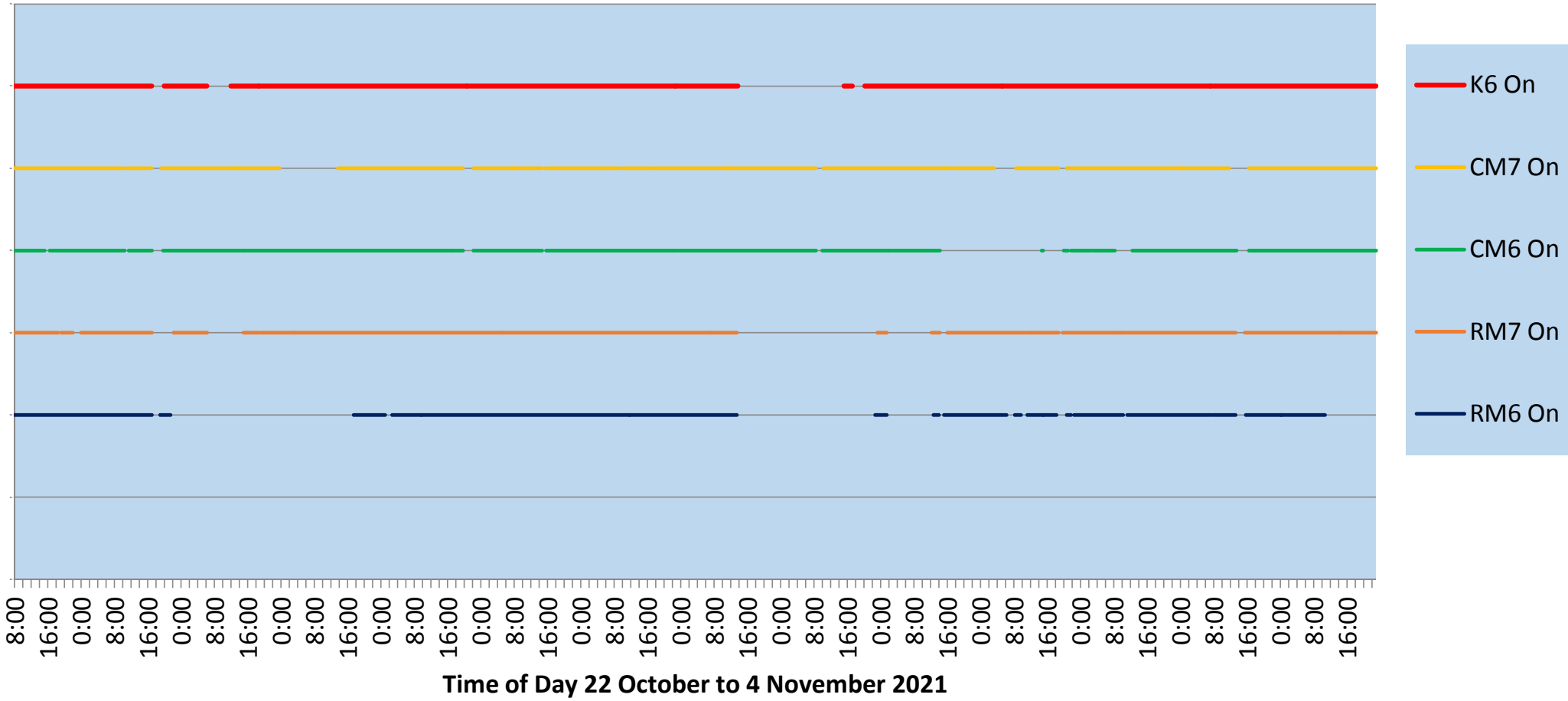


Figure 4.2: Boral Cement Berrima Annual Noise 2021- Weather 22 October to 4 November 2021

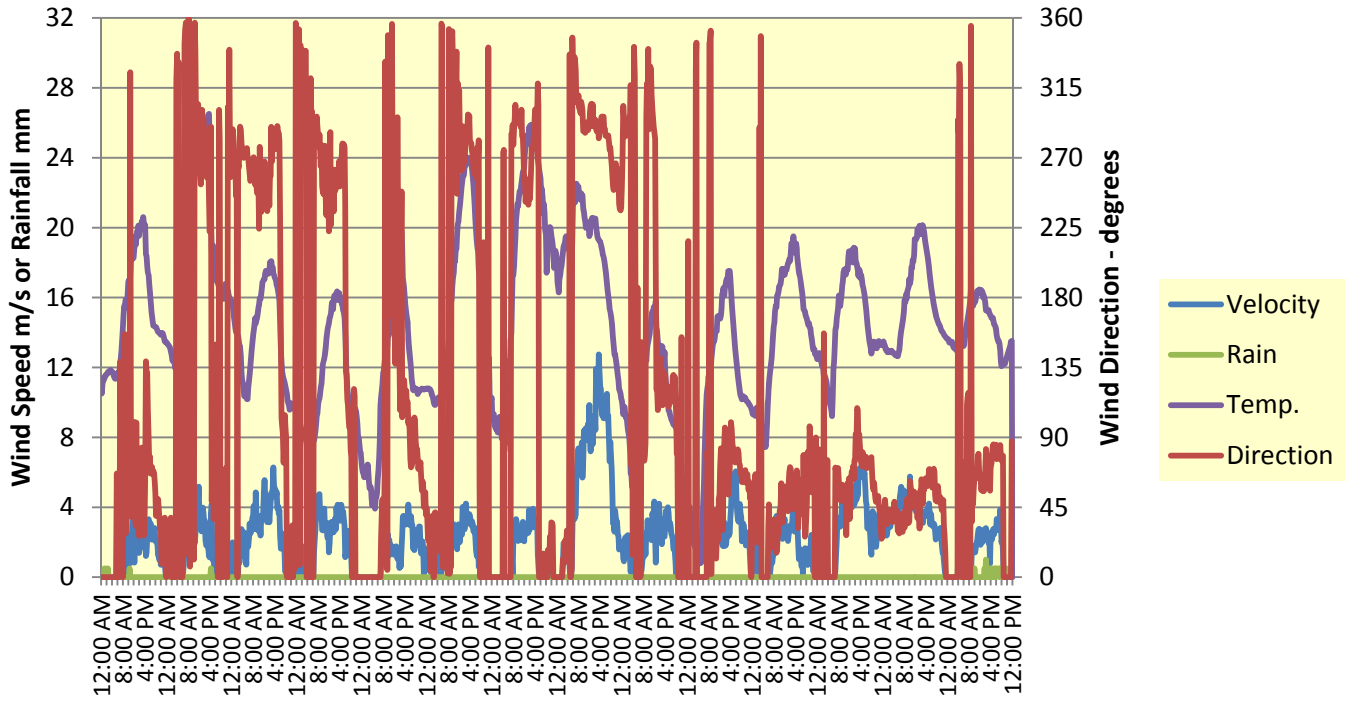


Figure 4.3: Boral Cement Berrima Annual Noise 2021- Weather 22 October to 4 November 2021

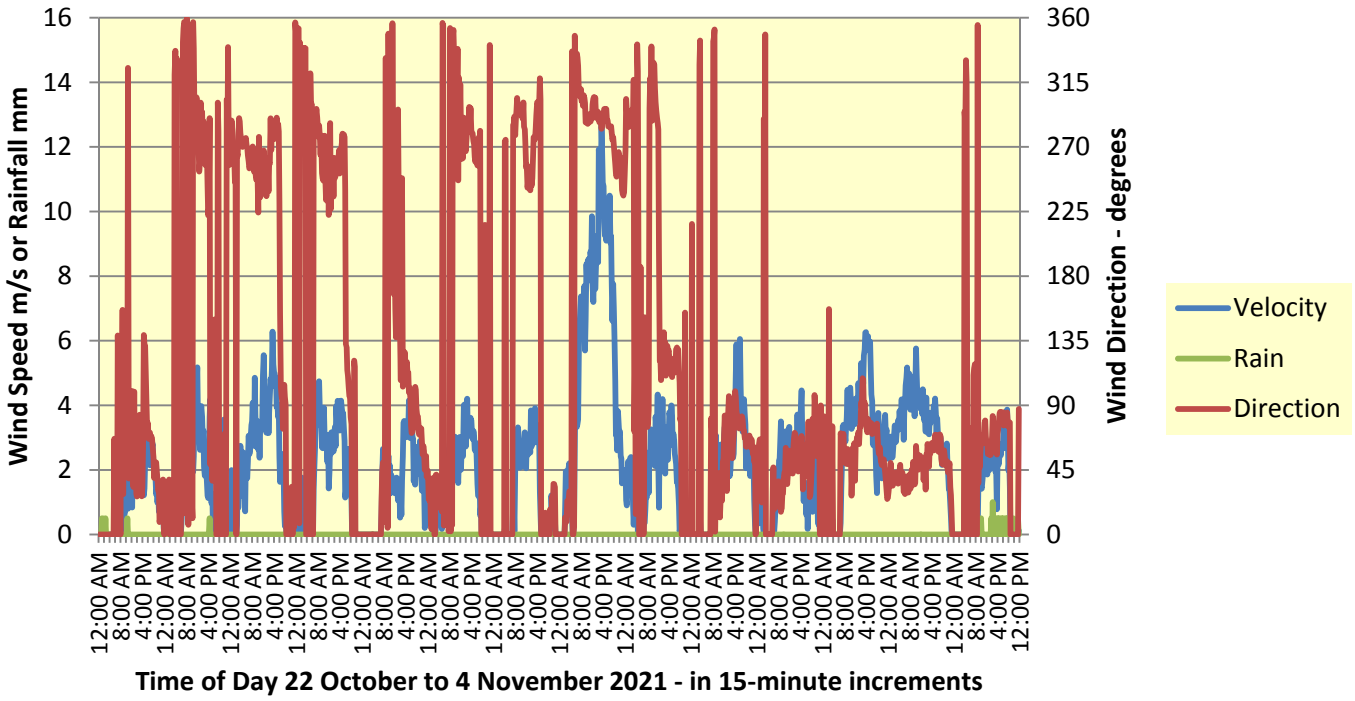


Figure 4.3: Boral Cement Berrima Annual Noise 2021-
Weather 22 October to 4 November - Wind speed and Rainfall

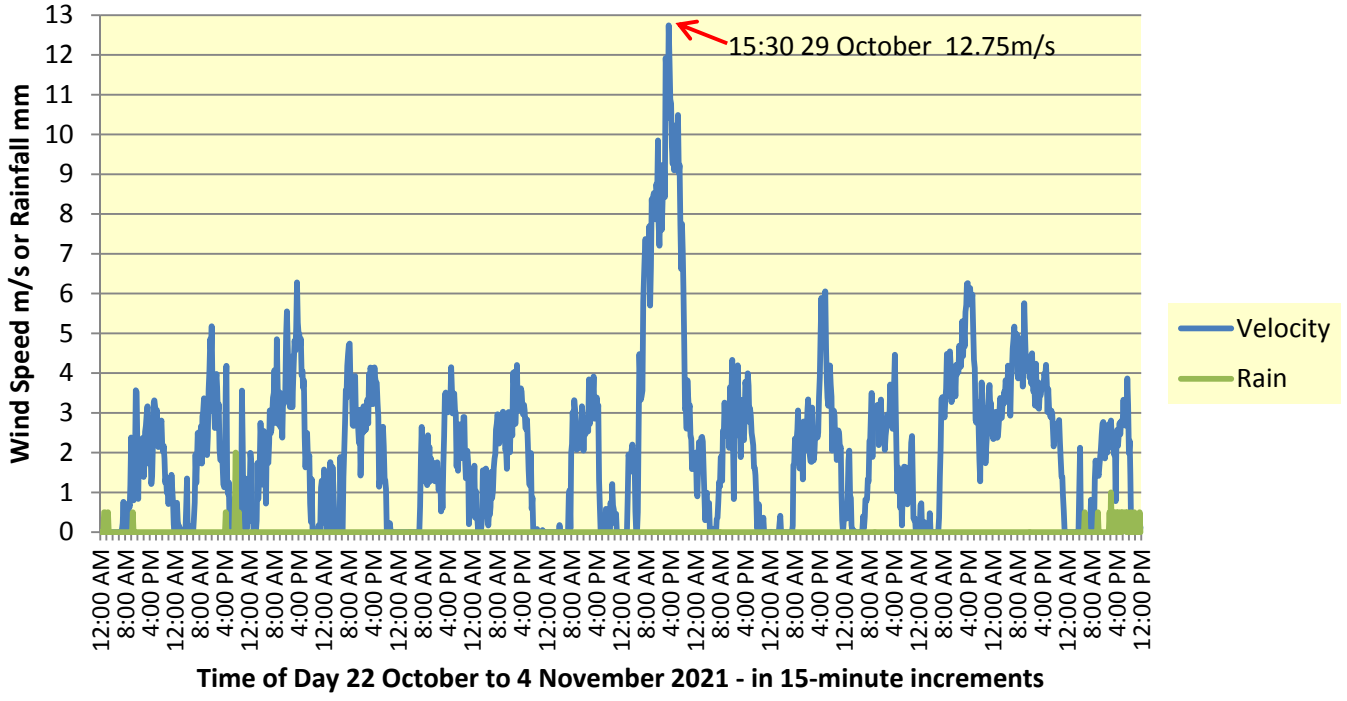


Figure 4.4: Boral Cement Berrima Annual Noise 2021-
Weather 22 October to 4 November 2021 - Wind Direction

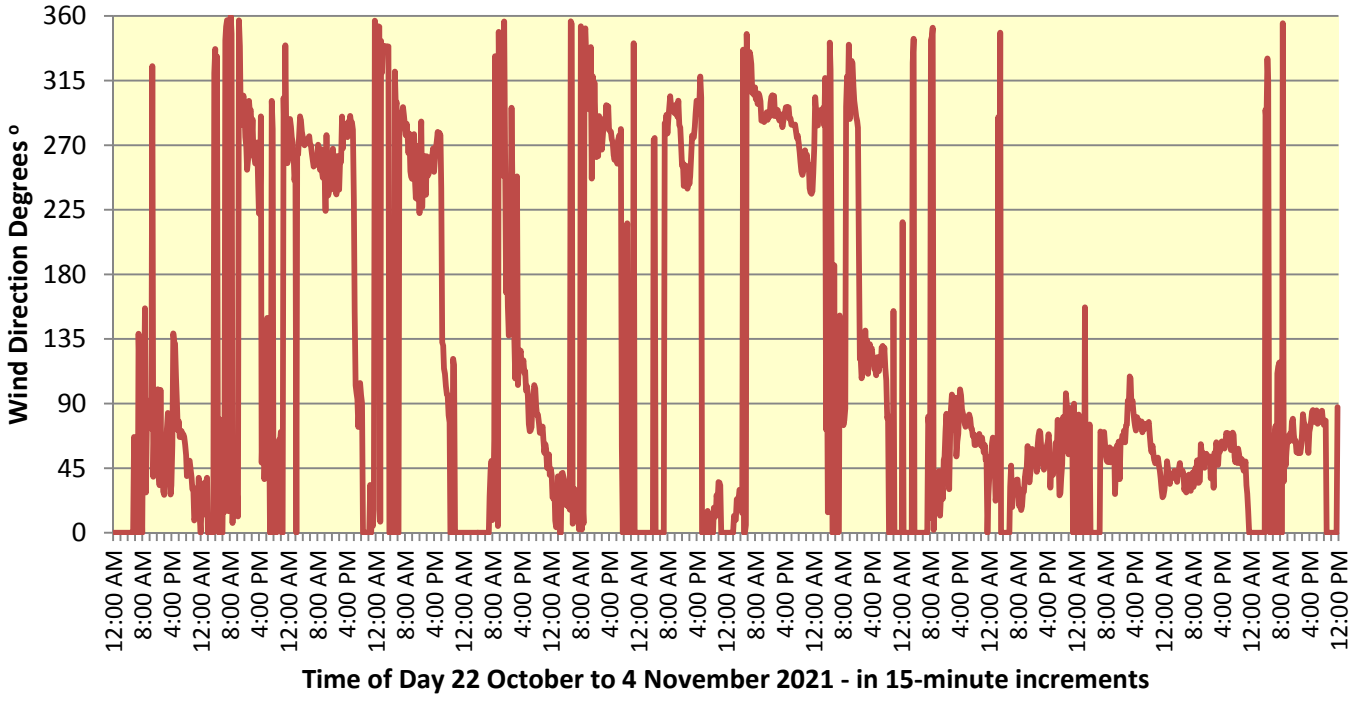


Figure 4.4: Boral Cement Berrima Annual Noise 2021-
Weather 22 October to 4 November - Wind speed and Rainfall

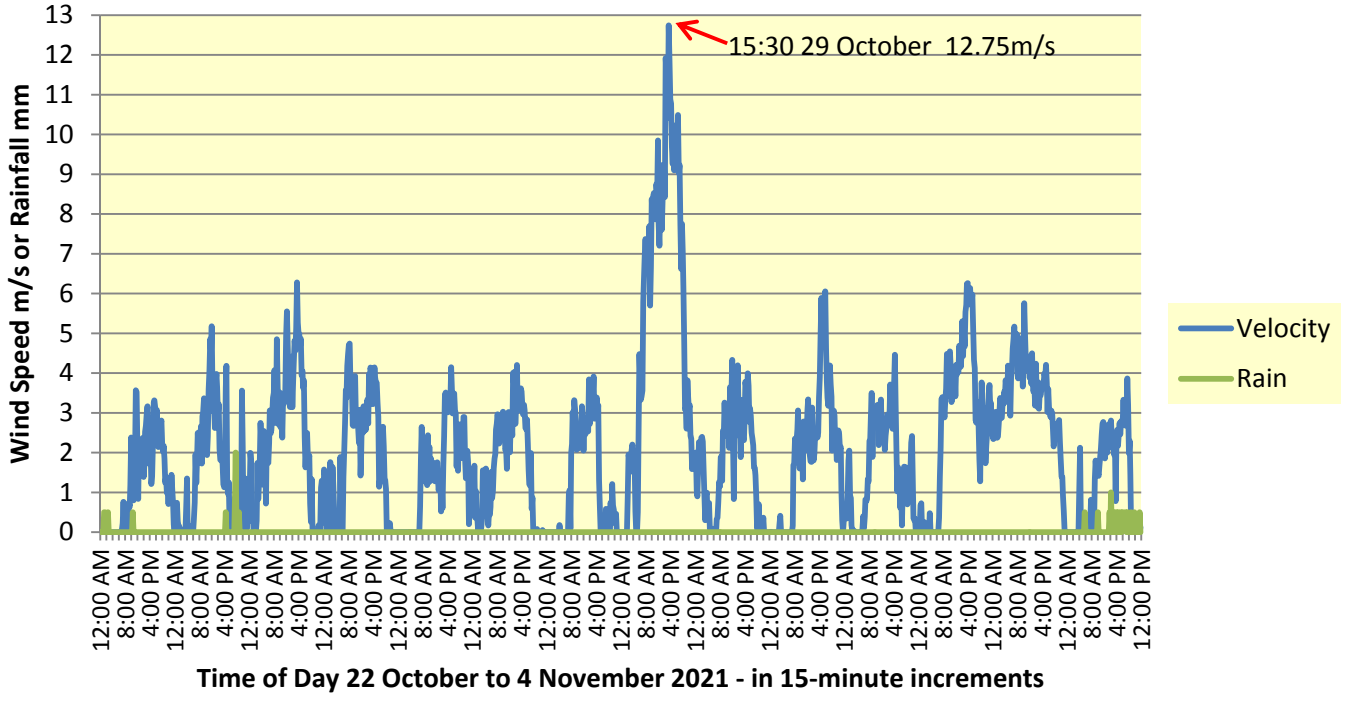


Figure 4.5: Boral Cement Berrima Annual Noise 2021-
Weather 22 October to 4 November 2021 - Wind Direction

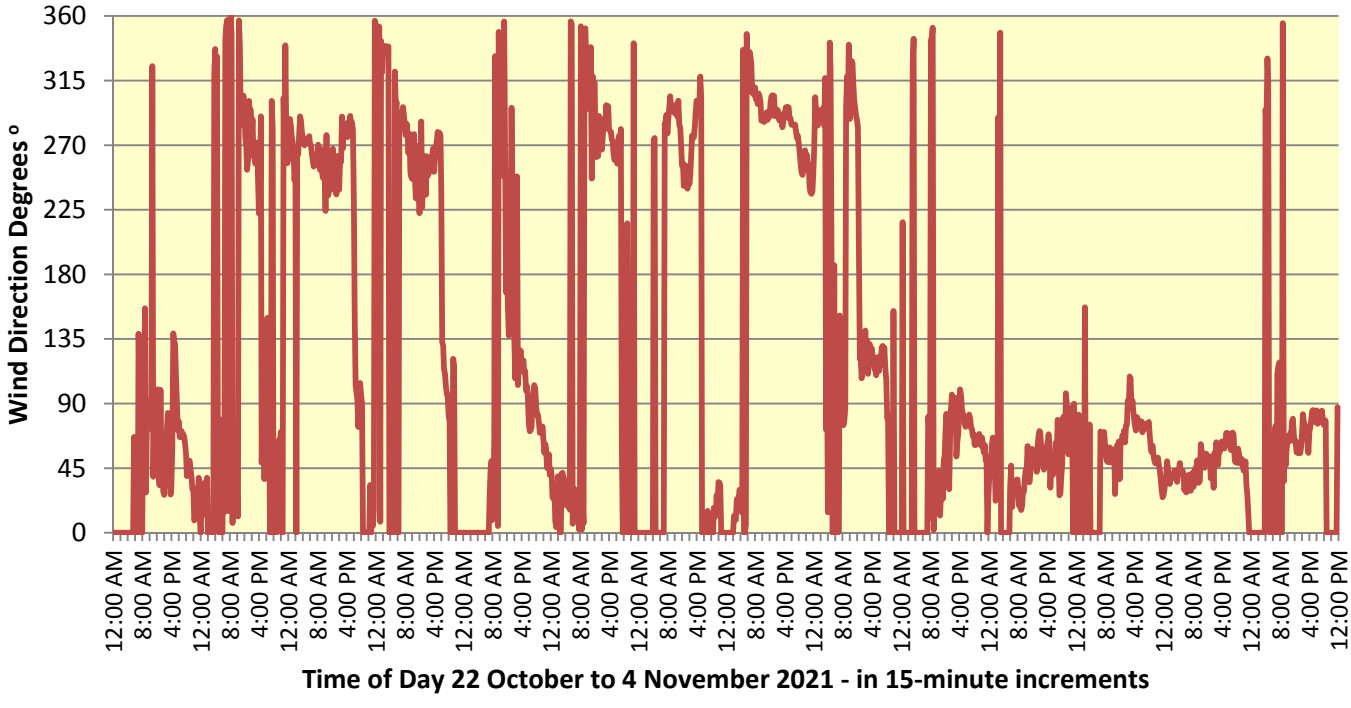


Figure 4.6: Boral Cement Berrima Annual Noise 2021- Weather 22 to 25 October 2021

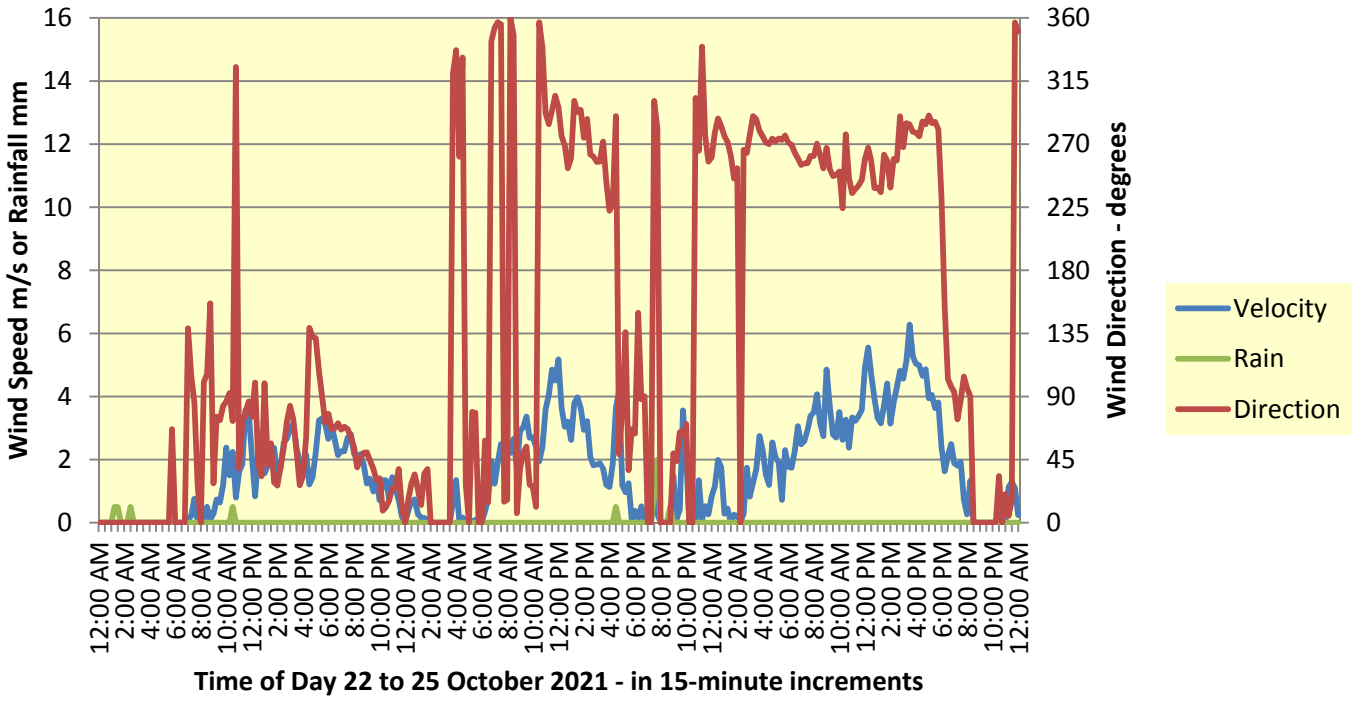


Figure 4.7: Boral Cement Berrima Annual Noise 2021 - Weather 25 to 28 October 2021

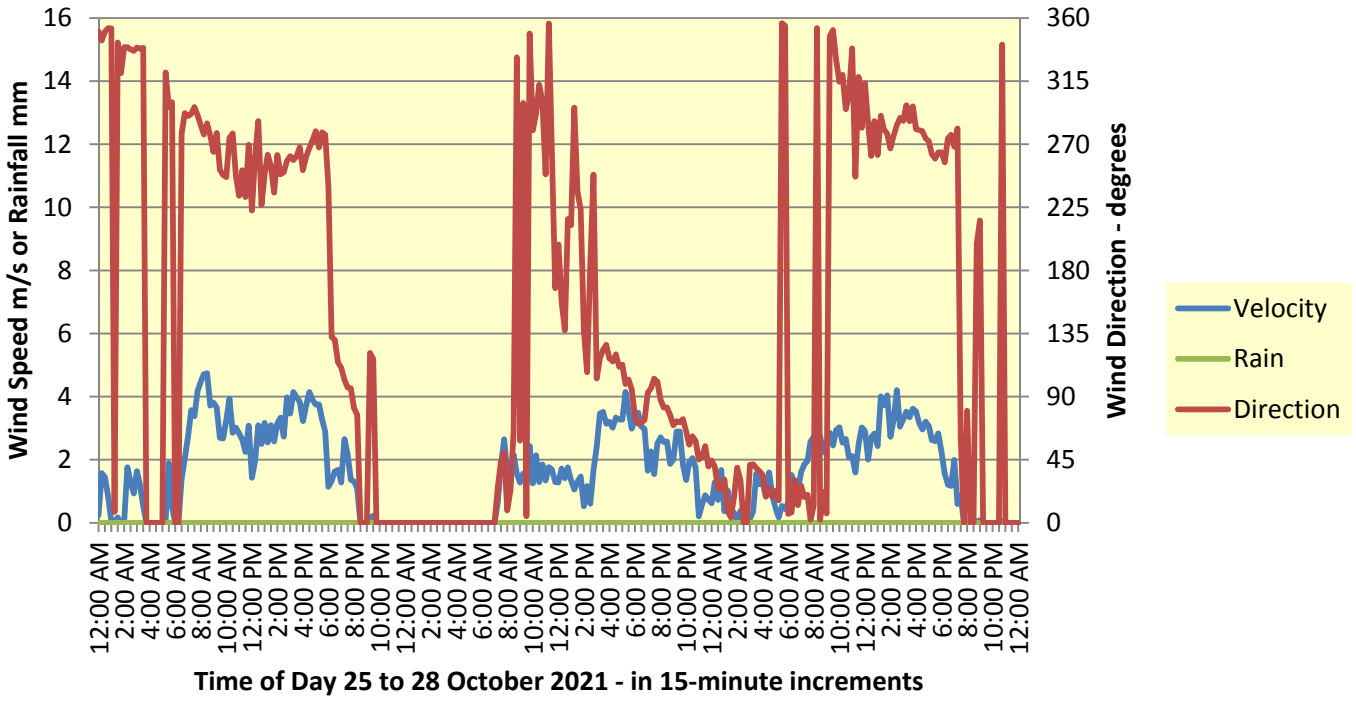


Figure 4.8: Boral Cement Berrima Annual Noise 2021 - Weather 28 to 31 October 2021

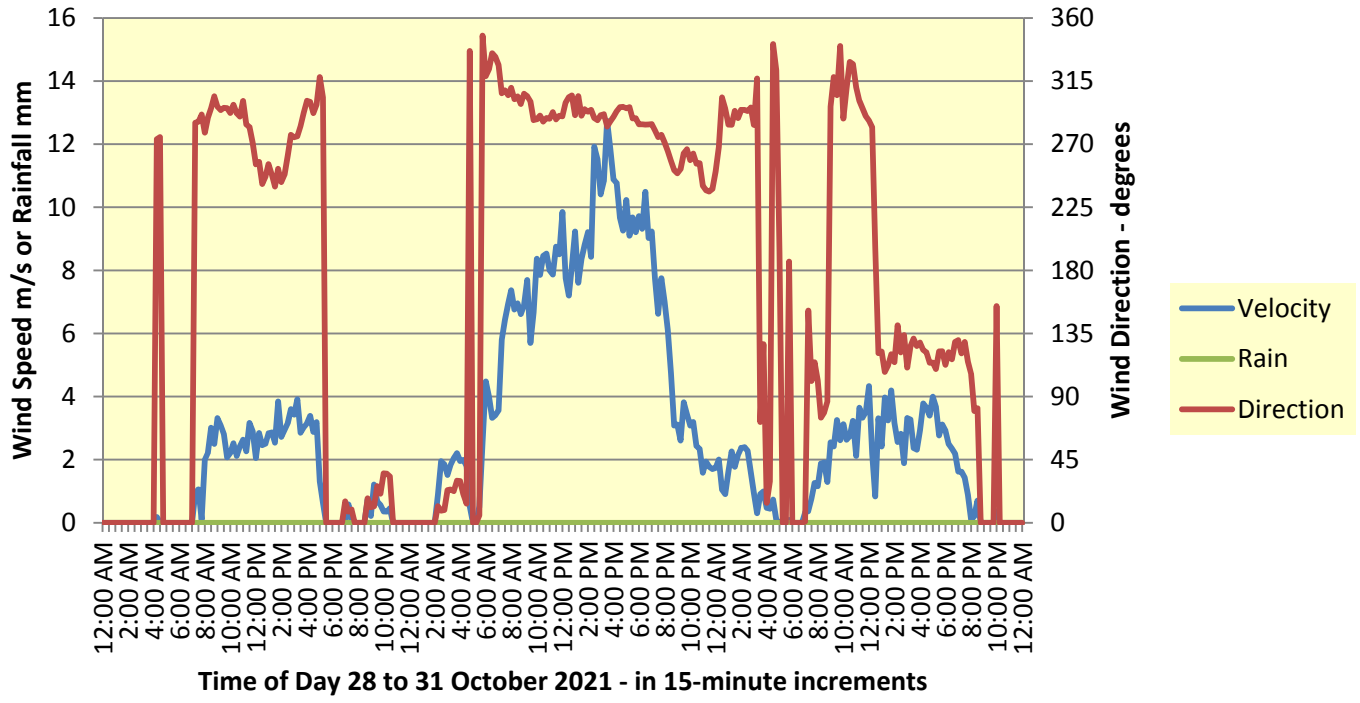


Figure 4.9: Boral Cement Berrima Annual Noise 2021 - Weather 31 October to 3 November 2021

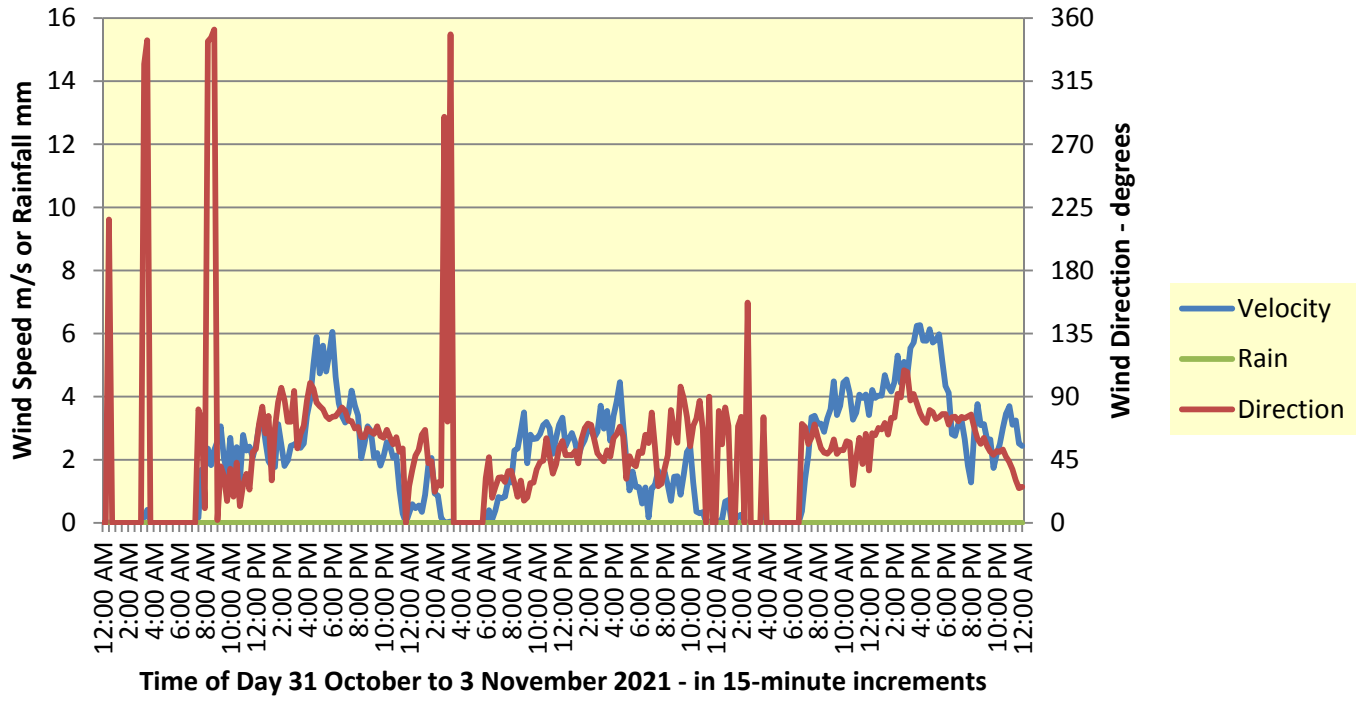


Figure 4.10: Boral Cement Berrima Annual Noise 2021 - Weather 3 to 4 November 2021

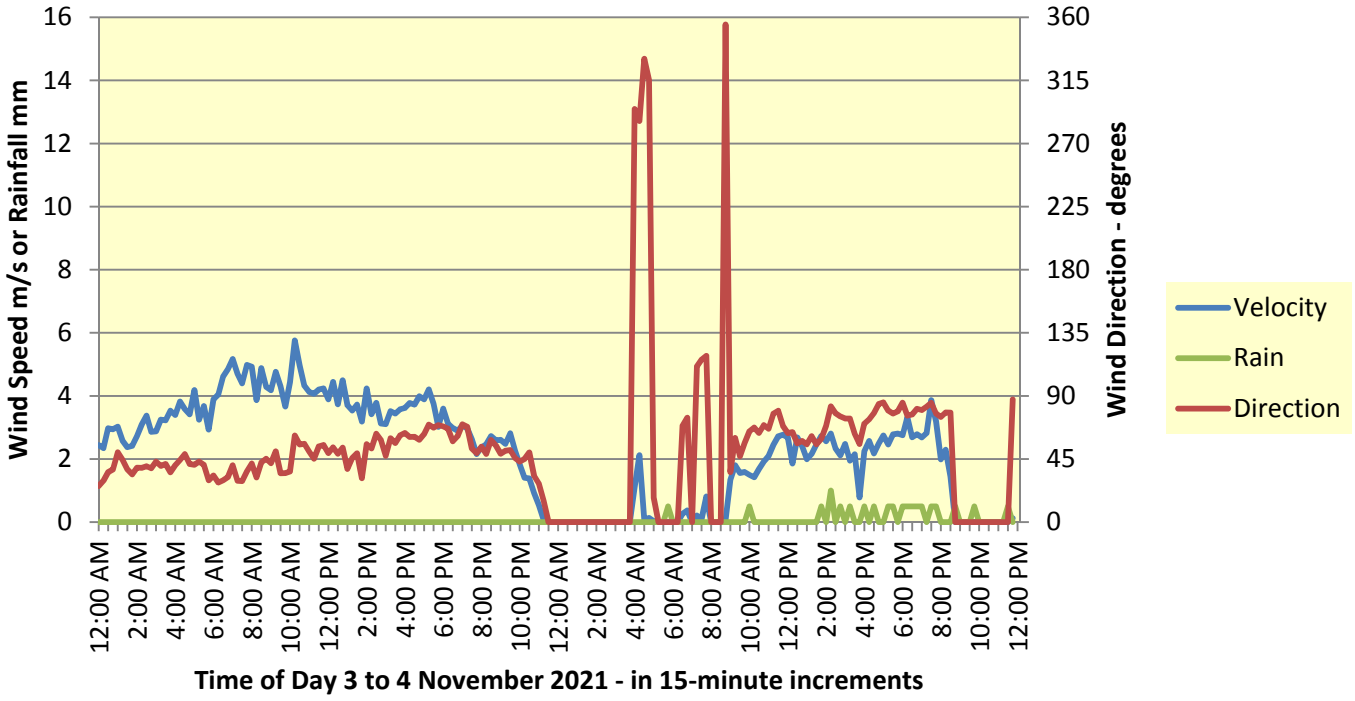


Figure 4.10A: Boral Cement Berrima Annual Noise 2021- Temperature and Humidity 22 October to 4 November 2021

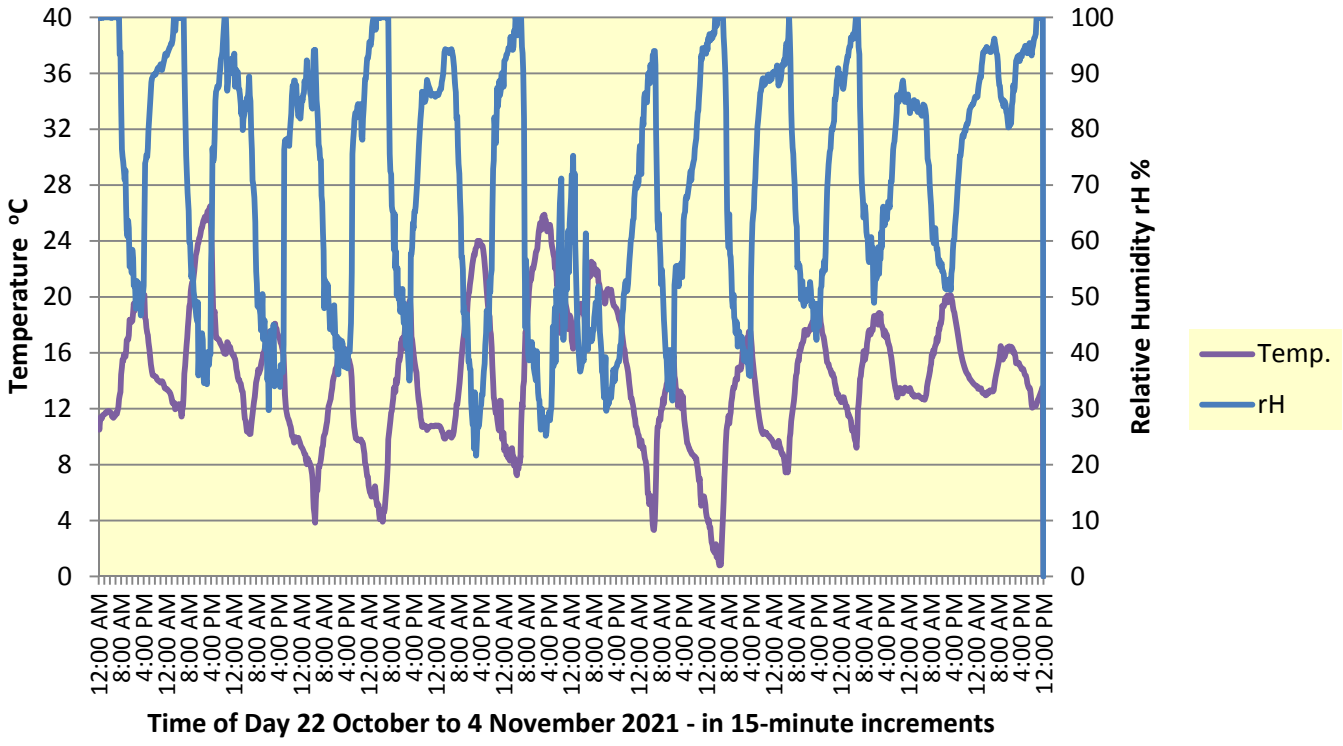


Table 4.1: Boral Cement Berrima annual environmental noise assessment 2021 - residential and boundary or compliance locations
Comparison of Period $L_{AEQ,\ Period}$ Average $L_{A90,Period}$ and Period 10% $L_{A90,Period}$ Results
Summary of Statistical Data: Note Data for Adelaide St and Brisbane Street are from two sets of attended results. Others are from 14-day long-term logger results.

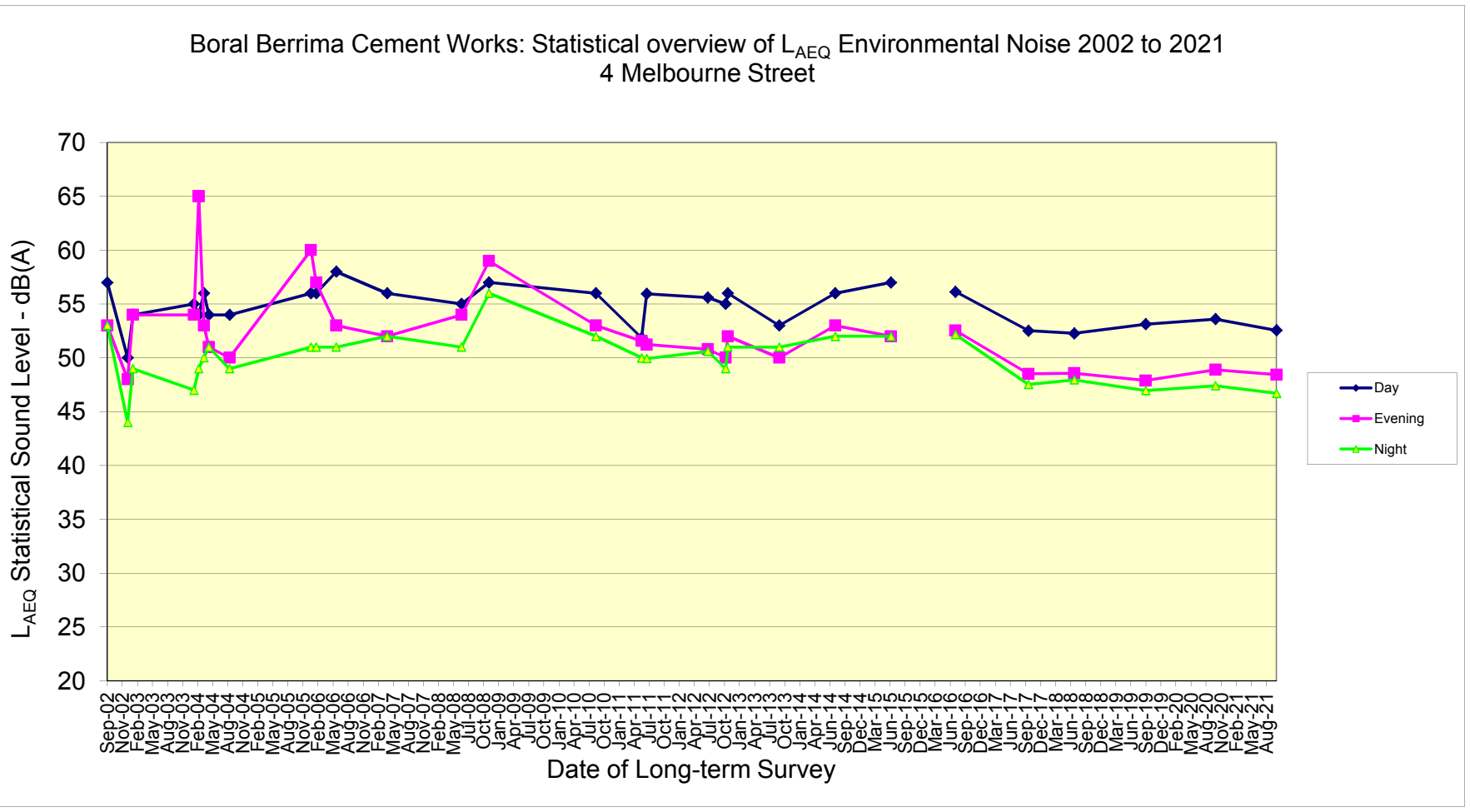
$L_{Aeq.15min}$	Day			Evening			Night			24 hour		
	Max $L_{AEQ.Day}$	Min $L_{AEQ.Day}$	Ave $L_{AEQ.Day}$	Max $L_{AEQ.Eve.}$	Min $L_{AEQ.Eve.}$	Ave $L_{AEQ.Eve.}$	Max $L_{AEQ.Night}$	Min $L_{AEQ.Night}$	Ave $L_{AEQ.Night}$	Max $L_{AEQ.24hr}$	Min $L_{AEQ.24hr}$	Ave. $L_{AEQ.24hr}$
4 Melbourne St, New Berrima	57	49	53	51	46	48	49	44	47	59	41	50
Adelaide St near 74 Taylor			62			58						
12 Brisbane St			52			54						
Location 20 - Stockyard	58	54	57	56	53	55	58	53	56	55	46	50
North Fence, New Berrima	55	49	51	55	49	51	54	49	51	53	48	50

$L_{90.15\text{-}min}$ 10%	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
4 Melbourne St, New Berrima	45	36	41	40	41	36	39	39	45	36	39	39
Adelaide St near 74 Taylor			45				47					
12 Brisbane St			42				44					
Location 20 - Stockyard	54	49	51	51	53	49	51	51	52	49	51	51
North Fence, New Berrima	50	42	45	44	51	43	47	46	50	44	46	45

$L_{A90,Period}$	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
4 Melbourne St, New Berrima	48	39	43	42	44	38	42	42	46	38	41	40
Adelaide St near 74 Taylor			45				47					
12 Brisbane St			42				44					
Location 20 - Stockyard	55	50	52	52	54	49	52	52	53	51	52	52
North Fence, New Berrima	51	45	47	46	52	44	48	47	51	45	47	47

Difference Average L_{Aeq} - Median 10%L_{A90}	Difference for period - Average $L_{AEq.period}$ - Median 10% $L_{A90.period}$ dB		
	Day	Evening	Night
4 Melbourne St, New Berrima	12	9	8
Adelaide St near 74 Taylor Ave., New Berrima	17	11	
12 Brisbane St. New Berrima	10	10	
Store Yard Close, Boral Cement	5	4	5
Northern Fence, Boral Cement	6	5	6

Copy of Berrima 4 Melbourne Oct21 A criteria ver1 ct: Summary Data



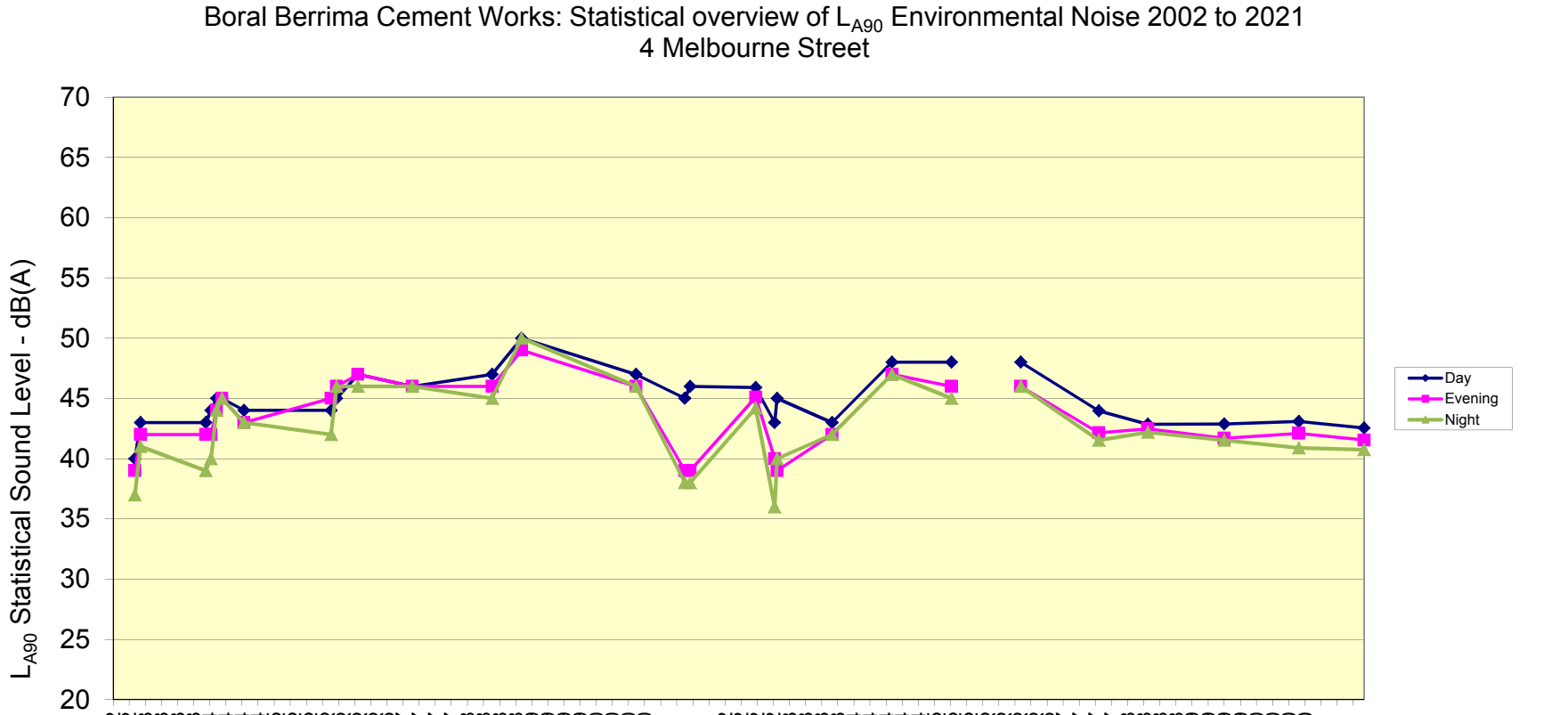
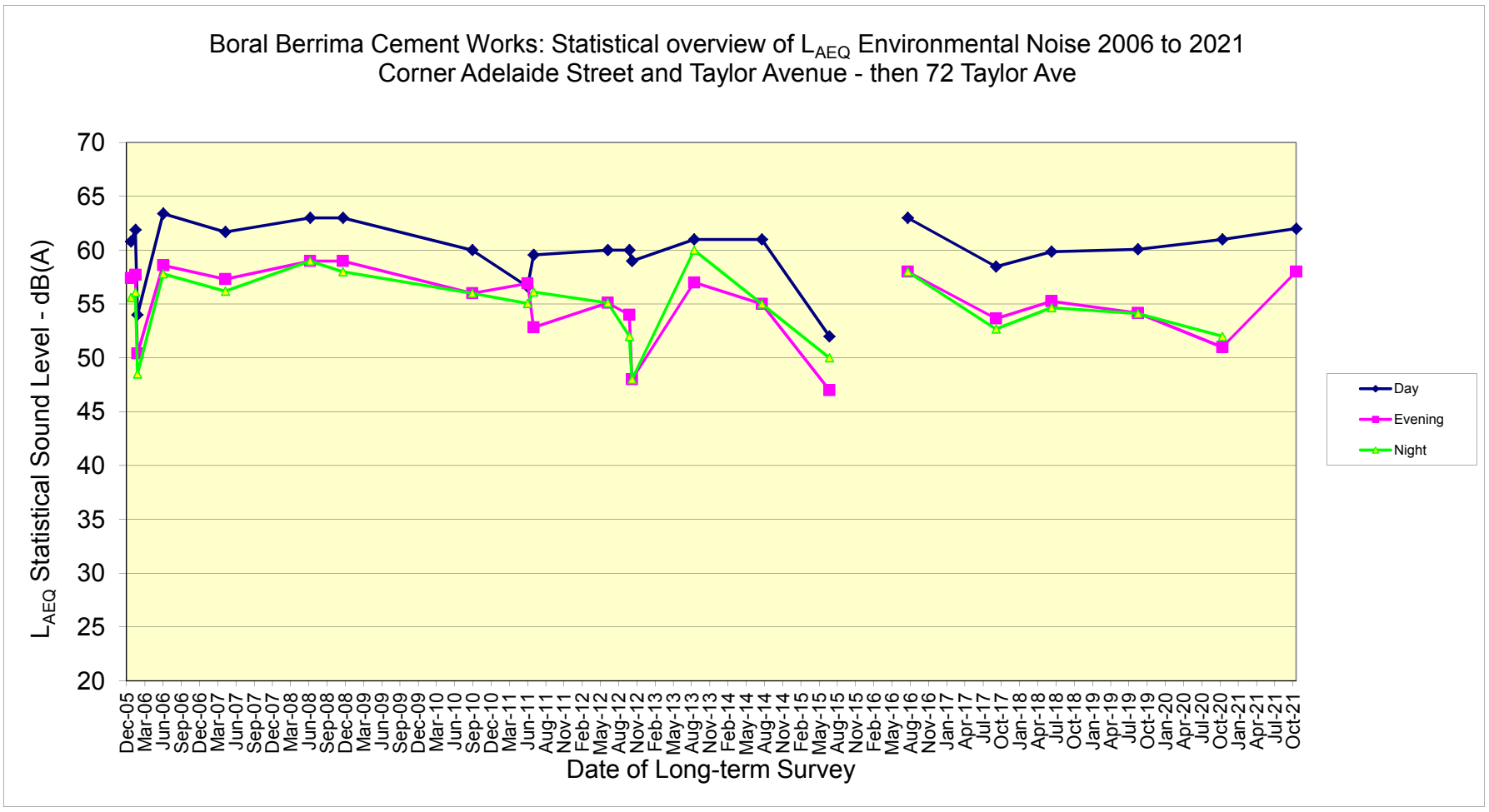
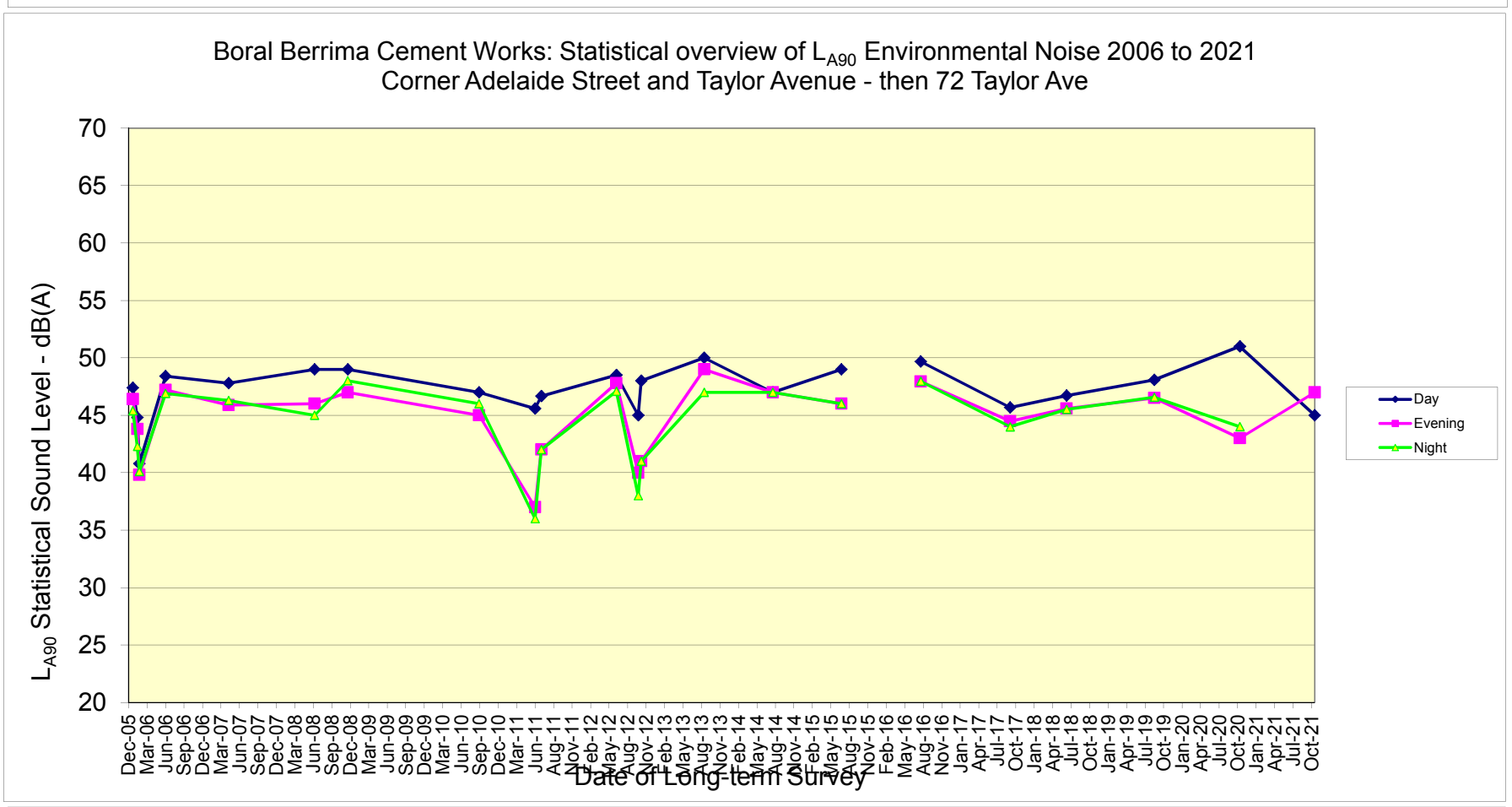


Figure 4.11: Comparison of statistical sound levels for 4 Melbourne Street location





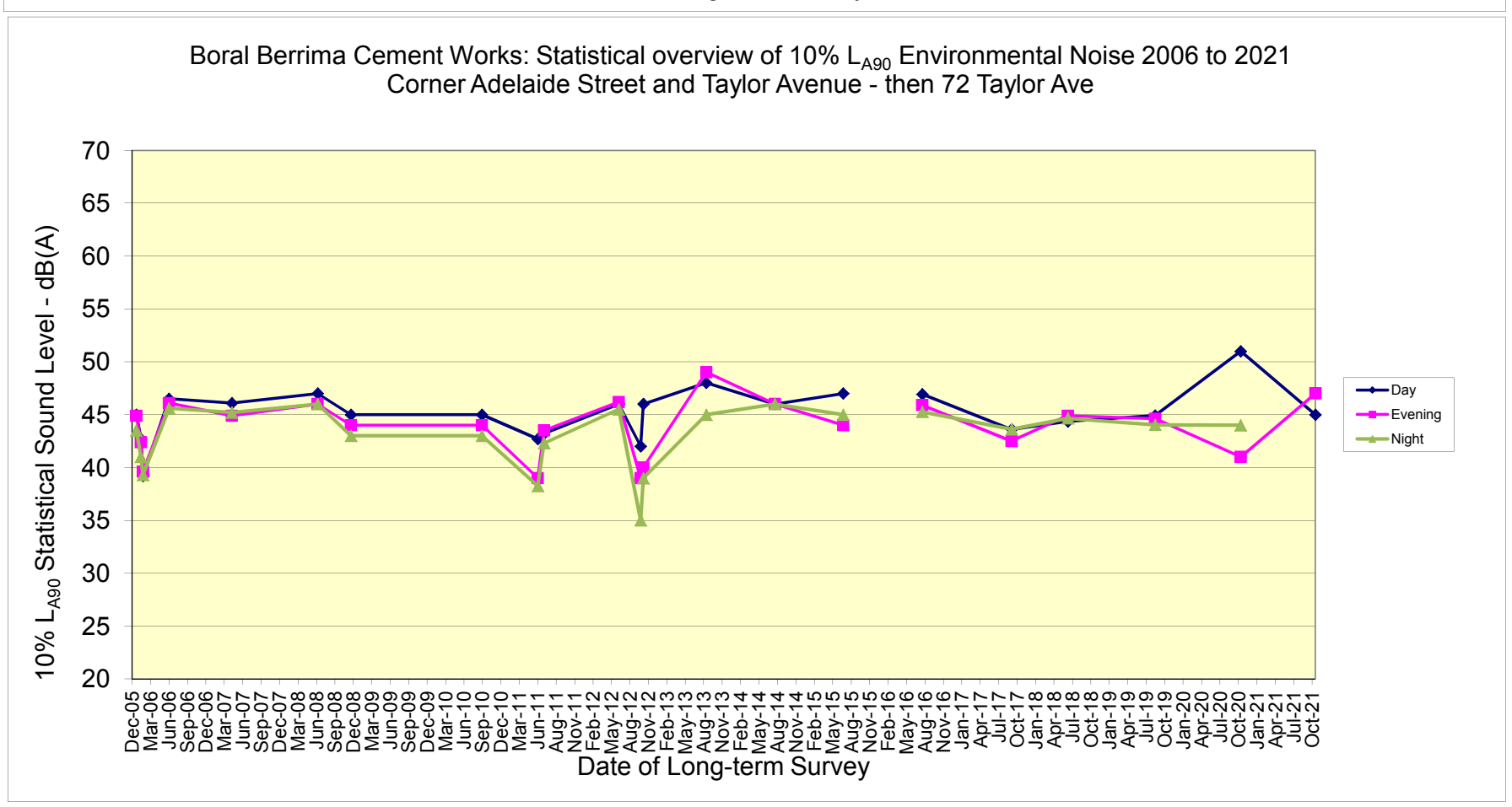
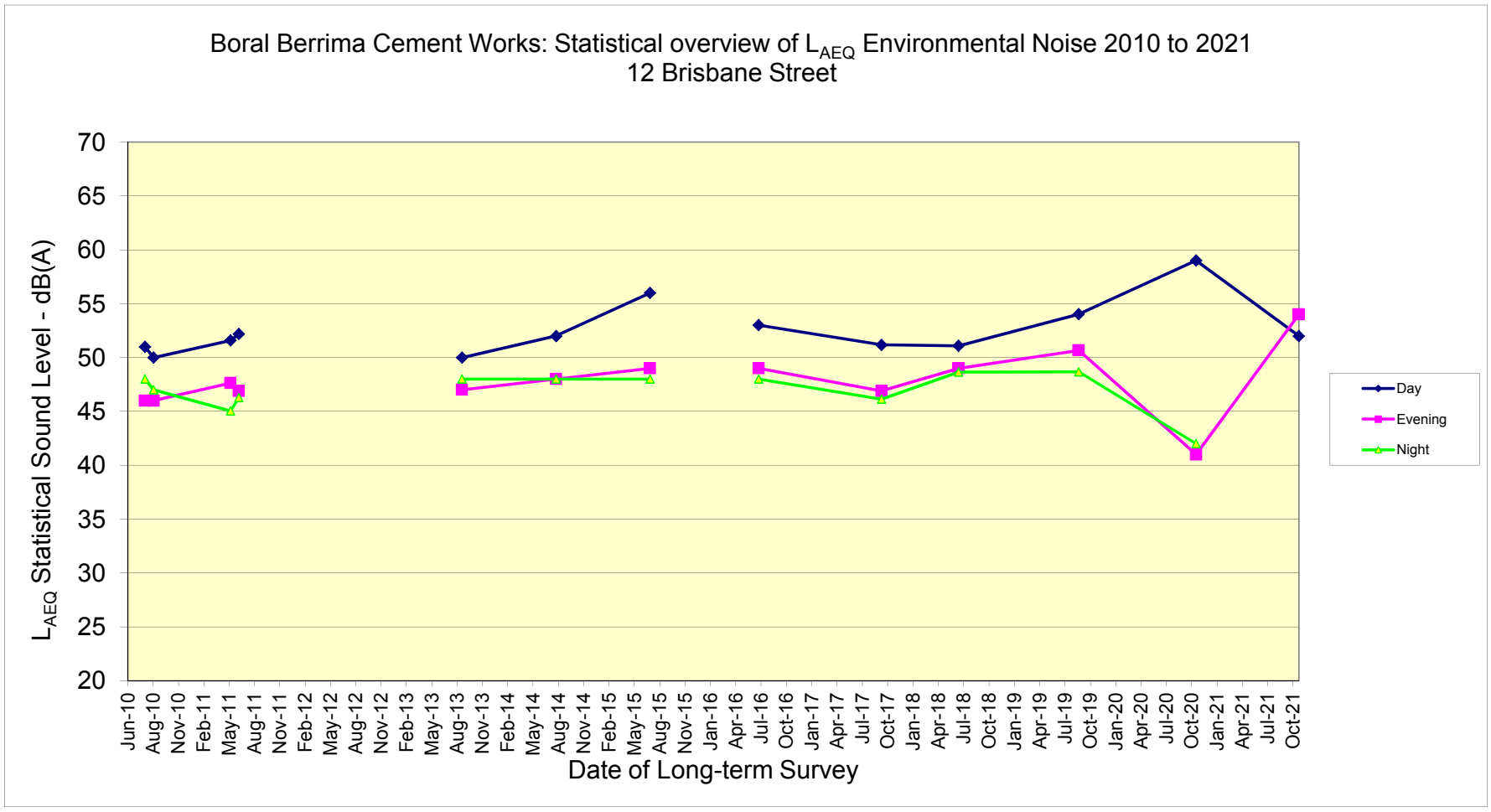


Figure 4.12: Comparison of statistical sound levels for 72 Taylor Ave location



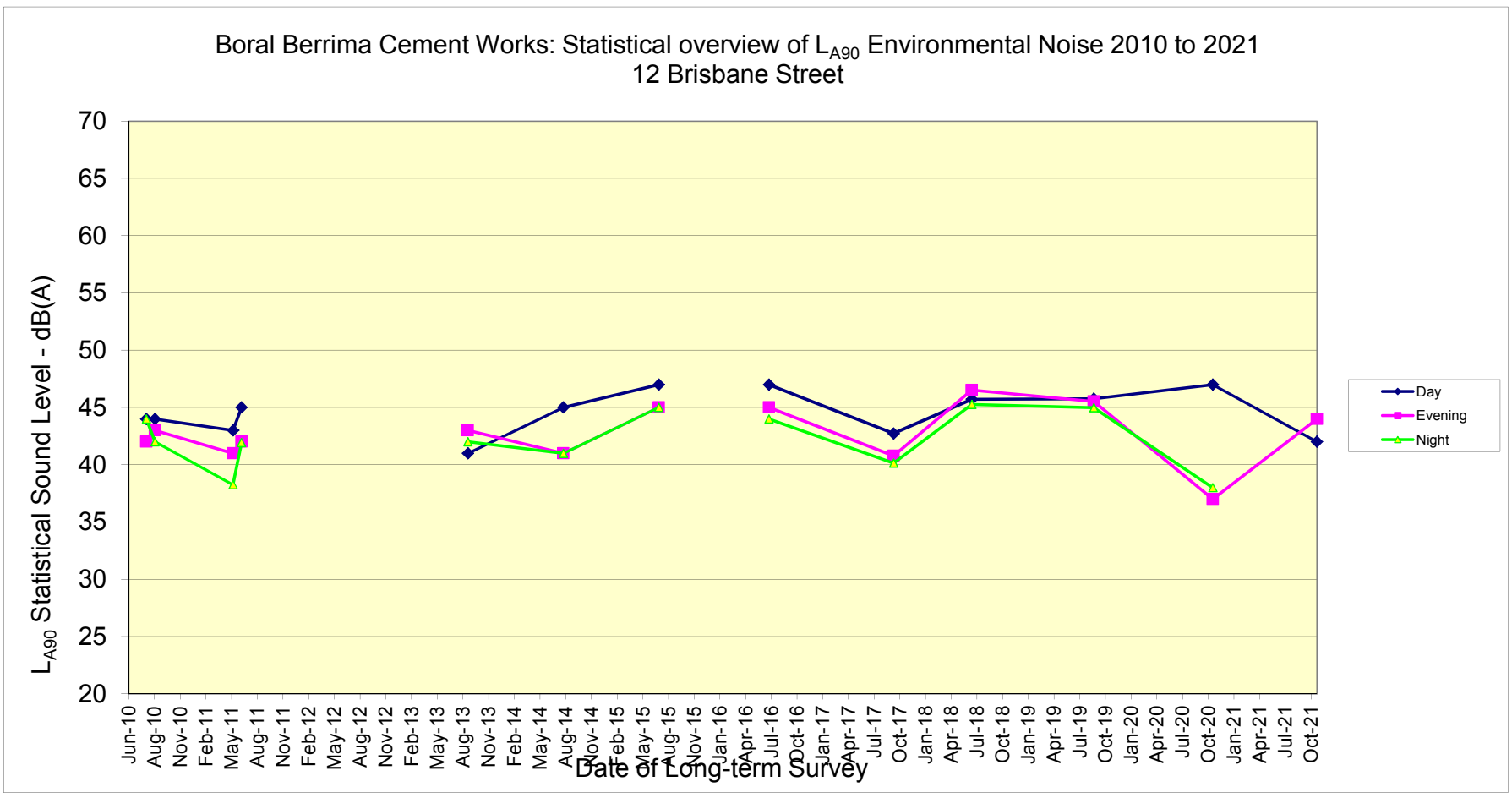
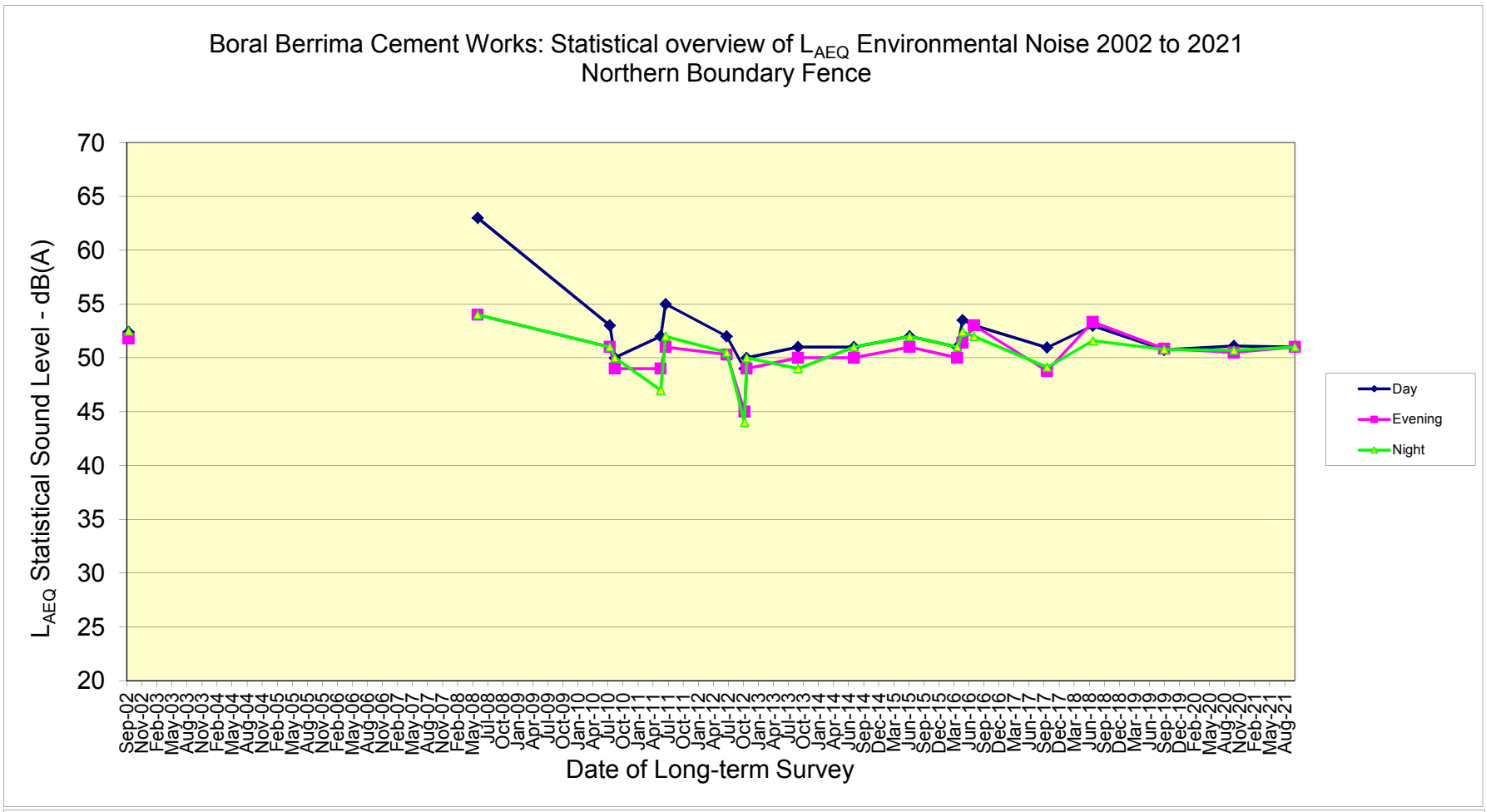
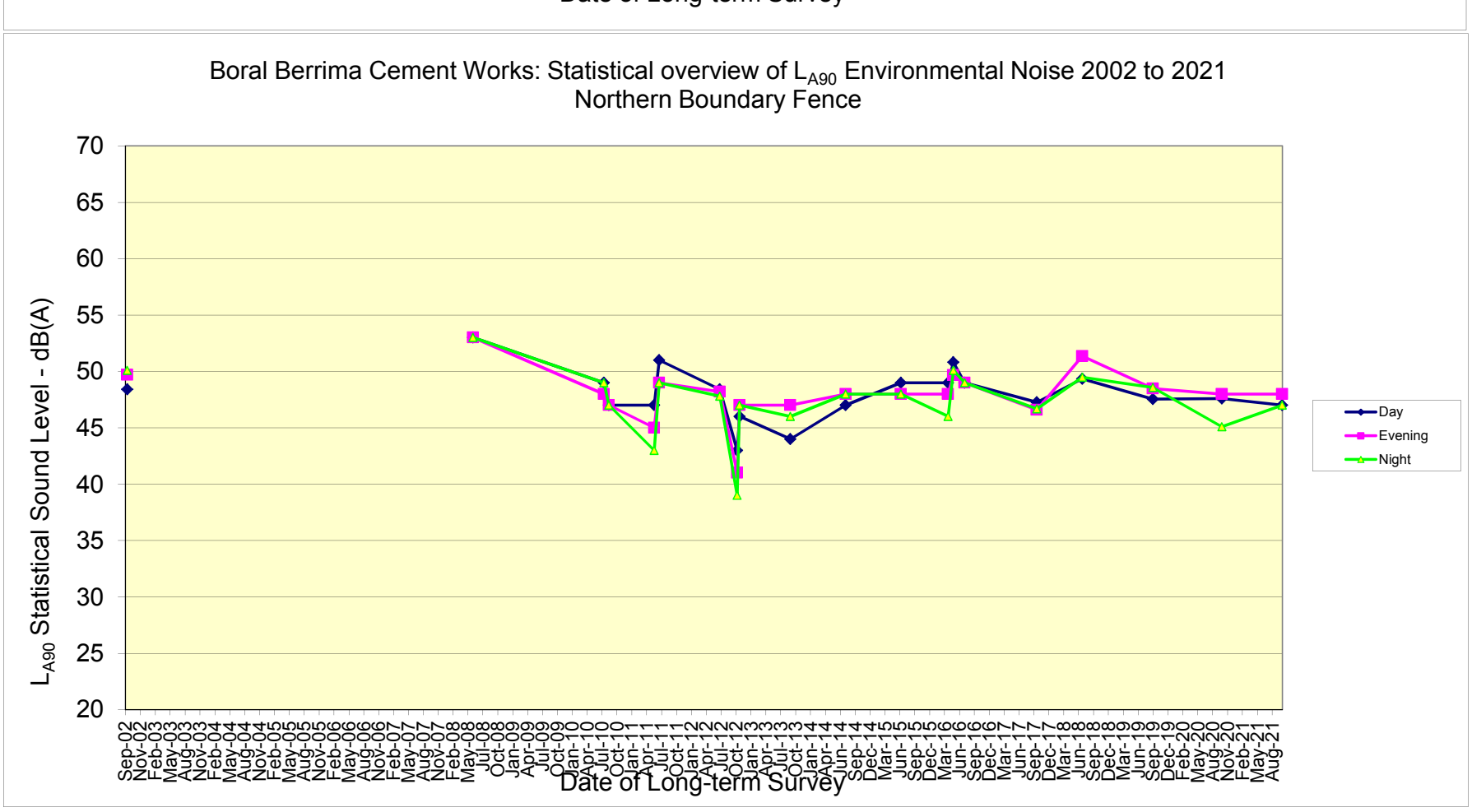


Figure 4.13: Comparison of statistical sound levels for 12 Brisbane Street location





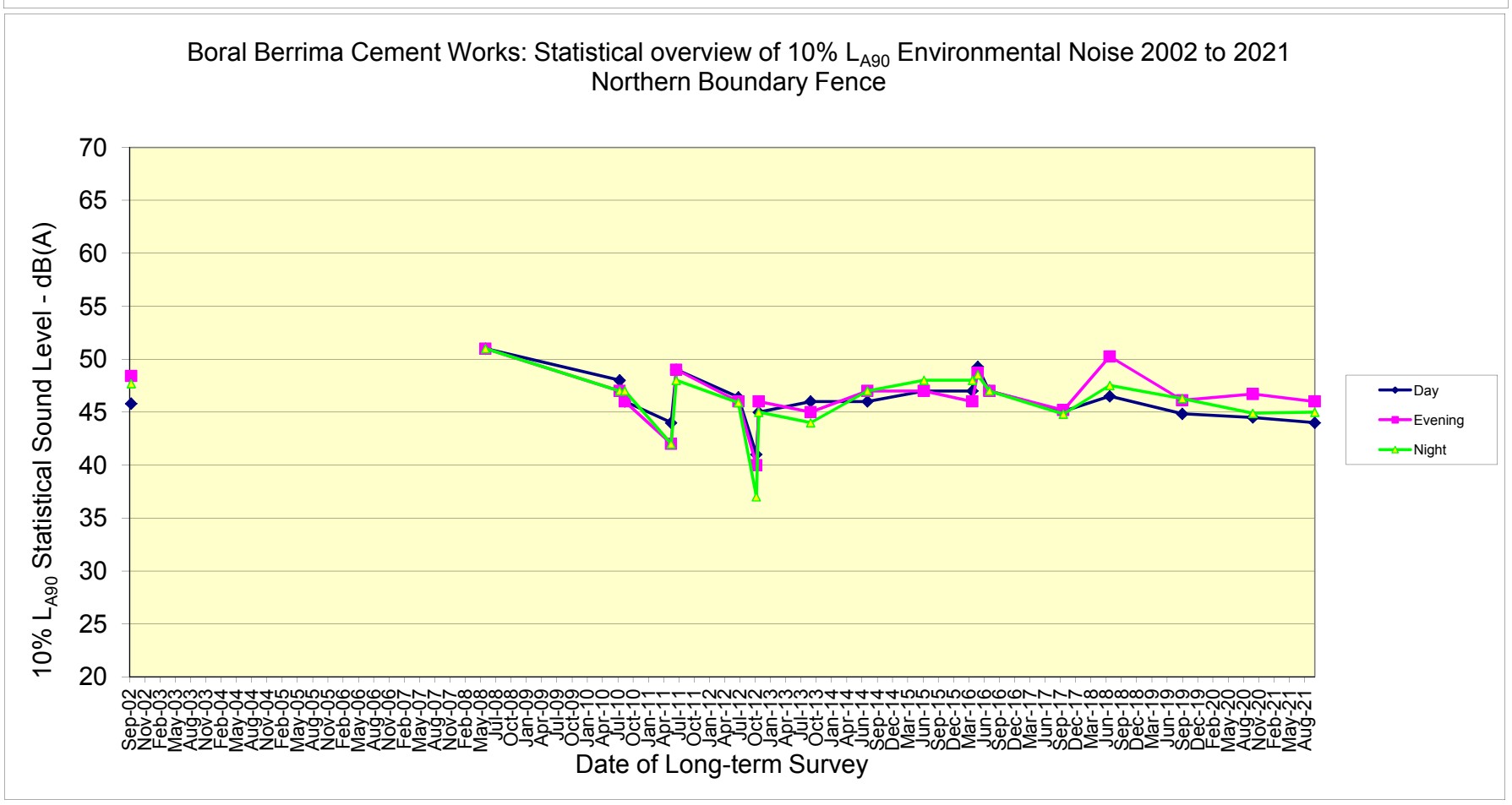
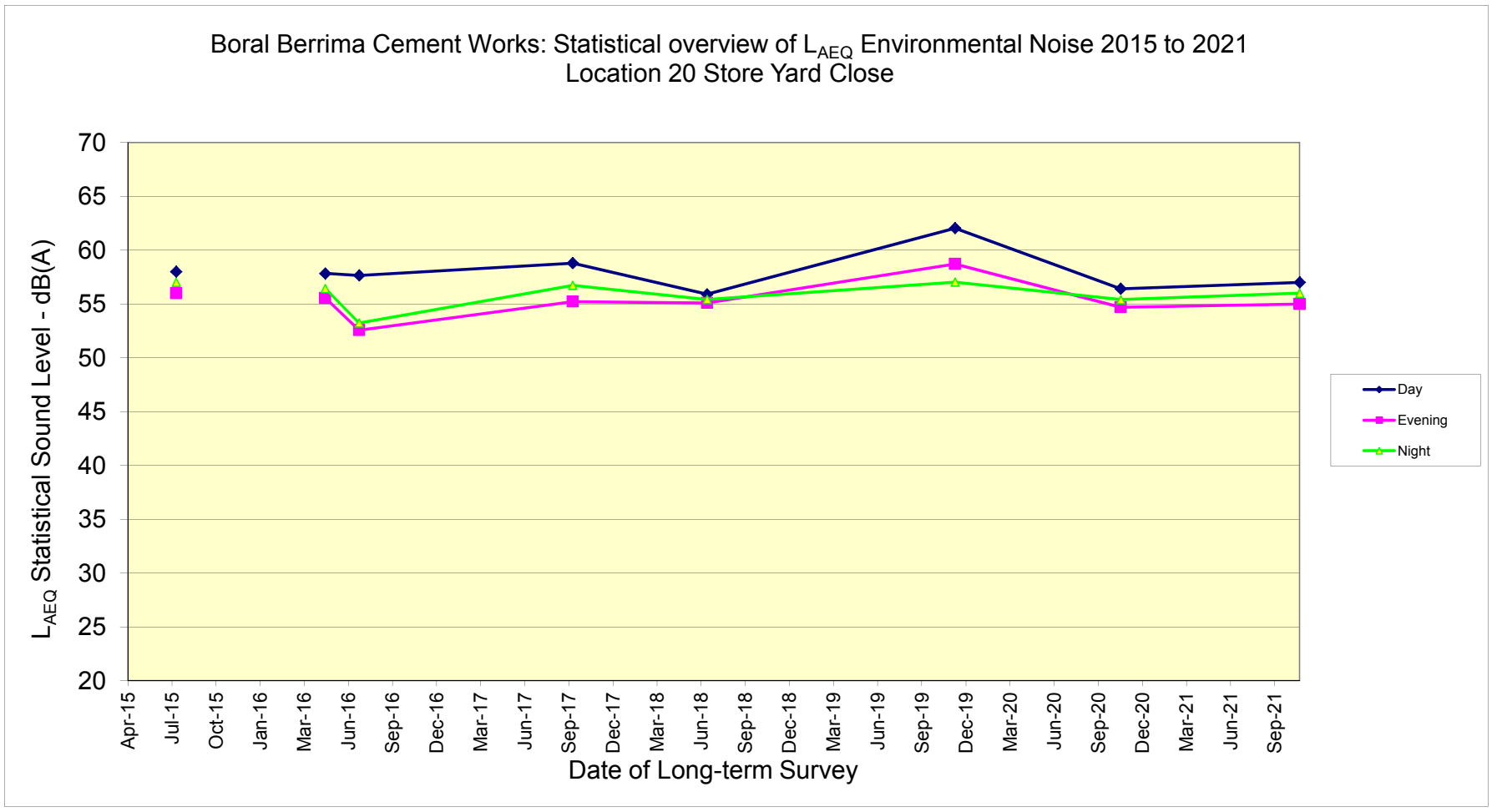


Figure 4.14: Comparison of statistical sound levels for Northern Boundary Fence location



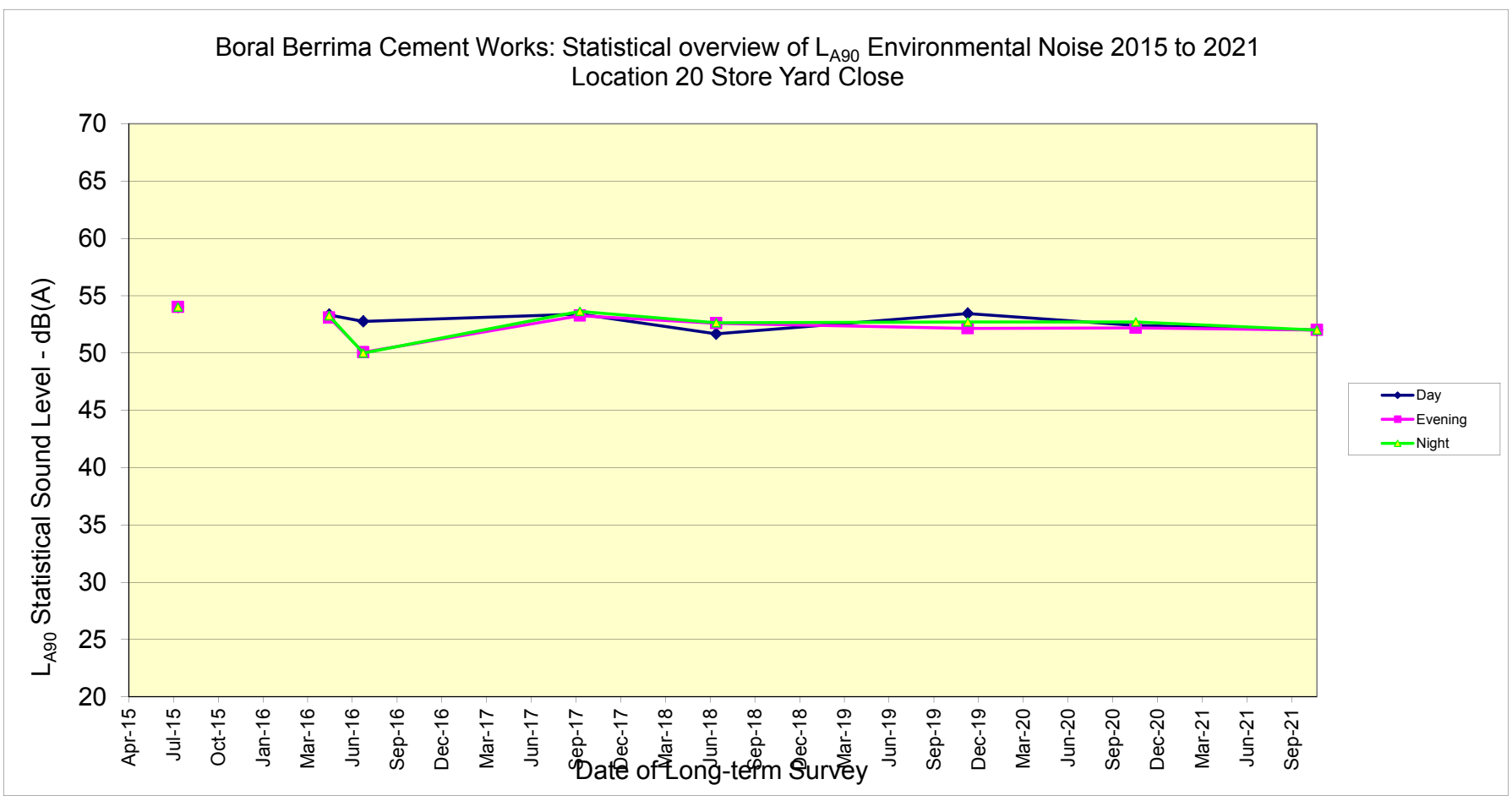


Figure 4.15: Comparison of statistical sound levels for Store Yard Close location

Table 4.2: Boral Cement Berrima - 2021 Annual Environmental Noise Review: Comparison of statistical sound levels 2002 to 2021

Receiver Location 4 Melbourne Street

Parameter	Period	Survey Dates																										Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Sep-04	Jan-06	Feb-06	Jun-06	Apr-07	Jun-08	Dec-08	Sep-10	Jun-11	Jul-11	Jul-12	Oct-12	Oct-12	Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Oct-21	Max	Min	Ave	SD
LAEQ.ave	Day	57	50	54	55	54	56	54	54	56	56	58	56	55	57	56	52	56	56	55	56	53	56	57			56	53	52	53	54	53	58	50	55	1.9
	Evening	53	48	54	54	65	53	51	50	60	57	53	52	54	59	53	52	51	51	50	52	50	53	52			53	49	49	48	49	48	65	48	52	3.8
	Night	53	44	49	47	49	50	51	49	51	51	51	52	51	56	52	50	50	51	49	51	51	52	52			52	48	48	47	47	47	56	44	50	2.4
LA90.ave	Day	46	40	43	43	44	45	45	44	44	45	47	46	47	50	47	45	46	46	43	45	43	48	48			48	44	43	43	43	43	50	40	45	2.2
	Evening	44	39	42	42	42	44	45	43	45	46	47	46	46	49	46	39	39	45	40	39	42	47	46			46	42	42	42	42	42	49	39	43	2.8
	Night	44	37	41	39	40	44	45	43	42	46	46	46	45	50	46	38	38	44	36	40	42	47	45			46	42	42	42	41	41	50	36	43	3.3
10%LA90.med	Day	44	38	41	39	41	43	43	42	43	43	45	45	45	43	45	42	44	43	40	43	41	45	46			45	42	41	40	41	40	46	38	42	2.1
	Evening	42	37	40	40	39	42	44	42	43	43	45	44	45	46	43	38	41	42	33	34	41	45	44			45	41	41	40	41	39	46	33	41	3.1
	Night	42	35	39	37	37	42	43	41	42	43	44	44	44	44	44	38	40	41	29	34	40	44	43			43	40	40	39	38	39	44	29	40	3.6

		INP Acceptable*	Kiln 6 Contribution	CM7 Contribution	NL Rec PRP7 20
LAEQ	Day	60	43	43	46
	Evening	50	43	43	42
	Night	45	40	40	40

* Based on Suburban/Industrial Interface from NSW INP Table 2.1

Most Off Most on Most Off Most on

Ave L90 from attended for Jun & Dec 2008

44126

Table 4.2: Boral Cement Berrima - 2021 Annual Environmental Noise Review: Comparison of statistical sound levels 2002 to 2021 continued

Receiver Location 4 Melbourne Street

Receiver Location 72 Taylor Ave near Adelaide St - Note for 2020 results are from attended monitoring

Parameter	Period	Survey Dates																										Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Jan-06	Feb-06	Feb-06	Jun-06	Apr-07	Jun-08	Dec-08	Sep-10	Jun-11	Jul-11	Jul-12	Oct-12	Oct-12	Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Oct-21	Max	Min	Ave	SD
LAEQ.ave	Day								61	62	54	63	62	63	63	60	57	60	60	60	59	61	61	52			63	58	60	60	61	62	63	52	60	2.8
	Evening								57	58	50	59	57	59	59	56	57	53	55	54	48	57	55	47			58	54	55	54	51	58	59	47	55	3.4
	Night								56	56	49	58	56	59	58	56	55	56	55	52	48	60	55	50			58	53	55	54	52		60	48	55	3.3
LA90.ave	Day								47	45	41	48	48	49	49	47	46	47	49	45	48	50	47	49			50	46	47	48	51	45	51	41	47	2.2
	Evening								46	44	40	47	46	46	47	45	37	42	48	40	41	49	47	46			48	44	46	47	43	47	49	37	45	3.1
	Night								45	42	40	47	46	45	48	46	36	42	47	38	41	47	47	46			48	44	46	47	44		48	36	44	3.3
10%LA90.ave	Day								45	43	39	47	46	47	45	45	43	43	46	42	46	48	46	47			47	44	44	45	51	45	51	39	45	2.4
	Evening								45	42	40	46	45	46	44	44	39	44	46	39	40	49	46	44			46	43	45	45	41	47	49	39	44	2.7
	Night								44	41	39	46	45	46	43	43	38	42	46	35	39	45	46	45			45	44	45	44	44		46	35	43	3.0

		INP Acceptable*	Kiln 6 Contribution	CM7 Contribution	NL Rec PRP7 20
LAEQ	Day	60	43	43	48
	Evening	50	43	43	44
	Night	45	40	40	43

Most Off Most on Most Off Most on

Ave L90 from attended for Jun & Dec 2008

Receiver Location 12 Brisbane Street - Note for 2020 results are from attended monitoring

Parameter	Period	Survey Dates																										Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Sep-04	Jan-06	Feb-06	Jun-06	Apr-07	Jun-08	Aug-10	Sep-10	Jun-11	Jul-11				Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Oct-21	Max	Min	Ave	SD
LAEQ.ave	Day														51	50	52	52				50	52	56			53	51	51	54	59	52	59	50	53	2.5
	Evening														46	46	48	47				47	48	49			49	47	49	51	41	54	54	41	48	3.0
	Night														48	47	45	46				48	48	48			48	46	49	49	42		49	42	47	1.9
LA90.ave	Day														44	44	43	45				41	45	47			47	43	46	46	47	42	47	41	45	2.0
	Evening														42	43	41	42				43	41	45			45	41	47	46	37	44	47	37	43	2.5
	Night														44	42	38	42				42	41	45			44	40	45	45	38		45	38	42	2.5
10%LA90.ave	Day														42	42	40	42				42	42	46			44	42	43	42	47	42	47	40	43	1.9
	Evening														41	41	37	41				42	42	43			43	41	44	43	36	44	44	36	41	2.4
	Night														39	41	35	40				39	42	44			41	40	44	43	38		44	35	41	2.5

Most Off Most on

Receiver Location 4 Northern Boundary

Parameter	Period	Survey Dates																										Statistics			
		Sep-02	Jan-03	Feb-03	Feb-04	Mar-04	Apr-04	May-04	Sep-04	Jan-06	Feb-06	Jun-06	Apr-07	Jun-08	Aug-10	Sep-10	Jun-11	Jul-11	Jul-12	Oct-12	Oct-12	Sep-13	Aug-14	Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Sep-19	Oct-20	Oct-21	Max	Min	Ave	SD
LAEQ.ave	Day	52												63	53	50	52	55	52	49	50	51	51	52	51	54	53	51	53	51	51	51	63	49	52	2.9
	Evening	52												54	51	49	49	51	50	45	49	50	50	51	50	51	53	49	53	51	51	51	54	45	50	1.9
	Night	53												54	51	50	47	52	51	44	50	49	51	52	51	52	52	49	52	51	51	51	54	44	51	2.2
LA90.ave	Day	48												53	49	47	47	51	48	43	46	44	47	49	49	51	49	47	49	48	48	47	53	43	48	2.3
	Evening	50												53	48	47	45	49	48	41	47	47	48	48	48	50	49	47	51	48	48	48	53	41	48	2.4
	Night	50												53	49	47	43	49	48	39	47	46	48	48	46	50	49	47	49	49	45	47	53	39	47	2.9
10%LA90.ave	Day	46												51	48	46	44	49	46	41	45	46	46	47	47	49	47	45	47	45	45	44	51	41	46	2.2
	Evening	48												51	47	46	42	49	46	40	46	45	47	47	46	49	47	45	50	46	47	46	51	40	47	2.5
	Night	48												51	47	47	42	48	46	37	45	44	47	48	48	49	47	45	48	46	45	45	51	37	46	2.9

Most Off Most on Most Off Most on

Receiver Location 20 Store Yard Close from 2015

Parameter	Period	Survey Dates																										Statistics			
																								Jul-15	Apr-16	May-16	Jul-16	Sep-17	Jul-18	Nov-19	Oct-20	Oct-21	Max	Min	Ave	SD
LAEQ.ave	Day																							58		58	58	59	56	62	56	57	62	56	58	1.9
	Evening																							56		56	53	55	55	59	55	55	59	53	55	1.7
	Night																							57		56	53	57	55	57	55	56	57	53	56	1.3
LA90.ave	Day																							54		53	53	53	52	53	52	52	54	52	53	0.8
	Evening																							54		53	50	53	53	52	52	52	54	50	52	1.2
	Night																							54		53	50	54	53	53	53	52	54	50	53	1.2
10%LA90.ave	Day																							52		52	52	52	51	53	51	44	53	44	51	2.8
	Evening																							53		52	51	53	51	51	51	46	53	46	51	2.2
	Night																							51		52	51	53	52	52	51	45	53	45	51	2.5

4.2 Location 20 Store Yard (Close) location results compared to licence conditions and recommendations

4.2.1 $L_{A90,period}$ sound levels

The licence condition for noise emissions from the site is consolidated into measurements at Location 20, with $L_{A90,15\text{-minutes}}$ not to exceed 58 dBA. The PRP recommended objectives for the Store Yard Close location were a long-term average $L_{A90.period}$ not greater than 56 dBA or 58 dBA for any 15-minute period. Measurement methods have to be generally as required in the NSW Noise Policy for Industry – this means omission of results during high wind speed or rainfall or from extraneous sources. Results of the measurements are provided in Appendix D.

For the 14 days of measurements the highest 15-minute period value for $L_{A90,15\text{-min}}$ was 59 dBA, which is the same as in 2018, 2019 and 2020. This occurred in the 15-minute period from 4:15am to 4:30am on 28 October 2021, and is considered to have been caused by train movements by one or more trains adjacent to the Location 20 noise logger position, as discussed further below. Other periods with sound levels at 58 dBA occurred during periods when the wind speed was close to 10m/s and general environmental noise was likely to be high, in the early morning of 25th and 28th October. All other day, evening or night periods had no period $L_{A90,15\text{-min}}$ greater than 57 dBA. The highest period average in any 24-hour day was 56 dBA for the night periods starting on 25th , 27th and 30th October. The average over all periods for the 14 day period was 53 dBA, with daytime 55 dBA, evening 54 dBA and night-time 56 dBA. Table 4.3 below shows the statistics for the $L_{A90.15minute}$ period values and Figures 4.17 to 4.20 show graphs of these results.

Of the 1217 periods measured with wind speeds less than 10m/s and no rainfall events, two 15-minute period or 0.2% of the total number had $L_{A90.15\text{-minute}}$ sound levels greater than the recommended maximum for any period of 58.0 dBA. Most of these were for periods with high wind speeds on 25 and 26 October. Only one period exceeded 58.5 dBA and none exceeded 59.0 dBA. The most commonly occurring sound level was 53 dBA with 16% of periods at this value.

One event with the maximum sound level of 59 dBA $L_{A90,15\text{-min}}$ was for the period from 4:15 to 4:30am on 28 October. Review of the logger data indicated that the event with higher sound levels commenced at approximately 4:18am and there were events with relatively high passby sound levels. Figure 4.21 shows the 1 second time-history graphs for the period. Figure 4:22 includes 63 Hz and 80 Hz band sound levels from Location 20 and 80 Hz band levels from the North Fence. A curve showing direction of the major source from the logger is also included. The main frequency was found to be in the 80 Hz one-third octave band. When this period was reviewed using the directional information, the source direction of the major sound was SSE and S. The analysis and listening to the whole period indicated that train activity was occurring. Table 4.3a indicates the time-line of the train movements from 3:45am to 4:45am. Figures 4.23 to 4.26 show the sound levels and directions of the major source from 3:45am to 4:45am for each the 15-minute period respectively, also shown are the listening observations in those periods, overlayed with the one-second sound levels, 80 Hz frequency band sound level and direction (degrees ° from north) information. It indicates one or two locos on the rail lines. A loco 140° from the logger moving (a horn and rail squeal are indicators of this), while a Loco at 158° moving to and performing some shunting at 180° or south of the logger. Rail squeal was observed to have the highest peak of 67 dBA in this period.

The period from 4:30 to 4:45am was included to show a train or trains moved back and forward from 162 ° to 165°, back to 158° and then back to 166°. The sound level data over at this time period

ABN: 25 153 946 064
ACN: 153 946 064

reflects this movement, rising from 58 to 63 dBA and then falling to 56, and back up to 63 dBA. A vehicle also appeared to have been parked near the logger at 4:44am, which could have been a support vehicle for the rail activities. The major source of the elevated sound levels during the period was most likely the train locomotive movements and rail squeal.

Such sources are considered extraneous and are not included in the assessment level. The difference in sound level calculated between the Location 20 and North Fence also indicated that the sound level would not affect the $L_{A90,15\text{-}min}$ or other sound level received at the residential locations.

Figure 4.17: Boral Cement Berrima Annual Noise 2021-
Statistics Location 20 $L_{A90,15\text{-}min}$ Number of periods at a sound level

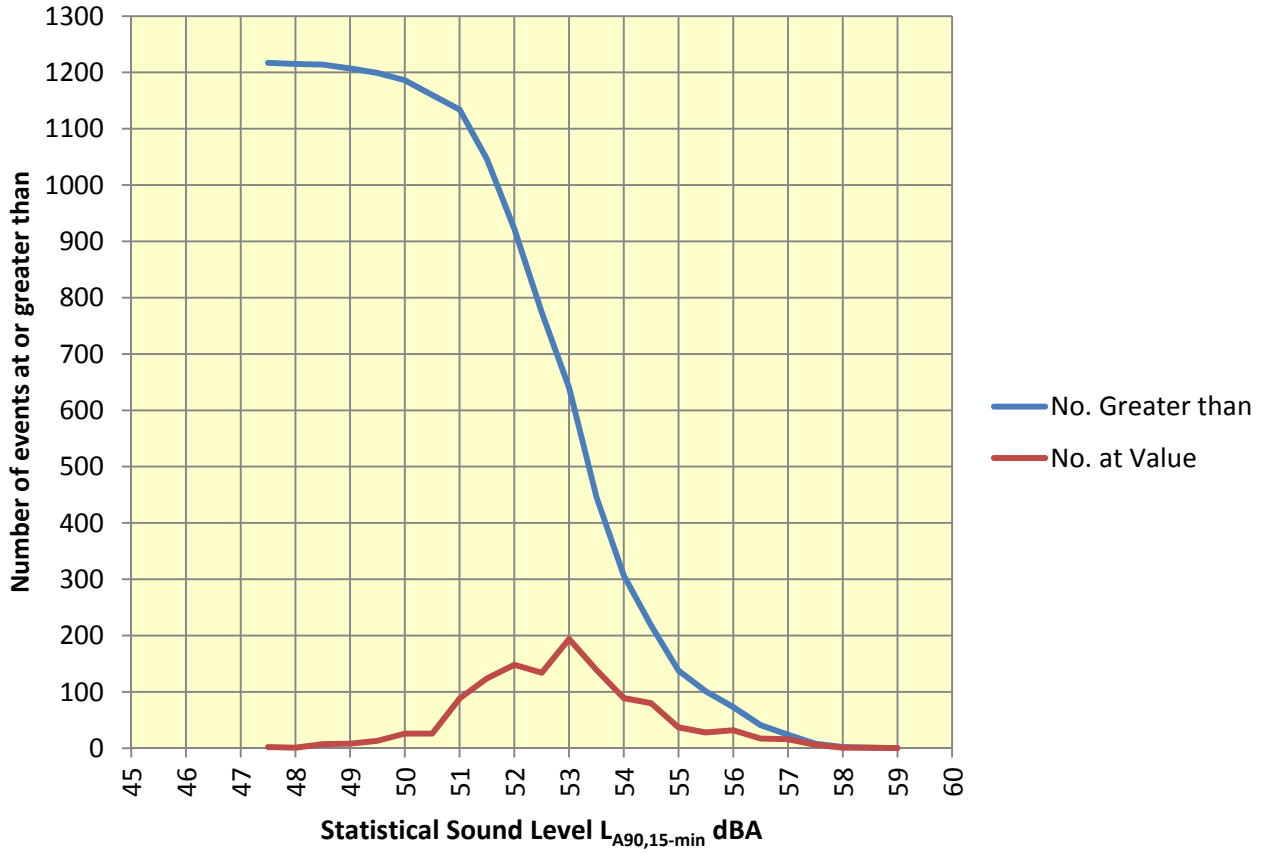


Figure 4.18: Boral Cement Berrima Annual Noise 2021-
Statistics Location 20 $L_{A90,15\text{-}min}$ Percentage of periods at a sound level

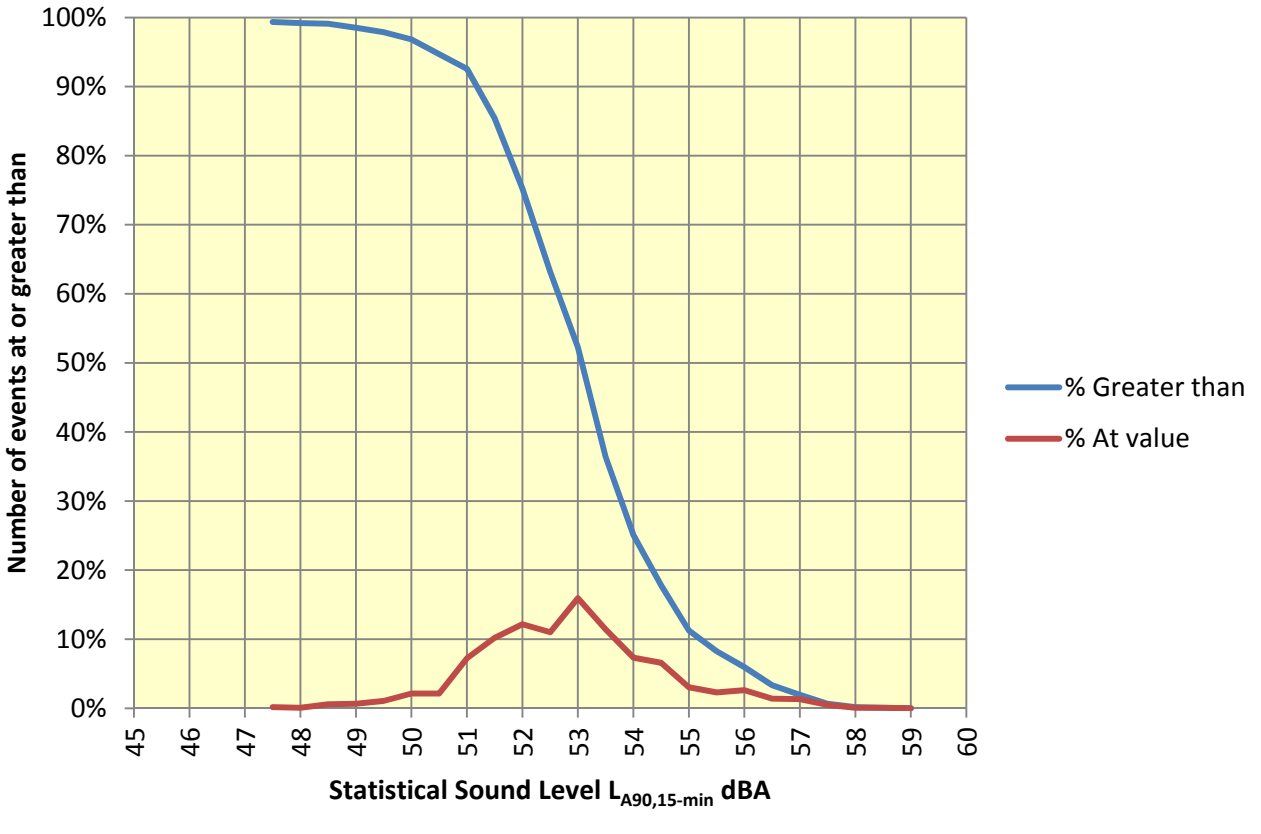


Figure 4.19: Boral Cement Berrima Annual Noise 2021-
Statistics Location 20 $L_{A90,15\text{-}min}$ number of periods at a sound level

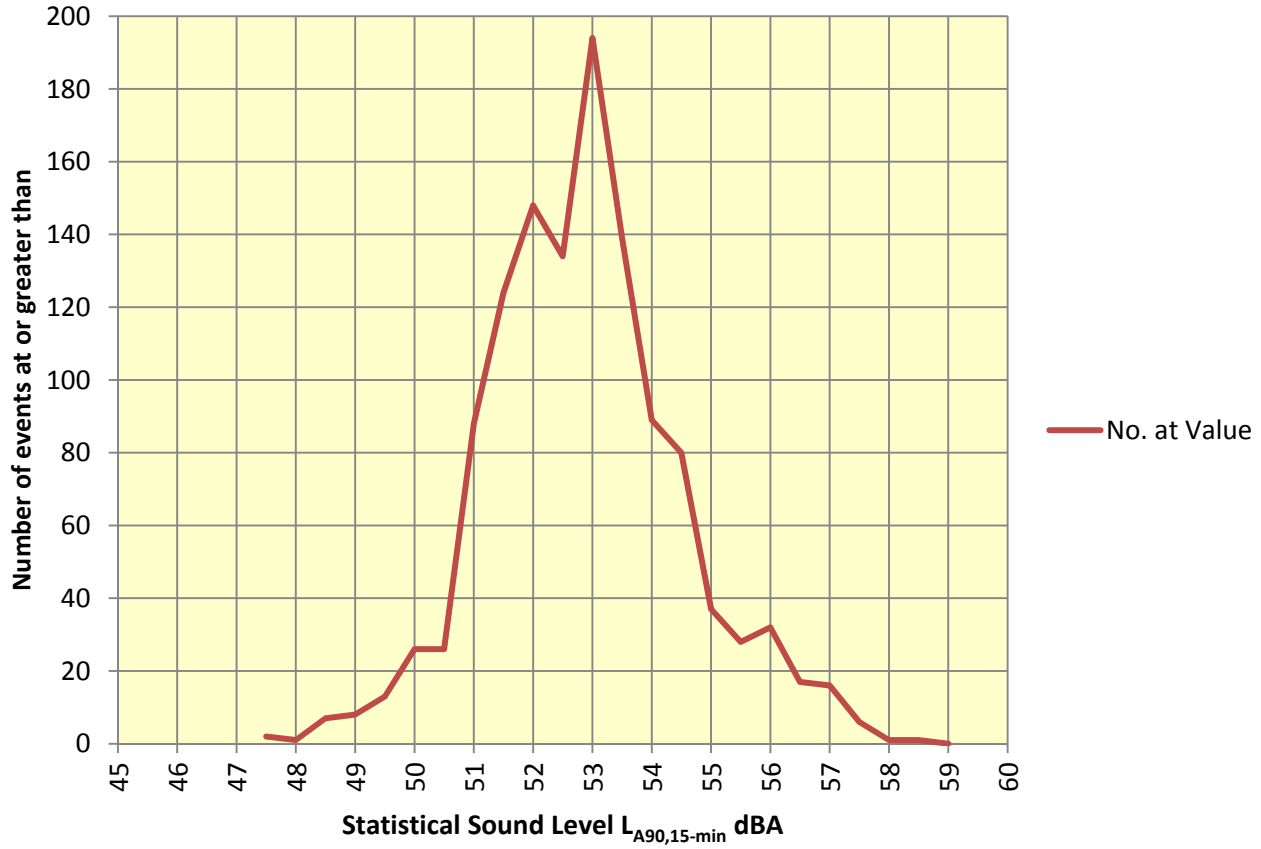
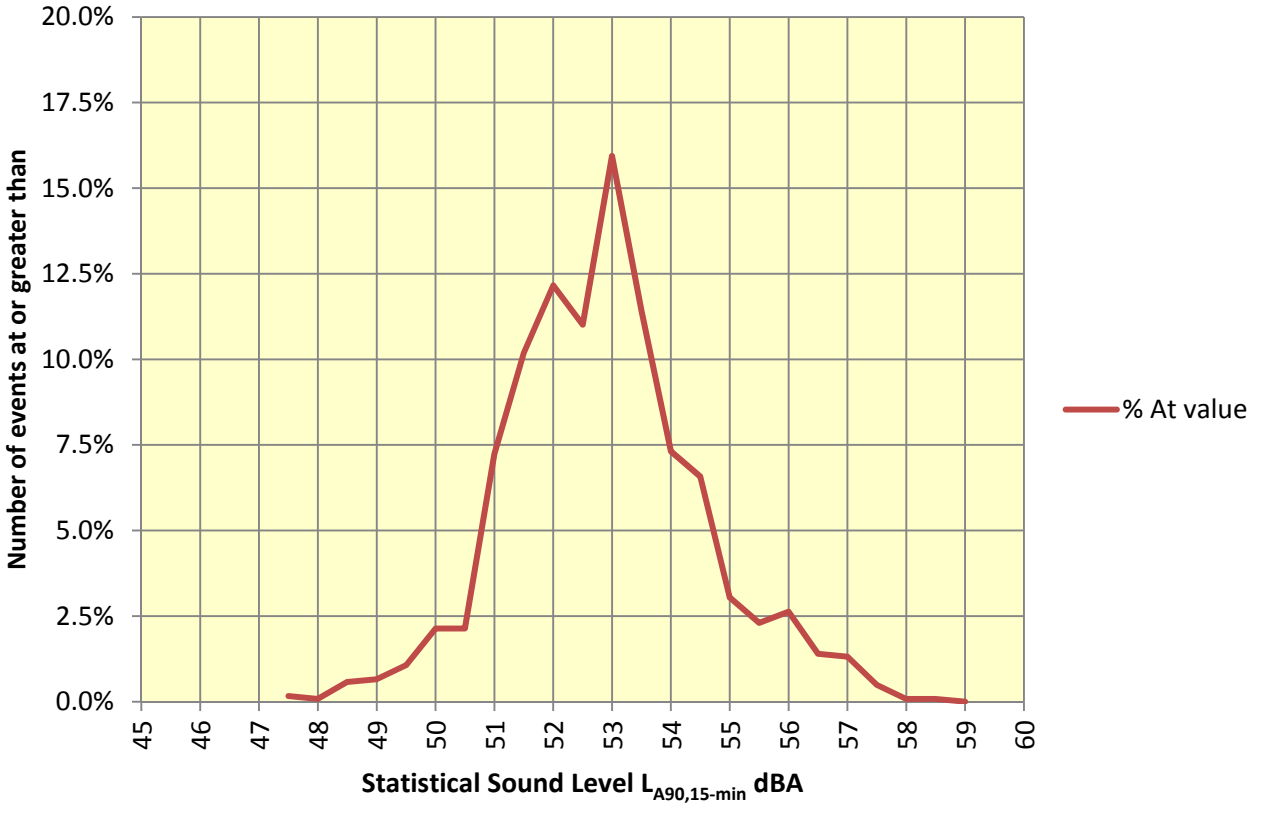


Figure 4.20: Boral Cement Berrima Annual Noise 2021-
Statistics Location 20 $L_{A90,15\text{-}min}$ Percentage of periods at a sound level



ABN: 25 153 946 064
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Table 4.3: Boral Cement Berrima - Store Yard Close Location

Statistics for individual $L_{A90.15\text{-minute}}$ data periods for 2021 measurements

Value $L_{A90,15\text{-min}}$ dBA	No. of periods greater than	No. of periods at Value	% Greater than	% At value
47.5	1217	2	99.3%	0.2%
48	1215	1	99.2%	0.1%
48.5	1214	7	99.1%	0.6%
49	1207	8	98.5%	0.7%
49.5	1199	13	97.9%	1.1%
50	1186	26	96.8%	2.1%
50.5	1160	26	94.7%	2.1%
51	1134	88	92.6%	7.2%
51.5	1046	124	85.4%	10.2%
52	922	148	75.3%	12.2%
52.5	774	134	63.2%	11.0%
53	640	194	52.2%	15.9%
53.5	446	139	36.4%	11.4%
54	307	89	25.1%	7.3%
54.5	218	80	17.8%	6.6%
55	138	37	11.3%	3.0%
55.5	101	28	8.2%	2.3%
56	73	32	6.0%	2.6%
56.5	41	17	3.3%	1.4%
57	24	16	2.0%	1.3%
57.5	8	6	0.7%	0.5%
58	2	1	0.2%	0.1%
58.5	1	1	0.1%	0.1%
59	0	0	0	0

This analysis of acceptable sound level periods monitored at Location 20 for the full 14 day period are considered to be less than or not greater than the licence condition and compliance is achieved.

Figure 4:21: Boral Cement Berrima Annual Environmental Noise 2021 - Location 20 Sound Level 4:15 to 4:30am 28/10/2021

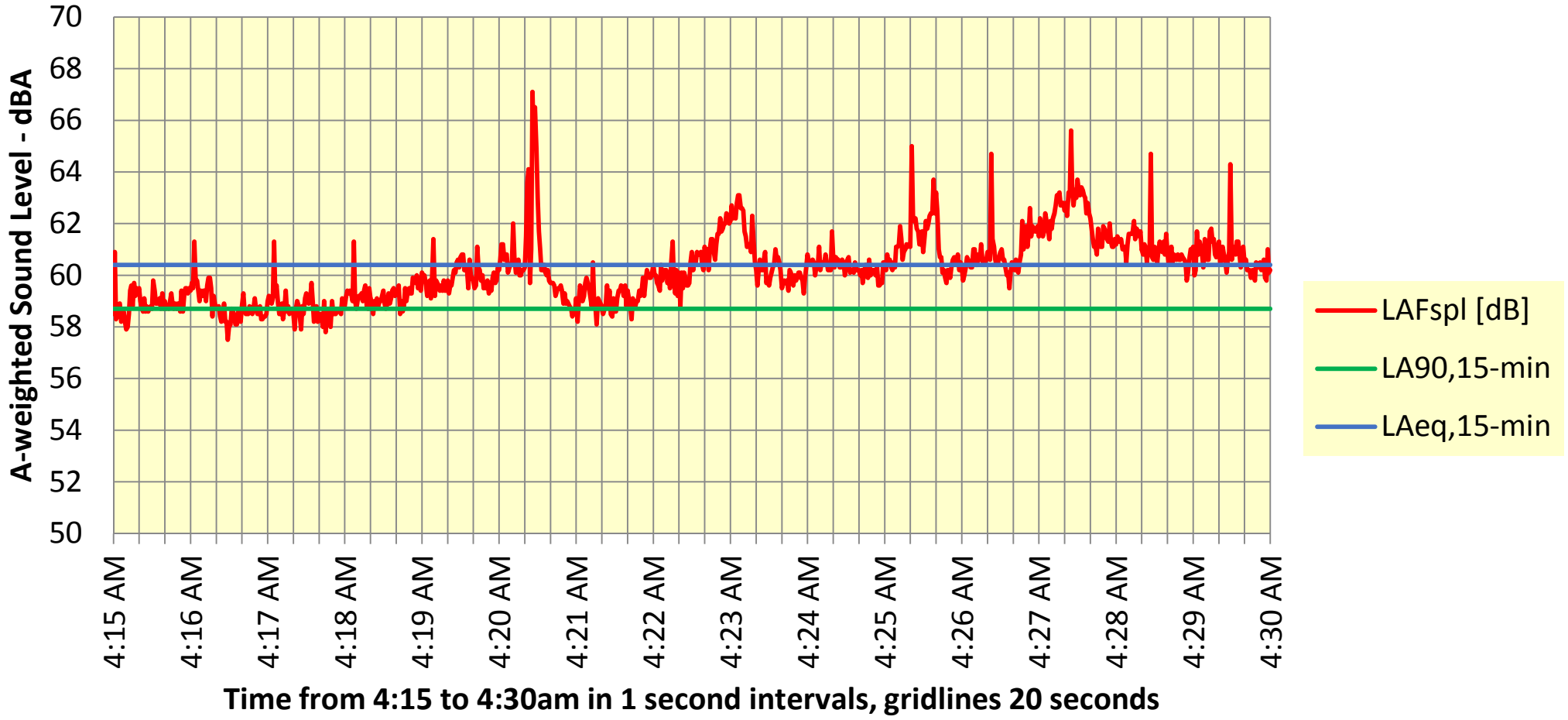


Figure 4:22: Boral Cement Berrima Annual Environmental Noise 2021 - Location 20 4:15 to 4:30am 28/10/21 Noise Investigation

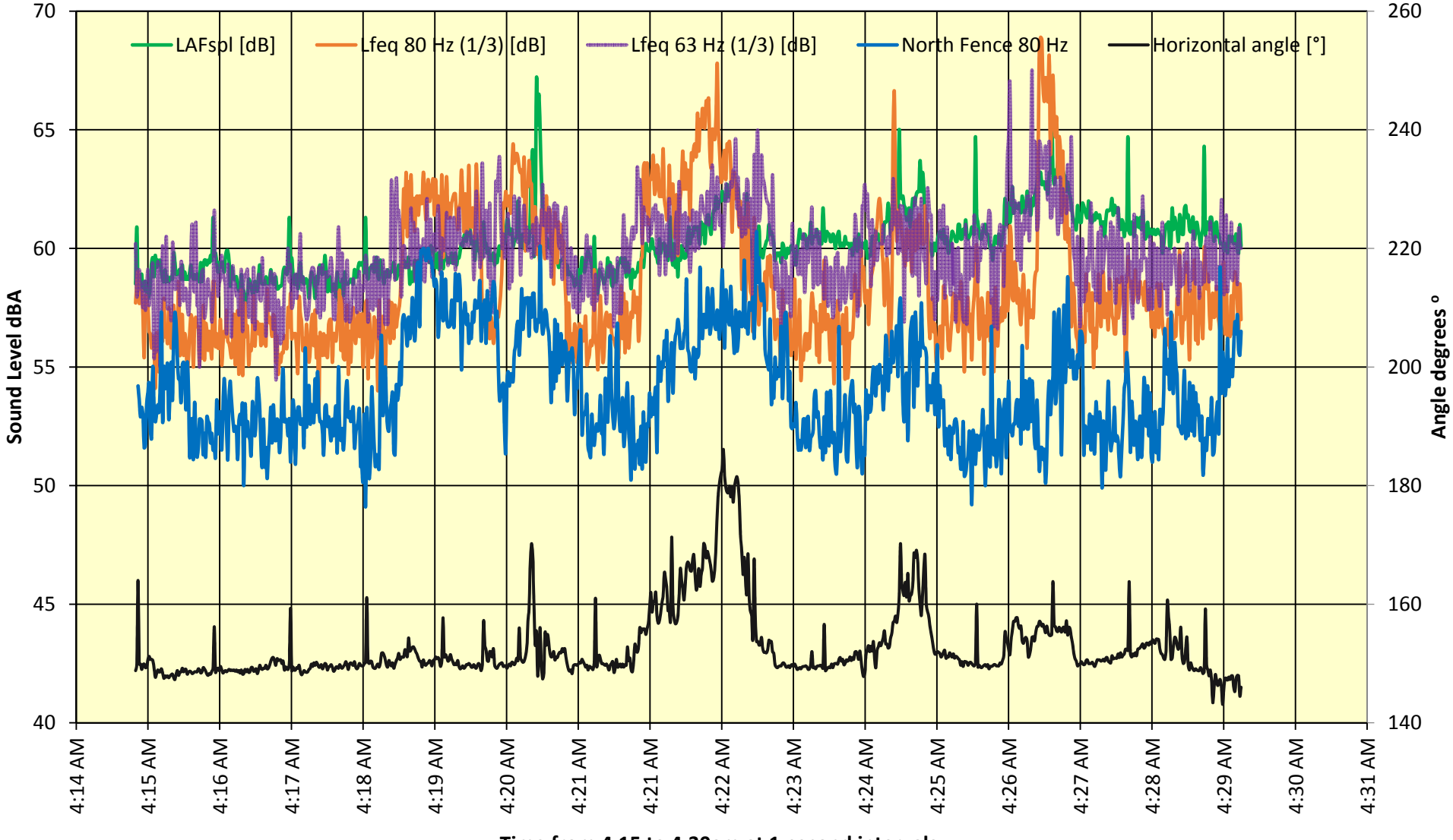


Table 4.3a The timeline of observations while investigation the exceedance event

Time	Activity	$L_{Aeq.15min}$	$L_{A90.15min}$
4:04	train horn - from 150º to 140º; 80Hz level increases indicating loco movement overall spl drops from 60 to 58dbA	60	58
4:09	Rail squealmovement from 150º to 142º indicating movement in that direction ; Level stays the same at 58 dBA	60	58
	It should be noted that the compressor direction moved from 159º at 4:04 to 160º at 4:08		
4:13	The Loco moves closer to logger	60	58
4:18	Loco moves from from 158º to 160º Rail squeal detected 65 dBA	60	59
4:22	Loco moving and shunting @ 180º	60	59
4:24	Loco moving and rail squeal @ 170º	60	59
4:27	Loco only ; 65 dBA	60	59
4:29	Alarm and rail squeal	60	59
	Note: the SPL between was approx 60-67 dBA between 4:23 and 4:30		
4:31	Rail movement : from 162º to 165º to 160º to 158º to 161º to 166º to 158 to 162º to 166º Corresponds to spl going from 58 to 63 to 56 to 63 dBA	59	58
4:44	A vehicle moves next to logger	59	58

Figure 4:23: Boral Cement Berrima Annual Environmental Noise 2021 - Location 20 3:45 to 4am 28/10/21 Noise Investigation

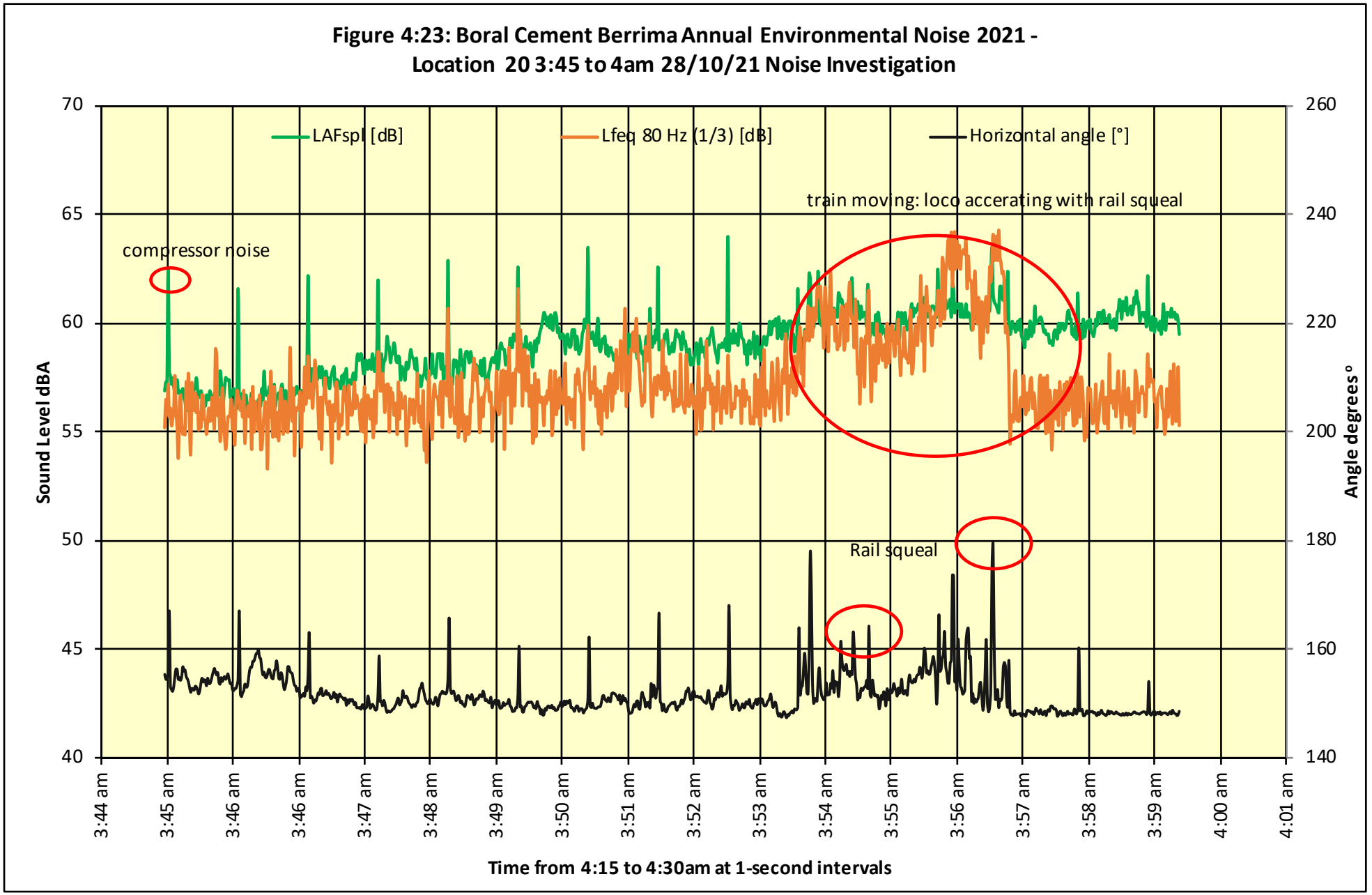


Figure 4:24: Boral Cement Berrima Annual Environmental Noise 2021 - Location 20 4am to 4:15am 28/10/21 Noise Investigation

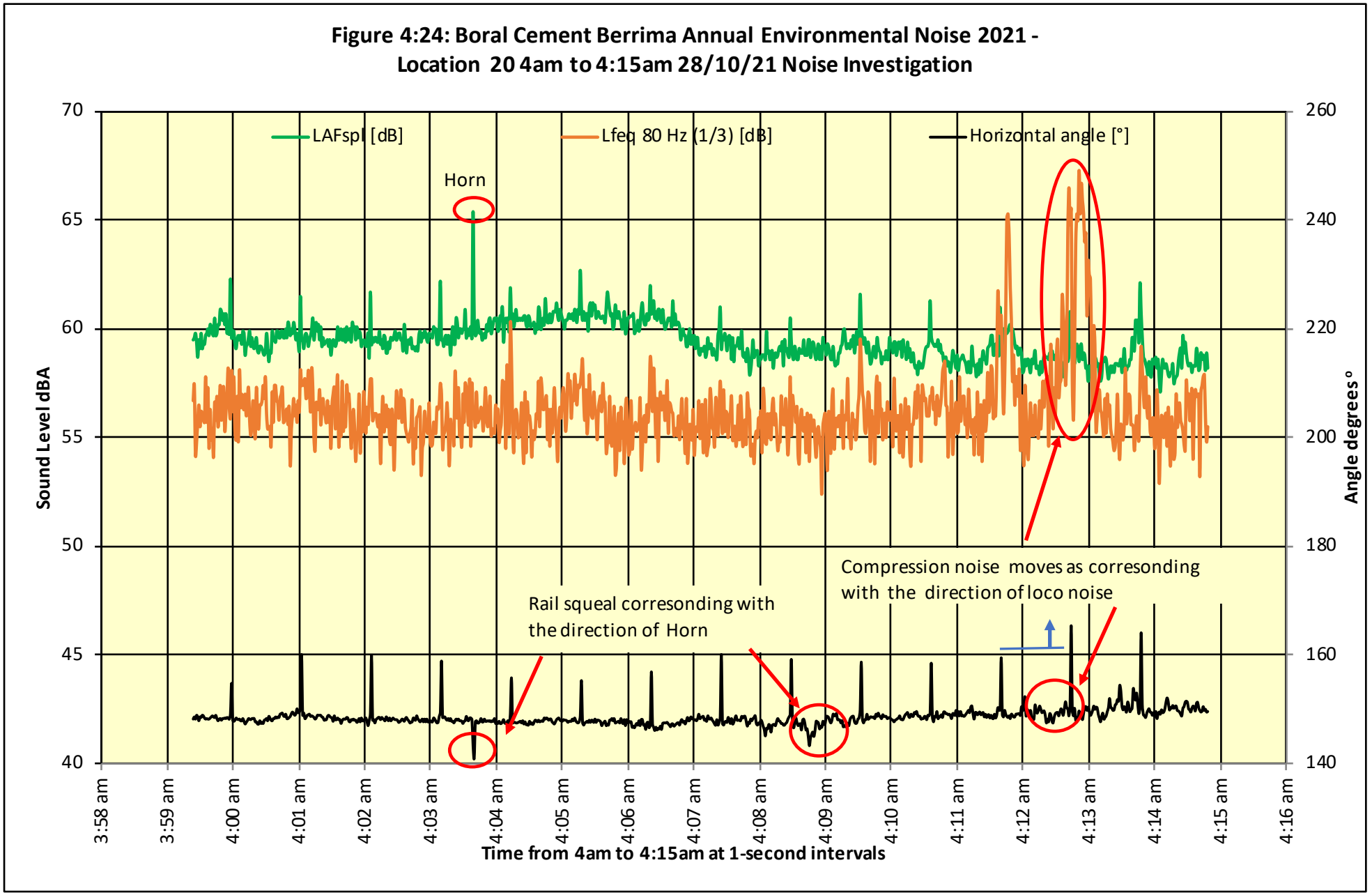


Figure 4:25: Boral Cement Berrima Annual Environmental Noise 2021 - Location 20 4:15 to 4:30am 28/10/21 Noise Investigation

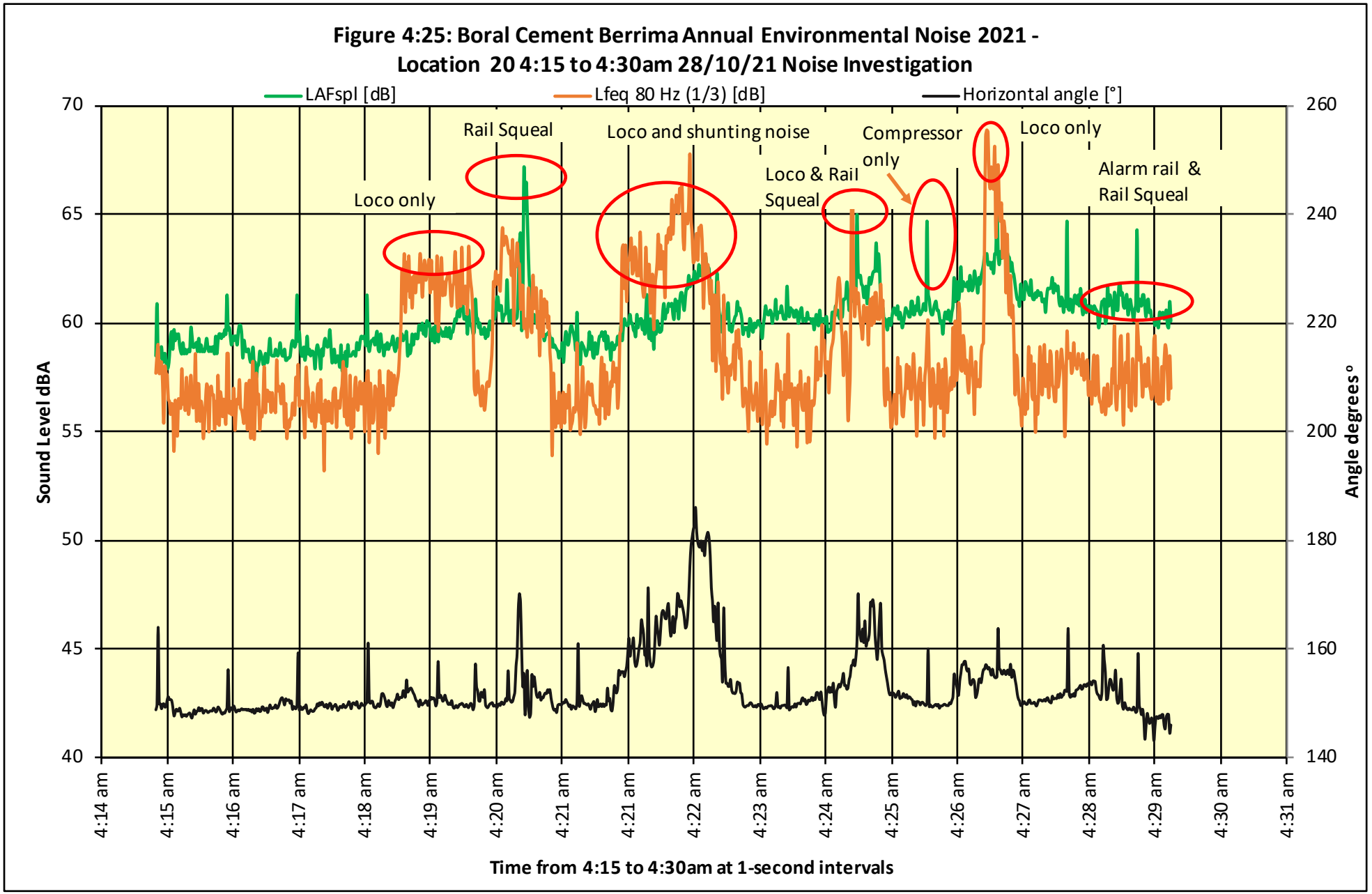
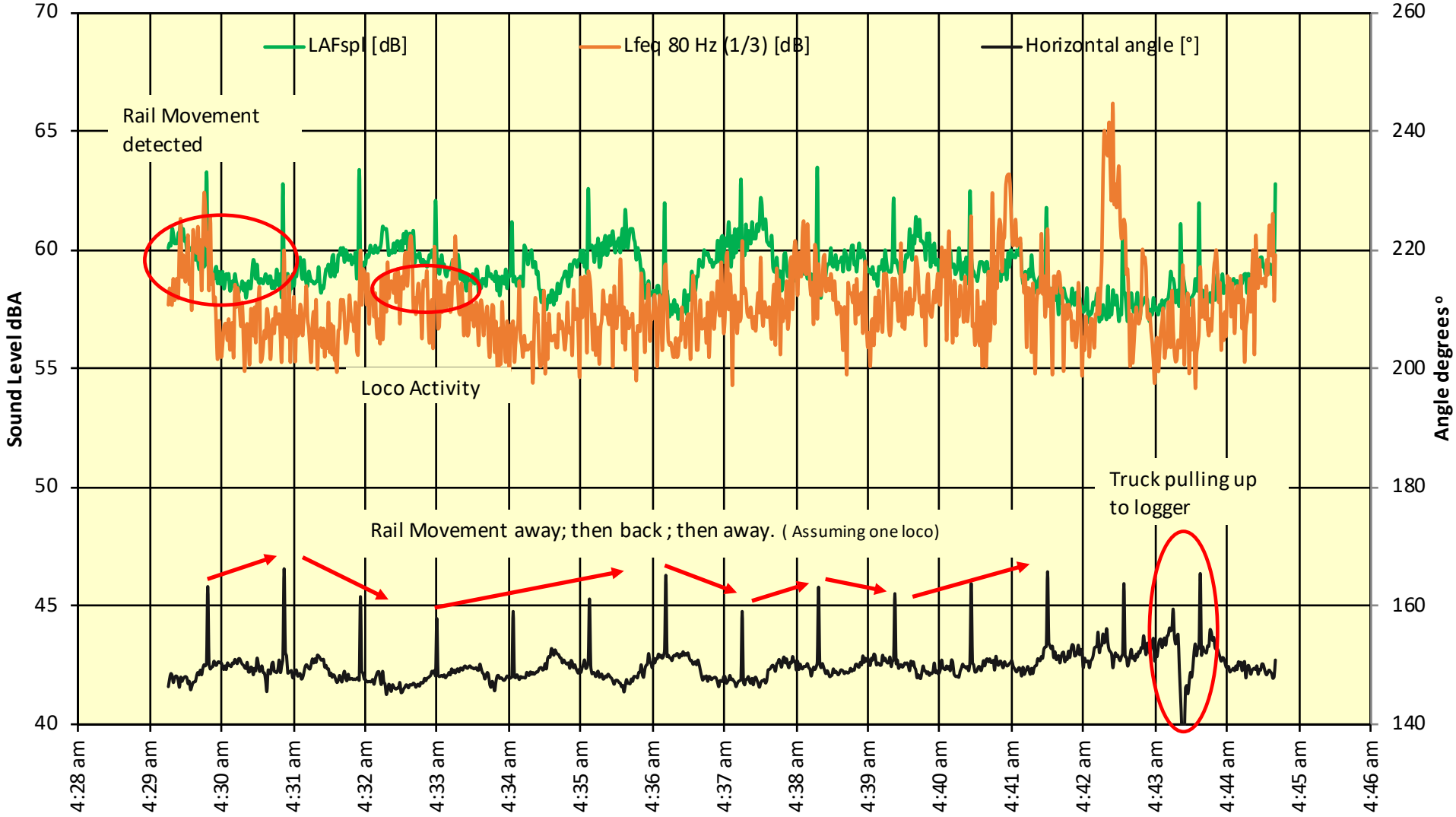


Figure 4:26: Boral Cement Berrima Annual Environmental Noise 2021 - Location 20 4:30 to 4:45am 28/10/21 Noise Investigation



4.2.2 $L_{A01.1\text{-minute}}$ and $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ results for the Northern Boundary

Sound levels measured at the Northern Boundary locations included $L_{A01.1\text{-minute}}$ to allow calculations of $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ at night-time to be made to provide comparisons with recommended maximum values for night-time. The recommended maximum objective of 60 dBA for $L_{A01.1\text{-minute}}$ night-time for the Northern Boundary location and not greater than 15 dB difference for $L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}$ are to indicate sleep disturbance potential and were provided as recommendations in the PRP report. The analysis is made at the Northern Boundary rather than 4 Melbourne St because 4 Melbourne St is regularly affected by noise of passing vehicles in Taylor Avenue and would require significant analysis. If the North Fence results indicate acceptable conditions from Cement plant emissions, then it follows that the 4 Melbourne St location would also be acceptable for Cement Plant sound levels.

The analyses made for the Northern Boundary location showed that for this location, there were 105 events which exceeded the objective of $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ not greater than 15 dB. 15 groups of these periods occurred and sound recordings of specific periods within those 15 groups with $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB were listened to determine sources of noise occurring in the period. These periods were assumed to be typical of the events in adjoining or near-in-time periods.

Of the 105 events identified with a difference of greater than 15 dB at night-time, 30 had a difference of greater than 20 dB and 3 were greater than 25 dB. The maximum difference was 27 dB.

Figure 4.27 is a graph showing the times of events with the $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB for each night of the whole survey. On some or most night periods the events occurred in one particular segment of the period, such as just before and until after dawn; on other nights there were some events also prior to midnight and other nights where the noise occurred several times. Most of the early morning events were associated with bird noise.

The approach to listening to the events to determine the sources of noise was to listen to a representative sample for the monitoring period. The sampling was determined on the time sequence and difference level, for example if there was a run of events one period following directly after each other the period with the highest difference was investigated. If the exceedances were outside the typical period, for example, 2:15am, these were listened to as well. Table 4.4 indicates that a total of 33 events were observed from the listening sample set. Also shown in Table 4.4, birds were identified on 25 of the 33 occasions. This is main cause of exceedances in the period between 5:30am and 7am. As observed from Figures 4.28 to Figures 4.31, these periods with bird noise are the main cause of all the total 47 periods which had exceedances. Other sources identified were, heavy vehicles and thumps on 3 occasions, rail wheel squeal on 2 occasions, of which one was considered loud and annoying, and locomotive horns and rain on one occasion.

On further investigation, it was identified that heavy vehicles were trucks on Taylor Avenue, not inside the plant as the equivalent sound levels at location 20 were lower than the $\mathbf{L_{A01.1\text{-minute}}}$ at North Fence. Melbourne St data also indicates similarly high values at the corresponding times.

Table 4.5 shows the noise observed from the sample set that did not contain the heavy vehicles that were identified on Taylor Ave and birds or insects, which indicated Cement plant site activities. Also included in Table 4.5 are the Sleep Disturbance Criteria $\mathbf{L_{A01.1\text{-minute}}}$, $\mathbf{L_{A90.15\text{-minute}}}$ measured at 4 Melbourne St and their difference. This is to determine whether the potential for sleep disturbance is observed at the closest residential receivers to the cement works.

ABN: 25 153 946 064
ACN: 153 946 064

As indicated from Table 4.5, of the four observed exceedances of the Sleep disturbance criteria at North Fence, when cross referenced with the $L_{A1\text{-Melbourne St}}$ - $L_{A90\text{-Melbourne St}}$ parameter, the sample set was reduced to only one event observation. After listening to the Melbourne St audio file for that time period, the exceedance was considered to have been caused by a vehicle on Taylor Avenue, not from Cement Plant emissions.

A comparison of the event sound levels received at the Northern Boundary indicated that the high levels of $\mathbf{L_{A01,1\text{-minute}}}$ measured were caused by birds, insects or animals, the highest being 77 dBA. Trucks on Taylor Ave were also identified at the Northern Boundary. Rail squeal was noted to have $\mathbf{L_{A01,1\text{-minute}}}$ sound levels of greater than 60 dBA at the Northern boundary, however the number of occurrences was reduced compared to the corresponding survey reported in the 2020 Annual Noise Assessment report.

The results of the analyses for 2021 are very similar to those of the corresponding analysis from the 2020 Annual Noise Assessment report. These analyses indicate that the number or times that the objectives of $\mathbf{L_{A01,1\text{-minute}}}$ greater than 60 dBA and $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB, are relatively low. Therefore it is considered that the noise emissions from the Cement Plant have a low potential for sleep disturbance. Site measurements and analyses indicate that the most likely cause of site sources to exceed criteria is rail associated noise, but not all rail events cause exceedances.

Figure 4.27 Boral Cement Berrima Annual Noise Assessment -Sleep Disturbance Criteria exceedances at North Fence Total Survey Period

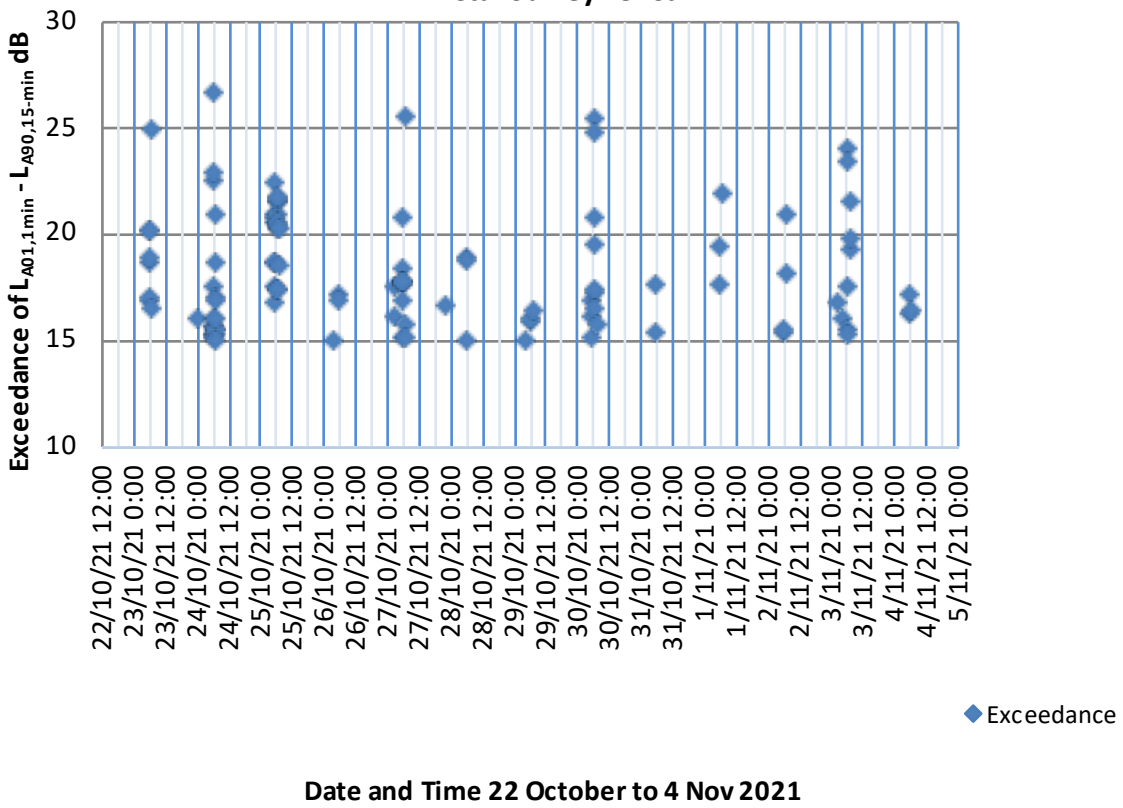


Figure 4.28 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

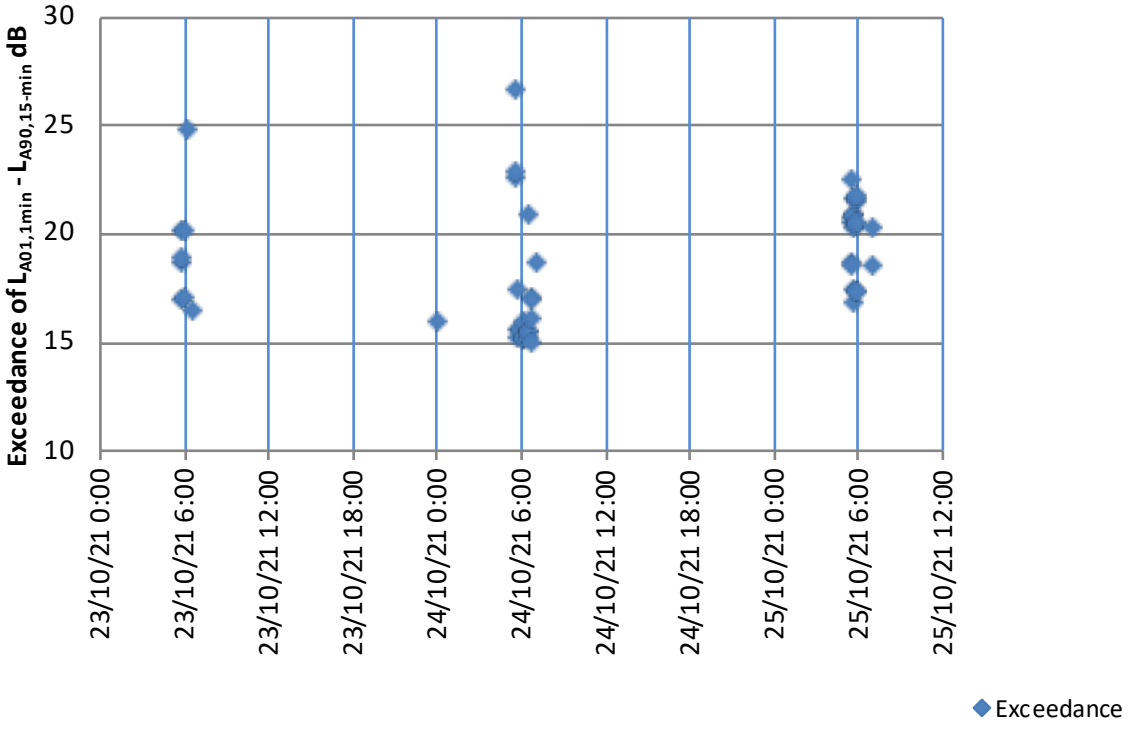


Figure 4.29 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

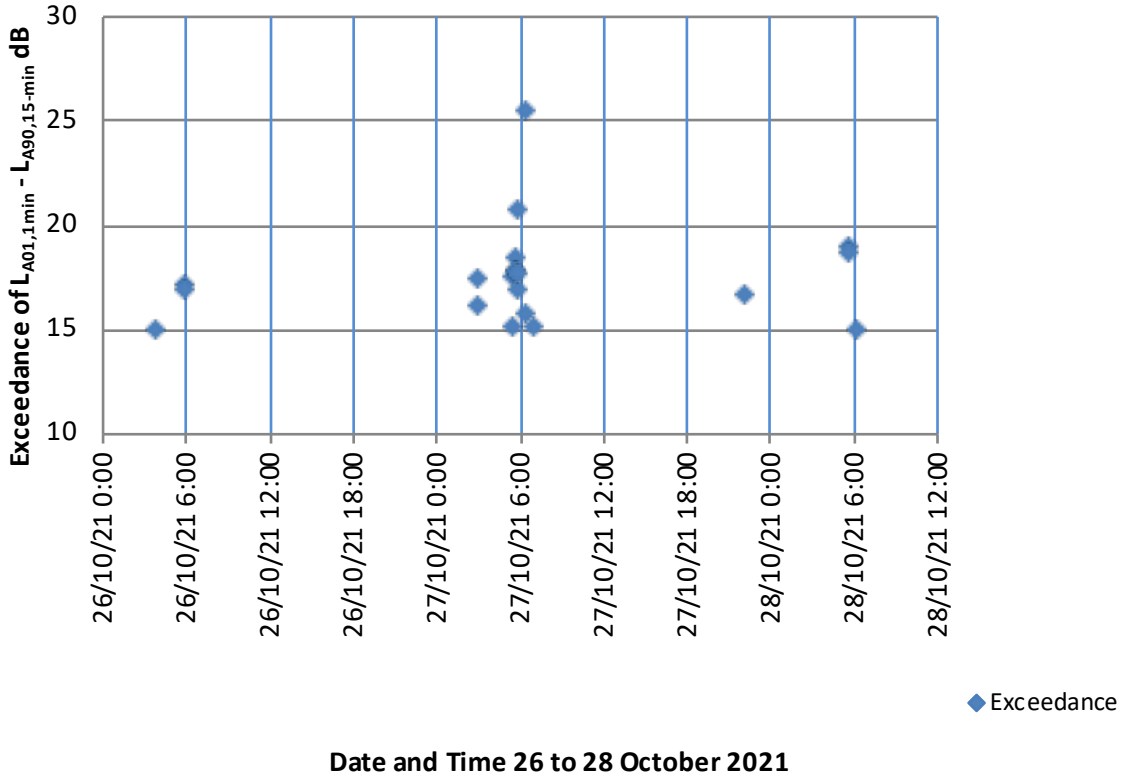


Figure 4.30 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

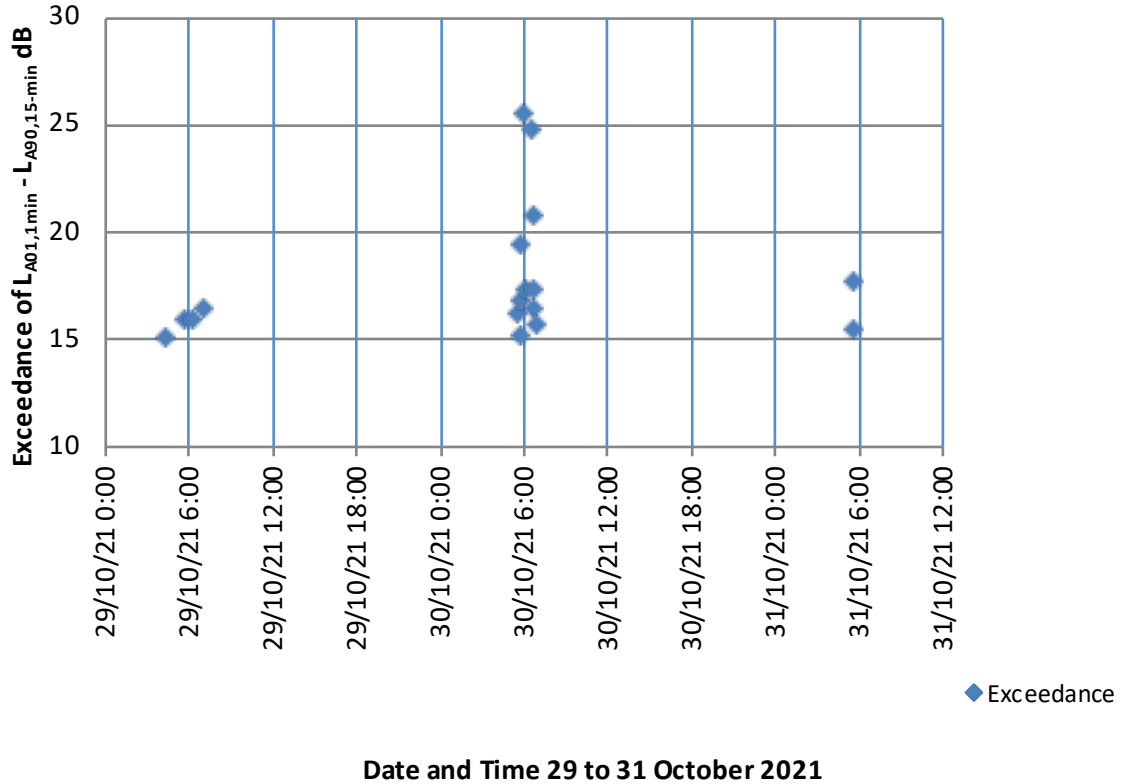


Figure 4.31 Boral Cement Berrima Annual Noise Assessment - Sleep Disturbance Criteria exceedances at North Fence

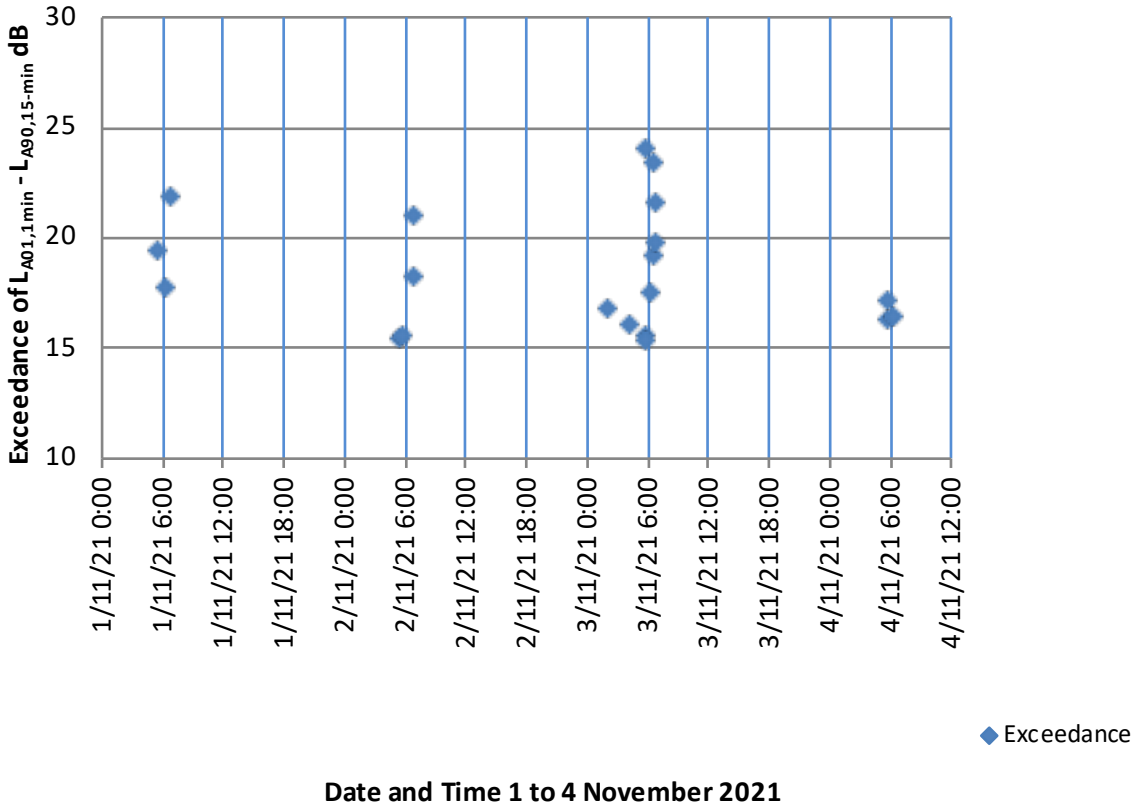


Table 4.4 Berrima Cement Annual Noise Assessment 2021

Analysis of audible sources of the Sleep Disturbance parameter $L_{A01.1min}$ - $L_{A90.15-min}$ > 15 dBA

for Night-time exceedances at the **BerrimaCement** North Fence monitoring location 22 October to 4 November 2021

Date	Time	No. of events in 15-min period	Maximum Exceedance dB	Identified source comments
23/10/21 5:45	5:45	1	17	
23/10/21 6:00	6:00	3	20	
23/10/21 6:15	6:15	3	25	Birds
23/10/21 6:30	6:30	1	16	
24/10/21	0:00	1	16	Rail squeal ; (Rain)
24/10/21 5:30	5:30	2	27	Birds
24/10/21 5:45	5:45	3	23	
24/10/21 6:00	6:00	2	16	
24/10/21 6:15	6:15	3	16	
24/10/21 6:30	6:30	2	15	
24/10/21 6:45	6:45	6	21	
24/10/21 7:00	7:00	1	19	
25/10/21 5:30	5:30	3	22	
25/10/21 5:45	5:45	10	22	Birds
25/10/21 6:00	6:00	5	22	
25/10/21 7:00	7:00	2	20	
26/10/21 3:45	3:45	1	15	Thump ; Train Horn
26/10/21 6:00	6:00	2	17	
27/10/21 3:00	3:00	2	18	Birds ; heavy vehicle ; Thump
27/10/21 5:30	5:30	2	18	
27/10/21 5:45	5:45	3	18	
27/10/21 6:00	6:00	3	21	
27/10/21 6:30	6:30	2	26	Thump ; Birds
27/10/21 7:00	7:00	1	15	
27/10/21 22:15	22:15	1	17	Rail Squeal (loud & Annoying) ;
28/10/21 5:45	5:45	2	19	
28/10/21 6:15	6:15	1	15	
29/10/21 4:30	4:30	1	15	Heavy vehicle
29/10/21 5:45	5:45	1	16	
29/10/21 6:15	6:15	1	16	
29/10/21 7:00	7:00	1	16	
30/10/21 5:45	5:45	3	17	
30/10/21 6:00	6:00	3	26	Birds
30/10/21 6:45	6:45	4	25	Birds
30/10/21 7:00	7:00	1	16	
31/10/21 5:45	5:45	2	18	
1/11/21 5:30	5:30	1	19	
1/11/21 6:15	6:15	1	18	
1/11/21 6:45	6:45	1	22	
2/11/21 5:30	5:30	1	15	
2/11/21 6:00	6:00	1	16	
2/11/21 6:45	6:45	2	21	
3/11/21 2:15	2:15	1	17	Heavy vehicle
3/11/21 4:00	4:00	1	16	Thump
3/11/21 5:45	5:45	2	16	
3/11/21 6:00	6:00	1	24	
3/11/21 6:15	6:15	1	18	
3/11/21 6:45	6:45	3	23	
3/11/21 7:00	7:00	1	22	Birds
4/11/21 6:00	6:00	2	17	
4/11/21 6:30	6:30	1	16	

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ABN: 25 153 946 064
ACN: 153 946 064

Table 4.5 The effect of the Noise sources to the closest receiver of 4 Melbourne St

Date Time	Noise at North Fence	Measured $L_{A90,15\text{-}min}$ at Melbourne St	Measured $L_{A01,1\text{-}min}$ at North Fence	Measured $L_{A01,1\text{-}min}$ at Melbourne St	Measured $L_{A01,1\text{-}min}$ - $L_{A90,15\text{-}min}$ at Melbourne St	Criteria
27/10/21 22:02	rail squeal	42	67	60	17.9	15
26/10/21 3:45	train horn ; thump	47	69	59	12.0	15
24/10/21 0:00	Rail squeal / rain	44	63	50	6.1	15
3/11/21 4:00	Thump	37	61	50	13.4	15

4.2.3 Low frequency noise

The NSW Noise Policy for Industry has a section for assessment of low frequency noise from industry as received at residential locations. This is based on an initial screening test of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value. The values for the community attended monitoring locations are shown in Table 4.6.

If the threshold levels are exceeded by up to and including 5 dB in evening or night-time, a positive adjustment of 2 dB is added to the measured sound level. If the exceedance in any band is more than 5 dB, a positive adjustment of 2 dB is added to the measured sound level for daytime and 5 dB added for evening and night-time.

The initial screening test on attended measurements indicated that exceedances were reported on three out of nine occasions measured at 4 Melbourne Street and four occasions out of seven measured at the Northern Fence, but no occasions for 12 Brisbane St or Adelaide St near Taylor Ave (20m) in line with 72 Taylor façade.

For low frequency assessment, an initial screening test is made of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value. Figures of the one-third octave band spectra compared to the objectives for both L_{eq} and L_{90} spectra are shown in Appendix F figures F62 to F67.

From the measurements in the residential receiver locations, the low frequency assessment was made on both $L_{Aeq,15\text{-}min}$ and $L_{A90,15\text{-}min}$ values. Exceedance of the screening test were identified on three occasions out of 9 measurements for L_{eq} at 4 Melbourne St and none of the two measurements at each of Adelaide St and 12 Brisbane St. For the North Fence location exceedance of the screening test occurred on four of the seven measurements.

From the assessment of this survey it is considered that the main source of low-frequency noise events exceeding the policy objectives for the L_{eq} measurements is from road traffic noise associated with trucks, either from within New Berrima or on distant roads and the freeway. The plant can be a source at times but this is not considered to be significant. For the L_{90} comparison, the exceedances are considered to be minor.

Table 4.6: Boral Cement Berrima Annual Noise Assessment 2021: Low Frequency Assessment

Location and Parameter	Date & File	C - A	$L_{eq,15\text{-}min}$ dB in One-third Octave band Frequency - Hz											
		L_{eq}	12.5	16	20	25	31.5	40	50	63	80	100	125	160
4 Melbourne St Leq	1 22/10 8:28	11	61	61	62	63	60	60	59	67	60	59	66	61
	313 22/10 18:37	10	59	60	60	62	56	55	54	56	52	53	56	55
	Log 23/10 18:00	13				54	53	52	51	47	44	42	38	40
	Log 26/10 00:00	16				62	56	55	55	48	45	39	39	53
	Log 28/10 19:00	19				62	54	56	54	57	54	47	48	50
	Log 29/10 00:00	19				60	51	53	52	45	43	38	37	45
	Log 3/11 14:00	13				59	58	61	59	60	55	49	48	51
	Log 4/11 8:30	15				62	58	59	58	62	61	49	48	53
	Nor 63 4/11 13:55	12	60	62	61	64	63	61	62	62	61	62	63	61
	Objective	15	89	86	77	69	61	54	50	50	48	48	46	44
		L_{90}												
4 Melbourne St L90	1 22/10 8:28	13		56	57	59	55	54	53	53	51	52	51	54
	313 22/10 18:37	13		55	56	59	52	51	49	50	48	49	48	51
	Log 23/10 18:00	14				47	47	47	44	39	38	34	29	34
	Log 26/10 00:00	13				59	51	51	50	44	42	37	37	51
	Log 28/10 19:00	17				59	50	50	49	44	41	35	34	43
	Log 29/10 00:00	17				56	46	49	47	41	38	34	33	42
	Log 3/11 14:00	15				49	47	52	47	44	39	35	33	39
	Log 4/11 8:30	13				57	51	52	51	49	44	39	38	47
	Nor 63 4/11 13:55	13	52	55	55	58	54	52	51	51	49	49	47	49
	Objective		89	86	77	69	61	54	50	50	48	48	46	44
Adelaide St		L_{eq}												
Leq	309 22/10 18:00 Leq	11	61	61	64	69	60	56	57	56	55	56	55	56
Leq	Nor 60 4/11 13:31 Leq	12	62	63	63	67	68	63	67	67	68	61	63	63
		L_{90}												
L90	309 L90	17	55	56	61	67	55	51	52	51	50	50	49	51
L90	Nor 60 4/11 13:31 L90	17	52	55	55	62	57	53	52	51	49	48	47	49
	Objective		89	86	77	69	61	54	50	50	48	48	46	44
Brisbane St		L_{eq}												
Leq	312 22/10 18:18 Leq	10	59	60	61	62	58	54	52	55	53	50	52	53
Leq	449 4/11 13:36 Leq	9	59	60	60	63	64	57	57	60	56	51	54	52
	Objective	L_{90}	89	86	77	69	61	54	50	50	48	48	46	44
L90	312 L90	15		55	56	59	53	50	47	49	46	45	46	48
L90	449 L90	16		54	56	58	54	50	47	47	44	43	43	45
Objective	Objective		89	86	77	69	61	54	50	50	48	48	46	44
North Fence		L_{eq}												
Leq	Nor 131 22/10 17:56	15	62	64	65	69	62	58	55	55	54	53	54	54
	Log 23/10 18:00	13	55	52	55	58	58	49	51	49	49	45	42	40
	Log 26/10 00:00	15	61	64	65	68	62	59	57	54	52	50	46	48
	Log 28/10 19:00	17	60	63	65	68	61	58	54	51	51	48	43	45
	Log 29/10 00:00	20	60	63	65	68	61	58	53	50	50	46	41	44
	Log 3/11 14:00	19	57	56	59	58	60	60	57	56	55	49	49	47
	Nor 41 4/11 10:00	17	61	63	65	69	66	63	60	61	57	53	52	54
	Objective	Objective	89	86	77	69	61	54	50	50	48	48	46	44
		L_{90}												
L90	Nor 131 22/10 17:56	11	55	59	61	67	58	54	51	52	51	50	51	51
	Log 23/10 18:00	11	52	46	45	50	53	45	45	43	44	41	37	34
	Log 26/10 00:00	11	55	59	60	65	58	55	52	50	49	47	44	46
	Log 28/10 19:00	17	54	58	60	66	57	54	50	48	47	45	40	43
	Log 29/10 00:00	18	54	58	61	66	57	54	50	47	46	43	38	41
	Log 3/11 14:00	16	49	50	53	53	54	56	51	49	46	44	40	41
	Nor 41 4/11 10:00	13	54	58	60	66	60	59	55	52	51	48	45	50
	Objective	Objective	89	86	77	69	61	54	50	50	48	48	46	44

Pink shaded cells indicate exceedance of objective

4.3 Attended measurement results and specific receiver locations

Attended measurements were taken at the same residential locations as the unattended measurements to identify the sources of noise occurring that were audible at the time, as well as other conditions. Attended measurements were not taken on the western side of Argyle Street, because the location now adjoins a petroleum service station. Table 4.1 has the collated long-term average results for each unattended monitoring location and figures 4.11 to 4.15 the graphs of those average results since 2002.

Listening attended monitoring was done for the three logger locations for two representative night-time periods, two evening periods and some other periods. Table 4.7 provides a summary of all of the monitoring results and conditions and observations during each 15-minute period. Table 4.8 summarises these results without the comments. Figures 4.32 to 4.38 compare the statistical sound level results for each location for day, evening and night periods.

Adelaide St near Taylor Avenue and Location 20 have similar highest levels of $L_{Aeq,15\text{-}min}$ for daytime, with the North Fence having higher $L_{Aeq,15\text{-}minute}$ values for evening periods at a similar level to Adelaide St (Figures 4.32 and 4.34). Daytime $L_{A90,15\text{-}min}$ values were highest at Location 20 but in the evening sometimes Location 20 was highest and on others the North Fence was the highest – indicating the effect of traffic noise during the evening.

For night-time, figures 4.36 and 4.37 show the results for the same time period at each logger location on two occasions – both midnight. Location 20 had the highest sound level on each occasion for both parameters.

The collated results and comments for the attended measurements are given in Appendix F. Table 4.9 shows the one-third octave band spectra from the attended monitoring. Table 4.9A has the tonality calculations for these measurements.

Figures F1 to F45 in Appendix F show the one-third octave band spectra and tonality graphs for each attended monitoring location. Figures E2 to E48 in Appendix E show the narrow band spectra analysed from the site sound recordings.

4.3.1 Comments on sound levels and results at residential 4 Melbourne St

Results for 4 Melbourne St attended measurements are shown in Table 4.7 and Appendix F: Environmental Noise Level Assessment Reports, with unattended measurements shown in Appendix B and Table 4.1, long-term unattended results in Table 4.2. Results have been collected for this location since 2002. Attended measurements were obtained for daytime on 22 October and 4 November, and listening attended results for 23, 26, 28, 29 October and 3 November.

As in previous surveys, sound levels in residential receiver areas continue to be mainly caused by road traffic noise, both on Taylor Avenue or Melbourne Street, and from the Hume Freeway at night-time. The noise emissions from the Cement Plant form the background sound levels on most occasions. Cement Plant sources audible included broad band sources such as fans and some rail operations. Tonal noise was not evident on most occasions or for 15-minute sample periods. Night time sound levels were ranging typically from 44 to 50 dBA.

One-third octave band sound levels are shown in Appendix F, Table 4.9 and spectra and tonality graphs are combined in Figures F1 for $L_{Aeq,15\text{-}min}$ and F2 for $L_{A90,15\text{-}min}$. The spectra are relatively broad-

band with very little tonality evident in either L_{Aeq} or L_{A90} results. L_{Aeq} spectra often show higher levels at higher frequencies compared to L_{A90} results – this is caused by insect noise.

Unattended sound levels shown on the two-day graphs of Appendix B show sound levels vary mainly diurnally with some influence from wind speed occasionally correlating with wind direction, but not all occasions, and there is little correlation of the effect from wind direction.

Average night-time $L_{A90.15\text{-}minute}$ sound levels were in the range 42 to 50 dBA and averaged 46 dBA.

Figures F46 to F51 show time histories of the listening attended monitoring periods, with annotations showing the causes of the higher sound level events. Most of the higher events were caused by passing vehicles in Taylor Avenue or birds.

For personal attended monitoring on the morning of 22 October, road traffic was the main source. The $L_{Aeq,15\text{-}min}$ was 60 dBA and the $L_{A90,15\text{-}min}$ 50 dBA. Figure F5 shows the one-third octave band spectra, with significantly higher levels for the L_{Aeq}. The L_{A90} curve peaks in the 200 Hz band. The measurements for both parameters show the spectra were non-tonal. Narrow-band spectra in Figures E1 and E2 for a quiet period show peaks at 177 and 193 Hz, related to stack fan emissions.

For the evening of 22 October, road traffic noise was the main source, with $L_{Aeq,15\text{-}min}$ 56 dBA and the $L_{A90,15\text{-}min}$ 47 dBA. Figure F6 shows the influence of insect noise with the highest bands being 3150 and 4000 Hz. The measurements show the spectra were non-tonal. Figures E3 and E4 narrow band show insect noise around the 2000 Hz area with fan noise at 180 and 195 Hz.

For the afternoon of 23 October 6:00 to 6:15pm shown in Figure F46, with the plant all idle, the average ambient sound levels were in the range 37 to 45 dBA. Figure F7 shows the one-third octave band spectra for the period, with an $L_{Aeq,15\text{-}min}$ sound level of 45 dBA and $L_{A90,15\text{-}min}$ of 36 dBA. Lower frequency components are relatively low compared to times with the plant operating. Figures E5 to E9 show narrow band spectra analysed for quieter periods between passby events – some of these have the A-weighted levels also shown. The most significant peak in the spectra for A-weighted sound levels was at 155 Hz

For the night of 26 October from midnight, Figure F47 shows a relatively constant sound level of 46 to 47 dBA with only 6 passby events from vehicles, up to 59 dBA. Figure F8 shows the one-third octave band spectra for this period, with very little difference between the L_{A90} and L_{Aeq}, being 45 and 46 dBA respectively. Narrow-band spectra for quiet times in this period are given in Figures E10 to E14. They show the dominant peak in the spectrum is at 176 Hz, related to emissions from FA250 and FA39. This spectrum was marginally above the tonal criterion for the 160 Hz band, at 9 dB compared to the objective of 8 dB.

For the evening of 28 October from 7:00pm, Figure F48 time history shows many vehicle passby events during the period. Several sources are listed but not all. Most were cars but there were also trucks and birds. Ambient levels were 42 to 45 dBA and maximums from trucks 60 dBA. F9 shows a broad band spectrum with higher levels in the 160 Hz band which are not tonal. There was a 5 dB difference between the L_{Aeq} and L_{A90} values, of 45 and 40 dBA respectively. Figures E15 to E17 show the narrow band spectra for three different quieter periods. The major peak was at 180 Hz, likely to be from FA39 and FA250.

On the night of 29 October from midnight, the time history of Figure F 49 shows only two passby events and some dogs barking. Ambient sound levels ranged from 35 to 43 dBA and the passby event maximum was 62 dBA, caused by a truck. Figure F10 shows the parameter values for the

period were 42 dBA for L_{Aeq} and 38 dBA for L_{A90}. The spectrum levels have a peak in the 160 Hz band. Narrow-band analyses of the quiet periods are given in Figures E18 to E23 show the major A-weighted peak is at 179 to 180 Hz, again indicating stack emissions from FA39 and FA250.

For 2pm on 3 November, the time history is shown in Figure F50. Road traffic was the main contributor, however birds (galahs and cockatoos) caused the highest sound level of 72 dBA. Cars and trucks caused sound levels of 55 to 68 dBA. The ambient sound levels were as low as 35 dBA at times but during most of the time the sound levels between vehicles were in the low 40 dBA area. Figure F10 shows the L_{Aeq} was 53 dBA, compared to the much lower L_{A90} of 39 dBA – this difference is caused by the significant traffic noise. The one-third octave band spectrum is relatively broad-band. Figures E24 to E29 show major A-weighted peaks at 166 and 182 Hz, both assumed to be related to FA39 and FA250, but further operational data would be required to identify which fan is related to which peak at the time, as both fans have variable speeds.

The final time-history analysed was for 8:30 am on 4 November to augment the attended measurements interrupted by rain. This is shown in Figure F51. Road traffic noise was the major source in this period with passby sound levels 55 to 67 dBA. Ambient levels between passbys were 45 to 46 dBA. Figure F 12 shows the one-third octave band spectra, which although with a peak at 200 Hz, is non-tonal. A narrow band analysis was not made for this period but was for the attended measurement at 9:00am.

For the measurement from 8:44am on 4 November, described in Table 4.7, road traffic was the major source with trucks causing 63 to 75 dBA. The period averages were 59 dBA L_{Aeq} and 47 dBA L_{A90}. Figures E30 and E31 show the narrow-band analyses, with peaks at 179 Hz related to the stack fans. Peaks at 1385 and 1485 Hz may be related to fan drive electronic noise but appear to be too high for this location.

The final attended monitoring for Melbourne St was at 13:55pm on 4 November, with light rain occurring. Road traffic was the major source, causing an L_{Aeq} of 59 dBA, while the L_{A90} was 47 dBA. One-third octave band spectra are shown in Figure F13, which appears to be non-tonal. Figures E32 and E33 show the narrow band spectra, with insect noise around 1100 and 3800 Hz. Sources of the lower frequency peaks at 48, 69 and 248 Hz are not clear but the 178 Hz is related to stack fan noise.

4.3.2 Taylor Avenue – Corner Adelaide St

The location used for the attended measurements is in Adelaide Street, 20m north of Taylor Avenue which is in-line with the front façade of the residence at 72 Taylor Ave. Attended measurements were obtained for evening on 22 October from 18:00 and daytime on 4 November from 13:30. Results are provided in Table 4.7. One-third octave band spectra are shown in Figures F14 and F15 with F16 showing the tonality assessment. Both sets of spectra are broadband, with the 125 and 160 Hz bands being highest in the L_{A90} spectra – this shows a combination of vehicle and plant noise. Figures E34 and E35 show narrow band frequency analysis from the evening measurement of 22nd October. The highest A-weighted peak is at 179 Hz, related to stack fan emissions. A peak at 23 Hz may be CM6 rotation.

For the attended measurement on the afternoon of 4 November, the L_{Aeq} was 62 dBA and the L_{A90} 45 dBA, with ambient levels between road traffic at 44 to 47 dBA. The L_{Aeq} one-third octave band spectra in Figure F14 shows a move to higher frequencies from insect noise, compared to the morning measurement. The L_{A90} curve in Figure F15 show highest levels in the 160 and 200 Hz band,

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associated with industrial noise. Narrow band spectra in Figure E37 shows the expected stack fan peak at 178 Hz.

Results for attended measurements are shown in Appendix F: Environmental Noise Level Assessment Report, with the summary of attended measurements shown in Table 4.1, long-term averages of unattended results in Table 4.2 and Figure 4.12. In comparison with results from previous years, L_{Aeq} measurements were higher for day and evening with 62 and 58 dBA respectively, while L_{A90} results were higher for evening at 47 dBA but lower for daytime at 45 dBA.

L_{Aeq} results for this location are controlled by motor vehicle noise passing on Taylor Avenue and whether trucks pass over bumps in the road surface.

Cement Plant site sources identified included the gate alarm from the eastern (Truck) access gate opening and closing and occasional screw-conveyor squeal noise.

4.3.3 12 Brisbane Street

Monitoring locations used for 12 Brisbane Street were the same as in the previous measurements. L_{Aeq} results are affected by road traffic noise from Taylor Avenue and Brisbane Street. Cement Plant noise emissions also contribute at this location.

Results for attended measurements are shown in Table 4.7 and Appendix F: Environmental Noise Level Assessment Report. Tables 4.1 and 4.2 show long-term averages of results, which are also shown graphically as a time history in Figure 4.13. Table 4.8 has the one-third octave band spectra and tonality assessment with Figures F17 to F21 showing graphs of the one-third octave band spectra and tonality.

Attended measurements were made on the evening of 22 October and afternoon of 4 November. For 22 October evening the L_{Aeq} result was 54 dBA, with birds being the highest source measured at 73 dBA Ambient sound levels were 45 dBA when quiet. The L_{A90} result was 44 dBA. The one-third octave band spectra show high L_{Aeq} levels at higher frequencies compared to the L_{A90} curve, which is from insect noise. The peak in the 200 Hz band relates to Cement plant noise. The narrow band spectra are shown in Figures E38 and E39. Insect noise can be seen in the frequency region form 100 to 4000 Hz in Figure E38. Figure E39 shows stack fan noise likely at 180 Hz.

For the afternoon of 4 November, road traffic on Taylor Avenue was the major source, with truck to 63 dBA. The statistical sound levels L_{Aeq} at 52 and L_{A90} at 42 were lower than in the previous evening measurement. The one-third octave band spectra shown in Figure F20 show less influence from insect noise and mostly from road traffic noise. Both sets of measurements were non-tonal. Narrow band spectra shown in Figures E40 and E41 show bird noise at 2000 to 3000 Hz. Stack fan noise would be the likely source of the 179 Hz peak in Figure E41.

Long-term average night-time sound levels, shown in Table 4.2 and Figure 4.13, decreased for the daytime and increased for evening for both L_{Aeq} and L_{A90} values, compared to 2020. The daytime results were below the long-term average while the evening results were slightly above them.

4.3.4 Northern Boundary

Attended sound levels at the Northern Boundary have been measured at the northern end of the stockyard, this survey the attended measurements were made at the inside location next to the unattended meter.

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Results for attended measurements are shown in Appendix F: Environmental Noise Level Assessment Report, and summarised in Table 4.7, with unattended measurements shown in Appendix C. Table 4.1 has long-term unattended results and the historical data in Table 4.2 and Figures 4.14. Personal attended sound levels were measured on 22 October and 4 November. Listening attended monitoring was done for the same five periods as for 4 Melbourne St and Location 20. Table 4.8 has the one-third octave band spectra and Appendix Figures F22 to F32 show the spectra and tonality assessments. Both L_{Aeq} and L_{A90} spectra are non-tonal – Figures F24 and F25, with the high frequency L_{Aeq} tonal exceedances caused by insect noise.

The results of the reliable data points are similar to those of previous years. Statistical averages are similar to the previous years and long-term averages. Long-term L_{Aeq} averages were 51 dBA for each period and within 1 dB of the overall long-term average from 2008 to 2021. L_{A90} period averages were 47 or 48 dBA with the evening being the highest – considered caused by road traffic noise along Taylor Avenue. These were also the same as or 1 dB below the overall average.

Taylor Avenue vehicle movement sound levels are lower at this location than for the residential locations but are still the main influence on L_{Aeq}. Site sources identified in the attended monitoring included vehicle movements, train activities and general industrial noise.

For 22 October, measured attended L_{Aeq} sound levels were 58 dBA evening (from birds) and L_{A90} 54 dBA. One-third octave band spectra are shown in Figure F26, with a peak in the 200 Hz band likely caused by stack fan emissions.

For the listening attended monitoring on the evening of 23 October with all of the plant shut down, birds and vehicles were the main sources. L_{A90} sound levels were 44 dBA and L_{Aeq} 47 dBA. Figure F27 shows the one-third octave band spectra were broad band with a bird or insect peak at 8000 Hz.

For midnight on 26 October, sound levels were very stable with little difference between L_{Aeq} and L_{A90}, at 53 and 52 dBA. Figure F28 shows the spectra, without any peak for the stack fans showing. A narrow-band analysis was done for this period and is shown in Figure E42. It shows A-weighted peaks at 176 and 187 Hz, most likely related to the stack fans, and one at 984 Hz which may be an insect.

For the evening of 28 October, birds and road trucks were the major source of noise. The L_{Aeq} sound levels were 51 dBA evening and L_{A90} 47 dBA. Figure F29 shows the one-third octave band spectra were very similar up to 1600 Hz, then insect or bird noise caused much higher L_{Aeq} levels with a peak at 2500 Hz.

For the midnight measurement on 29 October, rail movements were the major source of noise identified. The L_{Aeq} and L_{A90} were very close at 47 and 46 dBA respectively. The spectra of these is shown in Figure F30 and both are very broad band.

For the afternoon of 3 November, road traffic, birds and site traffic were noted sources. L_{Aeq} and L_{A90} were 46 and 43 dBA. One-third octave band spectra are shown in Figure F31 and are non-tonal and broad band. All of the plant sources were off except for Kiln 6 and its associated fans and plant.

For the morning of 4 November, the personal attended monitoring identified road traffic trucks on Taylor Avenue, trucks internal to the site and rail movements. L_{Aeq} and L_{A90} were 56 and 53 dBA, 10 dB higher than the day before. This indicates that these other sources may be more significant sources than the kiln, but further information would be required to assess relative contributions. The one-third octave spectra shown in Figure F32 show the tonal peak at 200 Hz from the stack fans.

4.3.5 Location 20 Store Yard Close location

This location has become the Environment Protection Licence noise compliance monitoring location to indicate achievement of compliance, without significant intrusion from other external noise sources (traffic) outside the plant boundary. The licence condition is for the $L_{A90,15\text{-minutes}}$ not to exceed 58 dBA (measured according to the methods of the Noise Policy for Industry, without transient or extraneous noise sources). Objectives are also for a long-term $L_{A90,period}$ over 7 days of 56 dBA . Earlier discussion of the results of this monitoring was provided in Section 4.2.

Results discussed in this section are for attended monitoring and associated one-third octave band and narrow-band analyses. Results of the attended monitoring are given in Table 4.7, Appendix F: Environmental Noise Level Assessment Report, and summarised in Table 4.8. Appendix D provides the unattended sound level results and Appendix E the analysed narrow band spectra of attended sound level recordings.

Main sources were industrial noise of fans from the main parts of the plant, locomotive and train movements at times (sometimes with wheel squeal) and internal traffic movements. Mobile equipment loading and stockpile operations on the southern side of the rail line were noted during some measurements. Specific measurements during operation of the Isotainer Loading facility were occasionally audible but did not cause observable variation in received sound levels.

Tables 4.9 and 4.9A show one-third octave band and tonality assessments, Figures F33 to F36 show the combined L_{Aeq} and L_{A90} spectra and tonality assessment. None of the spectra were found to be tonal.

Narrow-band spectra are shown in Appendix E figures E42 to E49.

Unattended sound levels shown in the two-day graphs of Appendix D show fairly constant sound levels for $L_{Aeq,15\text{-min}}$ between 53 and 62 dBA and for $L_{A90,15\text{-min}}$ 50 to 56 dBA. Wind speed had an effect with slightly increased levels but direction less of an observable effect, on both $L_{Aeq,15\text{-min}}$ and $L_{A90,15\text{-min}}$ sound levels. Of more effect was operation of plant, with CM6 and CM7 idle periods giving reduced sound levels. For the occasions when the whole plant was off, sound levels were less than 50 dBA.

For the attended measurements from 11:51 on 22 October, train movements and local truck movements were the major sources of variable noise. The L_{Aeq} and L_{A90} were 62 and 58 dBA respectively. One-third octave band spectra shown in Figure F37 shows a peak at 100 Hz, which would be related to either locomotive or heavy vehicle exhaust. Later on at 12:22, the L_{Aeq} and L_{A90} were 57 and 55 dBA indicating the train had probably moved – this can be also seen in the one-third octave band spectrum of Figure F38, with the peak at 200 Hz clearer than earlier and no peaks at 100 Hz.

For the listening attended monitoring on the evening of 23 October with the whole plant idle, birds, cars and road trucks were the main sources of noise. The L_{Aeq} and L_{A90} had dropped to 50 and 47 dBA. Figure F39 shows the one-third octave spectrum is broad band with the 500 and 630 Hz bands being highest. The narrow band spectrum of E43 shows peaks that may be related to the stack fans restarting at 156 and 192 Hz, plus a group around 600 Hz but the source of these is not known.

For the midnight period on 26 October, the sound level was very stable and some rail noise was identified. L_{Aeq} and L_{A90} were 57 and 56 dBA. Figure F40 has the one-third octave band spectra. Figure E44 shows the narrow band spectrum for this period. The stack fan peak at 176 Hz and its harmonic are evident.

For the evening period on 28 October, birds and general plant noise were the main sources identified. L_{Aeq} and L_{A90} were 53 and 52 dBA, indicating little vehicle movements in the period. The one-third octave band spectra are shown in Figure F41.

For midnight on 29 October, plant noise and rail movements were the main sources of noise. L_{Aeq} and L_{A90} were 53 and 52 dBA, the same as for the previous attended measurement and indicates little vehicle movement. Figure F42 shows the one-third octave band spectra.

For the afternoon of 3 November, with all major plant idle except for Kiln 6, local and site traffic were the major sources. L_{Aeq} and L_{A90} were 54 and 50 dBA, Stack fan noise in the 200 Hz band is evident in the one-third octave band spectra of Figure F43.

Attended monitoring on the 4 November identified local trucks and birds as the major sources, with Taylor Avenue traffic also audible in the next period. L_{Aeq} and L_{A90} were 58 and 54 dBA for the 10:24am measurement and 58 and 55 dBA for the 10:52am measurement. The one-third octave band spectra shown in Figures F44 and F45 show peaks in the 125 Hz band for both, related to truck or train exhausts, and 160 Hz related to stack emissions. The small peak at 25 Hz is related to operation of CM6 or CM7. The narrow band spectra of Figures E45 and E46 show peaks at 119 Hz, which would be a diesel engine exhaust, and 179 Hz which is considered to be the stack fan noise. A further narrow band analysis shown in Figures E47 and E48 show the same frequency peaks.

4.3.6 Comparison of One-third Octave Band Spectra for Listening monitoring

The listening monitoring of the three locations for the same periods provides an opportunity to compare the frequency spectra. This has been done in Figures F52 to 61 for both $L_{Aeq,15\text{-}min}$ and $L_{A90,15\text{-}min}$ parameters. These show differences between the relative contributions of the stack fan emissions in the 160 to 200 Hz bands at each location – the relative contribution is less for the site locations than the residential location.

Table 4.7: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Attended environmental monitoring summary

Location	Date	Start	File	Period	Statistical Sound Level - dBA					Comments
		hh:mm	No	l:mm:ss	$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
4 Melbourne St	22/10/2021	8:28 AM	1	0:15:00	60	71	50	71	11	16°C, 4/8 cc, sunny overhead. Wind 0 to 0.5m/s N. Ambient 49 to 50. Passing traffic significant - Trucks 68 to 75, cars 60 to 68. Magpies and other birds to 70. Street traffic 66 to 70
4 Melbourne St	22/10/2021	6:37 PM	313	0:15:00	56	66	47	66	10	20°C, 1/8 cc, sunny. Wind 0 to 1m/s N to NNW, mostly < 0.2m/s. Road traffic main source Trucks 67-68, cars 60 to 66, birds to 80. Ambient 46 to 48. Plant is in background.
4 Melbourne St (logger)	23/10/2021	6:00 PM		0:15:00	45	56	37	58	13	17°C, wind calm to 0.2m/s SSE. Plant off from lightning strike earlier. Birds 55 to 69, trucks 55 to 60, cars 50 to 60. Dogs barking 50 to 55. Ambient quiet 37 to 40.
4 Melbourne St (logger)	26/10/2021	12:00 AM		0:15:00	47	51	45	63	16	5°C, wind calm. Very stable sound level 46 to 47 dBA, 5 cars 54 to 59, 1 truck to 58.
4 Melbourne St (logger)	28/10/2021	7:00 PM		0:15:00	45	55	40	64	19	Wind 0.6m/s N, 18°C. Fairly stable sound level 41 to 42 between occasional but regular cars 50 to 55, two trucks 60. Distant dogs barking 45.
4 Melbourne St (logger)	29/10/2021	12:00 AM		0:15:00	42	51	38	61	19	13.5°C, wind calm. Relatively stable sound level 36 to 45. 1 truck pass 62, 1 car pass 51, dog bark 46.
4 Melbourne St (logger)	3/11/2021	2:00 PM		0:15:00	53	64	39	65	13	20°C, wind ave. 3.5m/s NE. Road traffic major noise with little time between vehicles. Trucks 60 to 66, cars 50 to 59, birds to 73. Dog bark 58. Quiet between vehicles sometimes 37 but rare. Ambient more often 40 to 45
4 Melbourne St (logger)	4/11/2021	8:30 AM		0:15:00	52	62	46	67	15	16°C, wind calm to 1m/s N. Ambient quiet 45 to 48. Road traffic main source Trucks to 65, cars 54 to 64. Occasional birds. Plant is background.
4 Melbourne St	4/11/2021	9:38 AM		0:12:00	58	69	48			16°C, overcast 8/8cc, wind calm to 0.4m/s N. Ambient 49 to 50. Passing trucks 65 to 70. Light rain started at 11 min.
4 Melbourne St	4/11/2021	1:55 PM	_0063.	0:15:00	59	71	47	71	12	16°C, overcast, wind 0 to 3m/s N; Ambient 46; Car 59- 63; Truck 66-75; Dog Barking 53; Birds 52-64
Adelaide St 30m to Taylor Ave	22/10/2021	6:00 PM	309	0:14:00	58	70	47	69	11	20°C, 2/8 cc, sunny. Wind 0 to 0.5m/s NW. Road traffic main source Trucks 70, cars 60 to 68, birds to 73. Plant screw conveyor just audible. Quiet ambient 47.
Adelaide St 30m to Taylor Ave	4/11/2021	1:31 PM	_0060.	0:15:00	62	75	45	75	12	16°C, overcast, wind 0 to 3m/s N; Ambient industrial noise 44-47; Many Trucks and Cars; Cars 58- 74; Truck 66-75; Dog Barking 58; Birds 50-65; Gate Alarm
12 Brisbane St W side	22/10/2021	6:18 PM	312	0:15:00	54	67	44	65	10	20°C, 1/8 cc, sunny. Wind 0 to 1m/s N but mostly < 0.2m/s. Road traffic main source but more distant. Birds to 73. Children 58. Quiet ambient 45. Plant level varies slightly on wind
12 Brisbane St W side	4/11/2021	1:36 PM	449	0:15:00	52	64	42	60	9	16°C, overcast, light rain, wind 0 to 3m/s N. Traffic on Taylor is main source - trucks 56 to 63, birds regular 45 to 50, cars pass in street 60 to 71, distant dog 50, ambient 40. No rain or wind noise.
Location 20	22/10/2021	11:51 AM	_0005.	0:12:08	62	70	58	76	14	Car Passing Stock yard 63; iso container train moving, rail squeal 60-65; Truck local road 72; Rail squeal 65; Heavy vechicle 70; Train movement 60; Horn 82

attended results

Table 4.7: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Attended environmental monitoring summary

Location	Date	Start	File	Period	Statistical Sound Level - dBA					Comments
		hh:mm	No	h:mm:ss	$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
Location 20	22/10/2021	12:22 PM	2_0007.	0:15:00	57	62	55	73	15	Industrial Noise 58; Car Passing Stock yard 63; iso container unloading train 58; 66; 59; 58; Truck over bump 66; Reversing beacon 59
Location 20	23/10/2021	6:00 PM	Log	0:15:00	50	54	47	62	12	17°C, wind calm to 0.2m/s SSE. Plant off from lightning strike earlier.Ambient - industrial Noise 47 to 49; Birds 53 to 64, trucks 55 to 60, cars 50 to 60. Dogs barking 50 to 55. Ambient - industrial Noise 50 to 53 (11 min along)
Location 20	26/10/2021	12:00 AM	Log	0:15:00	57	59	56	70	13	5°C, wind calm. Very stable sound level of industrial noise 56 to 58 dBA; observed a hint of rail squeal and alarm
Location 20	28/10/2021	7:00 PM	Log	0:15:00	53.2	55.8	52.1	68.7	15.5	industrial noise 52 to 56 dBA ; Birds 52- 58
Location 20	29/10/2021	12:00 AM	Log	0:15:00	53.2	56.4	51.8	69.2	16.0	13.5°C, wind calm. Ambient Industrial noise 51-54 ;Noise associated with Rail Movement - Thumps 57 (6x) ; possible loco acceration 55-56
Location 20	3/11/2021	2:00 PM	Log	0:15:00	54	64	50	69	15	20°C, wind ave. 3.5m/s NE. Work truck around stockyard traffic noise: 60 to 65; Truck Local 72; car local 55-61 , Ambient at start 49 to 51 increasing to 51 to 54.
Location 20	4/11/2021	10:24 AM	4_0042.	0:15:00	58	71	54	73	14	16°C, overcast, wind 0 to 3m/s NE; Truck Local 75; Birds 59
Location 20	4/11/2021	10:52 AM	4_0043.	0:12:06	58	72	55	74	15	16°C, overcast, wind 0 to 3m/s NE; Over cast Industrial Noise 57; Truck Local 59, 75 Truck Taylor 56; Birds 56-57; Possible vacumm truck 56-57; FFT recorded - 44S
North Fence	22/10/2021	5:56 PM	2_0131.	0:15:00	58	52	54	69	15	Slight Breeze from SW Industrial Noise 52 Truck Taylor road 55 Birdss 62, 54 , 55
North Fence	23/10/2021	6:00 PM	Log	0:15:00	47	54	44	60	13	17°C, wind calm to 0.2m/s SSE. Plant off from lightning strike earlier.Ambient - industrial Noise 43 -48 ;Birds prominent 43 - 54 with peaks of 64; Cars 48-51 ; alarm
North Fence	26/10/2021	12:00 AM	Log	0:15:00	53	54	52	68	15	5°C, wind calm. Very stable industrial noise 52-54 ; hint of rail squeal and shunting; alarm
North Fence	28/10/2021	7:00 PM	Log	0:15:00	51	62	47	67	17	Industrial noise 46 - 50 (more than 6pm) ; Birds 50 - 51 with a chirp 64 to 68 a period were Birds for a 1min 59 -68 ;Truck local road over a bump 50-52
North Fence	29/10/2021	12:00 AM	Log	0:15:00	47	50	46	67	20	13.5°C, wind calm. Ambient Industrial noise (variable) 44-49 ;Noise associated with Rail Movement - Thumps 50-51 ; possible loco acceration 47-49
North Fence	3/11/2021	2:00 PM	Log	0:15:00	46	52	43	64	19	20°C, wind ave. 3.5m/s NE. Work truck around stockyard traffic noise: 49 - 54 ; Truck over bump 51-55 ; car 49; Birds 50-53
North Fence	4/11/2021	10:00 AM	1590_2	0:15:00	56	50	53	70	17	16°C, overcast, wind 0 to 3m/s NE; Indutrial noise 49-50; Thump 52,53; Truck Local 53, 51 Truck Taylor 52,54,54 Remote Hammering infrequent; Train movement 55 Loco 56-58

attended results

Table 4.8: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Attended environmental monitoring statistical summary

Location	Date	Start	File	Period	Time of	Statistical Sound Level - dBA				
		hh:mm	No	d:mm:ss	Day	$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}
4 Melbourne St	22/10/2021	8:28 AM	1	0d 00:15:00	Day	60	71	50	71	11
4 Melbourne St (logger)	3/11/2021	2:00 PM		0d 00:15:00	Day	53	64	39	65	13
4 Melbourne St (logger)	4/11/2021	8:30 AM		0d 00:15:00	Day	52	62	46	67	15
4 Melbourne St (logger)	4/11/2021	8:45 AM		0d 00:15:00	Day	53	63	46	67	15
4 Melbourne St	4/11/2021	9:38 AM		0d 00:12:00	Day	58	69	48		
4 Melbourne St	4/11/2021	1:55 PM	_0063.NBF	0d 00:15:00	Day	59	71	47	71	12
4 Melbourne St	22/10/2021	6:37 PM	313	0d 00:15:00	Evening	56	66	47	66	10
4 Melbourne St (logger)	23/10/2021	6:00 PM		0d 00:15:00	Evening	45	56	37	58	13
4 Melbourne St (logger)	28/10/2021	7:00 PM		0d 00:15:00	Evening	45	55	40	64	19
4 Melbourne St (logger)	26/10/2021	12:00 AM		0d 00:15:00	Night	47	51	45	63	16
4 Melbourne St (logger)	29/10/2021	12:00 AM		0d 00:15:00	Night	42	51	38	61	19
Adelaide St 30m to Taylor Ave	4/11/2021	1:31 PM	_0060.NBF	0d 00:15:00	Day	62	75	45	75	12
Adelaide St 30m to Taylor Ave	22/10/2021	6:00 PM	309	0d 00:14:00	Evening	58	70	47	69	11
12 Brisbane St W side	4/11/2021	1:36 PM	449	0d 00:15:00	Day	52	64	42	60	9
12 Brisbane St W side	22/10/2021	6:18 PM	312	0d 00:15:00	Evening	54	67	44	65	10
Location 20	22/10/2021	11:51 AM	_0005.NBF	0d 00:12:08	Day	62	70	58	76	14
Location 20	22/10/2021	12:22 PM	_0007.NBF	0d 00:15:00	Day	57	62	55	73	15
Location 20	3/11/2021	2:00 PM		0d 00:15:00	Day	54	64	50	69	15
Location 20	4/11/2021	10:24 AM	_0042.NBF	0d 00:15:00	Day	58	71	54	73	14
Location 20	4/11/2021	10:52 AM	_0043.NBF	0d 00:12:06	Day	58	72	55	74	15
Location 20	23/10/2021	6:00 PM	Log	0d 00:15:00	Evening	50	54	47	62	12
Location 20	28/10/2021	7:00 PM		0d 00:15:00	Evening	53	56	52	69	15
Location 20	26/10/2021	12:00 AM		0d 00:15:00	Night	57	59	56	70	13
Location 20	29/10/2021	12:00 AM		0d 00:15:00	Night	53	56	52	69	16
North Fence	3/11/2021	2:00 PM	Log	0d 00:15:00	Day	46	52	43	64	19
North Fence	4/11/2021	10:00 AM	_0041.NBF	0d 00:15:00	Day	56	50	53	70	17
North Fence	22/10/2021	5:56 PM	_0131.NBF	0d 00:15:00	Evening	58	52	54	69	15
North Fence	23/10/2021	6:00 PM	Log	0d 00:15:00	Evening	47	54	44	60	13
North Fence	28/10/2021	7:00 PM	Log	0d 00:15:00	Evening	51	62	47	67	17
North Fence	26/10/2021	12:00 AM	Log	0d 00:15:00	Night	53	54	52	68	15
North Fence	29/10/2021	12:00 AM	Log	0d 00:15:00	Night	47	50	46	67	20

attended results

Figure 4.32: Berrima Cement Annual Noise Assessment 2021 - Attended Monitoring Statistical comparison of locations - Daytime L_{eq}

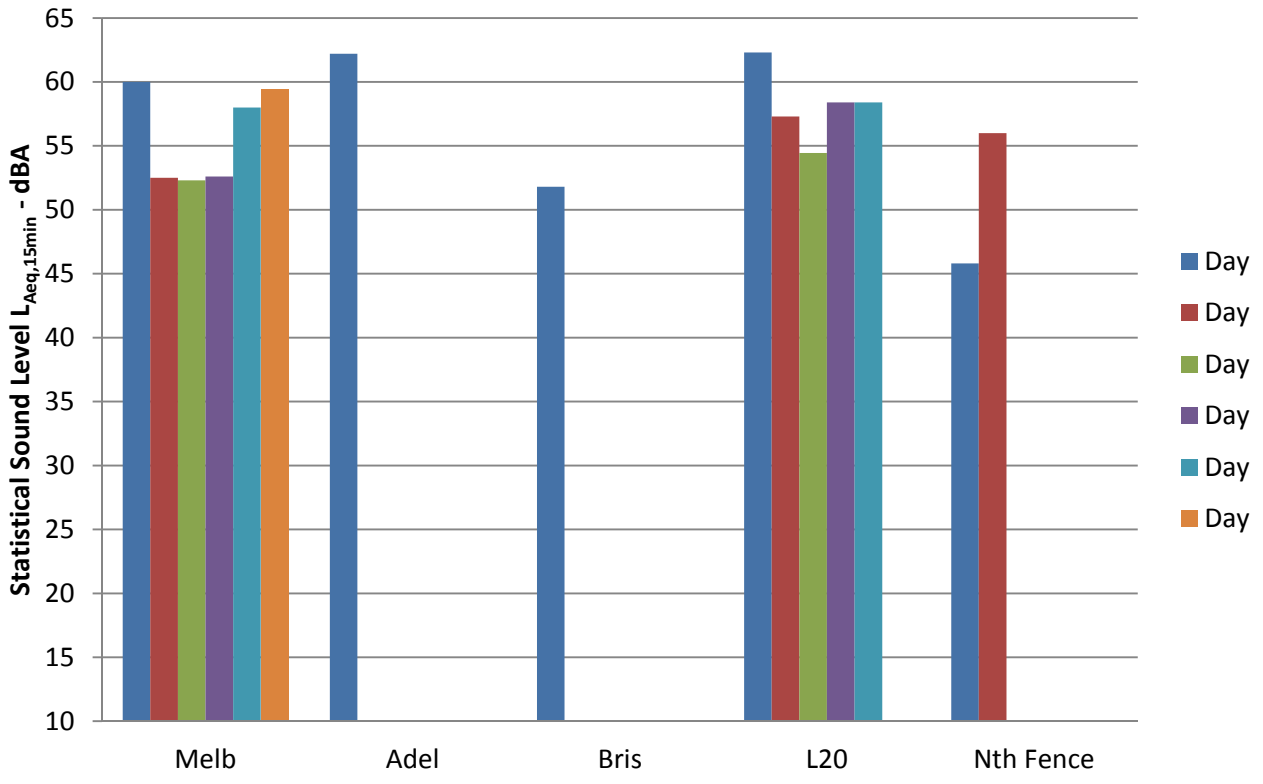
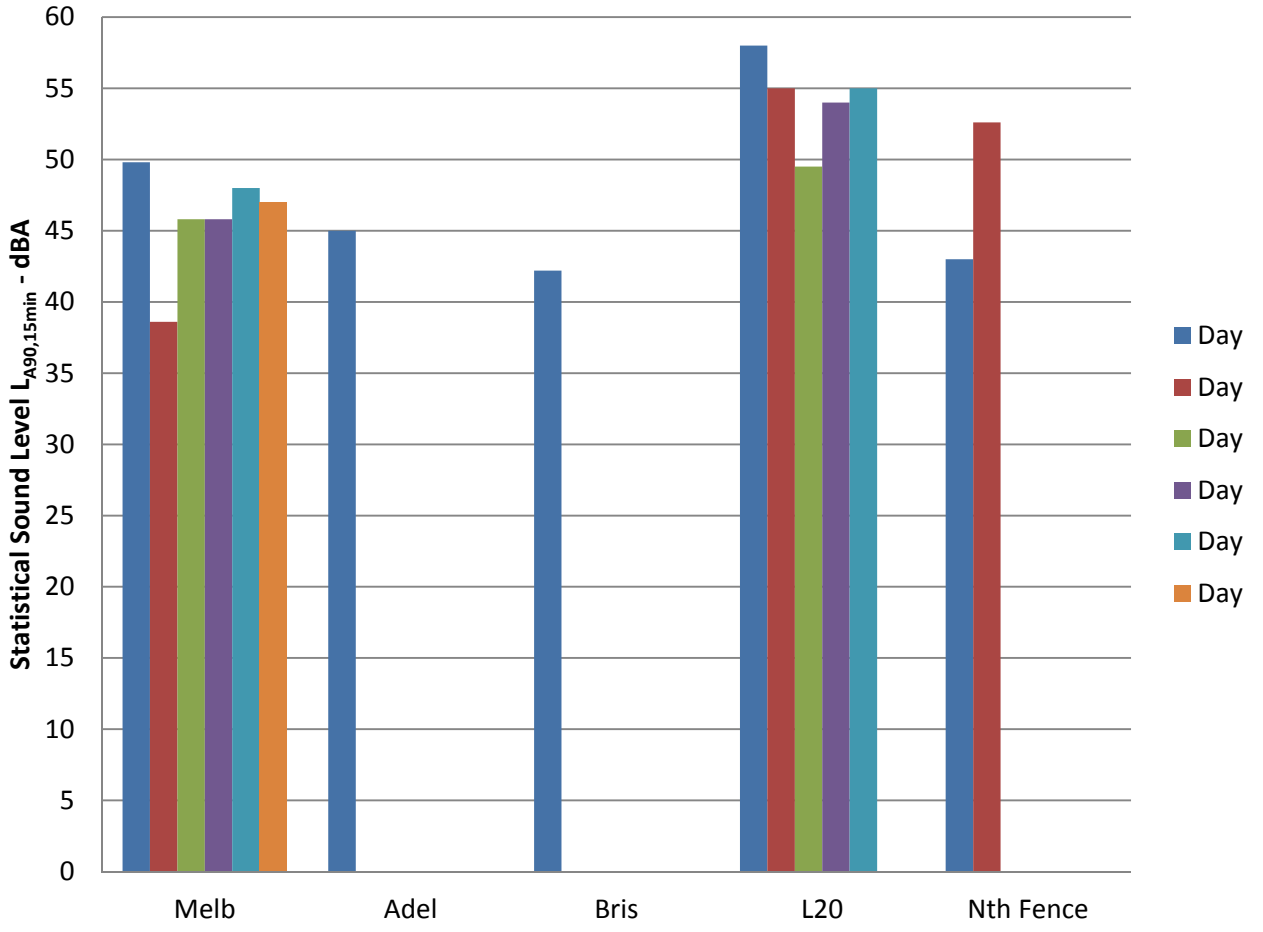


Figure 4.33: Berrima Cement Annual Noise Assessment 2021 - Attended Monitoring Statistical comparison of locations - Daytime L_{90}



attended results

Figure 4.34: Berrima Cement Annual Noise Assessment 2021 - Attended Monitoring Statistical comparison of locations - Evening L_{eq}

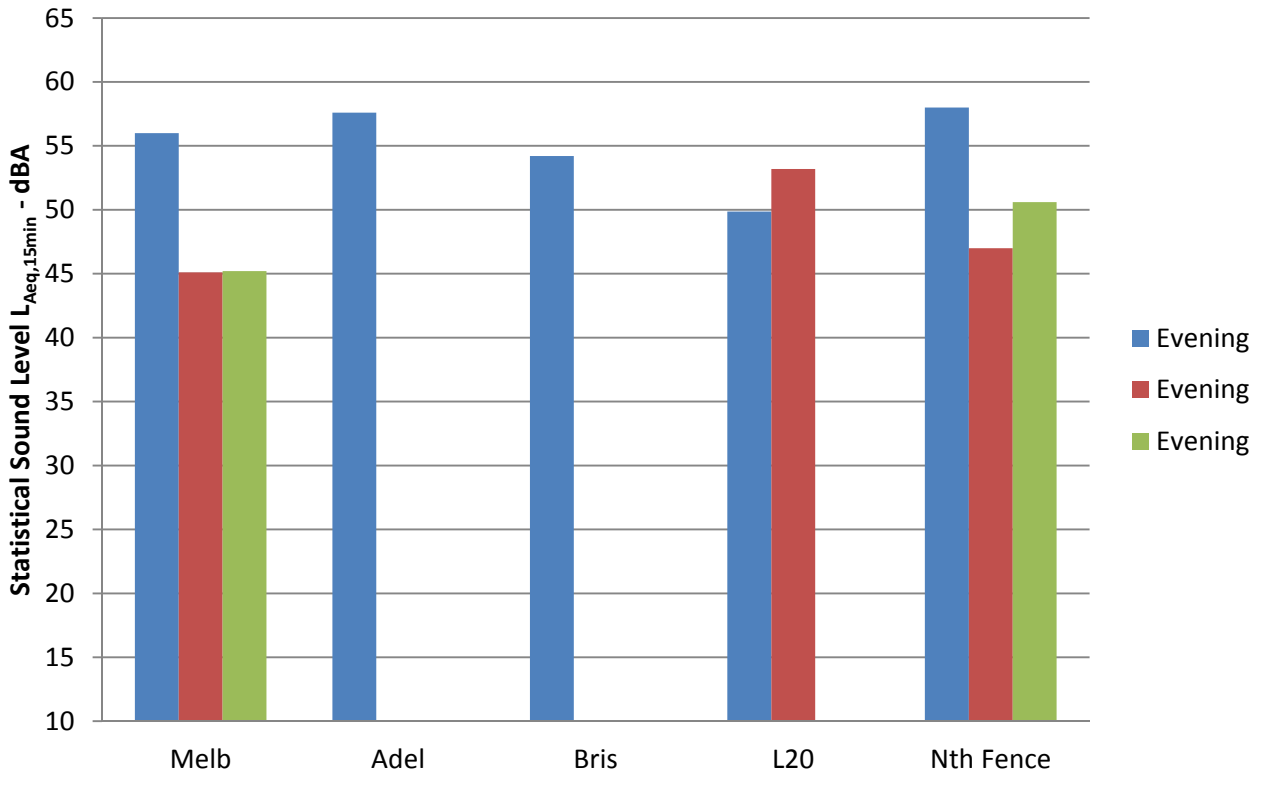
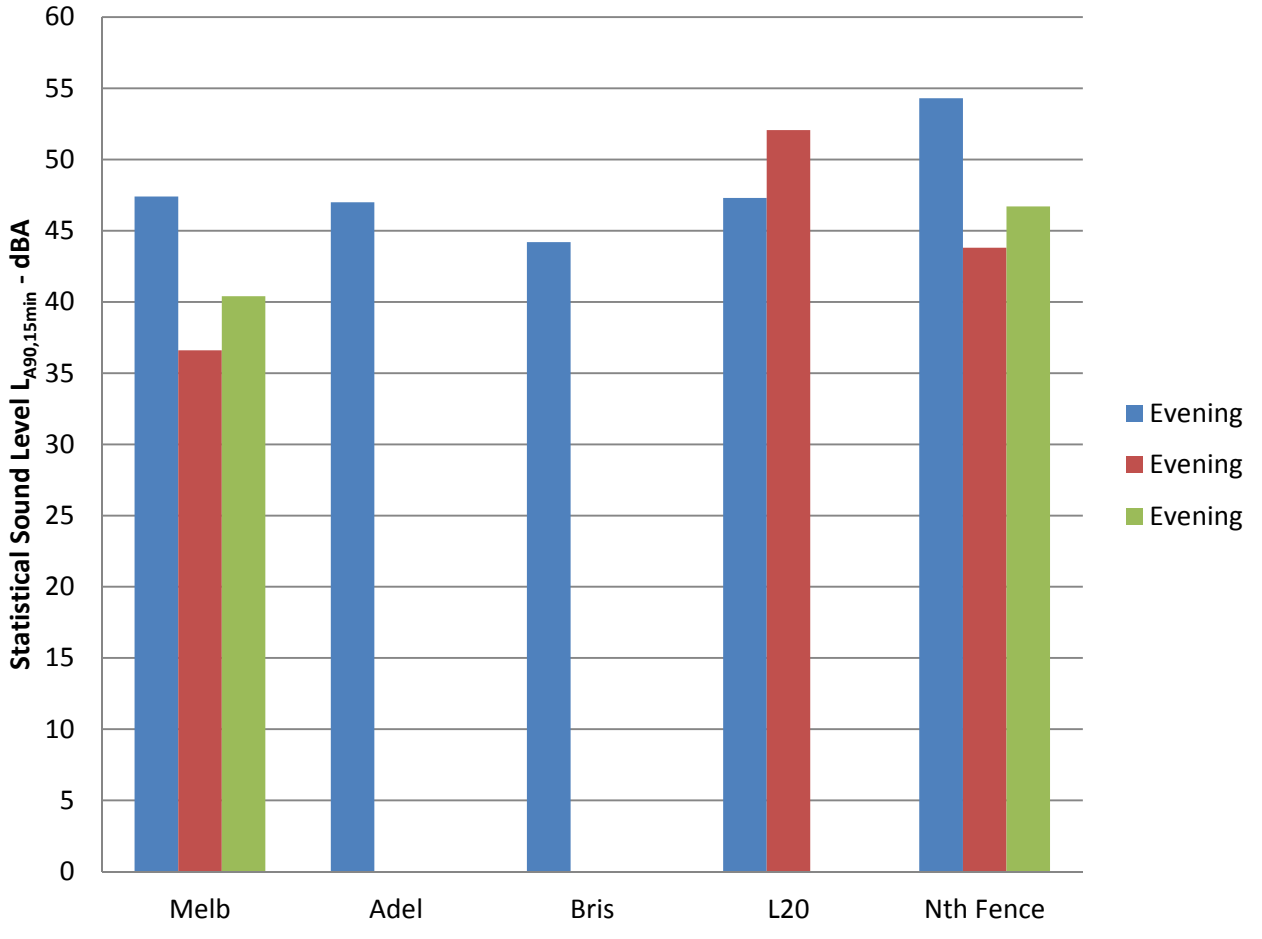


Figure 4.35: Berrima Cement Annual Noise Assessment 2021 - Attended Monitoring Statistical comparison of locations - Evening L_{90}



attended results

Figure 4.36: Berrima Cement Annual Noise Assessment 2021 - Attended Monitoring Statistical comparison of locations - Night-time L_{eq}

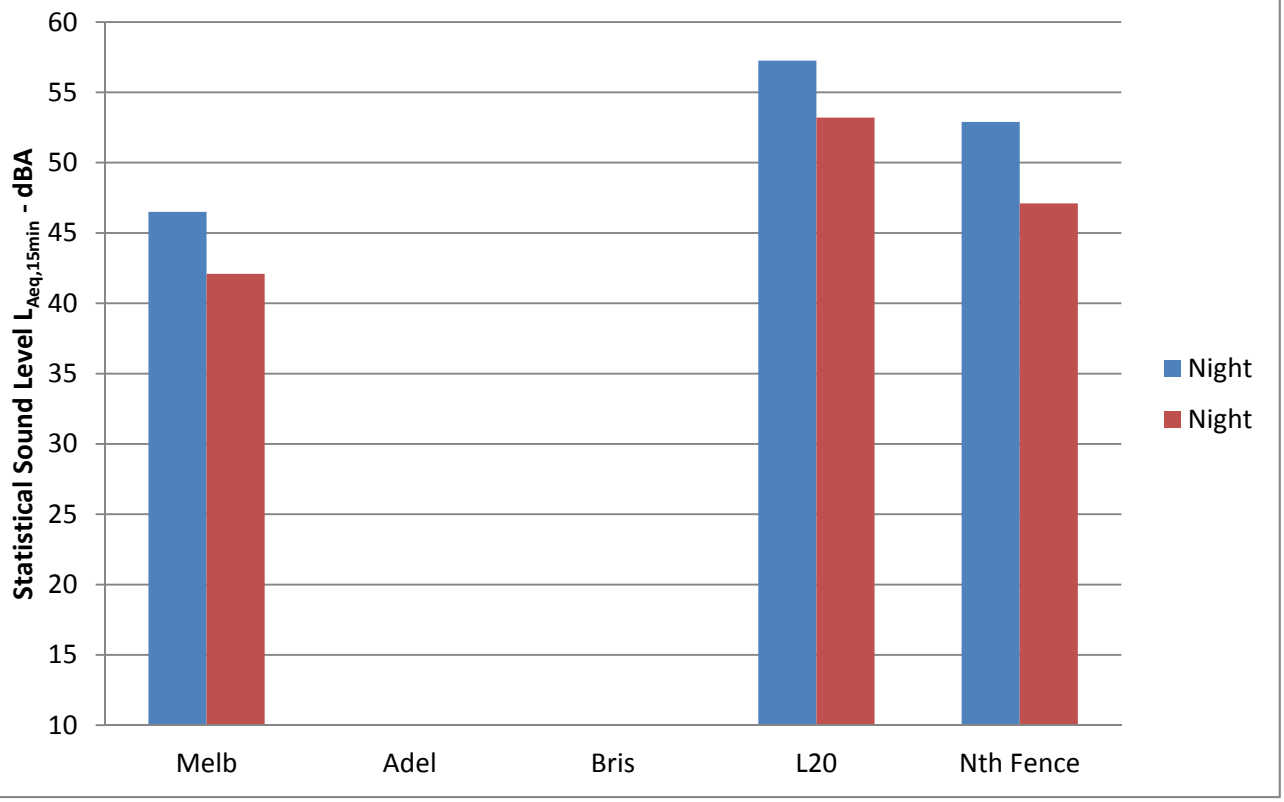
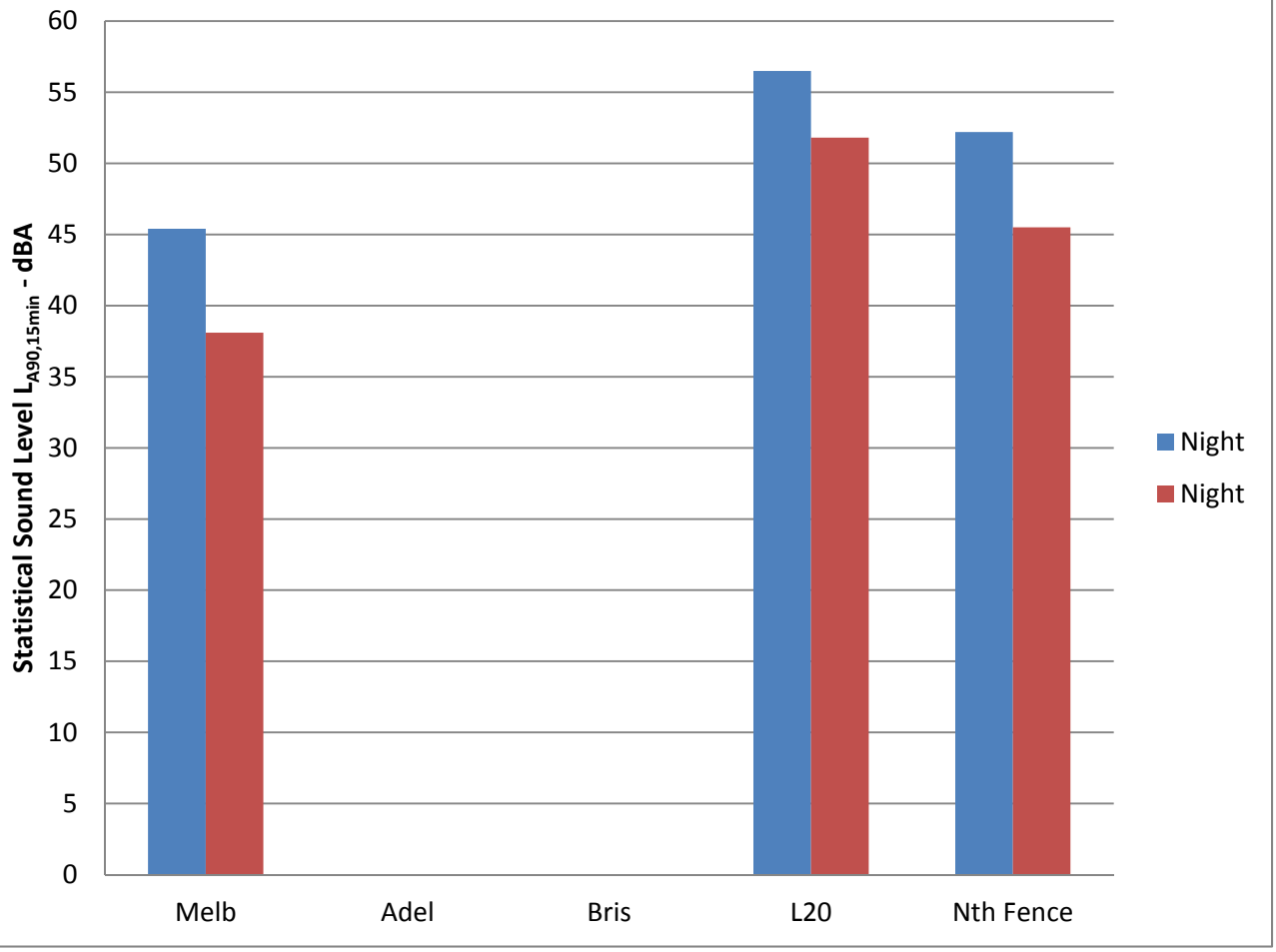


Figure 4.37: Berrima Cement Annual Noise Assessment 2021 - Attended Monitoring Statistical comparison of locations - Night-time L_{90}



attended results

Recognition Research
ABN: 25 153 946 064
ACN: 153 946 064

5 Summary and Conclusions

The Boral Cement Berrima works has a single noise limit condition for the total site, of $L_{A90,15\text{-minute}}$ not greater than 58 dBA at Location 20 in the Store Yard. Monitoring for total site emissions at Location 20 over a 14 day period in October to November 2021 has again confirmed that total site emissions are in compliance with the licence condition, as has occurred in 2019 and 2020. Times when that sound level limit was exceeded at the site were caused by weather conditions and extraneous sources not relevant to the compliance assessment.

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 the Kiln 6 Upgrade and Cement Mill No.7 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 were in compliance with their noise limit conditions at the time and continue to achieve their objectives.

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

- Monitoring of sound levels at Location 20 for compliance assessment;
- 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 one residential receiver location with unattended monitoring over long-term periods of two weeks and attended monitoring in day, evening and night-time at four residential receiver locations to compare with long-term averages from previous years and assess the audible acceptability of the received sound levels.

The finding of this 2021 annual environmental noise assessment is that total site noise emissions are considered to be in compliance with the licence condition.

Sound levels from the two major completed projects (Kiln 6 Upgrade and Cement Mill No.7) are also considered to be in compliance with their noise objectives 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 indicates that the Cement Plant is not increasing its emissions.

Measurements at the North Fence boundary location also assessed potential sleep disturbance and low-frequency impacts according to the 2017 release of the Noise Policy for Industry.

Calculations of sleep disturbance potential use $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ at night-time to provide comparisons with recommended maximum values for night-time of 60 dBA for $\mathbf{L_{A01.1\text{-minute}}}$ night-time for the Northern Boundary location and not greater than 15 dB difference for $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$. From the analyses it is considered that the number or times that the objectives of $\mathbf{L_{A01,1\text{-minute}}}$ greater than 60 dBA and $\mathbf{L_{A01.1\text{-minute}} - L_{A90.15\text{-minute}}}$ difference results greater than 15 dB are relatively low and the noise emissions from the Cement Plant have a low potential for sleep disturbance. Only warning signals from train horns, train operations and truck bumps were likely to cause the 60 dBA objective to be exceeded.

For low frequency assessment, an initial screening test is made of the C-weighted minus A-weighted (L_C-L_A) period sound level exceeding more than 15 dB. If the screening value is exceeded a one-third octave band frequency analyses is then made of un-weighted (or Z-weighted L_Z) sound levels in the low-frequency bands from 10 Hz to 160 Hz, compared to a specific value.

From the measurements in the residential receiver locations, the low frequency assessment was made on both $L_{Aeq,15\text{-}min}$ and $L_{A90,15\text{-}min}$ values. Exceedances were identified for L_{eq} on three occasions of 9 measurements at 4 Melbourne St and four occasions of seven measurements at the Northern Fence.

From the assessment of this survey it is considered that the main source of low-frequency noise events exceeding the policy objectives is from road traffic noise associated with trucks, either from within New Berrima or on distant roads and the freeway. The plant can be a source at times but this is not considered to be significant. Exceedances of the objectives by the L_{90} spectrum levels are considered to be minor.

Site noise sources

Some sources of noise at the Cement Plant had increased sound levels from previous measurements. Recommendations for review of plant item performance or maintenance were made for the following:

For No.6 Kiln

- PHT Level 2.5 - A review of the condition of FA63 and its discharge silencer for 63 Hz band sound levels. This recommendation was also made in previous years.
- The new kiln shell cooling fans have significantly increased the sound levels at locations on the northern side of the centre of Kiln 6. A review of alternatives for cooling of this area is recommended from a long-term aspect.
- Sound levels in the low frequency bands have increased around fan FA215 since 2019. A review of the maintenance condition of the fan is recommended to identify if there is a reason for this increase.
- Radicon Cooler fan sound levels were higher, possibly because of higher load. While calculated not to cause contribution sound levels above the objectives, their reasonably high spectrum levels at mid and lower frequencies may make them a major contribution source. If the blades of these fans need replacing at some time in the future, consideration should be given to more aerodynamic and quieter fan-blade profiles

For the No.7 Cement Mill and Cement Mill No.6 area, areas around CM7 had not significantly increased in sound level compared to previous years and remain acceptable:

- Cement Mill No.6 western wall fans discharge silencer continues to be a high sound level source.
- Cement Mill No.5 building FA502 and northern wall annex fan (DC702) fan discharges are also high.
- Openings at the bottom of all main roller doors be able to seal to ground, not left open 50 to 100mm, or totally open. This will likely require cleaning of the doorway surrounds.

- Openings of all smaller doorways be cleaned so they can close fully.
- Cement Mill No.6 - edges of the main northern wall doors have edge seals installed.

It is recommended that these items be reviewed for condition and silencers cleaned, replaced or installed if appropriate.

The Mineral Addition Plant was operating during this survey and the fan sound emission levels were found to be high and adding to sound levels at other measurement locations for CM6. It is recommended that a review of the fan discharge silencer on its dust collector unit DC126 be made and an improved silencer identified.

ABN: 25 153 946 064
ACN: 153 946 064

Appendices

Appendix A: One-third octave band frequency spectra of measurements and tonality graphs

Appendix B: Unattended environmental sound level results for 4 Melbourne Street

Appendix C: Unattended environmental sound level results for Northern Boundary

Appendix D: Unattended environmental sound level results for Compliance Monitoring Location 20 - Store Yard Close

Appendix E: Narrow-band spectra from attended measurement recordings

Appendix F: Attended monitoring results

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ABN: 25 153 946 064
ACN: 153 946 064

Appendix A: One-third octave band frequency spectra of measurements and tonality graphs

Figure A1a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 8 Top Airslide Platform

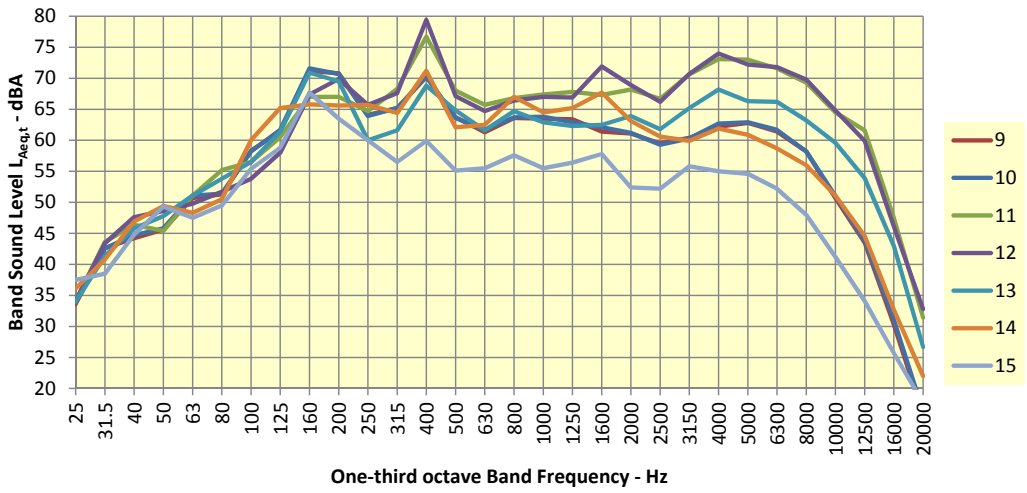


Figure A1b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 8 Top Airslide Platform

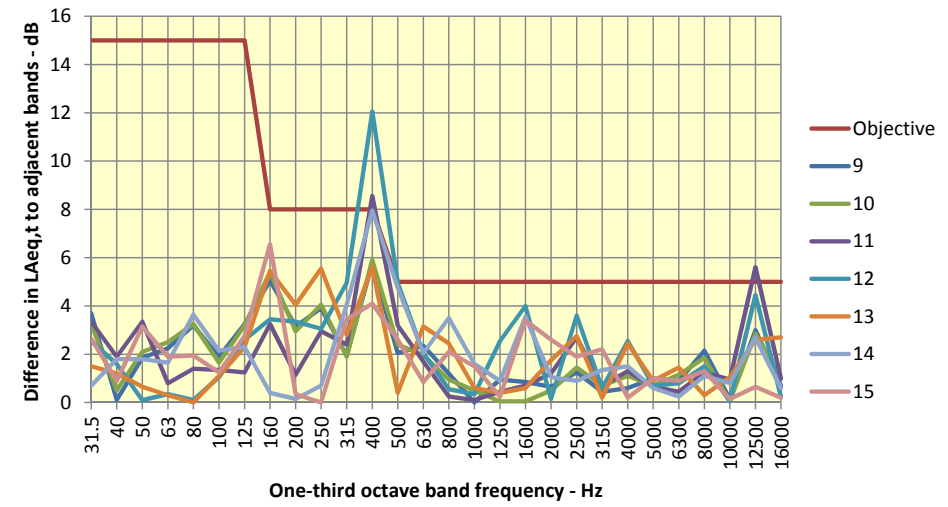


Figure A2a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 8 Lower Airslide Platform

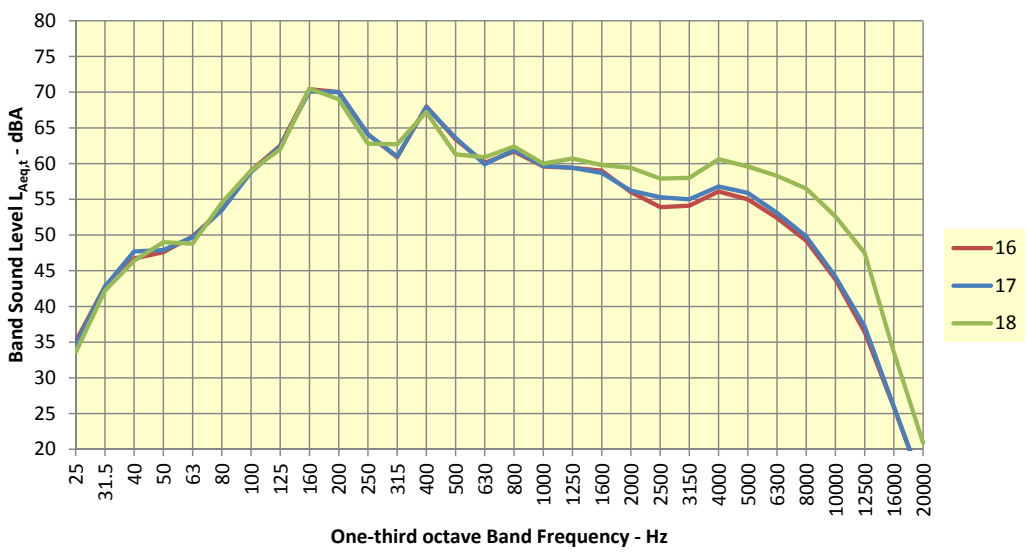


Figure A2b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 8 Lower Airslide Platform

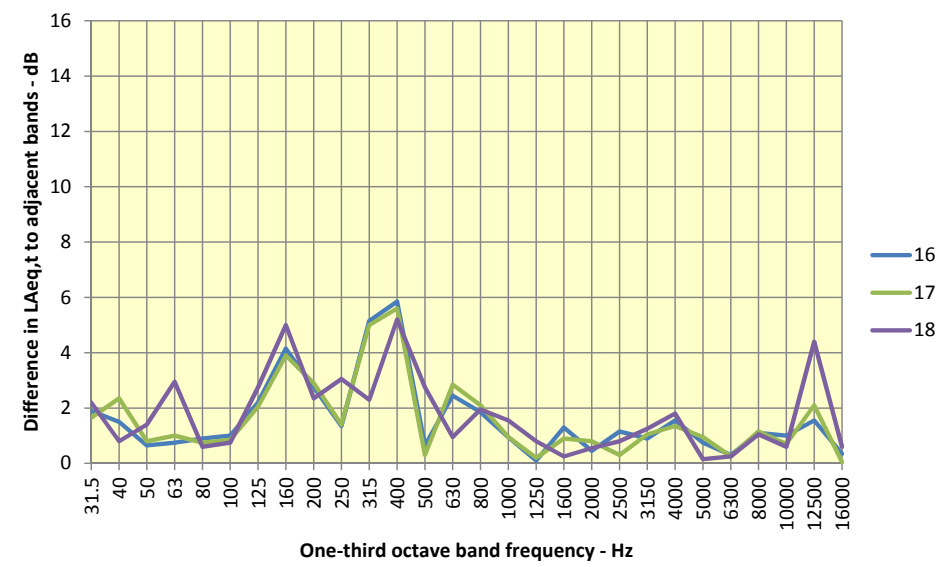


Figure A3a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 8 proper

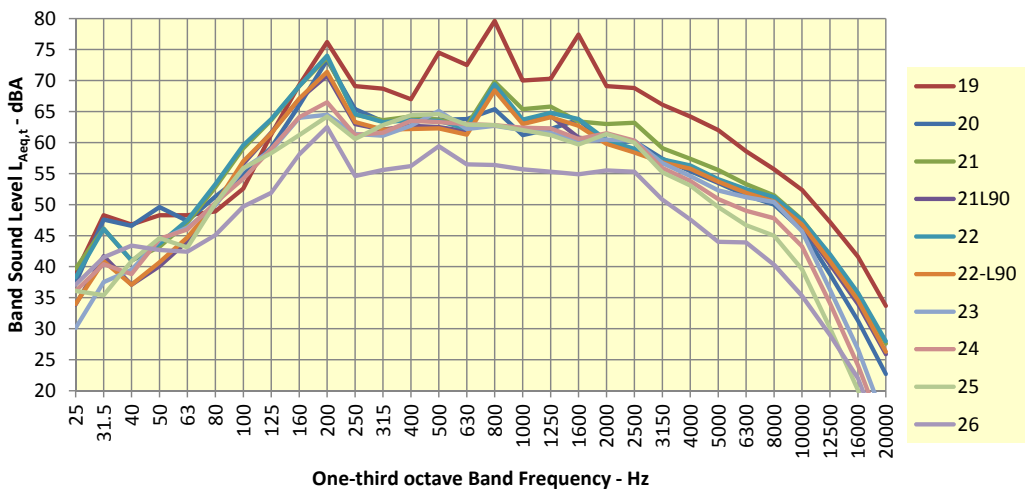


Figure A3b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 8 proper

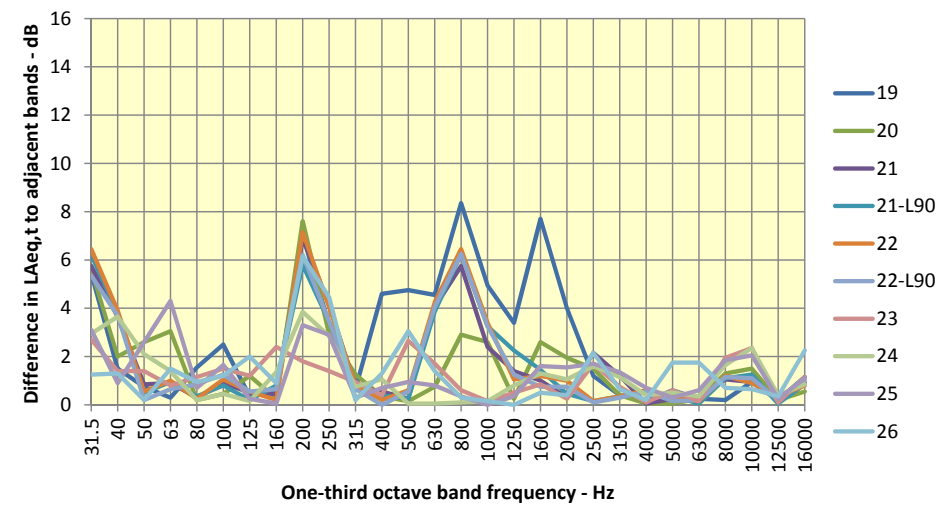


Figure A4a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 7 Alt. Fuels Transfer area

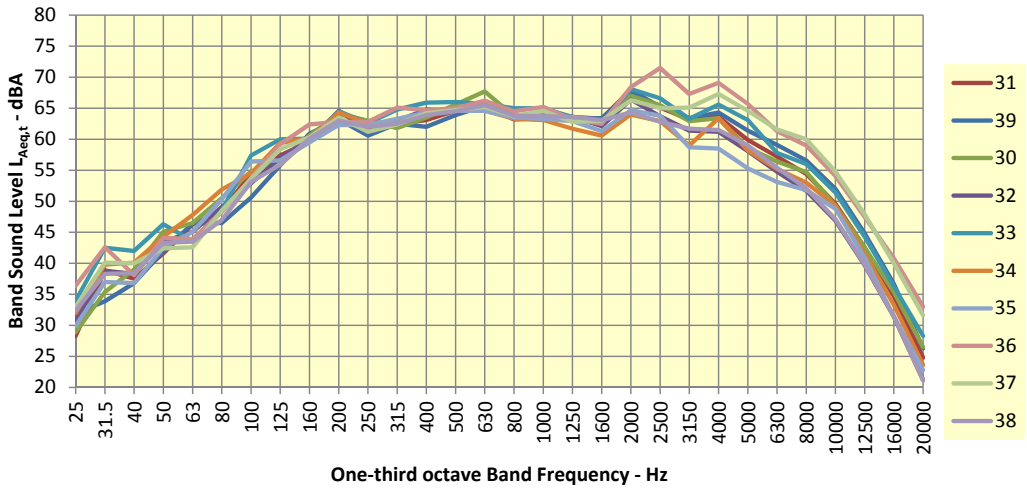


Figure A4b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 7 alt. fuels Transfer area

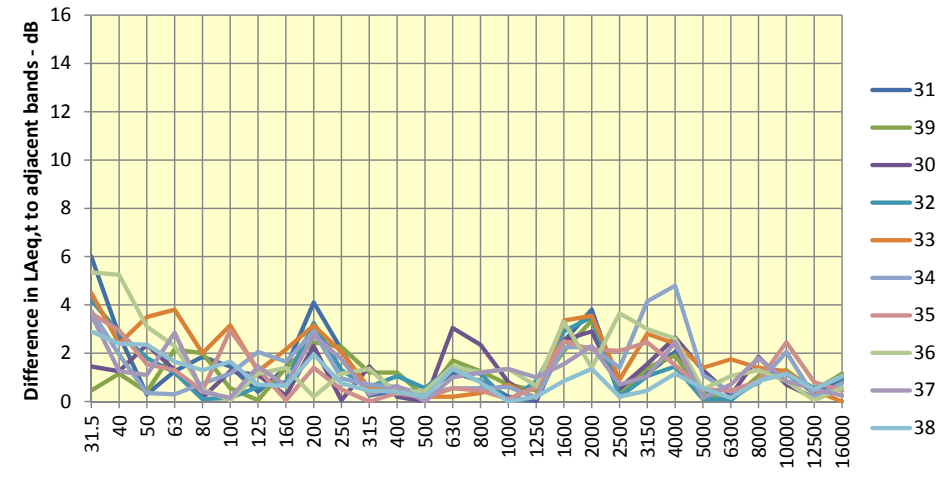


Figure A5a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 7

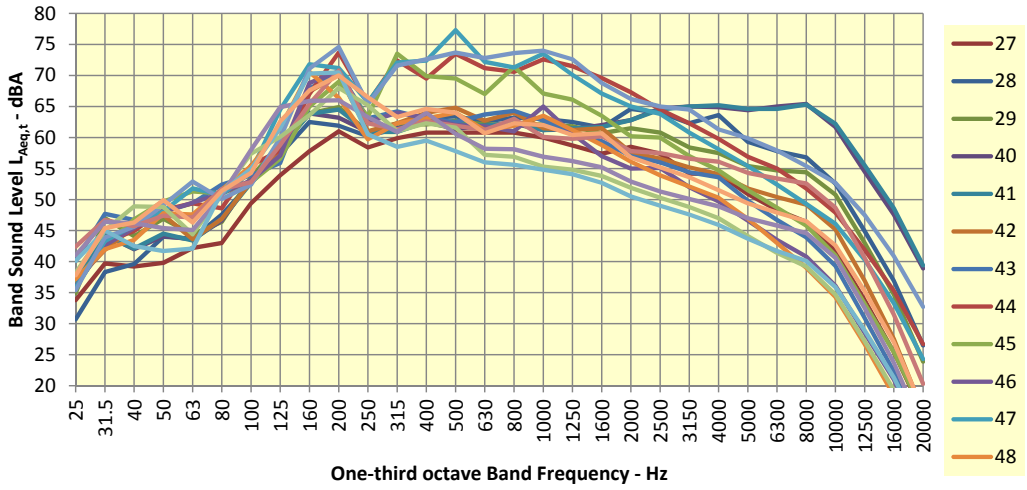


Figure A5b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 7

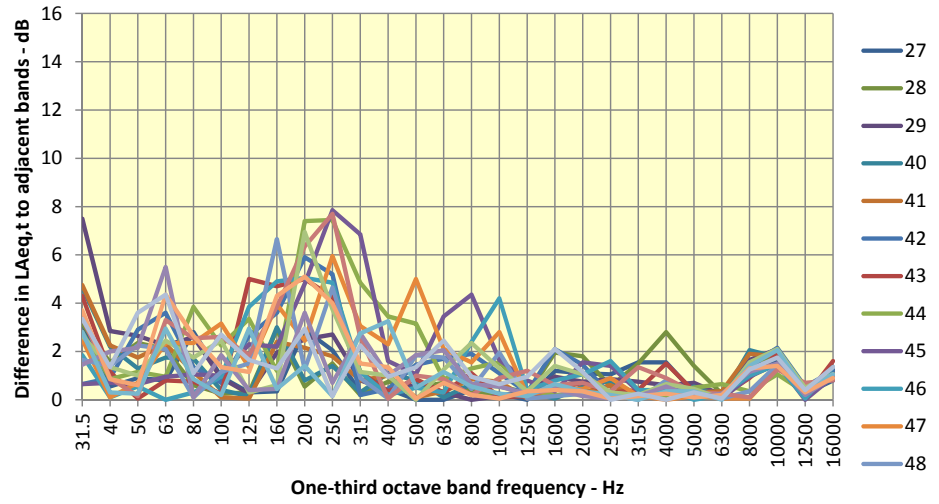


Figure A6a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 6 RM Silo Top

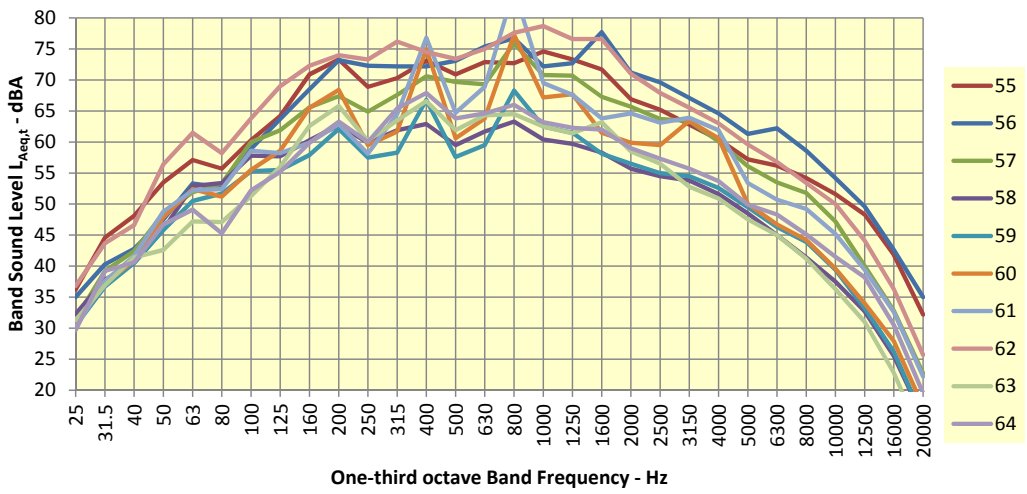


Figure A6b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 6 RM Silo Top

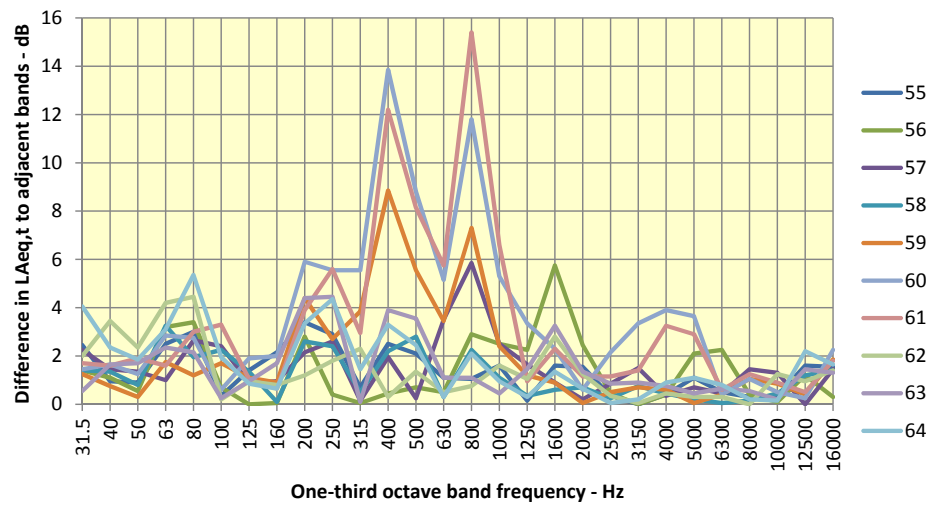


Figure A7a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 6

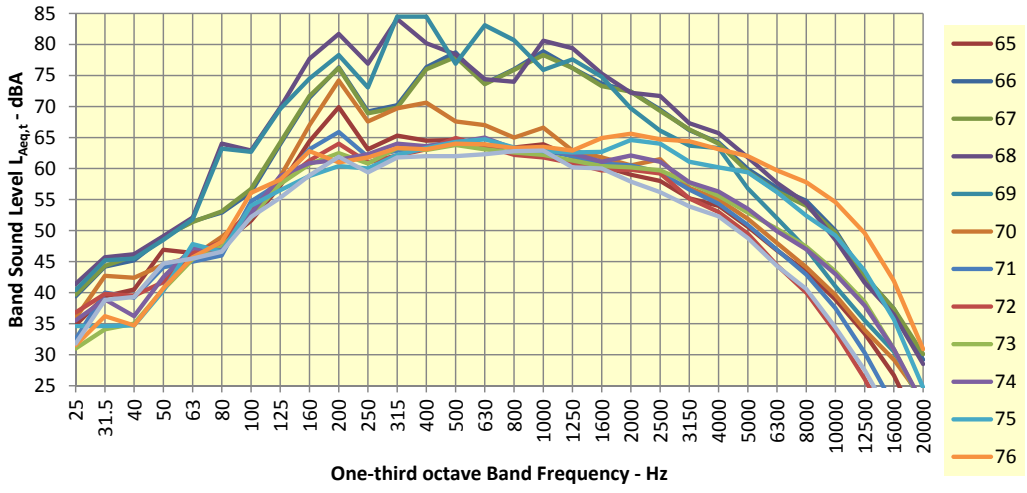


Figure A7b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 6

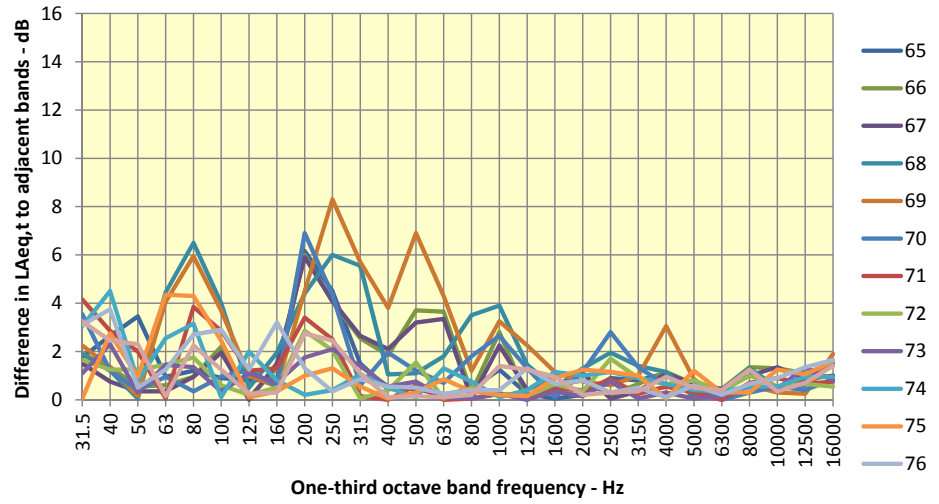


Figure A8a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 6 RM Silo Top Inside

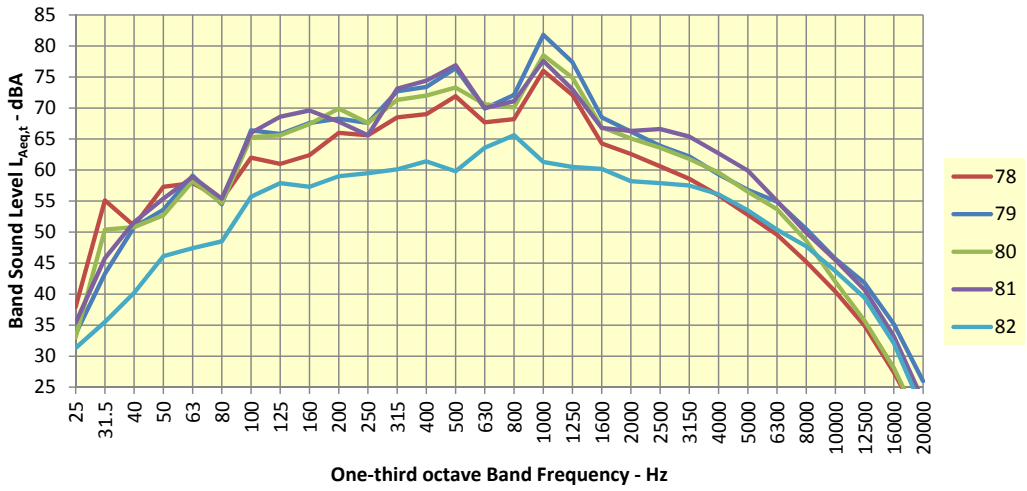


Figure A8b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 6 RM Silo Top Inside

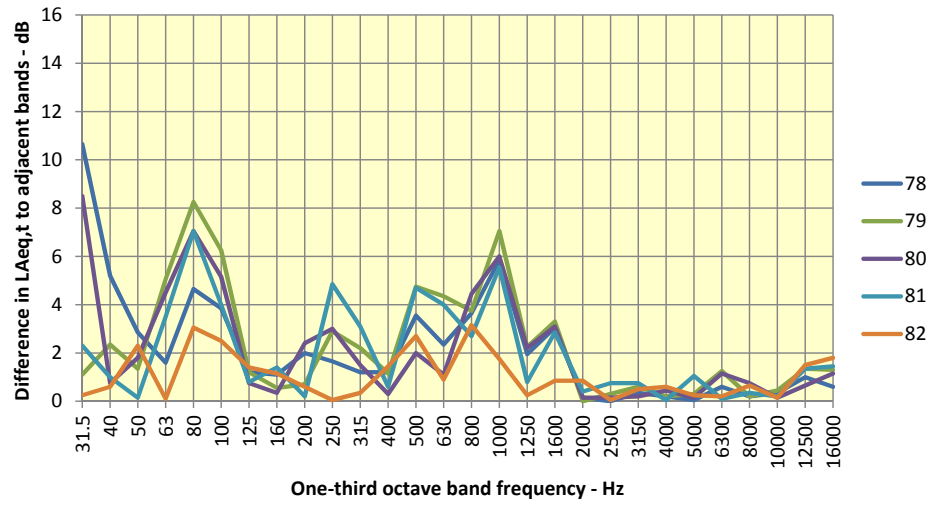


Figure A9a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 5

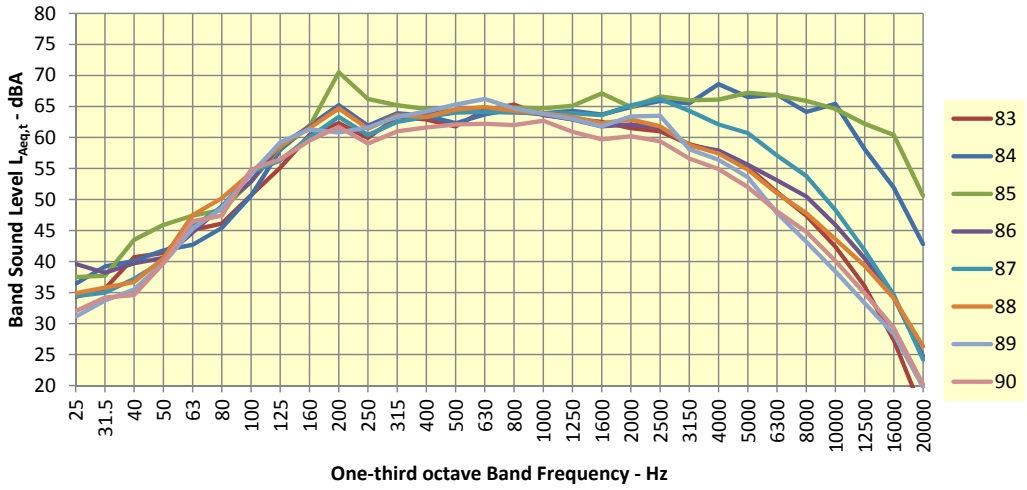


Figure A9b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 5

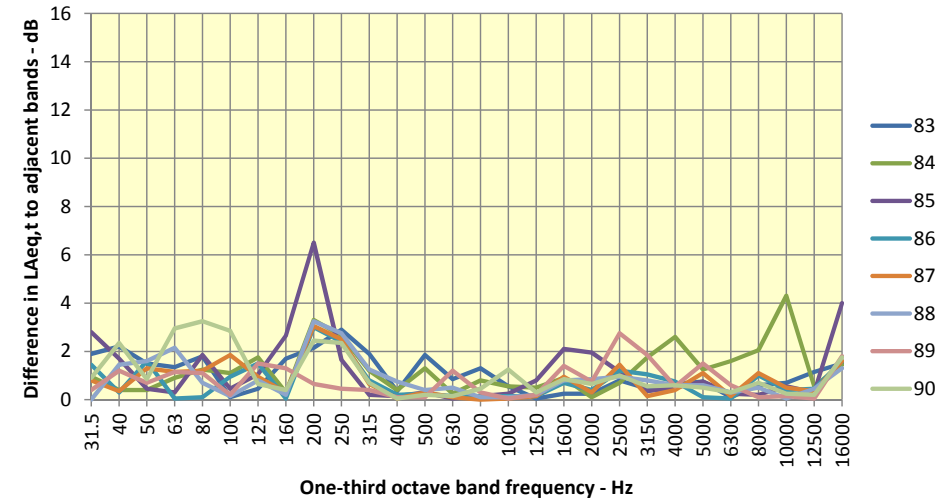


Figure A10a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 4

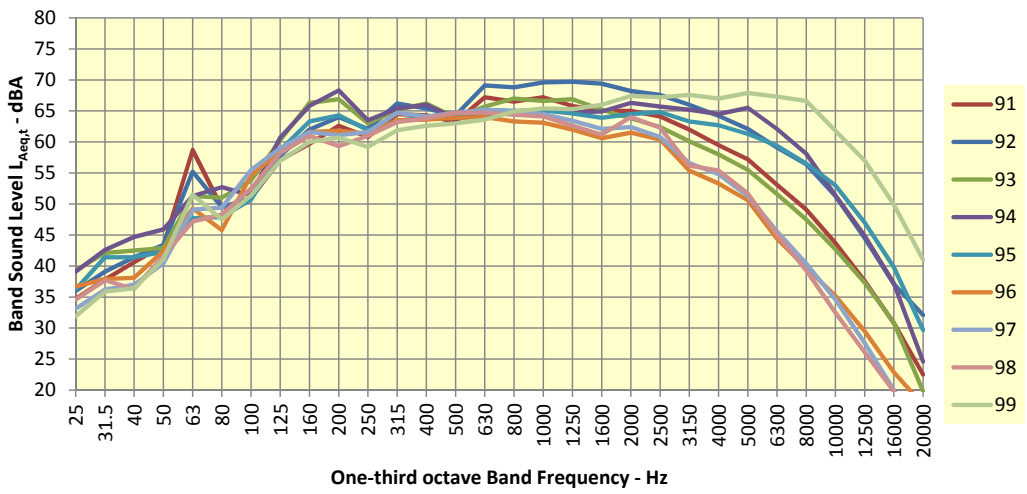


Figure A10b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 4

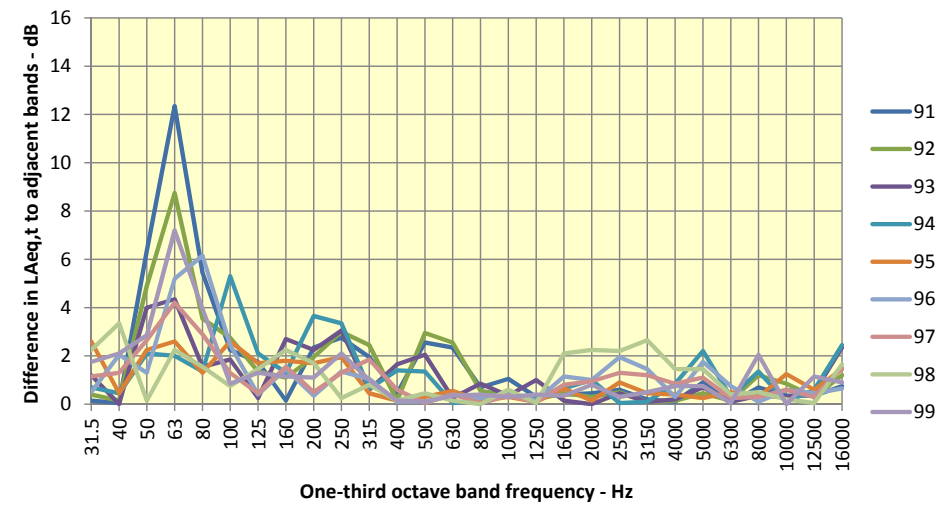


Figure A11a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra ESP E side

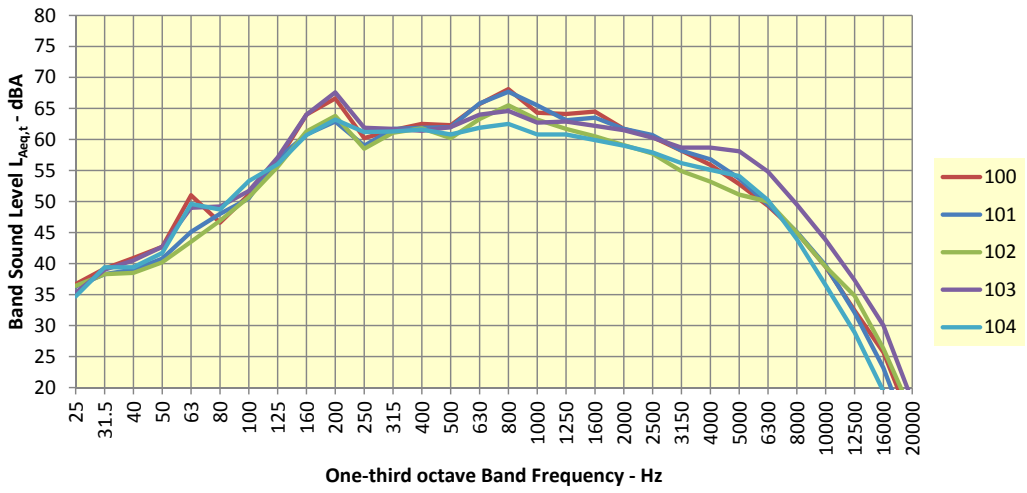


Figure A11b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - ESP E side

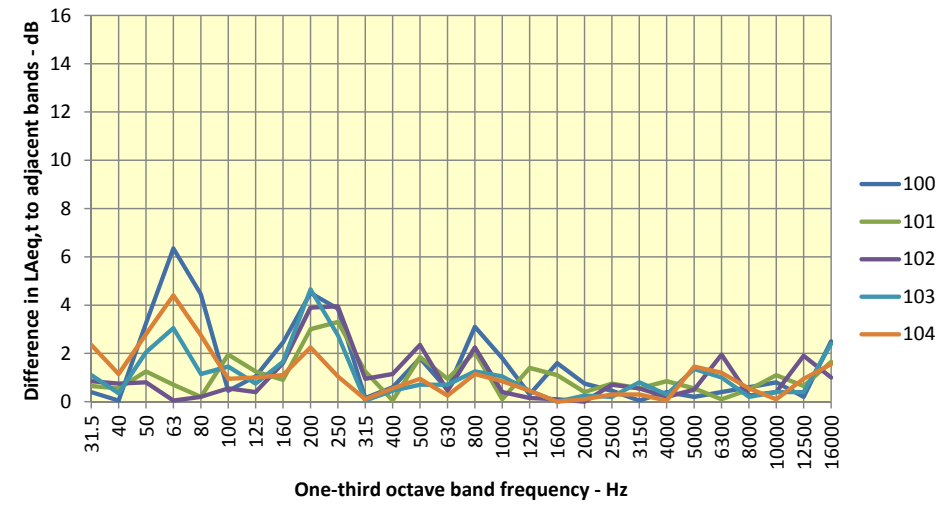


Figure A12a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 3

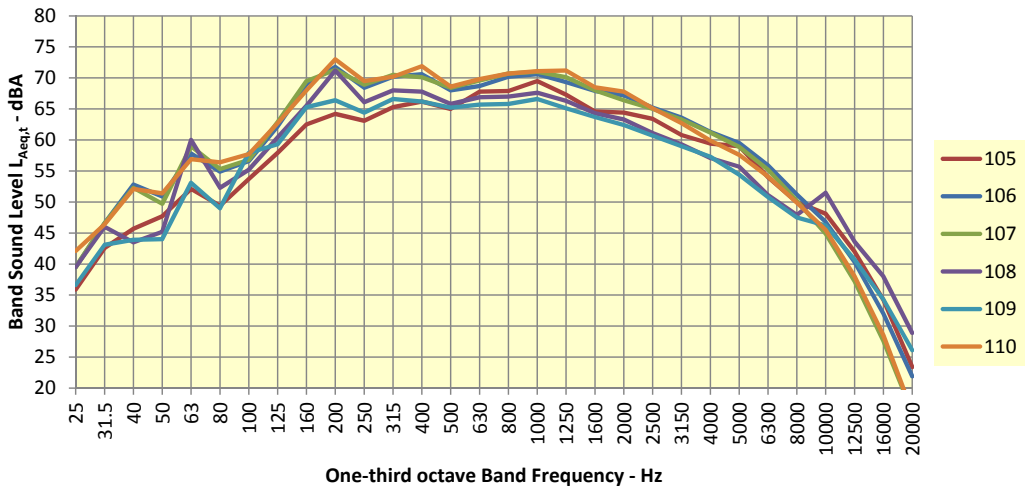


Figure A12b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 3

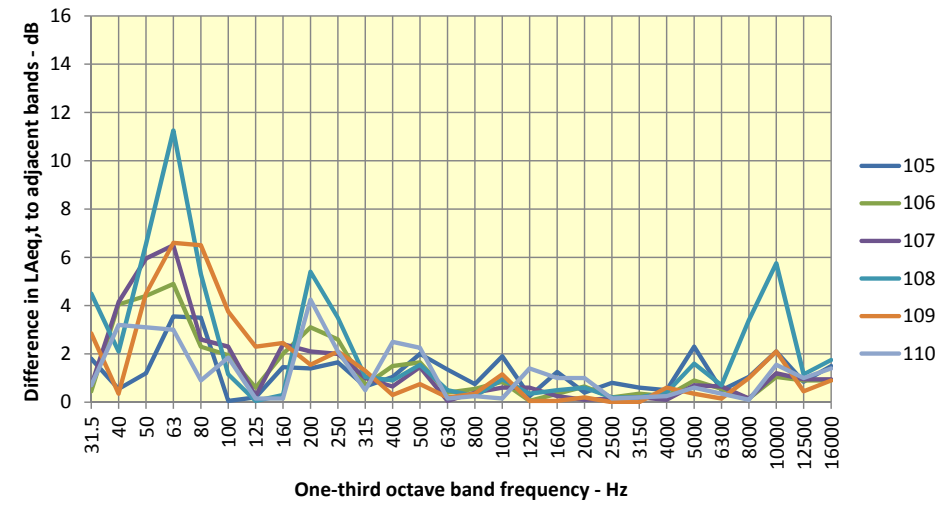


Figure A13a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 2.5

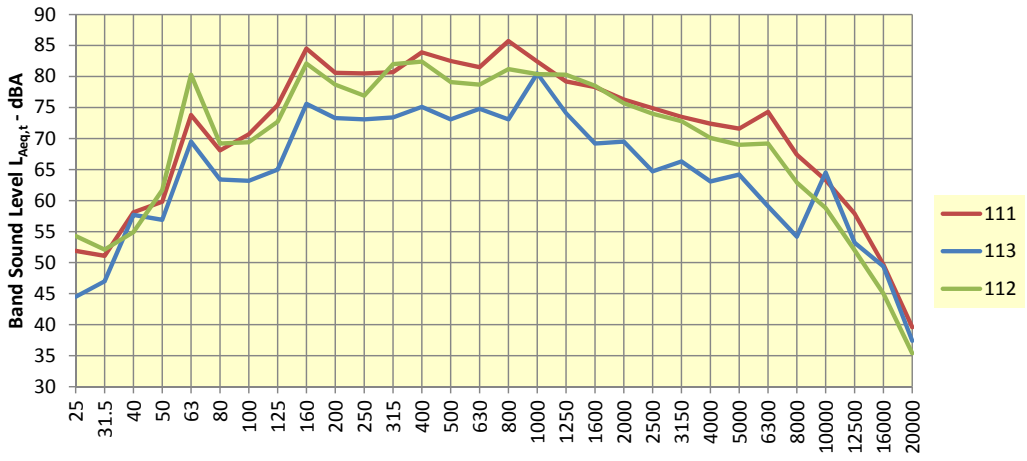


Figure A13b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 2.5

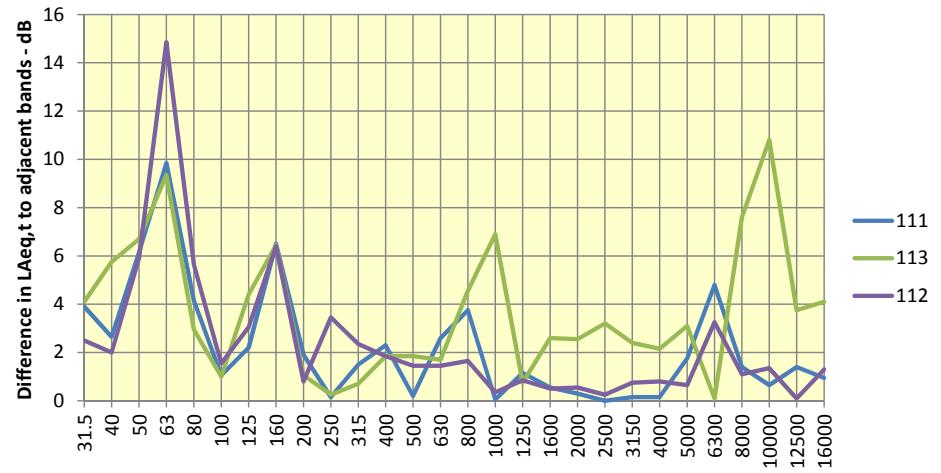


Figure A14a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 2.25

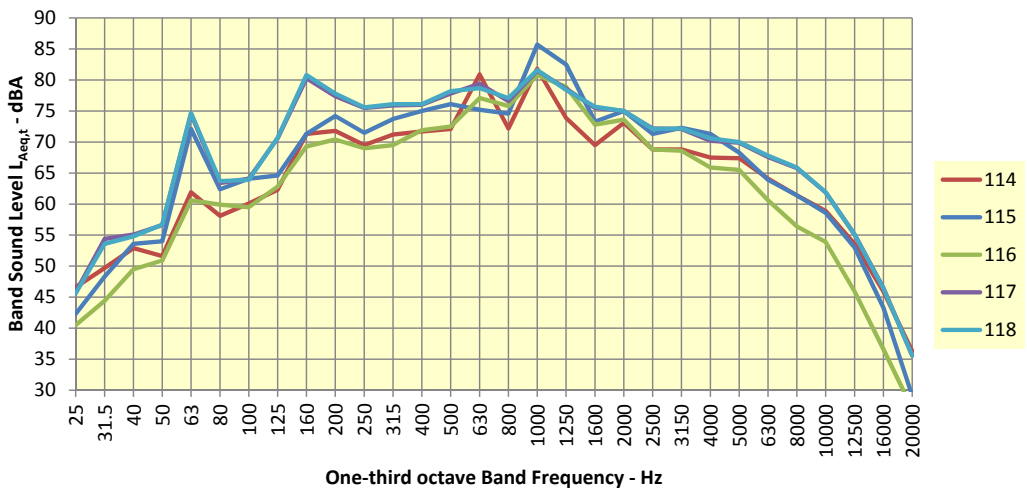


Figure A14b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 2.25

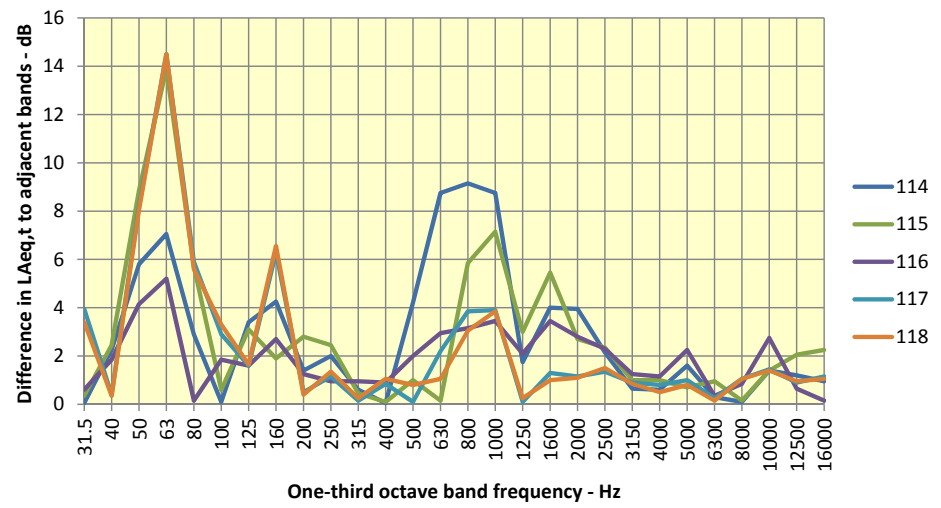


Figure A15a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 2

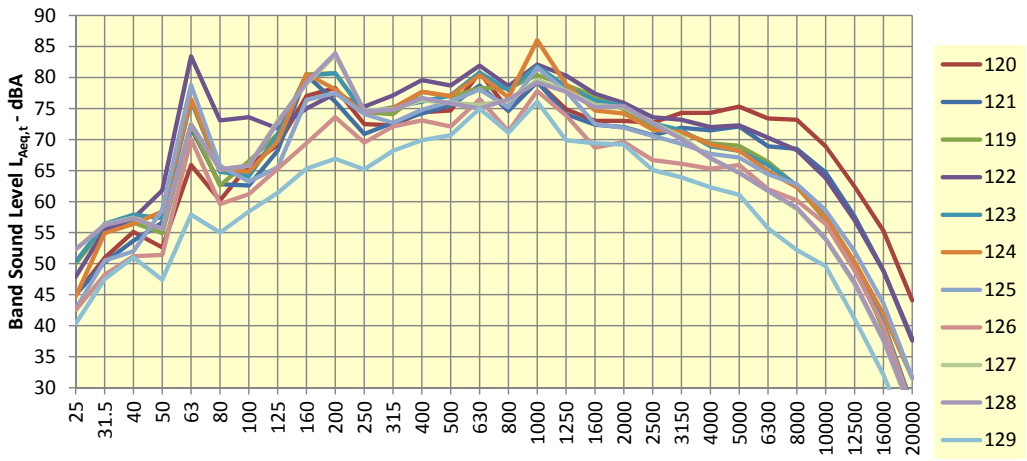


Figure A15b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 2

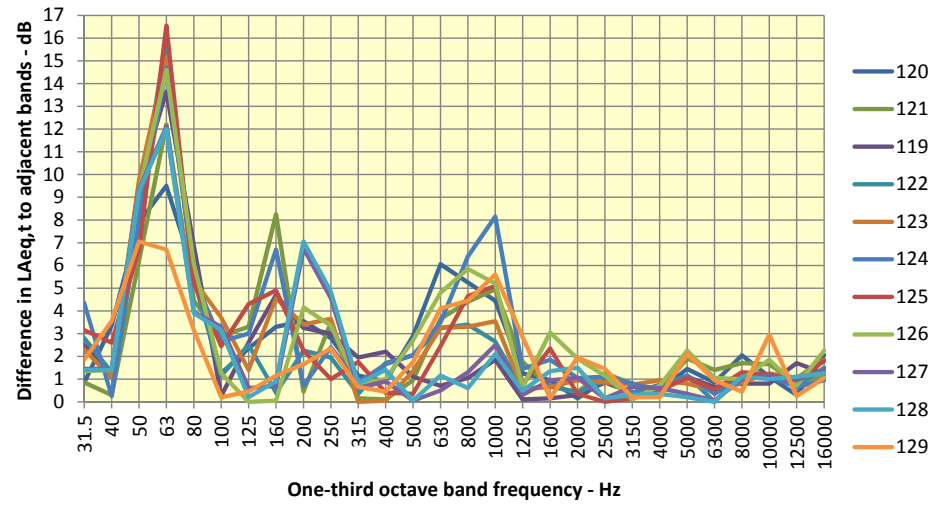


Figure A16a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT Level 1

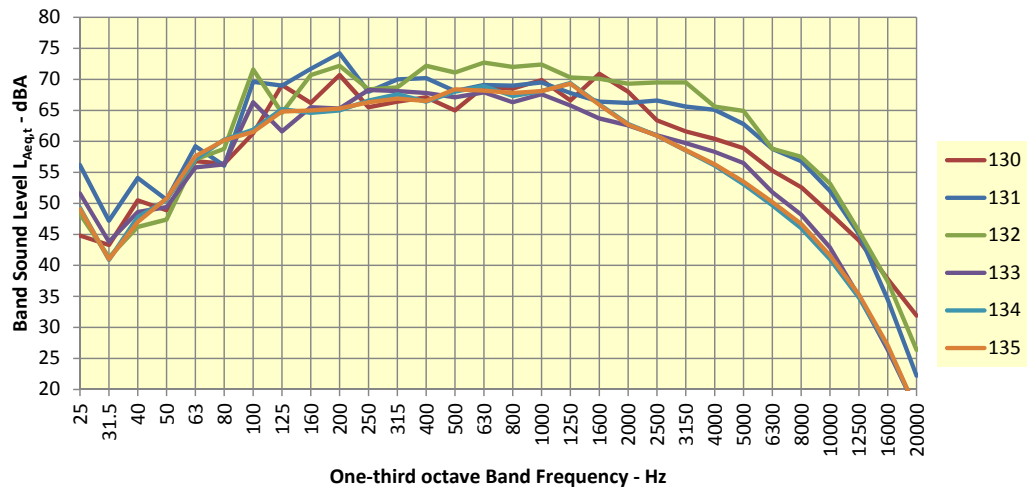


Figure A16b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT Level 1

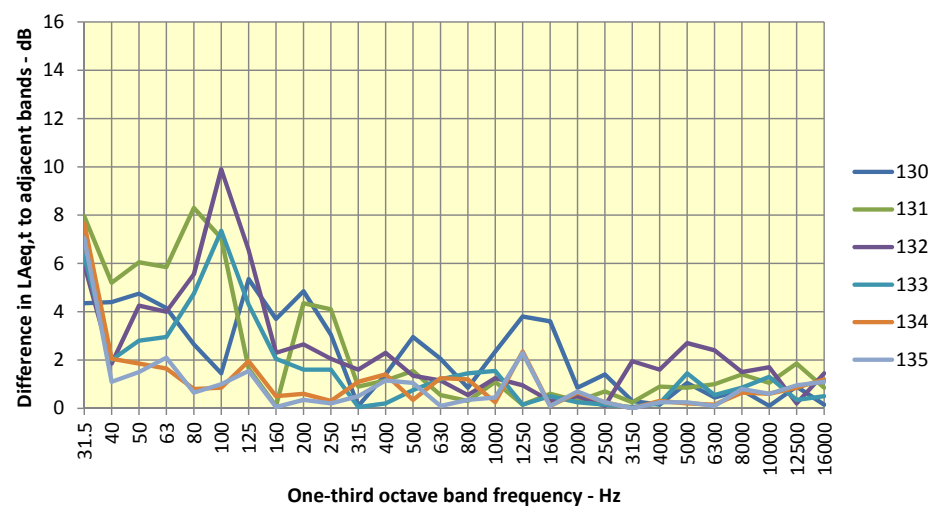


Figure A17a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra FA39

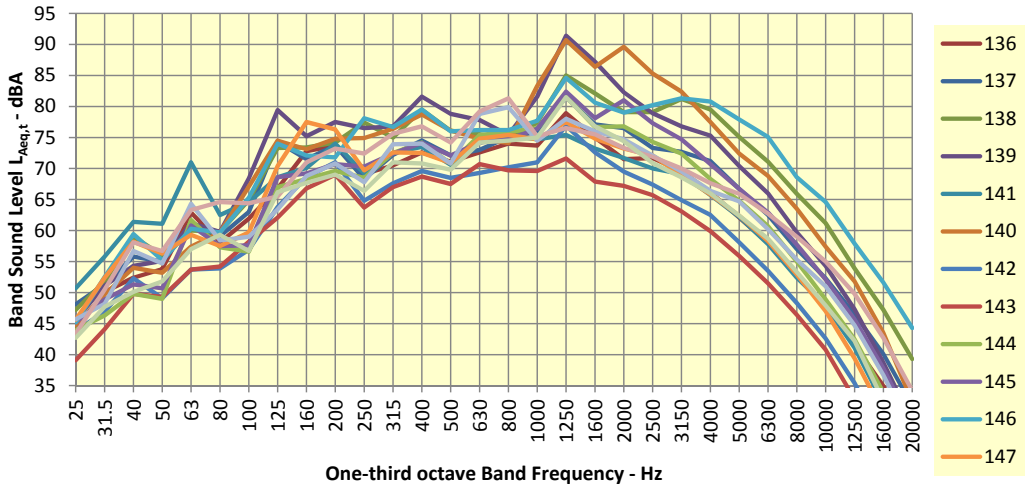


Figure A17b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - FA39

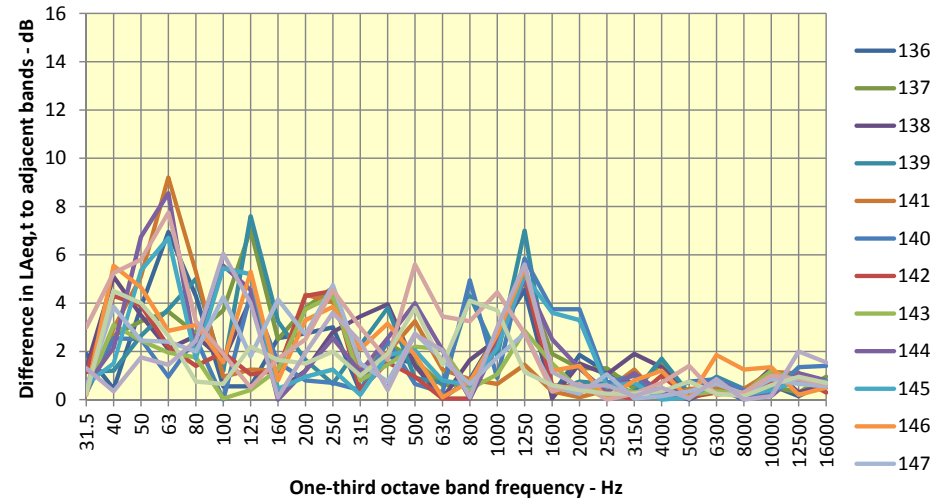


Figure A18a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra FA38

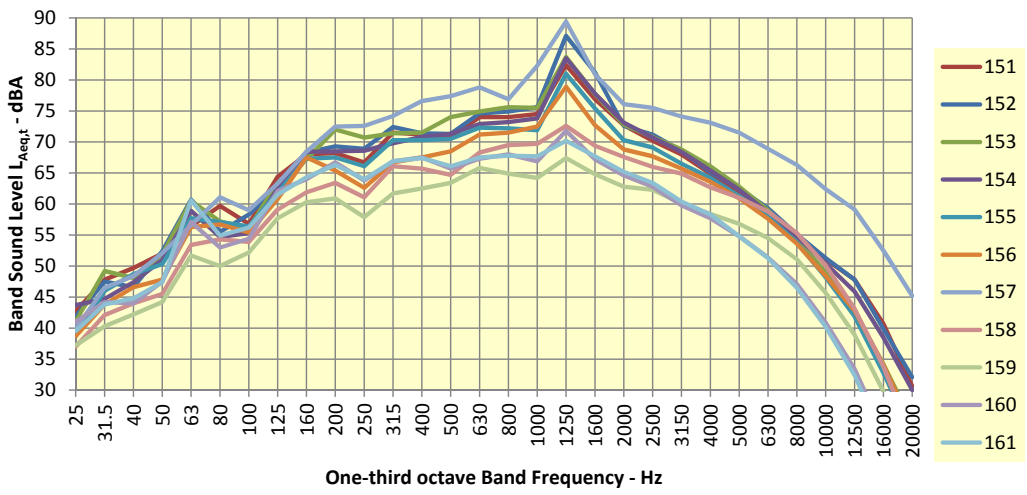


Figure A18b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - FA38

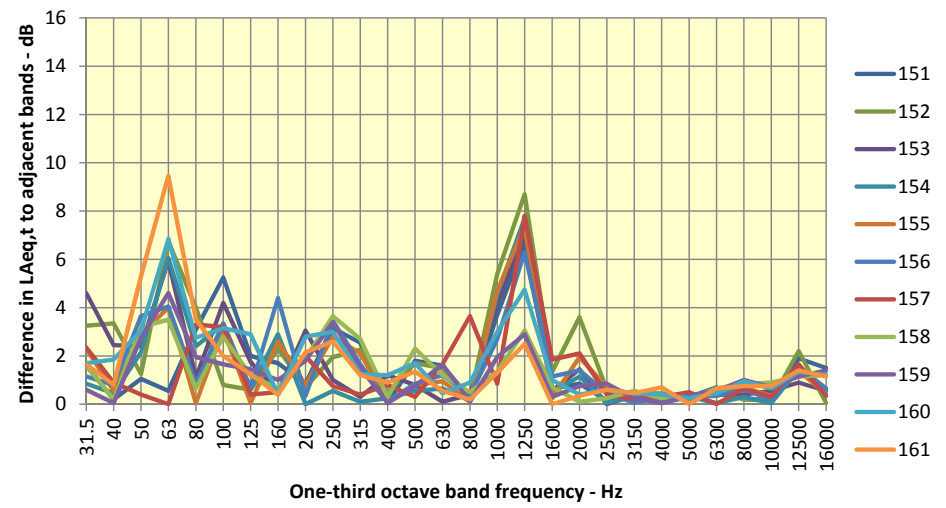


Figure A19a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 Outside

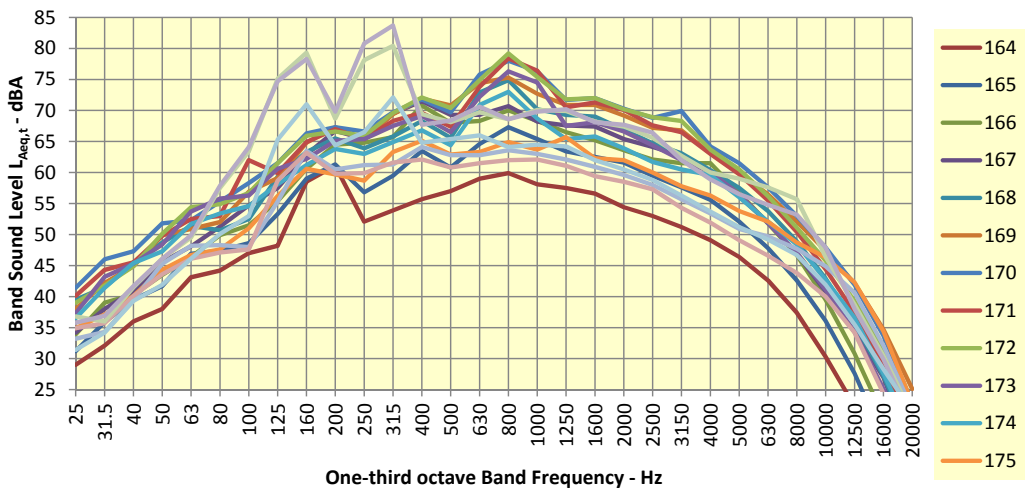


Figure A19b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 Outside

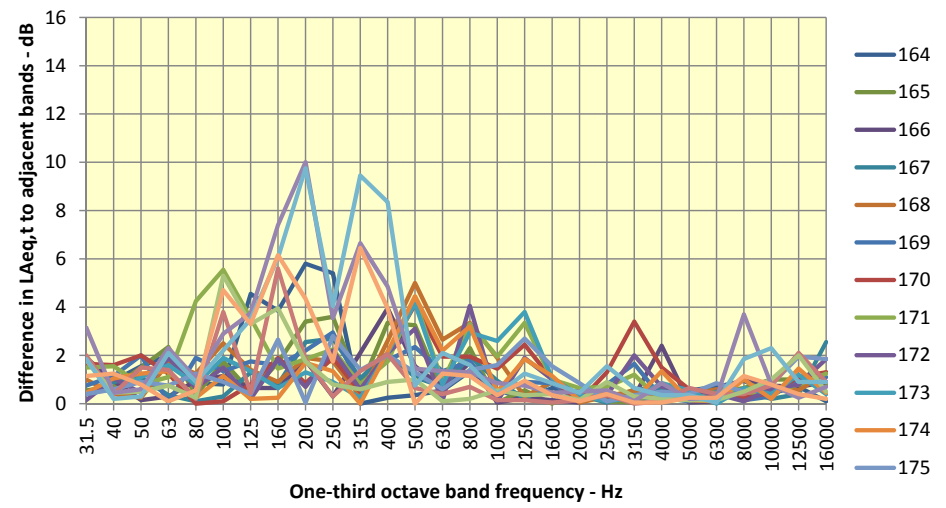


Figure A20a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 FA249

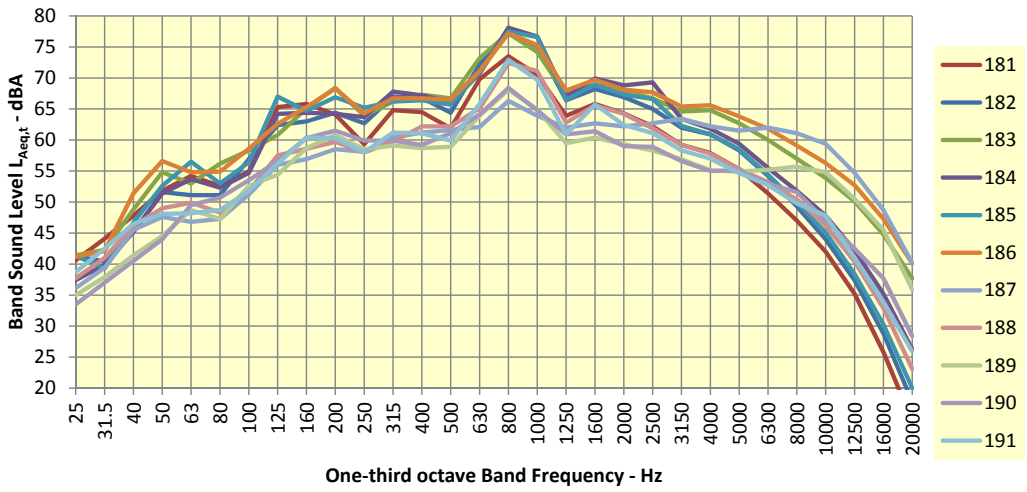


Figure A20b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 FA249

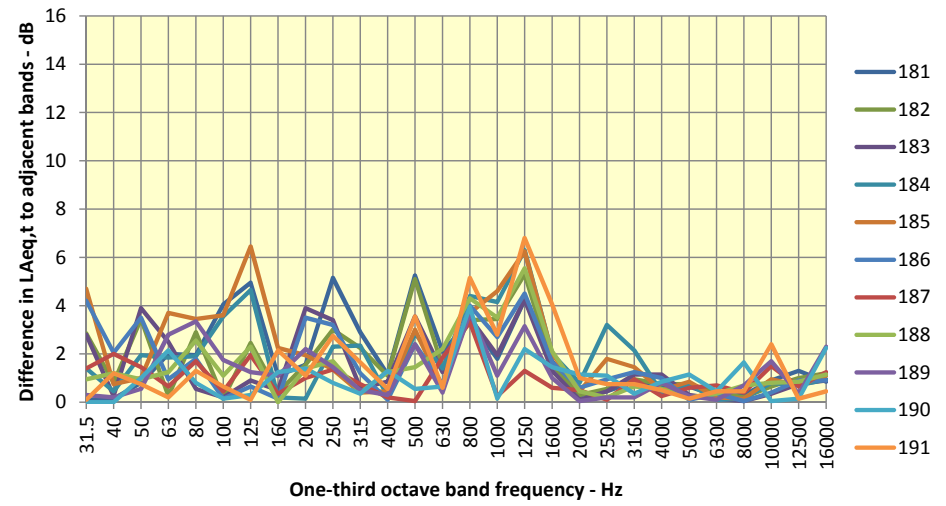


Figure A21a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 FA250

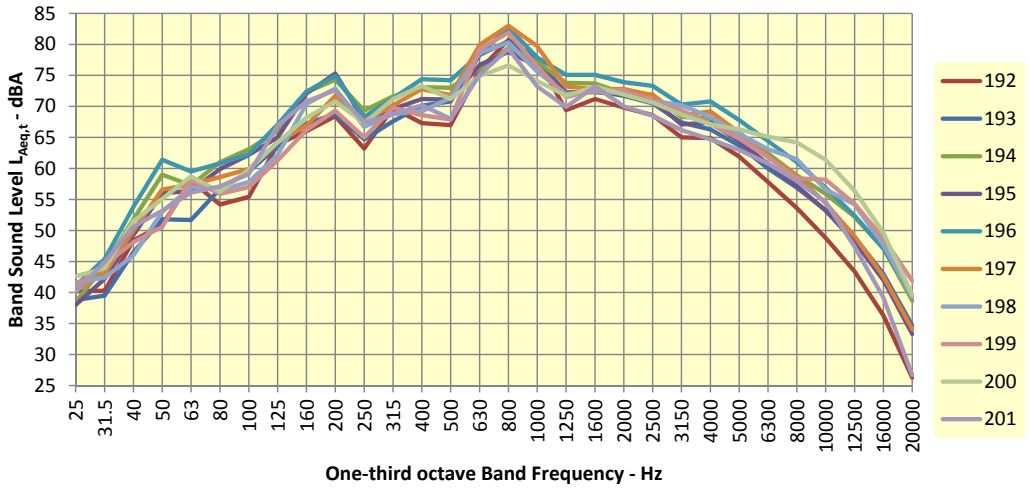


Figure A21b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 FA250

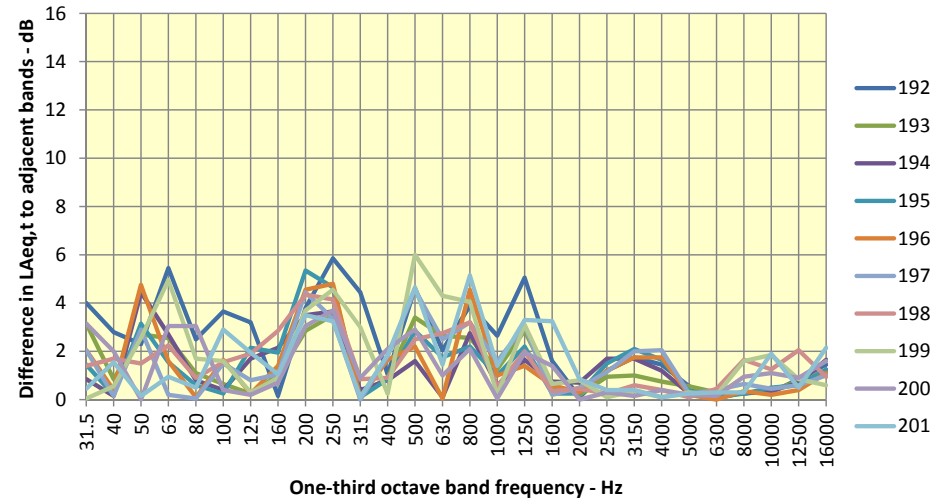


Figure A22a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 Roof Platform

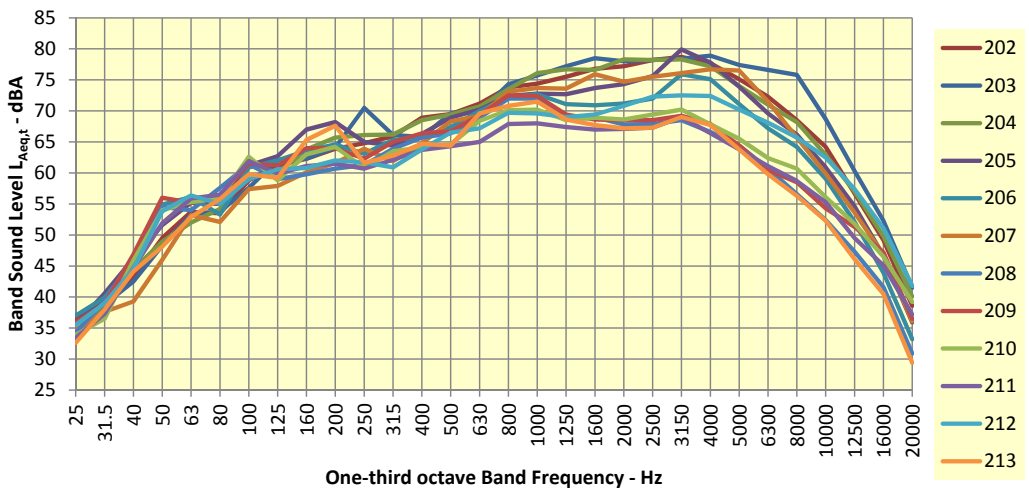


Figure A22b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 Roof Platform

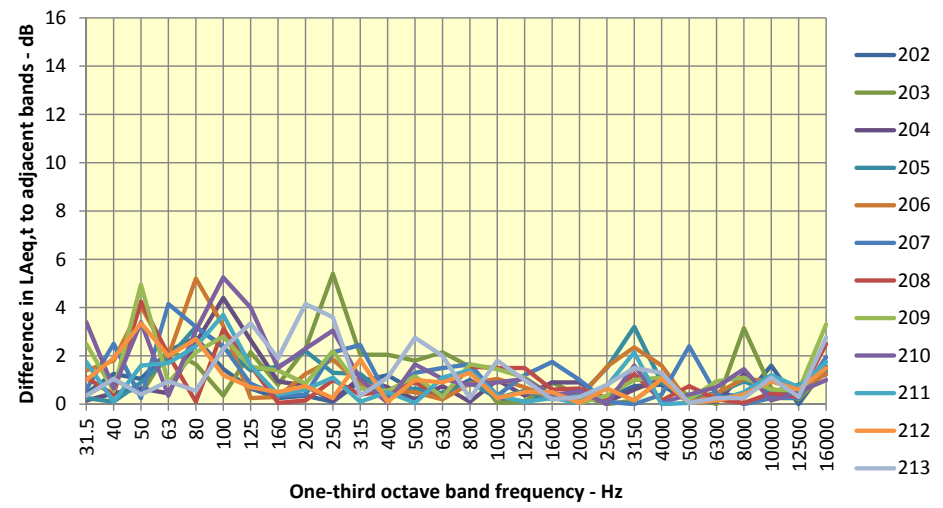


Figure A23a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 Baghouse Tower

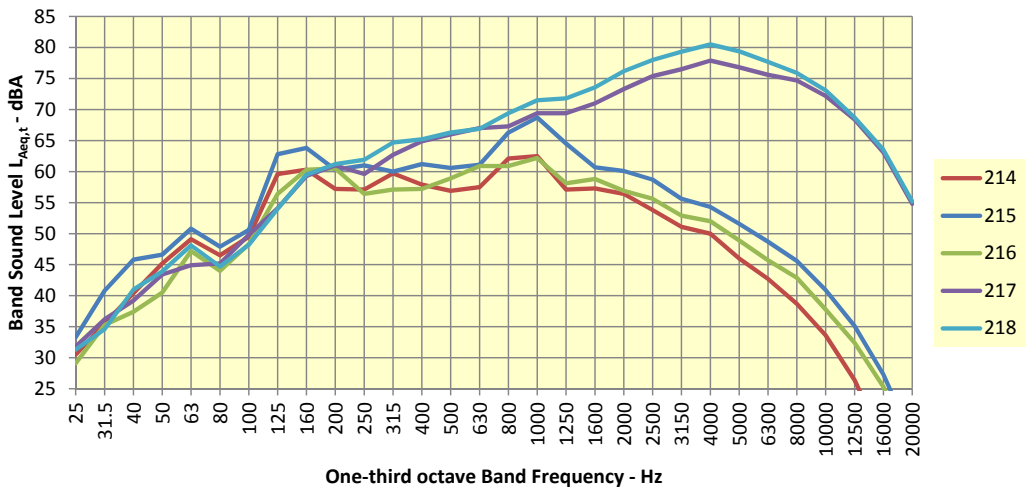


Figure A23b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 Baghouse Tower

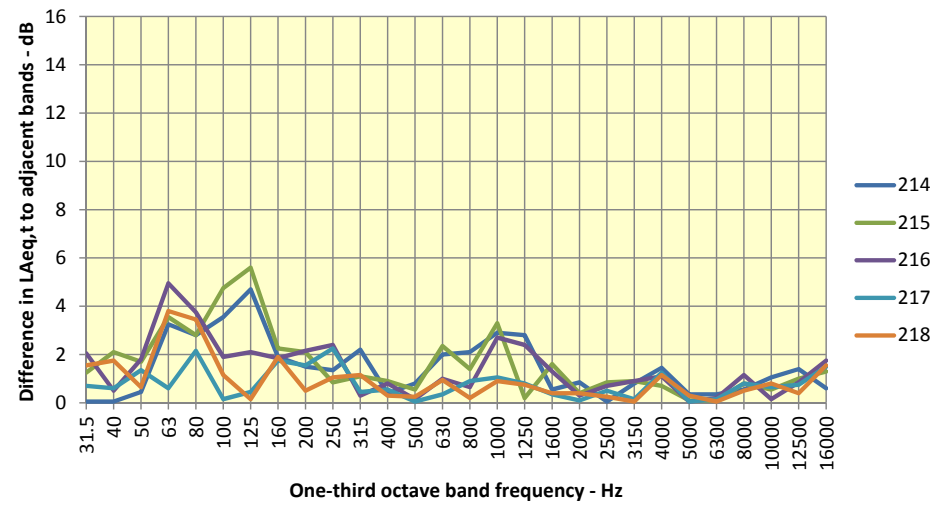


Figure A24a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 Inside

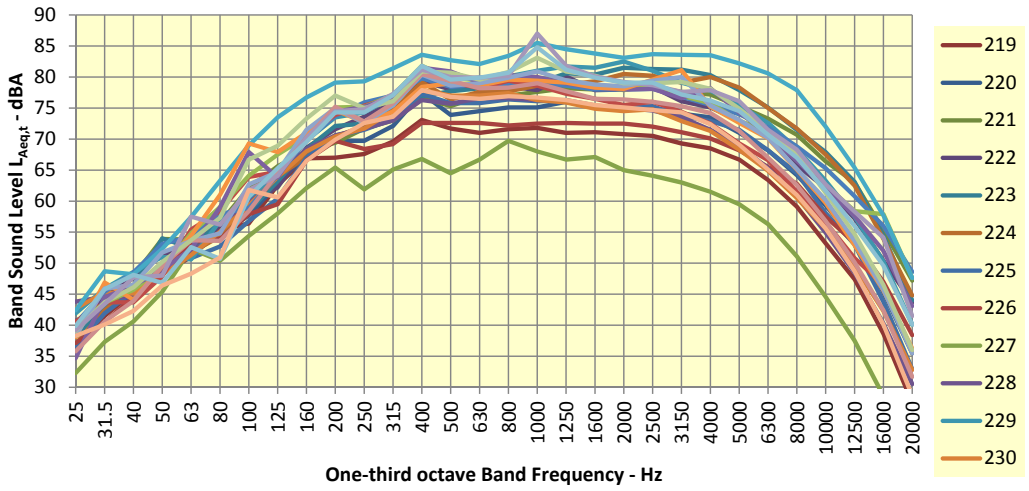


Figure A24b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 Inside

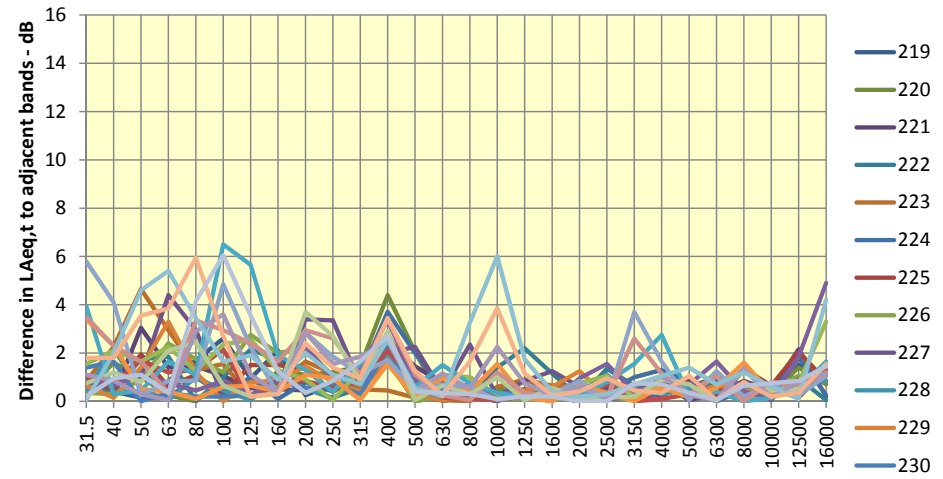


Figure A25a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM7 Baghouse Hopper area

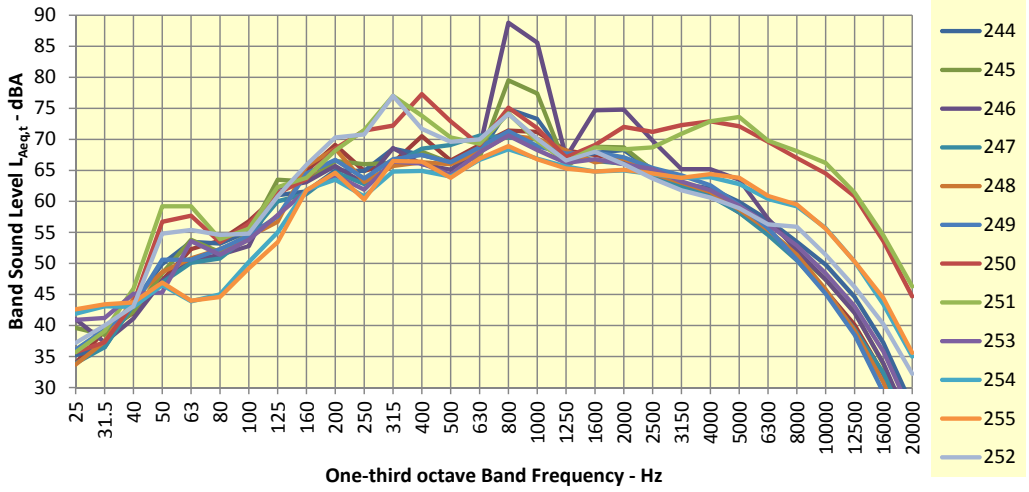


Figure A25b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM7 Baghouse Hopper area

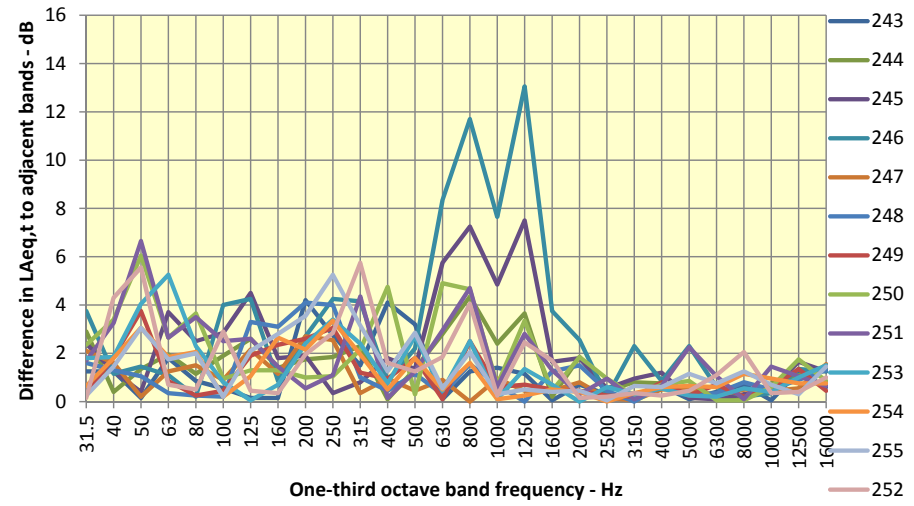


Figure A26a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Coal Road South side

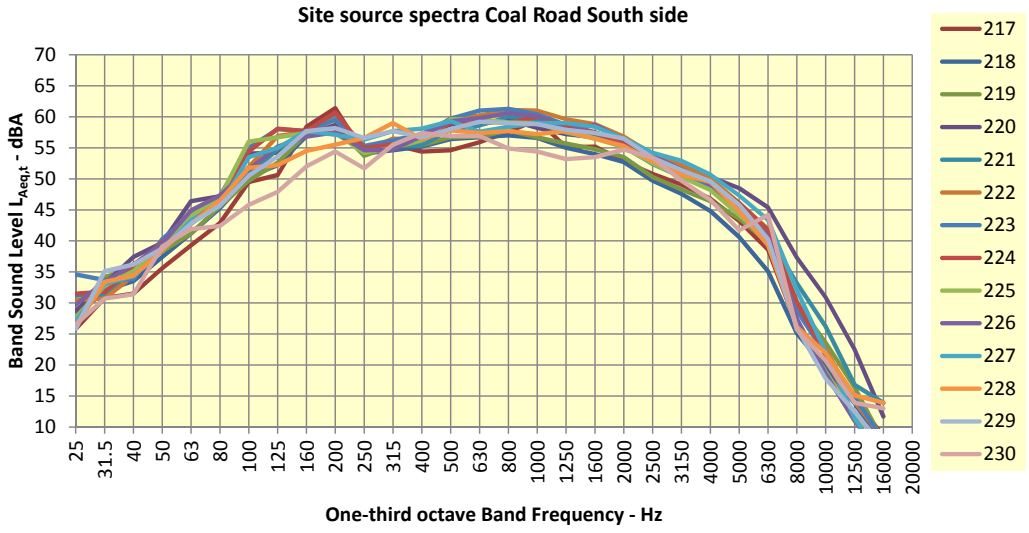


Figure A26b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Coal Road South side

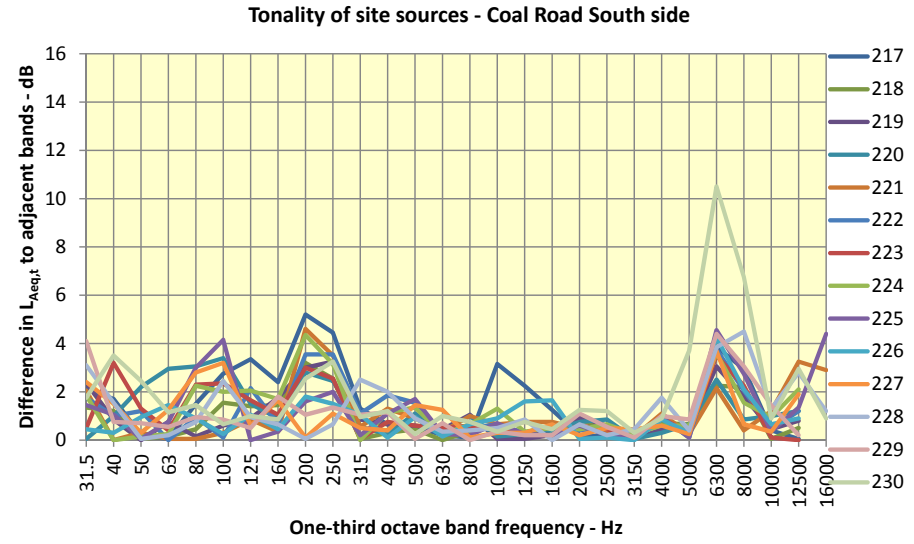


Figure A27a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Coal Mill building South side

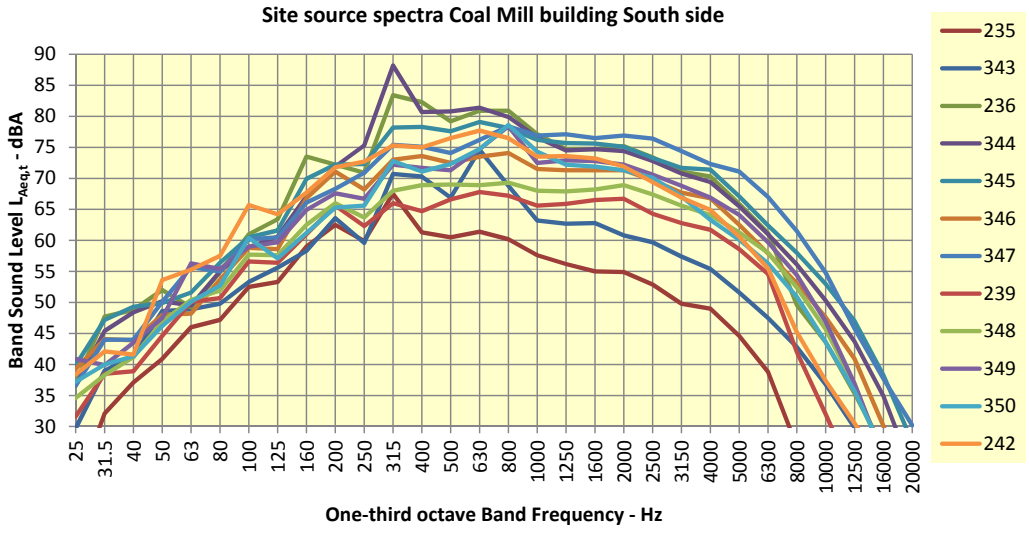


Figure A27b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Coal Mill Building South side

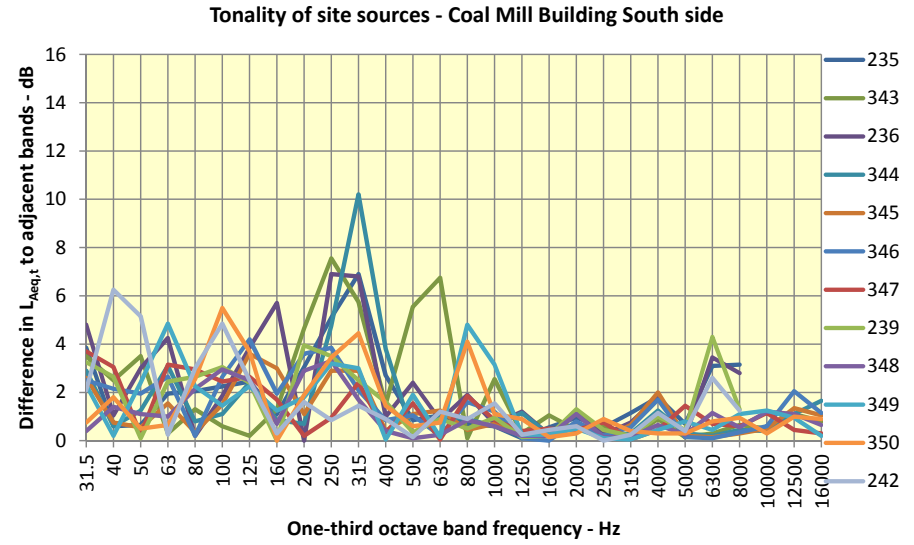


Figure A28a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 Firing Floor South side

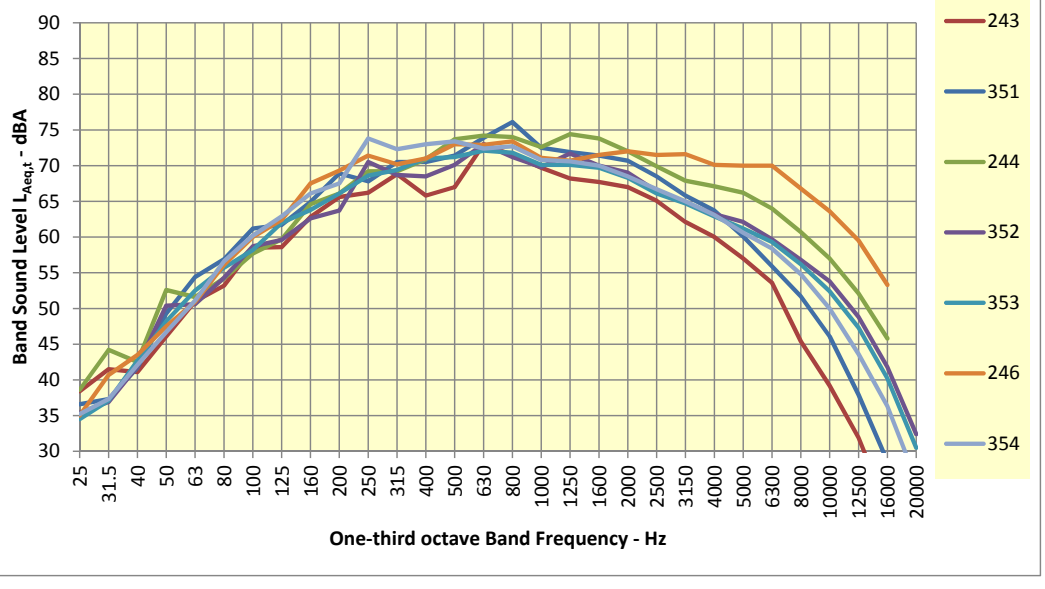


Figure A28b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 Firing Floor South side

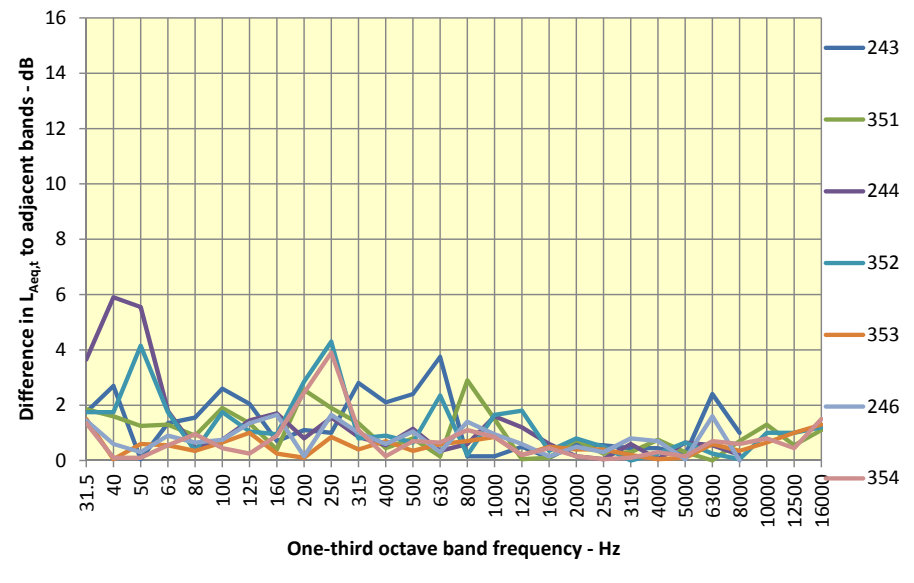


Figure A29a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 South side @ 13m

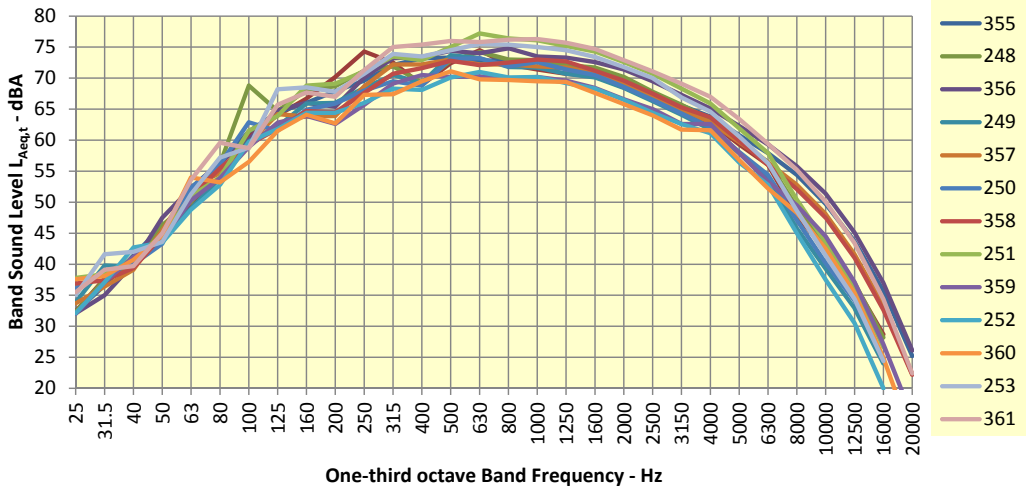


Figure A29b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 South side @ 13m

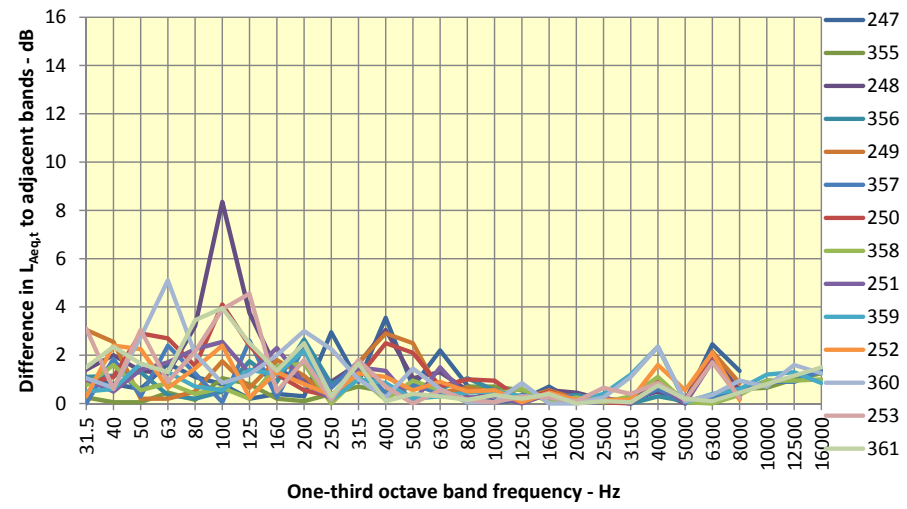


Figure A30a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln Drive platform

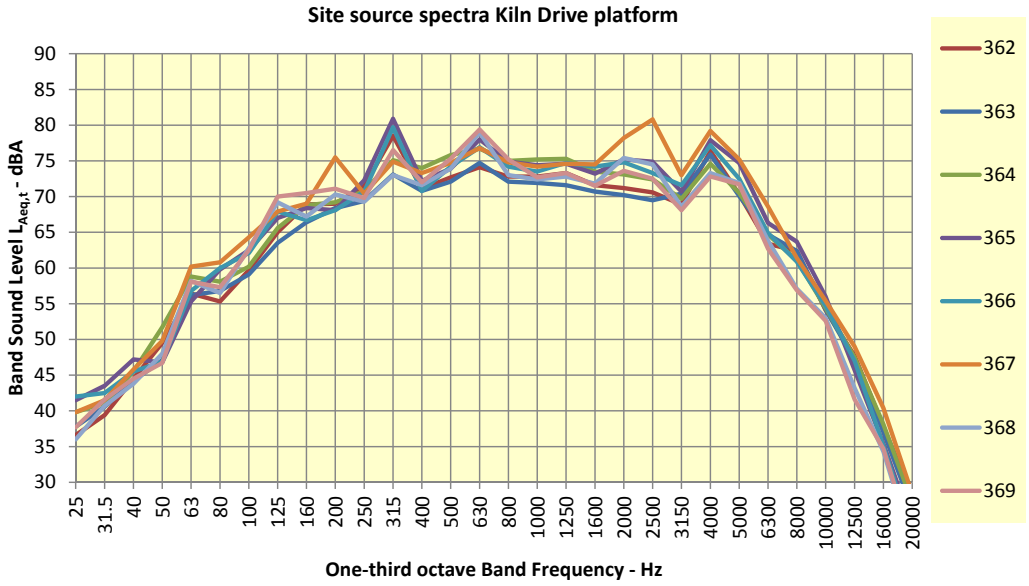


Figure A30b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 Drive platform

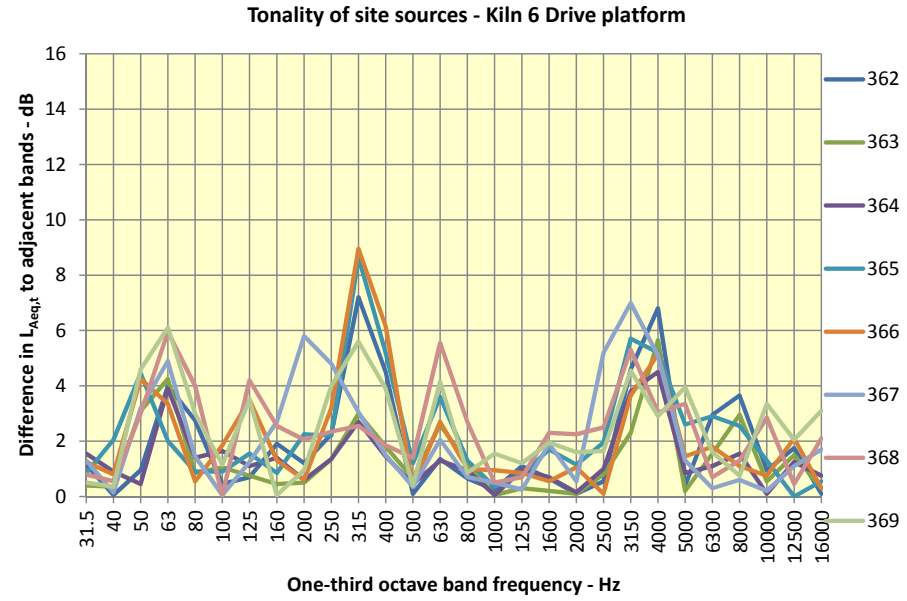


Figure A31a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra RM6 West and North sides

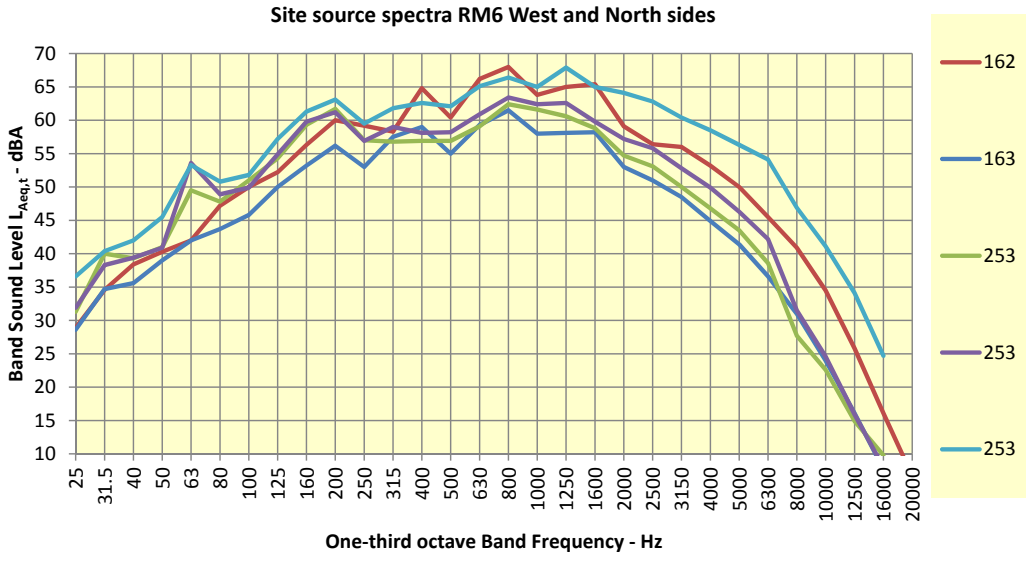


Figure A31b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - RM6 West and North sides

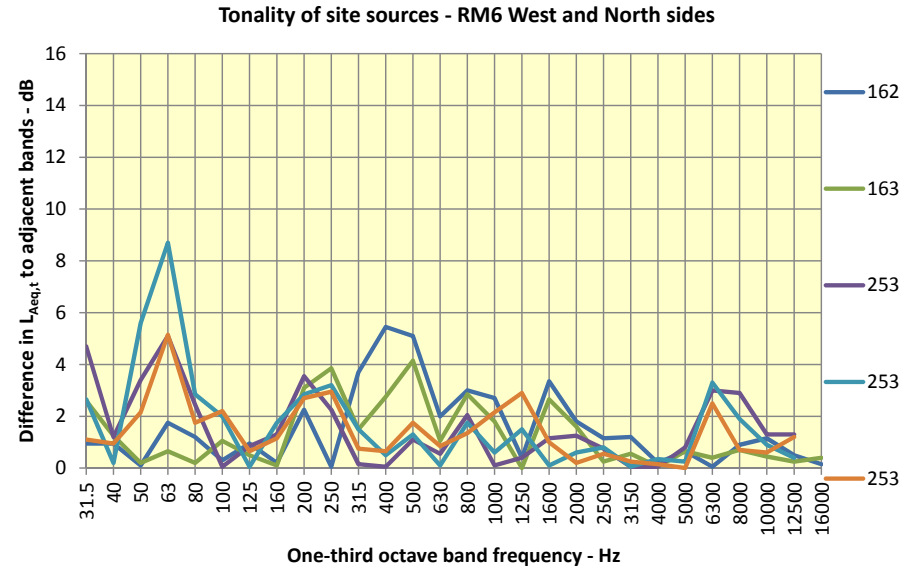


Figure A32a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra FA38 & FA39 North side of road

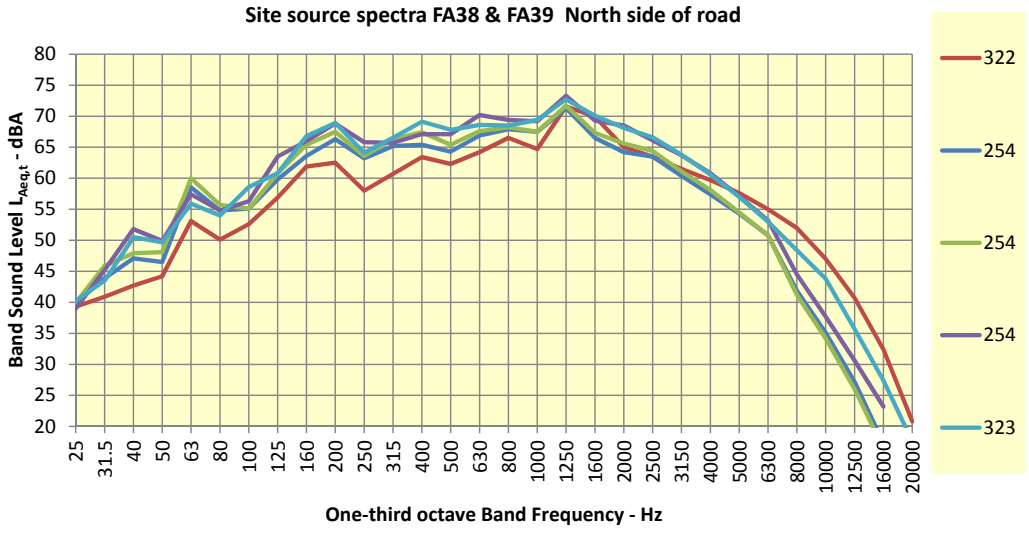


Figure A32b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - FA38 & FA39 North side of road

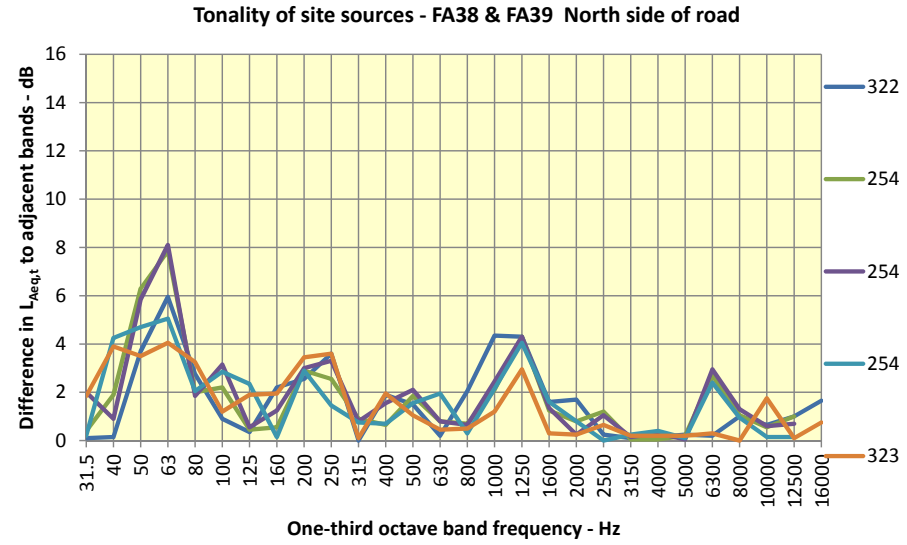


Figure A33a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra PHT North side of road

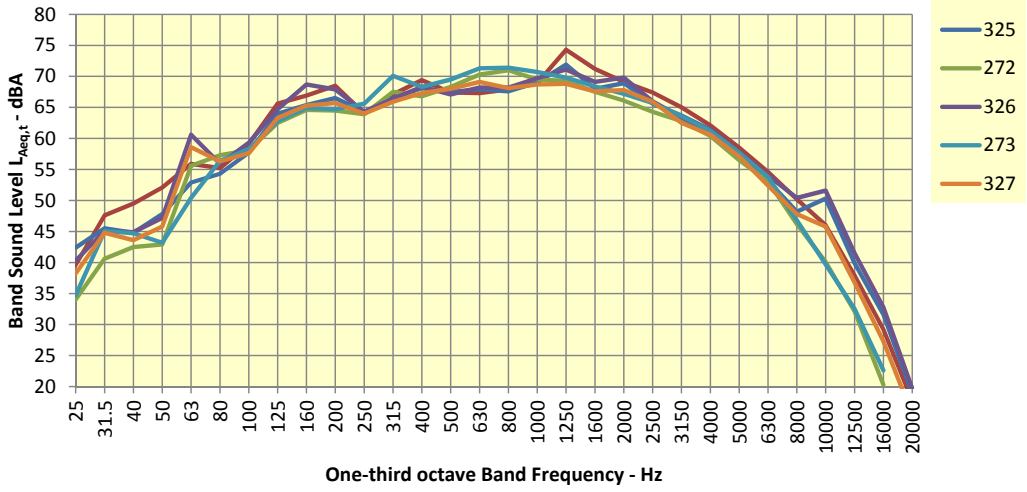


Figure A33b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - PHT North side of road

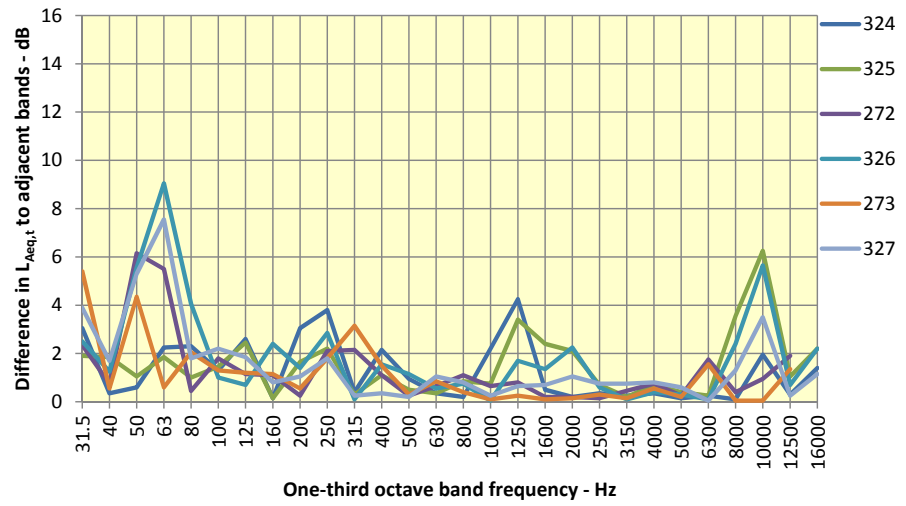


Figure A34a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 North side of road @ 13m

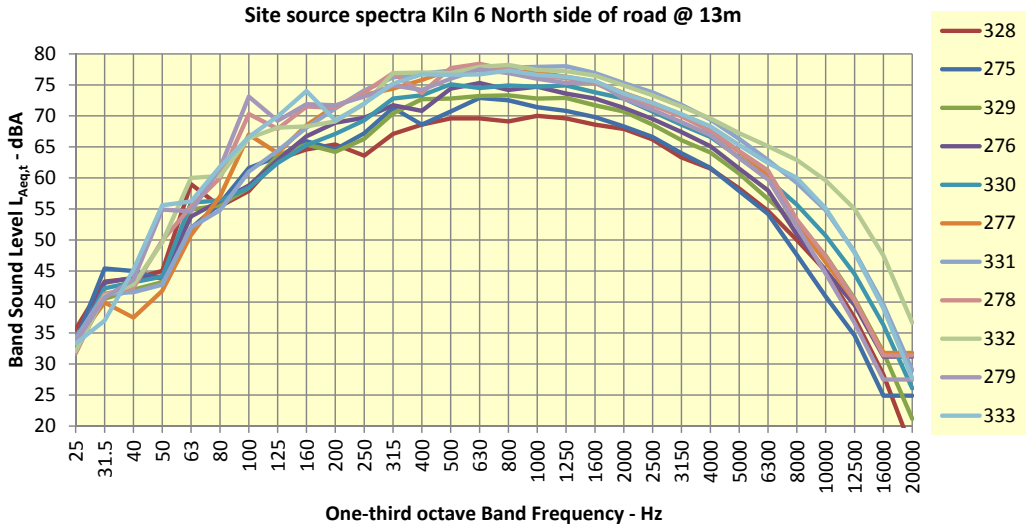


Figure A34b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 North side of road @ 13m

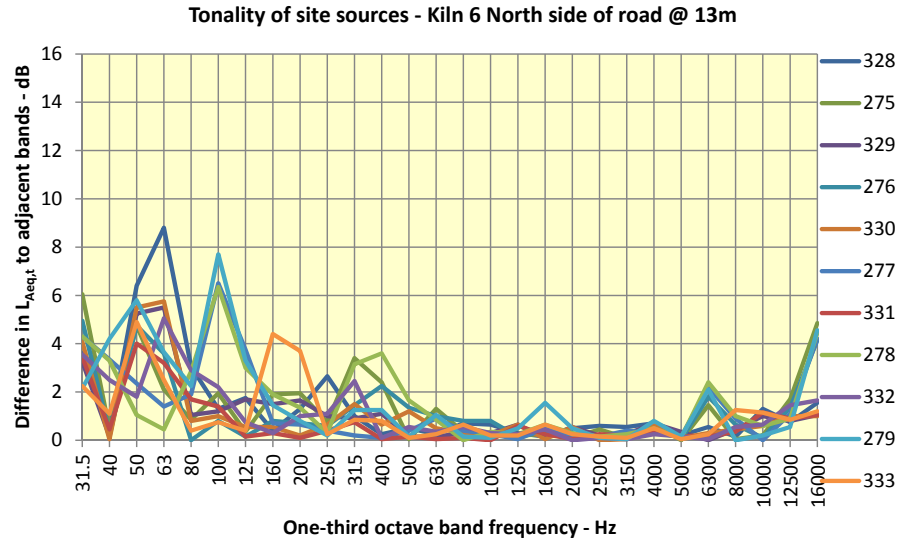


Figure A35a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 grate cooler fan courtyard

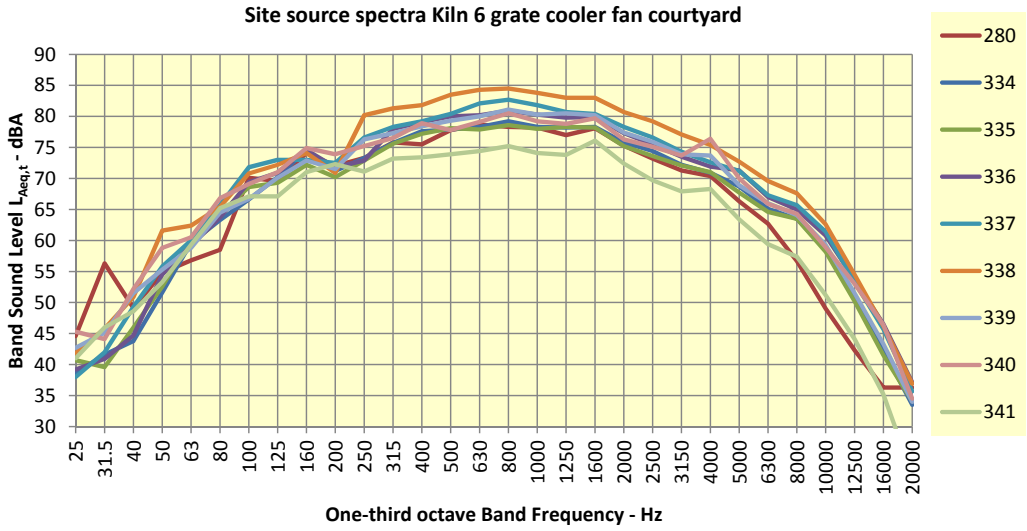


Figure A35b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 grate cooler fan courtyard

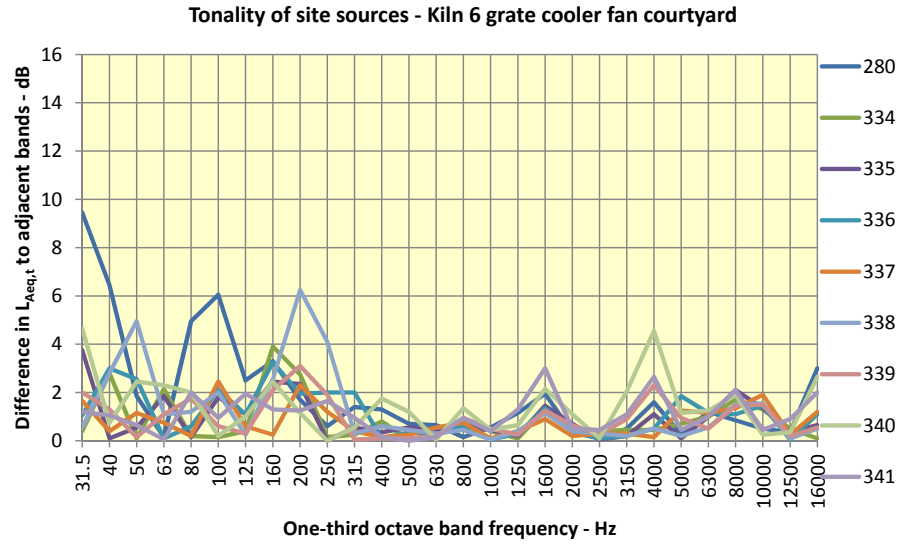


Figure A36a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 Grate northern side

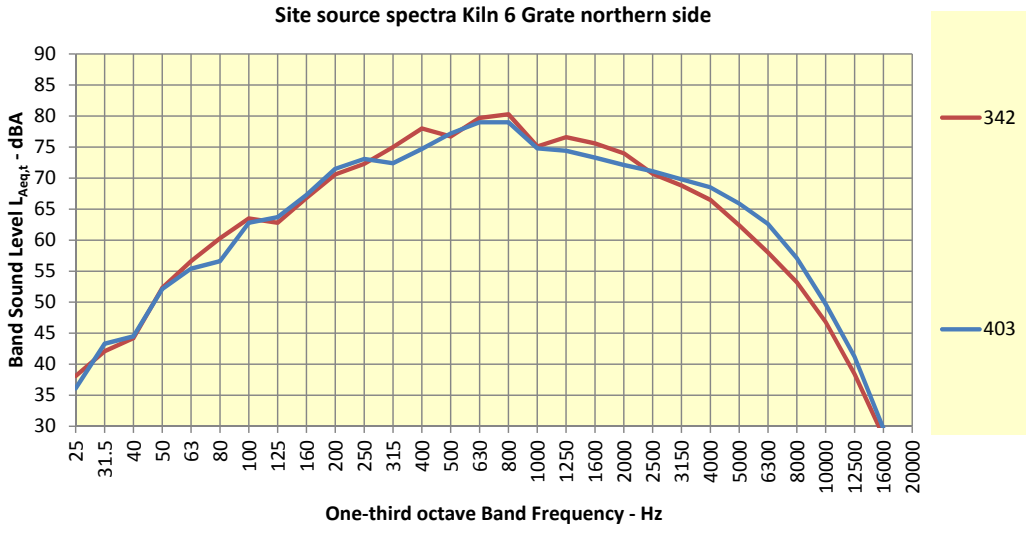


Figure A36b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 grate northern side

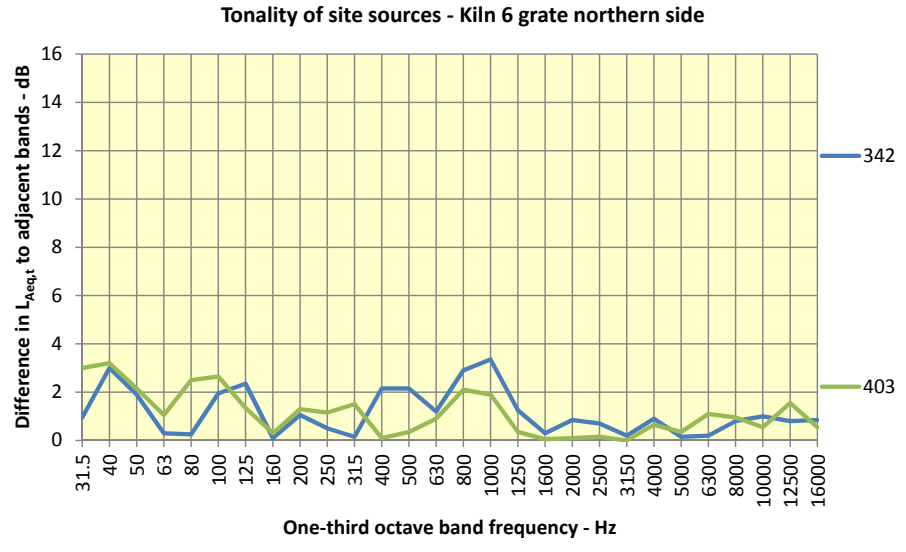


Figure A37a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 Firing floor North side opening

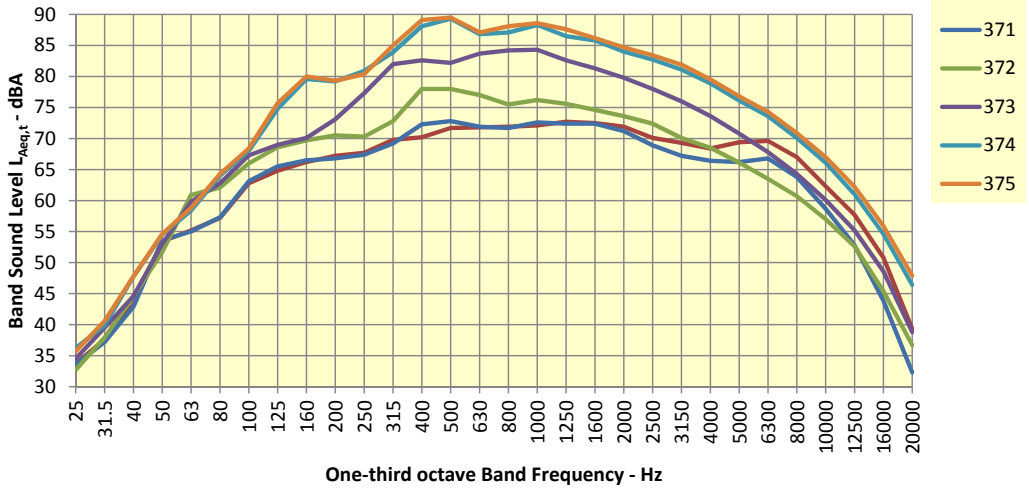


Figure A37b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 Firing floor North side opening

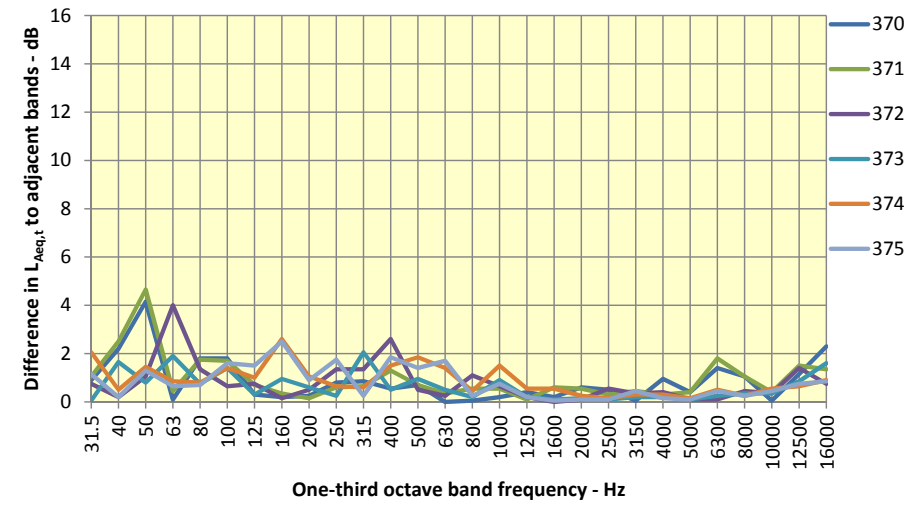


Figure A38a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 Firing floor South side opening

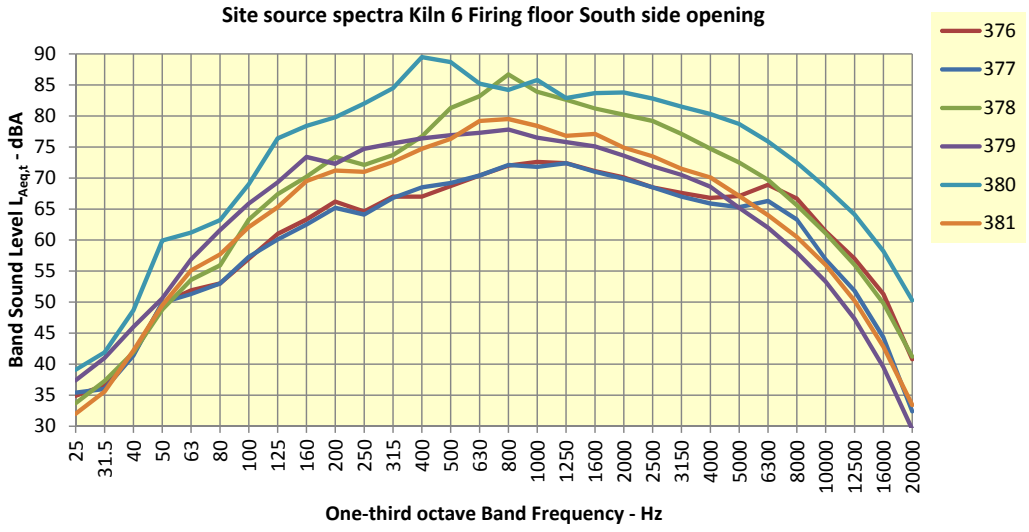


Figure A38b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 Firing floor South side opening

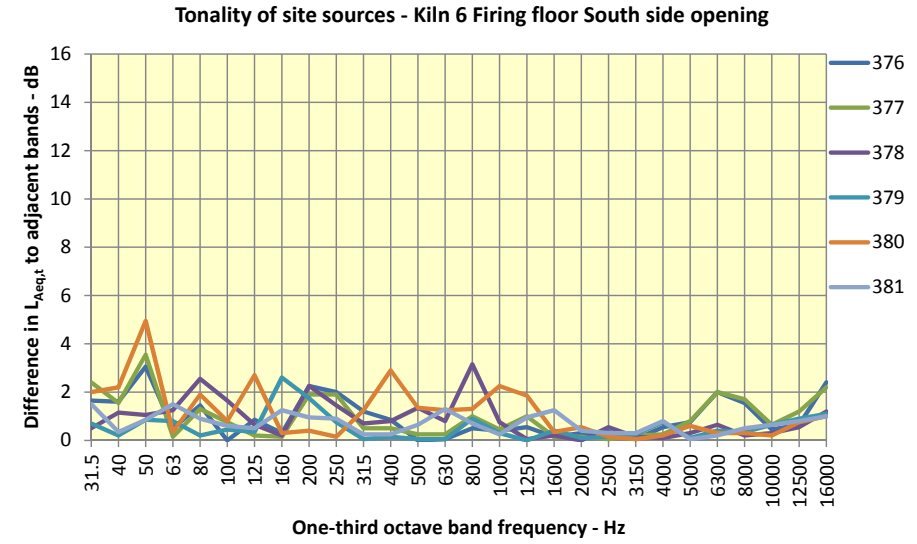


Figure A39a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 Firing floor inside

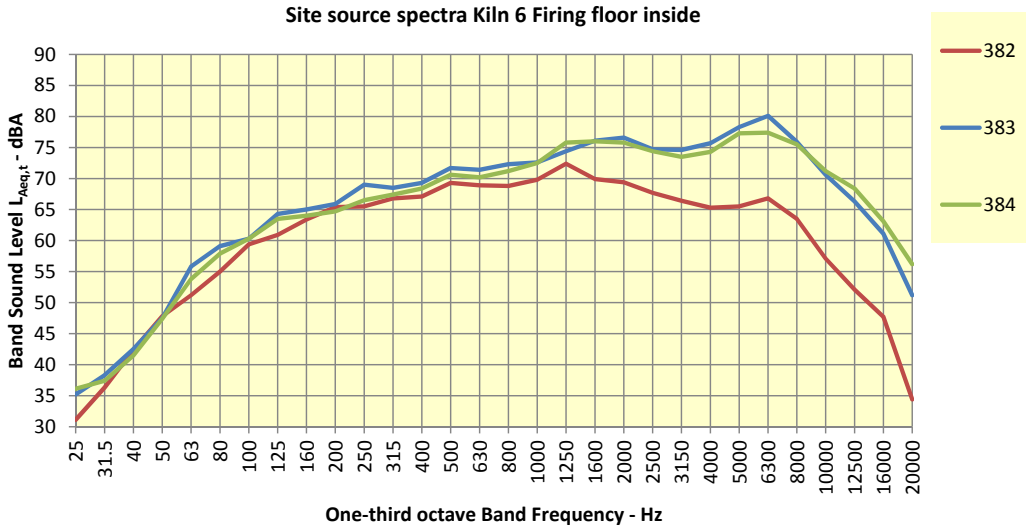


Figure A39b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 Firing floor inside

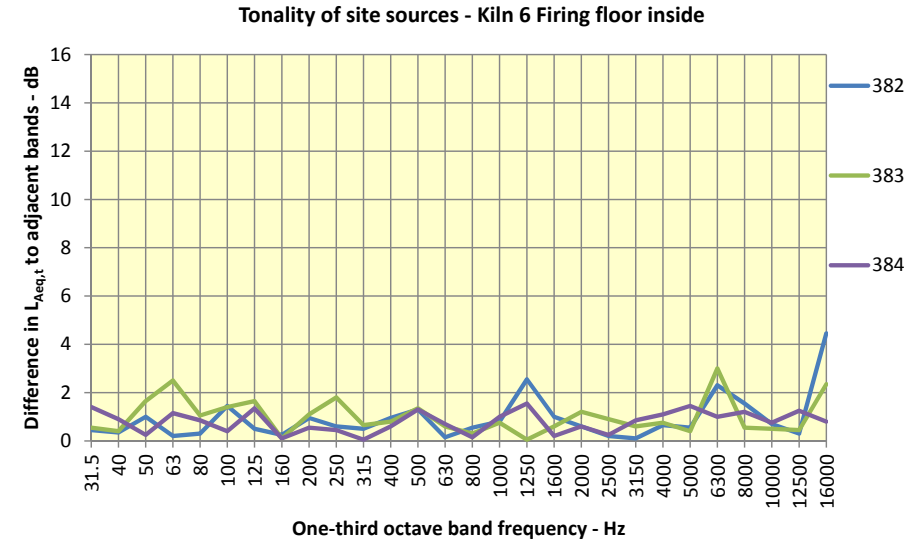


Figure A40a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Kiln 6 Radicon Cooler

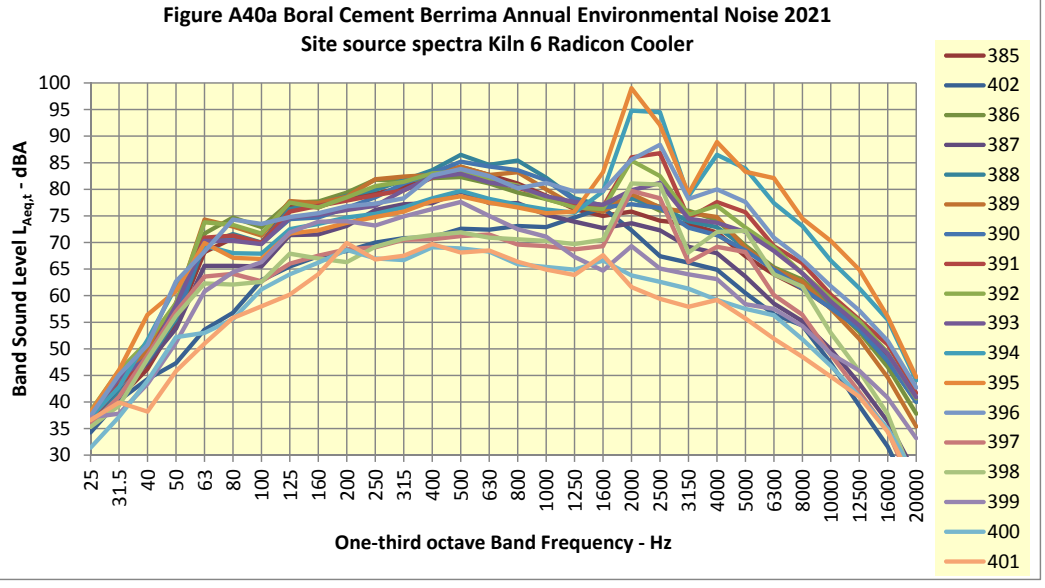


Figure A40b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Kiln 6 Radicon Cooler

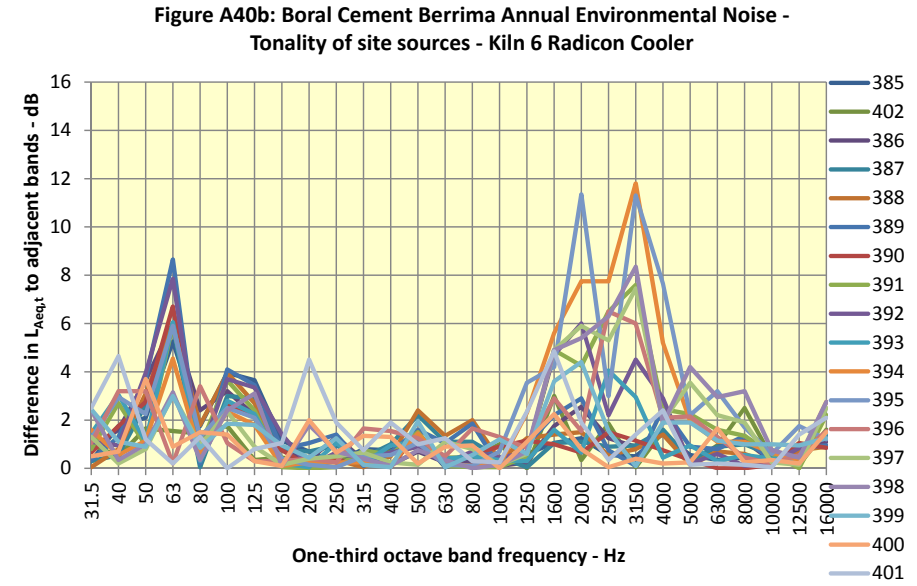


Figure A41a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra FA215

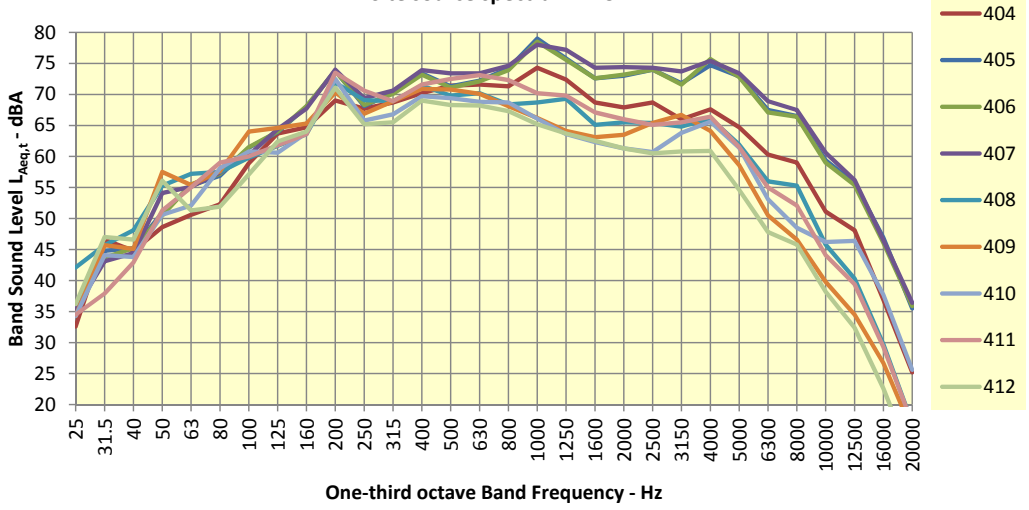


Figure A41b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - FA215

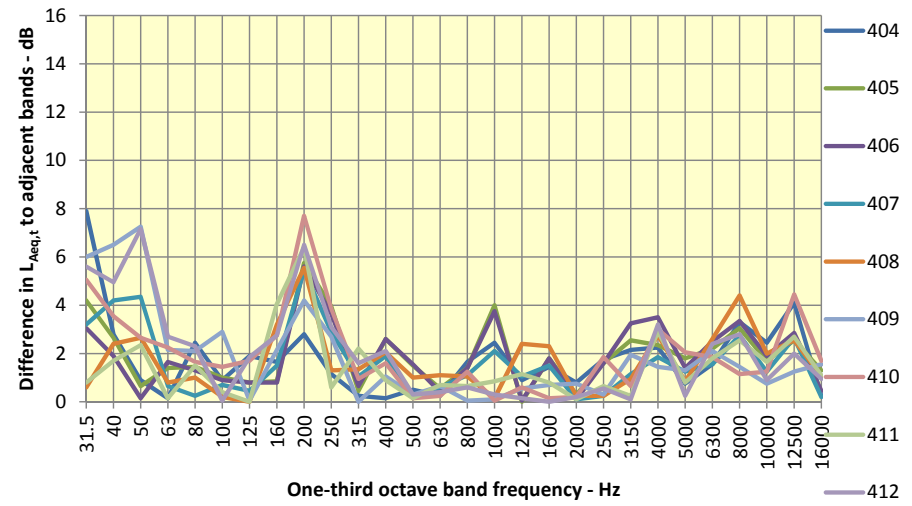


Figure A42a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Administration Building Roof

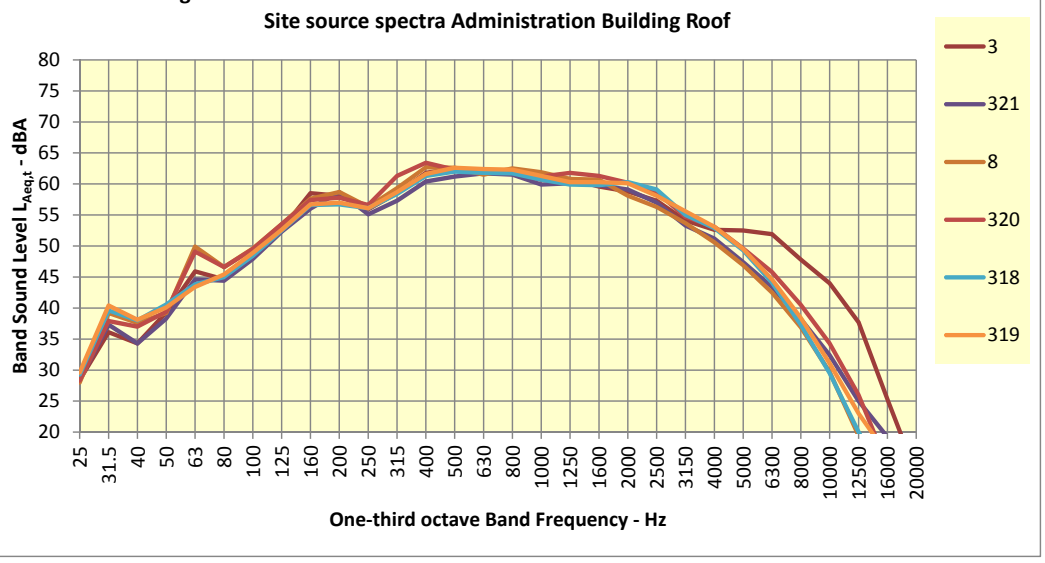


Figure A42b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Administration Building Roof

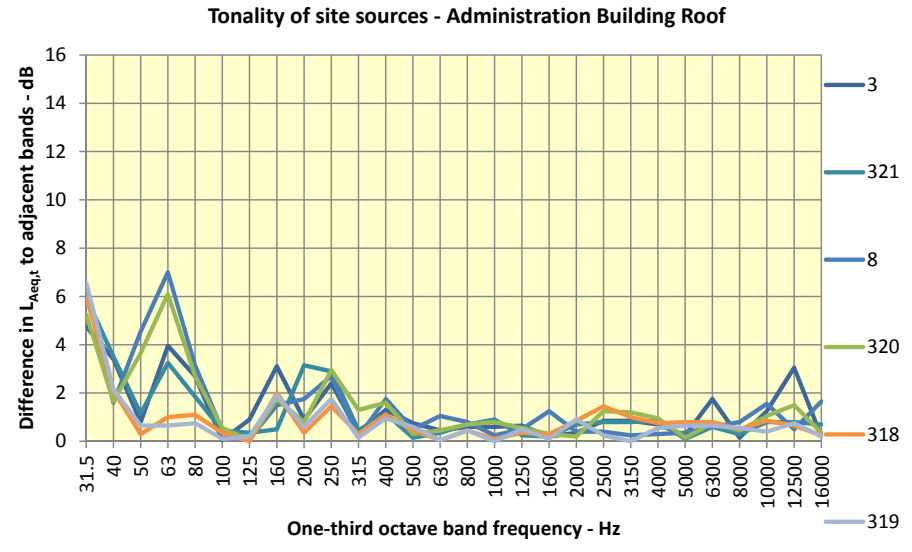


Figure A43a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Fenceline South

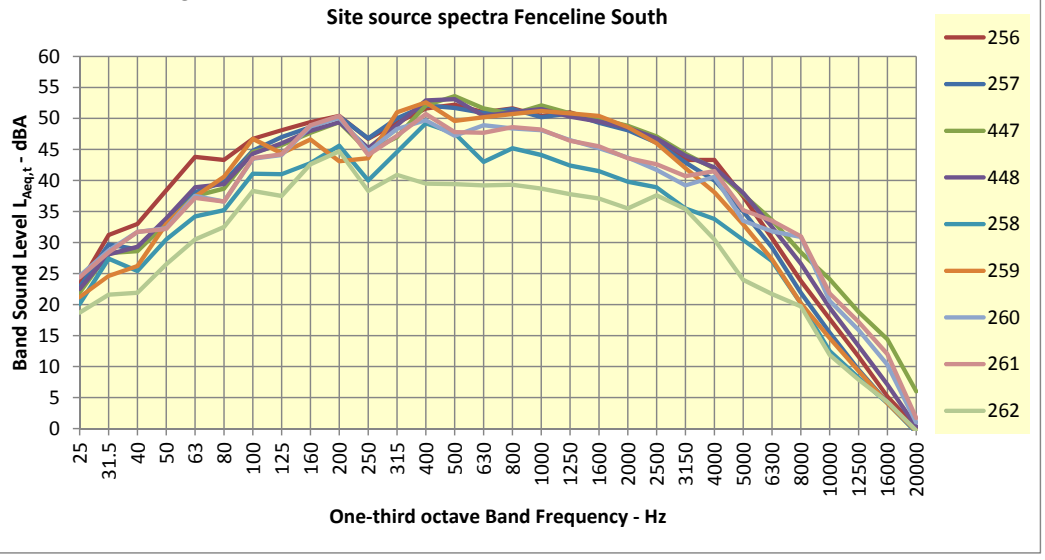


Figure A43b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Fenceline South

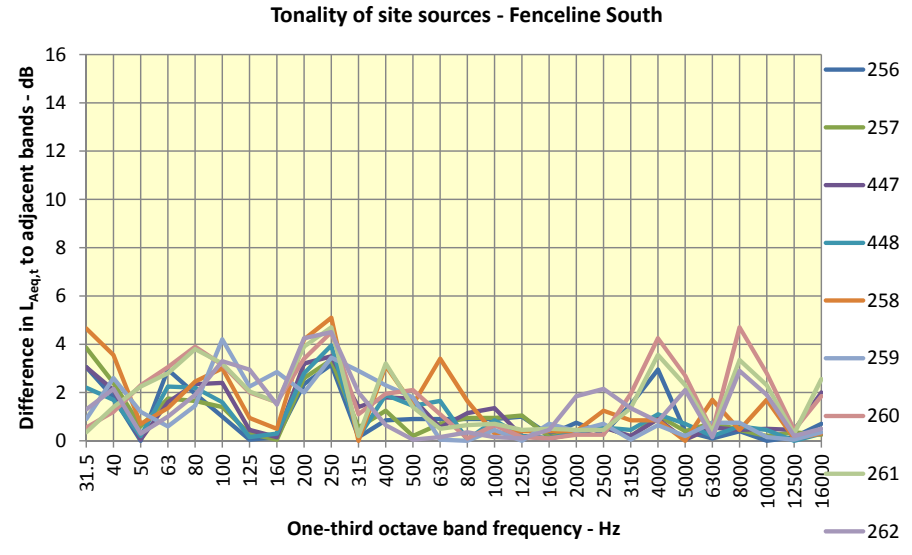


Figure A44a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Western side

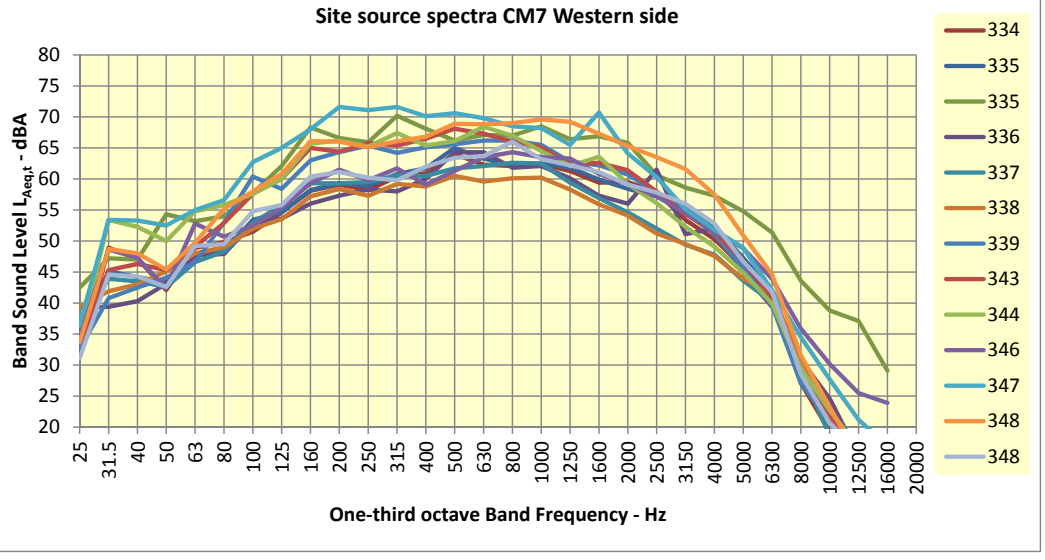


Figure A44b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Western side

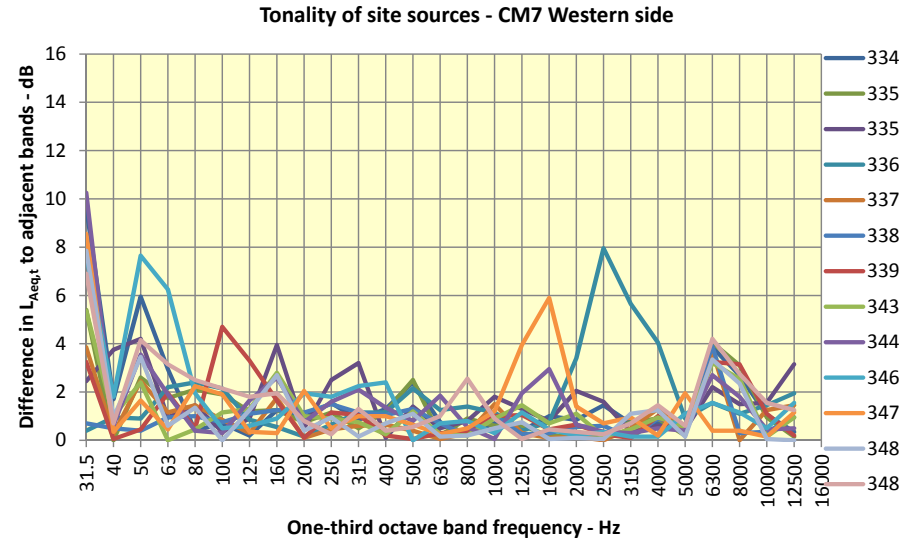


Figure A45a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Northern side

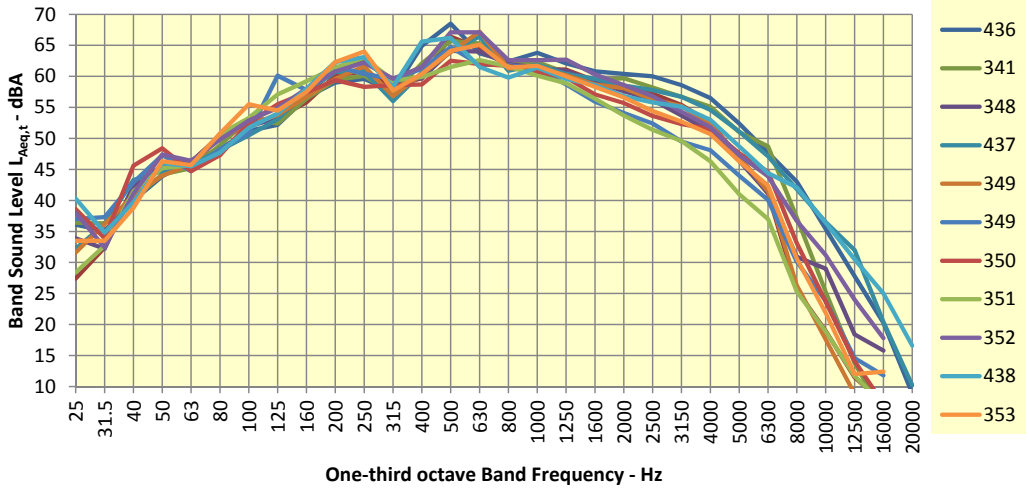


Figure A45b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Northern side

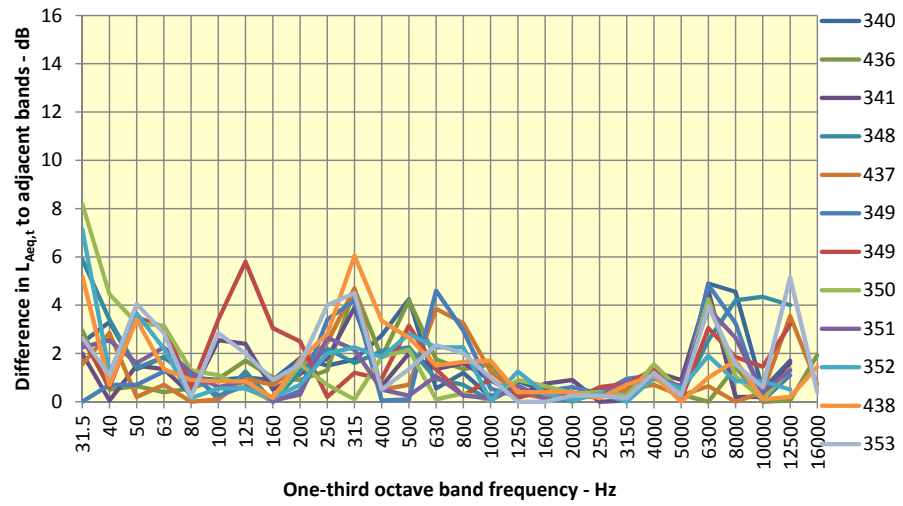


Figure A46a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Northern side near roller door

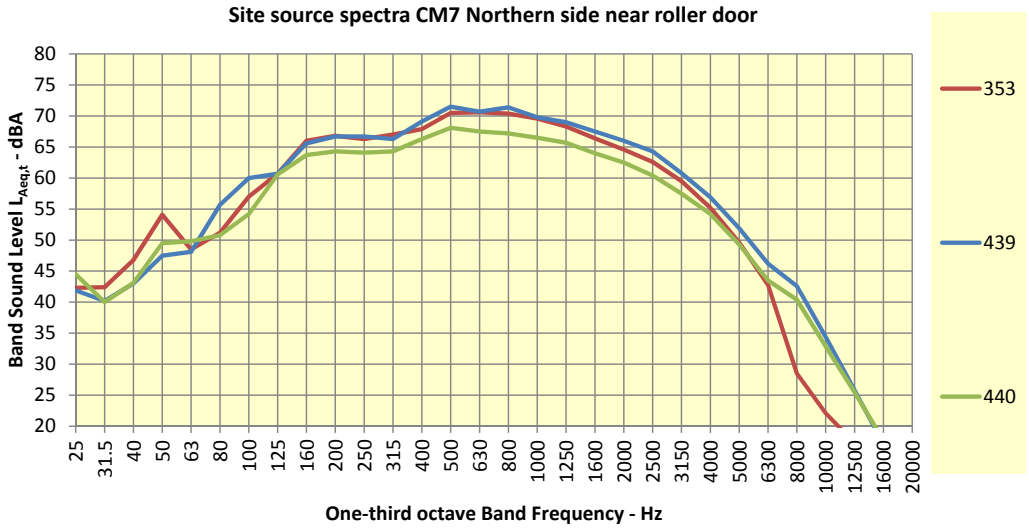


Figure A46b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Northern side near roller door

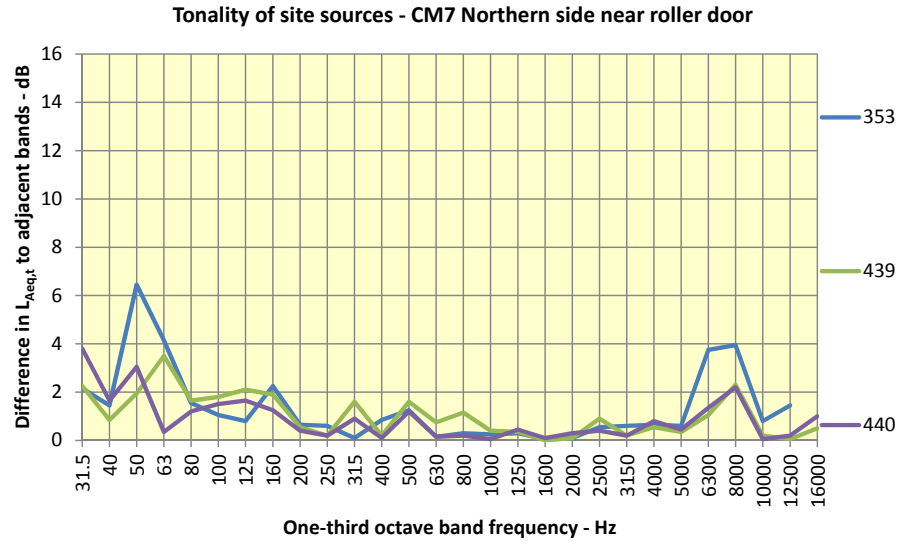


Figure A47a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 TS3

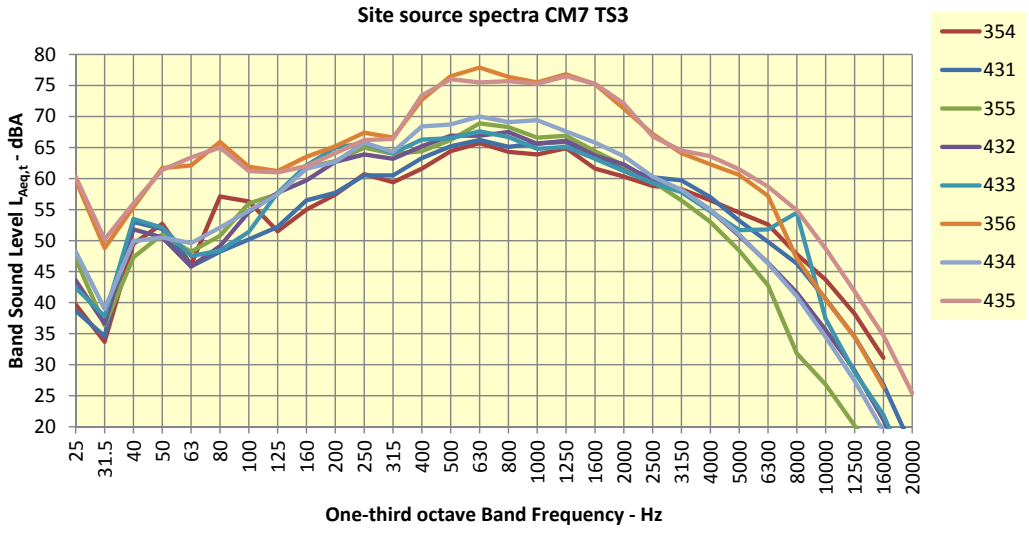


Figure A47b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 TS3

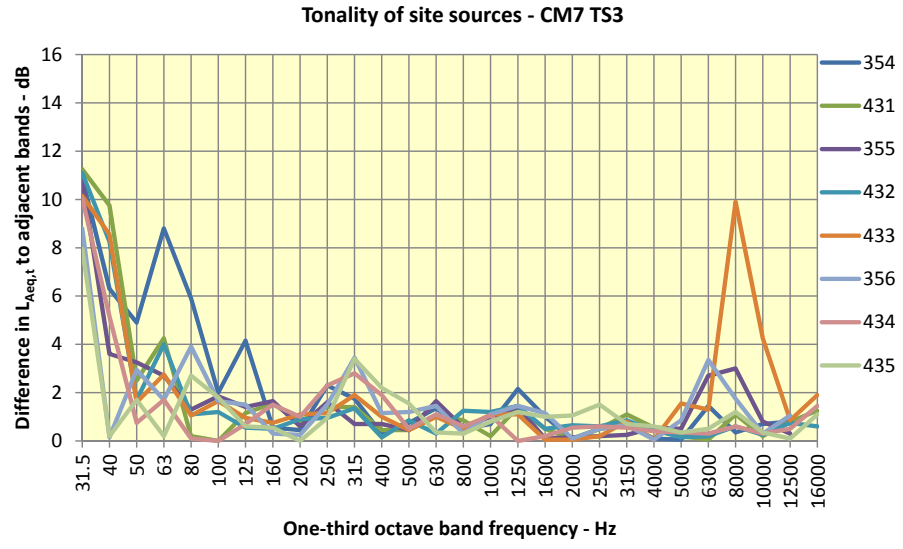


Figure A48a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Southern Side

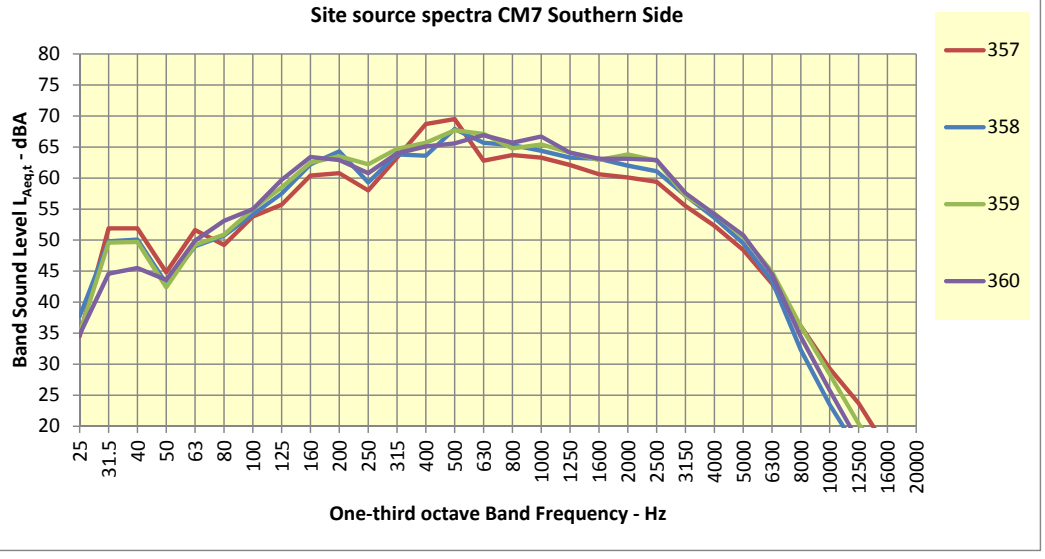


Figure A48b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Southern side

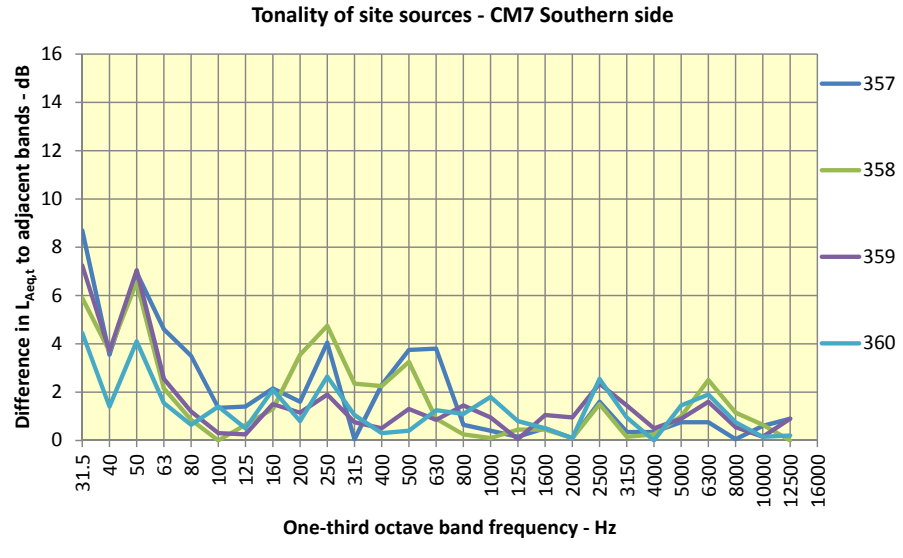


Figure A49a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Compressor house

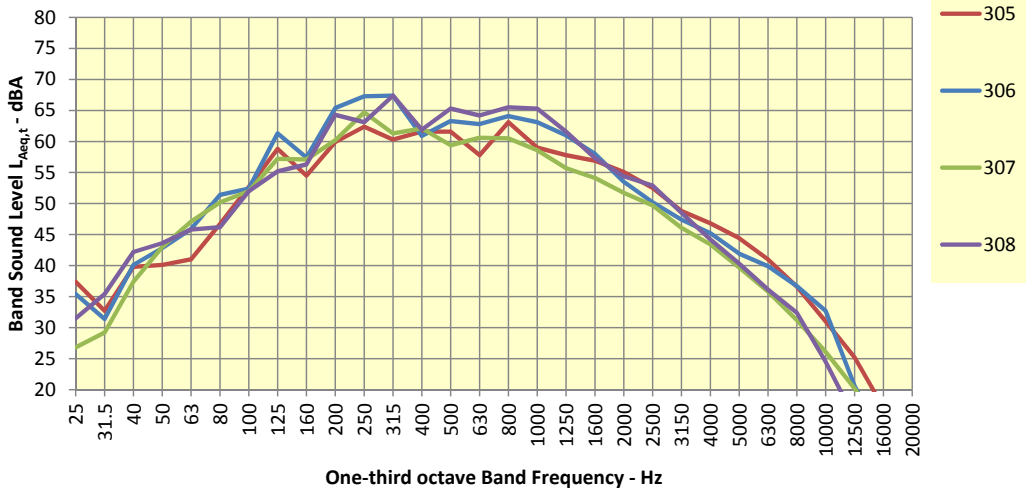


Figure A49b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Compressor house

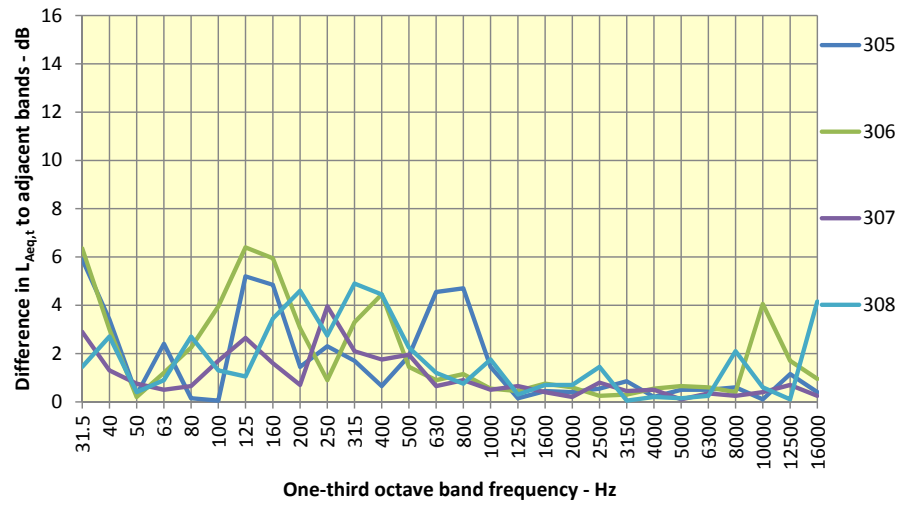


Figure A50a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM6 Western side

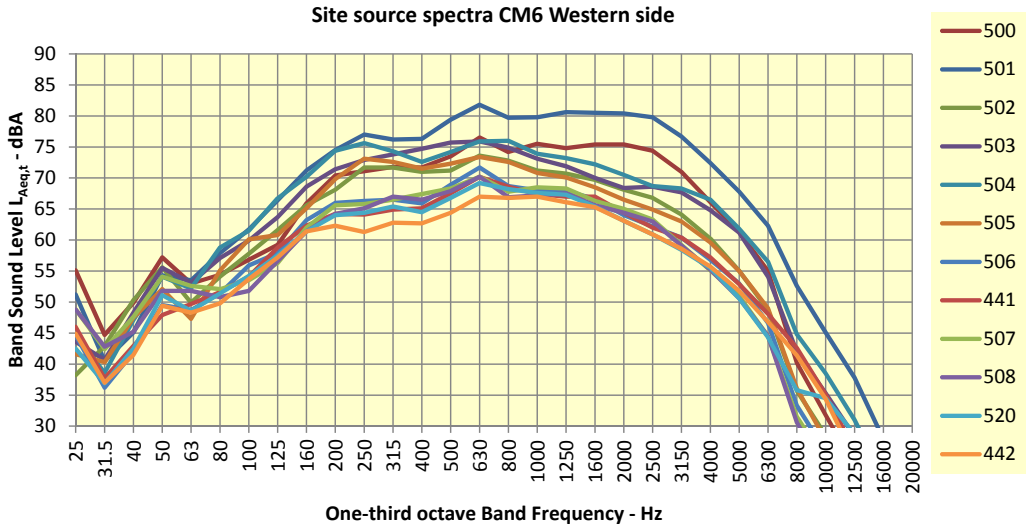


Figure A50b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM6 Western side

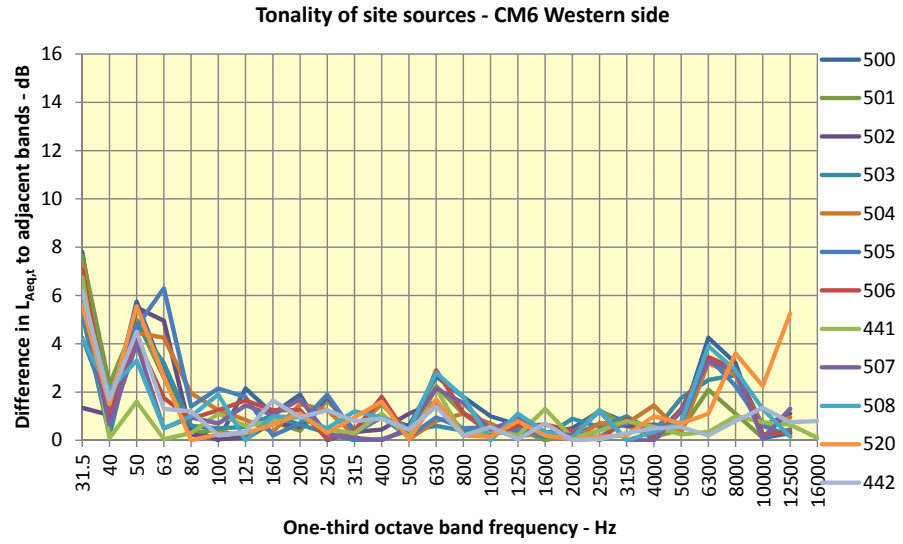


Figure A51a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM6 Southern side

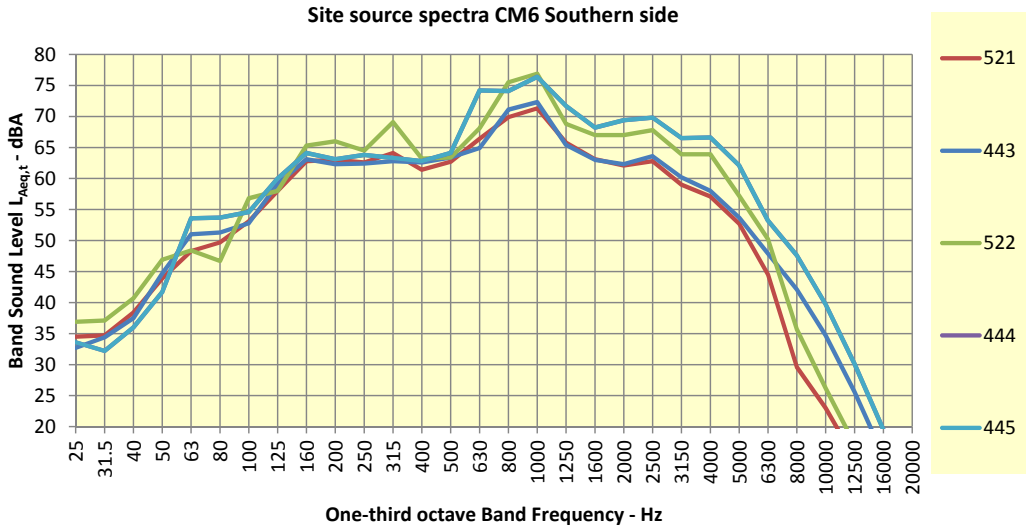


Figure A51b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM6 Southern side

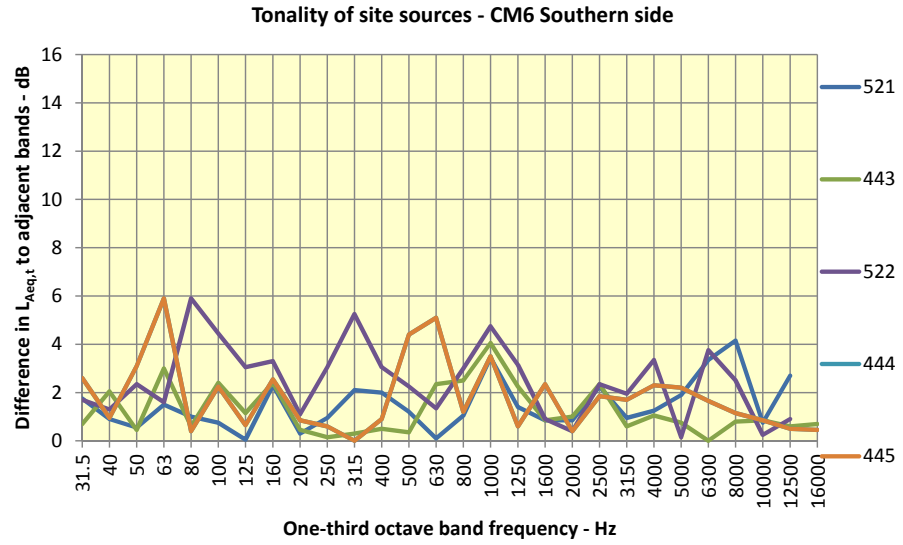


Figure A52a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM6 Eastern side

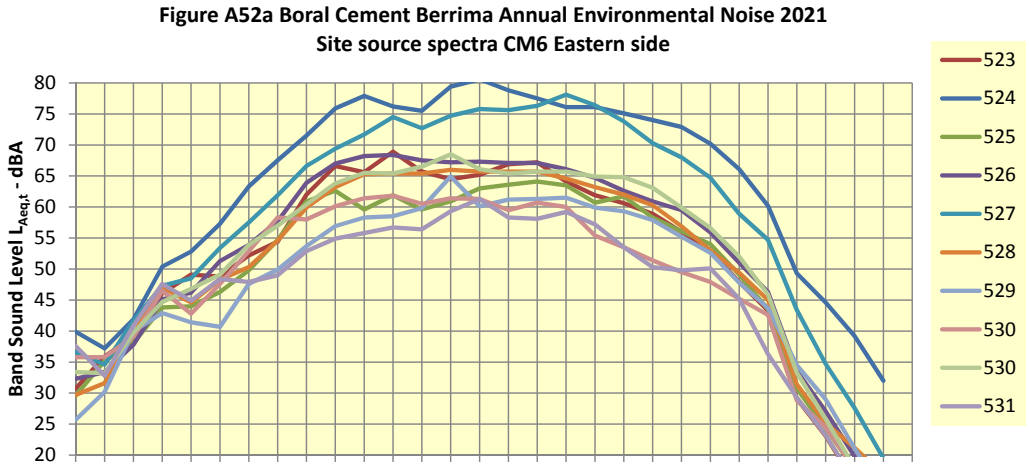
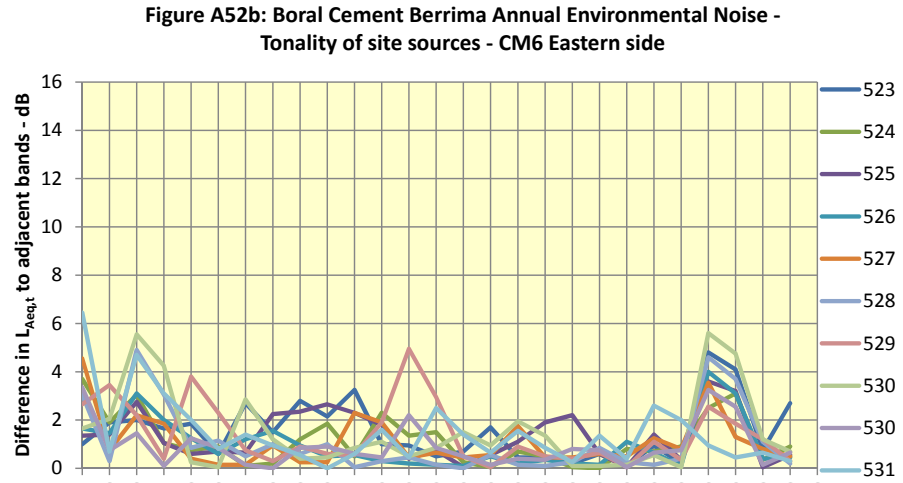


Figure A52b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM6 Eastern side



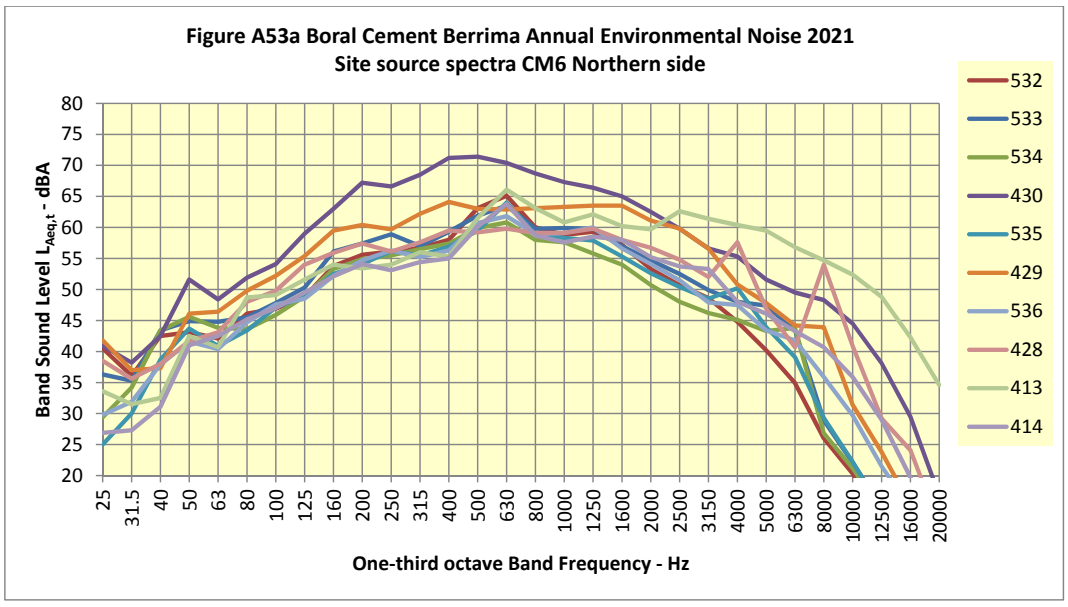


Figure A53a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM6 Northern side
Band Sound Level $L_{Aeq,t}$ - dBA
One-third octave Band Frequency - Hz
532
533
534
430
535
429
536
428
413
414

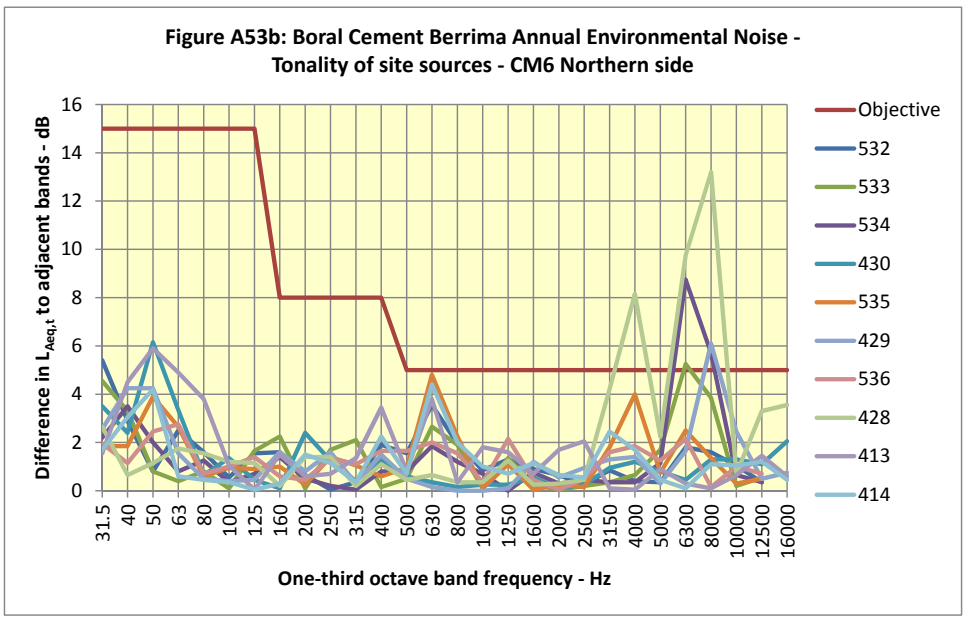


Figure A53b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM6 Northern side
Difference in $L_{Aeq,t}$ to adjacent bands - dB
One-third octave band frequency - Hz
Objective
532
533
534
430
535
429
536
428
413
414

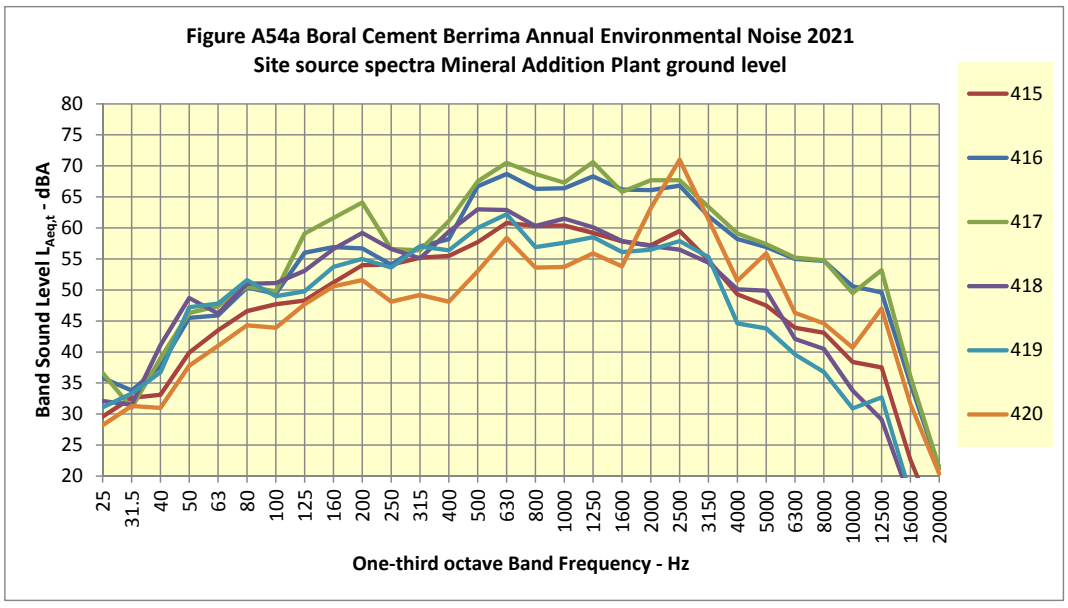


Figure A54a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Mineral Addition Plant ground level
Band Sound Level $L_{Aeq,t}$ - dBA
One-third octave Band Frequency - Hz
415
416
417
418
419
420

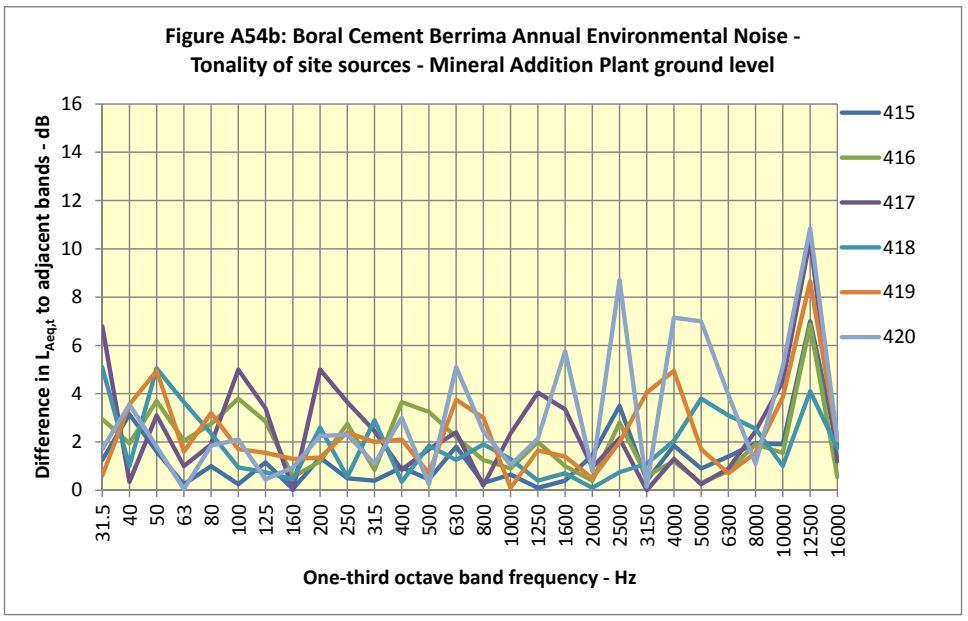


Figure A54b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Mineral Addition Plant ground level
Difference in $L_{Aeq,t}$ to adjacent bands - dB
One-third octave band frequency - Hz
415
416
417
418
419
420

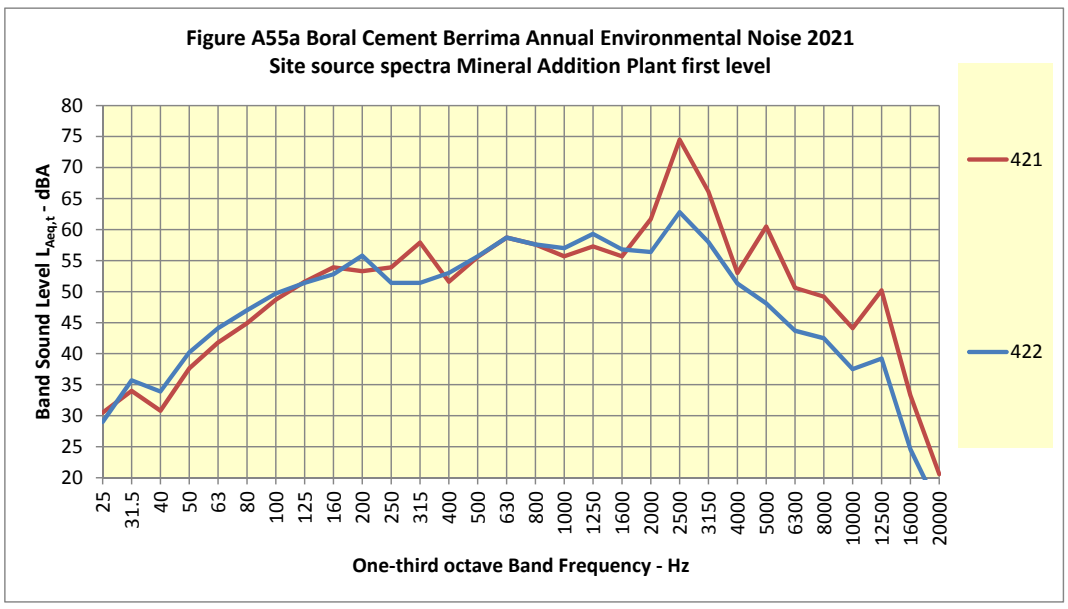


Figure A55a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Mineral Addition Plant first level
Band Sound Level $L_{Aeq,t}$ - dBA
One-third octave Band Frequency - Hz
421
422

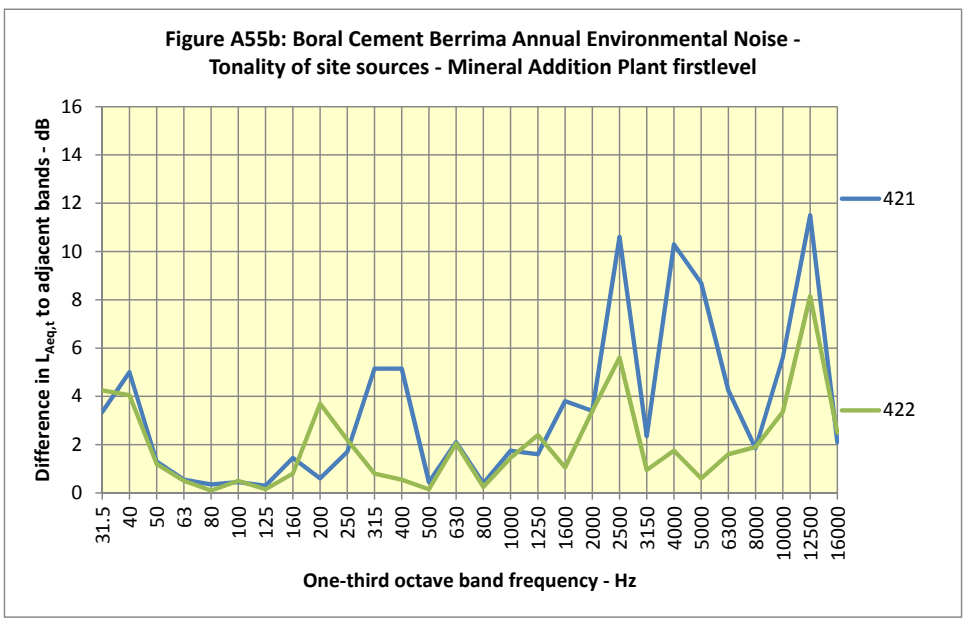


Figure A55b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Mineral Addition Plant firstlevel
Difference in $L_{Aeq,t}$ to adjacent bands - dB
One-third octave band frequency - Hz
421
422

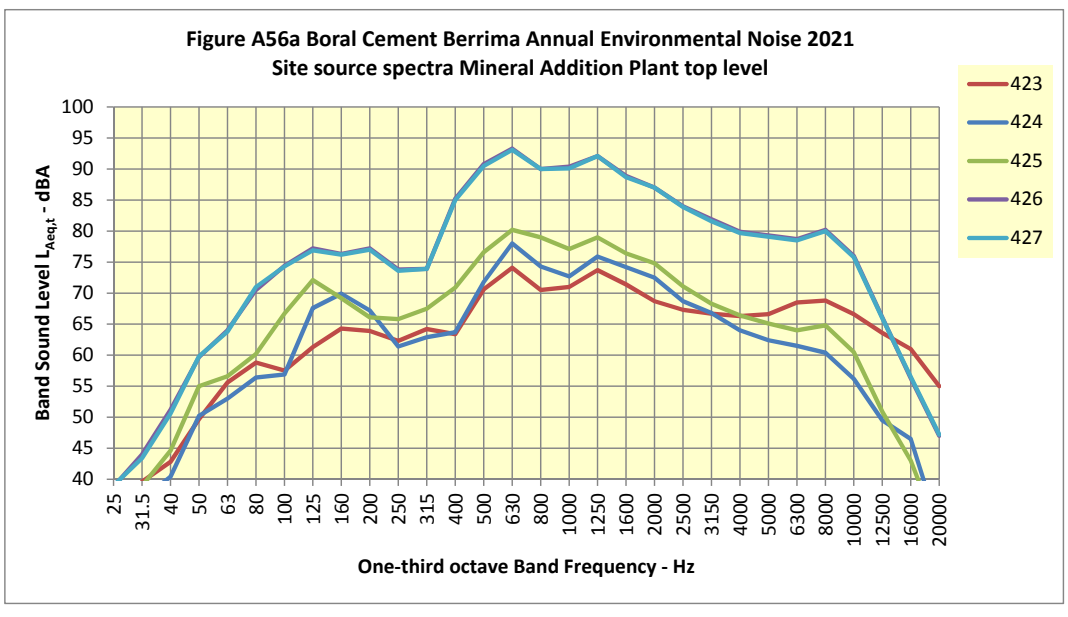


Figure A56a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra Mineral Addition Plant top level
Band Sound Level $L_{Aeq,t}$ - dBA
One-third octave Band Frequency - Hz
423
424
425
426
427

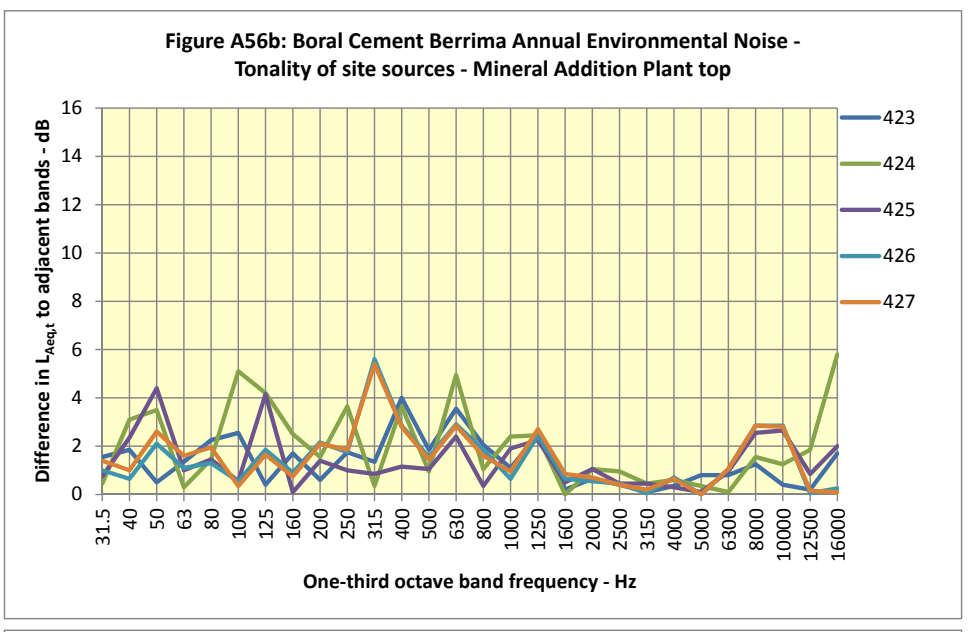


Figure A56b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - Mineral Addition Plant top
Difference in $L_{Aeq,t}$ to adjacent bands - dB
One-third octave band frequency - Hz
423
424
425
426
427

Figure A57a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Inside

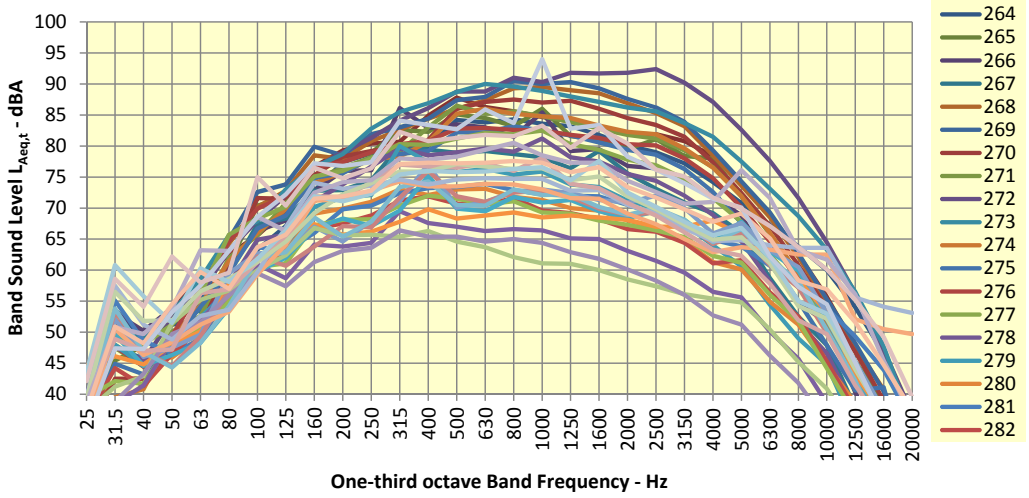


Figure A57b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Inside

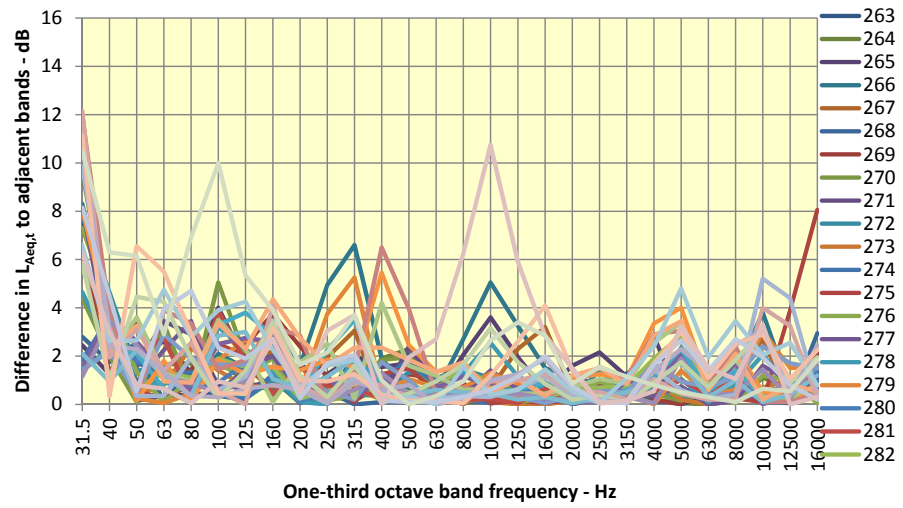


Figure A58a Boral Cement Berrima Annual Environmental Noise 2021
Site source spectra CM7 Inside compressor house

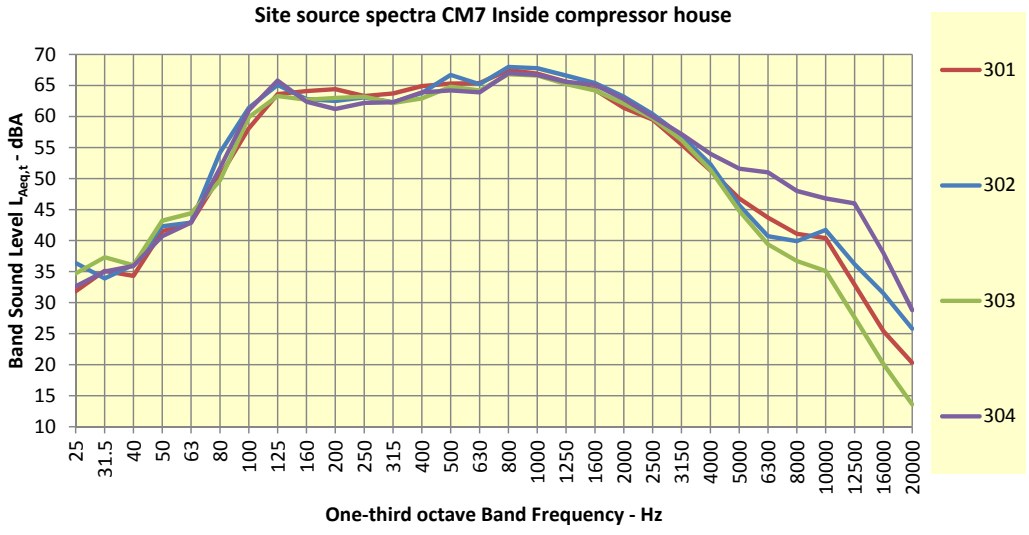
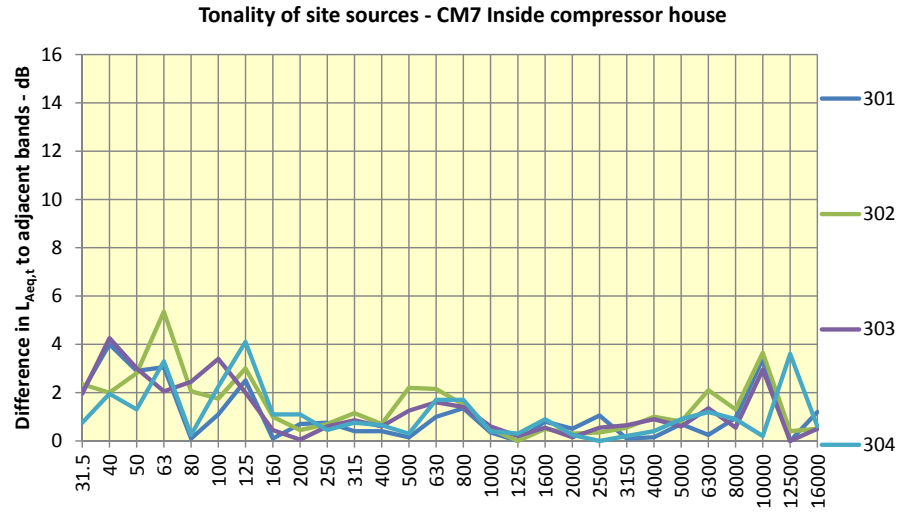


Figure A58b: Boral Cement Berrima Annual Environmental Noise -
Tonality of site sources - CM7 Inside compressor house



ABN: 25 153 946 064
ACN: 153 946 064

Appendix B: Unattended environmental sound level results for 4 Melbourne Street

Location 20 - Cement Works - 22 October to 4 November 2021
Comparison of Period LAEQ, Period Average LA10 and Period 90% LA90 Results
Summary of Statistical Data

LAEQ.15min	Day			Evening			Night			24 hour		
	Max $L_{AEQ.Day}$	Min $L_{AEQ.Day}$	Ave $L_{AEQ.Day}$	Max $L_{AEQ.Eve.}$	Min $L_{AEQ.Eve.}$	Ave $L_{AEQ.Eve.}$	Max $L_{AEQ.Night}$	Min $L_{AEQ.Night}$	Ave $L_{AEQ.Night}$	Max $L_{AEQ.24hr}$	Min $L_{AEQ.24hr}$	Ave. $L_{AEQ.24hr}$
Location 20 - Cement Works	58	54	57	56	53	55	58	53	56	61	52	56
4 Melbourne St., New Berrima	57	49	53	51	46	48	49	44	47	55	46	50
North Fence, New Berrima	55	49	51	55	49	51	54	49	51	53	48	50

L90.15-min 10%	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
Location 20 - Cement Works	54	48	52	52	53	47	51	52	56	50	52	52
4 Melbourne St., New Berrima	45	36	41	40	41	36	39	39	45	36	39	39
North Fence, New Berrima	49	41	45	45	48	43	46	46	51	43	46	46

L90.15-min	Day				Evening				Night			
	Max $L_{A90.Day}$	Min $L_{A90.Day}$	Ave $L_{A90.Day}$	Median $L_{A90.Day}$	Max $L_{A90.Eve.}$	Min $L_{A90.Eve.}$	Ave $L_{A90.Eve.}$	Median $L_{A90.Eve.}$	Max $L_{A90.Night}$	Min $L_{A90.Night}$	Ave $L_{A90.Night}$	Median $L_{A90.Night}$
Location 20 - Cement Works	55	51	53	53	54	51	53	53	56	51	54	53
4 Melbourne St., New Berrima	48	39	43	42	44	38	42	42	46	38	41	40
North Fence, New Berrima	51	45	47	47	50	45	48	48	52	45	48	48

4 Melbourne St, New Berrima

Daytime LAEQ **22 October to 4 November 2021**

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
7:00		47	47	54	52	52	54	50	51	51	54	57	51	57	47	52	2.8
7:15		48	44	52	54	55	54	52	46	50	54	53	51	55	44	51	3.3
7:30		47	49	56	52	53	53	52	53	48	52	55	52	56	47	52	2.8
7:45		48	54	51	54	53	54	52	47	48	52	52	51	56	47	52	2.7
8:00		55	46	52	52	51	54	51	48	49	53	51	52	55	46	51	2.6
8:15		47	47	51	59	51	52	52	47	45	53	51	51	59	45	51	3.7
8:30		50	48	51	54	51	51	51	54	45	51	56	53	56	45	51	2.9
8:45		49	46	50	53	52	57	51	46	46	53	52	55	57	46	51	3.4
9:00		49	45	51	53	53	62	57	48	46	53	51	56	62	45	52	4.6
9:15		47	45	54	55	54	62	60	47	53	52	53	52	62	45	53	5.1
9:30		49	44	54	53	52	62	59	47	54	50	53	51	62	44	52	4.8
9:45		50	46	50	51	51	59	58	48	45	52	52	52	59	45	51	4.2
10:00		48	47	50	52	51	59	58	47	47	54	52	50	59	47	51	3.9
10:15		49	48	50	54	52	60	58	48	46	50	52	51	60	46	51	4.2
10:30		49	50	49	51	50	59	59	48	48	49	51	50	59	48	51	3.8
10:45		48	48	50	51	51	59	58	48	45	53	53	51	59	45	51	4.0
11:00		49	47	51	51	51	61	57	68	51	49	52	52	68	47	53	5.8
11:15	53	49	46	52	52	51	59	52	54	47	52	52	51	59	46	51	3.3
11:30	52	54	47	51	55	54	59	52	51	46	49	52	51	59	46	52	3.4
11:45	52	51	47	54	53	52	60	53	58	48	49	50	51	60	47	52	3.9
12:00	52	49	47	51	55	57	61	53	60	55	50	51	50	61	47	53	4.2
12:15	52	49	48	52	51	51	52	57	57	45	52	50	50	57	45	51	3.2
12:30	52	48	53	51	53	48	52	52	46	46	50	53	49	53	46	50	2.6
12:45	52	51	51	53	52	51	52	49	48	50	50	51	52	53	48	51	1.3
13:00	51	50	52	51	53	50	51	54	45	48	52	51	51	54	45	51	2.3
13:15	52	56	48	50	54	53	52	52	48	50	51	53	51	56	48	52	2.3
13:30	52	50	49	52	51	51	54	52	48	49	52	52	49	54	48	51	1.8
13:45	53	49	48	56	52	53	53	52	48	48	51	52	52	56	48	51	2.5
14:00	52	60	49	50	53	51	52	53	47	48	52	51	51	60	47	51	3.2
14:15	54	50	52	53	52	53	53	53	48	47	55	51	53	55	47	52	2.2
14:30	53	49	50	53	52	52	53		50	46	53	51	50	53	46	51	2.1
14:45	53	49	50	52	52	53	52		49	47	54	50	53	54	47	51	2.1
15:00	52	49	48	54	55	52	52		51	48	52	51	53	55	48	51	2.1
15:15	52	51	49	50	52	58	54		50	51	51	52	50	58	49	52	2.6
15:30	52	53	48	56	52	51	53		53	52	51	50	51	56	48	52	2.0
15:45	51	50	48	51	52	53	54		55	51	52	53	50	55	48	52	1.8
16:00	52	50	53	52	52	52	55		48	46	50	51	53	55	46	51	2.4
16:15	50	51	58	53	51	52	52		51	47	50	53	52	58	47	52	2.7
16:30	53		54	51	53	52	52	55	48	45	51	53	50	55	45	51	2.8
16:45	50	49	60	52	52	51	54	52	49	56	51	53	52	60	49	52	3.0
17:00	50	49	53	50	52	53	51		48	46	52	51	50	53	46	50	2.2
17:15	50		47	51	51	51	52	53	48	52	50	52	50	53	47	50	1.8
17:30	50		46	50	54	54	52	53	49	47	49	52	51	54	46	51	2.5
17:45	51	57	48	50	52	51	50	52	49	51	50	51	52	57	48	51	2.3
18:00	51		49	50	52	56	48	55	47	48	49	52	51	56	47	51	2.8
Max	54	60	60	56	59	58	62	60	68	56	55	57	56	68	54	58	3.6
Min	50	47	44	49	51	48	48	49	45	45	49	50	49	52	44	48	2.3
Ave	52	50	49	52	53	52	55	54	50	48	51	52	51	55	48	52	1.9
SD	1.1	2.8	3.3	1.7	1.5	1.8	3.8	2.9	4.3	2.9	1.6	1.4	1.3	4.3	1.1	2.3	1.0
E Ave	52	51	51	52	53	53	57	55	54	49	52	52	52	57	49	53	1.8

Evening LAEQ

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
18:00	51		49	50	52	56	48	55	47	48	49	52	51	56	47	51	2.8
18:15	51	45	46	50	50	48	48	56	47	47	51	51	49	56	45	49	2.7
18:30	51	47	45	48	51	50	47		48	49	49	49	51	51	45	49	1.7
18:45	53	43	47	50	50	51	48	53	47	60	50	49	50	60	43	50	4.0
19:00	49	44	46	47	50	47	49	54	49	47	47	49	50	54	44	48	2.4
19:15	50	44	44	45	50	54	49	50	50	47	47	48	47	54	44	48	2.9
19:30	48		48	48	49	49	45	50	45	47	49	48	48	50	45	48	1.6
19:45	46		48	48	48	46	43	49	46	47	51	47	47	51	43	47	1.9
20:00	46	44	50	48	47	48	46	48	47	47	47	48	45	50	44	47	1.5
20:15	46	44	48	48	47	50	45	47	48	46	45	48	48	50	44	47	1.6
20:30	47		46	49	47	48	43	46	45	46	41	46	45	49	41	46	2.1
20:45	44		45	47	46	48	43	46	48	46	45	46	46	48	43	46	1.5
21:00	47	56	47	52	46	47	45	45	46	45	45	44	46	56	44	47	3.4
21:15	44	59	46	46	45	49	43	46	46	45	46	44	46	59	43	46	4.0
21:30	45	45	45	47	45	49	45	45	44	45	43	50	44	50	43	46	1.9
21:45	45	44	45	45	46	45	42	46	44	44	42	43	46	46	42	44	1.4
22:00	43	48	44	46	44	51	44	46	46	45	44	44	45	51	43	45	2.2
Max	53	59	50	52	52	56	49	56	50	60	51	52	51	60	49	53	3.4
Min	43	43	44	45	44	45	42	45	44	44	41	43	44	45	41	44	1.2
Ave	47	47	46	48	48	49	46	49	47	47	46	47	47	49	46	47	1.0
SD	3.0	5.2	1.7	2.0	2.4	2.8	2.4	3.6	1.7	3.5	3.1	2.6	2.1	5.2	1.7	2.8	1.0
E Avg	48	51	47	48	48	50	46	50	47	50	47	48	48	51	46	48	1.5

Night LAEQ

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
22:00	43	48	44	46	44	51	44	46	46	45	44	44	45	51	43	45	2.2
22:15	44	45	43	51	47	46	43	45	46	44	45	44	46	51	43	45	2.0
22:30	43	45	44	47	45	45	41	45	44	43	44	43	48	48	41	44	1.8
22:45	45	45	43	49	44	45	45	43	48	44	47	43	47	49	43	45	2.2
23:00	41	45	43	47	44	43	49	45	40	45	44	45	48	49	40	44	2.4
23:15	44	46	44	48	47	47	45	45	39	42	46	45	43	48	39	45	2.3
23:30	43	43	44	46	44	45	46	44	43	42	43	43	42	46	42	44	1.4
23:45	44	46	43	49	44	45	42	52	43	43	43	43	42	52	42	44	2.9
0:00	44	47	46	47	45	43	41	44	45	44	44	43	44	47	41	44	1.5
0:15	42	47	43	47	43	42	42	45	45	43	43	44	45	47	42	44	1.6
0:30	43	46	43	47	42	43	42	44	45	44	44	45	48	48	42	44	1.8
0:45	43	46	43	47	44	43	43	46	43	42	44	43	45	47	42	44	1.6
1:00	46	46	43	47	45	42	40	45	44	41	43	41	43	47	40	43	2.3
1:15	42	47	41	48	43	42	39	45	44	48	43	41	44	48	39	44	2.8
1:30	44	47	41	47	45	43	39	45	45	40	43	43	43	47	39	44	2.5
1:45	43	47	41	48	43	40	41	43	44	40	46	43	42	48	40	43	2.6
2:00	44	47	42	48	43	41	41	41	45	42	43	40	43	48	40	43	2.5
2:15	44	48	42	48	42	44	41	40	46	41	42	41	43	48	40	43	2.7
2:30	45	48	41	46	44	42	43	40	49	41	46	52	45	52	40	45	3.5
2:45	43	48	42	48	45	44	43	40	48	42	44	45	46	48	40	44	2.5
3:00	43	49	41	48	42	43	42	41	47	41	44	42	45	49	41	44	2.7
3:15	44	48	42	49	50	43	43	40	45	42	44	43	46	50	40	44	3.0
3:30	42	48	42	49	44	44	40	40	47	42	43	41	46	49	40	44	2.9
3:45	44	48	42	49	45	44	42	41	49	40	44	42	45	49	40	44	2.9
4:00	42	48	43	49	44	44	42	41	48	42	50	42	44	50	41	44	3.2
4:15	43	47	44	48	44	47	42	43	48	43	46	42	45	48	42	45	2.2
4:30	42	46	47	50	43	46	45	42	48	48	49	49	46	50	42	46	2.6
4:45	45	47	46	51	47	49	47	41	45	47	48	44	48	51	41	47	2.4
5:00	45	48	48	52	45	49	45	44	46	45	47	44	49	52	44	47	2.4
5:15	44	47	48	51	48	50	48	46	46	47	48	47	52	52	44	48	2.1
5:30	48	48	50	51	47	51	48	48	47	45	49	49	50	51	45	48	1.7
5:45	47	47	50	52	50	51	48	46	44	48	52	49		52	44	49	2.4
6:00	44	49	50	52	51	50	47	46	45	48	51	51	51	52	44	49	2.7
6:15	45	48	50	52	55	51	50	49	45	49	52	54	50	55	45	50	3.0
6:30	47	48	49	52	49	53	51	46	51	48	50	50	51	53	46	50	1.9
6:45	49	49	51	54	50	54	52	48	51	53	53	48	53	54	48	51	2.1
7:00	47	47	54	52	52	54	50	51	51	54	57	51	54	57	47	52	2.8
Max	49	49	54	54	55	54	52	52	51	54	57	54	54	57	49	53	2.0
Min	41	43	41	46	42	40	39	40	39	40	42	40	42	46	39	41	2.0
Ave	44	47	45	49	46	46	44	44	46	44	46	45	46	49	44	46	1.4
SD	1.7	1.3	3.4	2.1	3.1	3.9	3.5	3.0	2.7	3.5	3.5	3.6	3.3	3.9	1.3	3.1	0.7
E Avg	44	47	46	49	47	48	46	45	47	46	48	46	48	49	45	47	1.2
24hr	51	50	49	50	51	51	54	52	51	49	50	50	50	54	49	50	1.4

4 Melbourne St, New Berrima

Daytime LA90 **22 October to 4 November 2021**

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
7:00		40	40	43	46	42	46	42	38	47	42	42	41	47	38	43	2.8
7:15		40	40	44	46	41	46	44	36	48	42	43	41	48	36	43	3.1
7:30		39	39	43	44	41	44	42	37	43	40	44	41	45	37	42	2.5
7:45		40	40	43	45	40	45	43	37	42	41	44	41	45	37	42	2.4
8:00		41	40	43	44	41	47	43	38	41	40	43	40	47	38	42	2.5
8:15		39	41	42	43	41	45	46	37	41	42	42	41	46	37	42	2.4
8:30		40	41	42	44	40	45	44	37	40	39	42	41	45	37	42	2.5
8:45		39	40	43	42	41	48	45	36	40	41	42	42	48	36	42	3.0
9:00		41	40	42	44	43	59	48	35	39	42	42	41	59	35	43	5.6
9:15		40	38	42	44	42	59	56	36	39	41	41	42	59	36	43	6.9
9:30		40	38	42	43	41	49	55	36	39	39	41	41	55	36	42	5.2
9:45		41	38	42	42	40	47	55	35	38	40	40	42	55	35	42	5.1
10:00		41	38	42	42	42	47	55	35	40	39	40	40	55	35	42	5.0
10:15		42	39	42	42	41	47	55	36	39	39	41	41	55	36	42	4.9
10:30		41	41	42	43	40	46	54	34	38	39	39	40	54	34	42	5.0
10:45		40	40	42	43	41	47	54	36	37	40	41	40	54	36	42	4.7
11:00	43	41	39	43	43	42	48	46	36	39	40	41	41	48	36	41	3.2
11:15	42	41	40	43	42	43	47	47	37	40	39	40	42	47	37	42	3.0
11:30	43	41	40	42	44	42	47	46	36	38	39	40	41	47	36	41	3.1
11:45	42	41	41	43	44	44	48	46	40	40	39	40	40	48	39	42	2.9
12:00	43	41	42	43	44	42	46	47	43	43	40	39	41	47	39	43	2.3
12:15	44	42	42	44	42	41	45	48	37	38	40	40	41	48	37	41	3.1
12:30	43	42	47	43	42	41	45	47	36	39	40	40	39	47	36	42	3.3
12:45	43	42	44	44	43	42	45	44	37	40	39	40	40	45	37	42	2.6
13:00	44	43	43	43	44	42	45	47	36	41	38	40	39	47	36	42	3.1
13:15	43	44	42	44	43	42	45	48	37	41	40	41	39	48	37	42	2.9
13:30	42	44	43	44	44	41	45	45	39	42	39	42	38	45	38	42	2.4
13:45	43	43	42	43	46	41	46	46	36	40	40	41	39	46	36	42	3.0
14:00	44	44	41	43	44	42	46	46	37	40	41	42	40	46	37	42	2.8
14:15	42	44	44	45	44	43	45	47	41	41	43	42	39	47	39	43	2.2
14:30	44	43	43	43	41	43	46		42	40	43	42	39	46	39	42	1.9
14:45	42	42	44	43	44	42	46		41	40	43	41	42	46	40	43	1.5
15:00	43	44	43	43	45	43	47		42	40	43	41	40	47	40	43	2.1
15:15	44	44	42	42	44	43	46		43	40	41	41	39	46	39	42	2.1
15:30	44	46	42	43	44	43	46		42	40	42	42	40	46	40	43	1.9
15:45	44	46	42	44	44	43	47		45	40	42	43	40	47	40	43	2.3
16:00	44	45	42	43	43	41	46		42	39	39	43	40	46	39	42	2.1
16:15	42	45	52	43	43	43	44		42	40	38	45	40	52	38	43	3.7
16:30	42		50	44	47	44	45	48	43	38	39	46	40	50	38	44	3.8
16:45	41	44	47	43	46	44	45	46	42	41	41	45	42	47	41	44	2.0
17:00	42	44	45	42	47	43	44		40	41	39	44	42	47	39	43	2.1
17:15	42		42	43	46	43	43	46	42	40	40	44	43	46	40	43	2.0
17:30	42		42	42	47	44	44	47	43	41	40	45	44	47	40	43	2.3
17:45	44	40	41	44	47	43	41	46	43	44	41	44	42	47	40	43	2.1
18:00	43		41	44	46	44	40	49	41	43	40	43	42	49	40	43	2.6
Max	44	46	52	45	47	44	59	56	45	48	43	46	44	59	43	47	4.7
Min	41	39	38	42	41	40	40	42	34	37	38	39	38	45	34	40	2.5
Ave	43	42	42	43	44	42	46	48	39	40	40	42	41	48	39	43	2.5
SD	0.8	2.1	2.9	0.7	1.5	1.1	3.2	3.9	3.0	2.1	1.3	1.7	1.2	3.9	0.4	1.9	1.1
90%	42	40	39	42	42	41	44	43	36	38	39	40	39	45	36	41	2.6
															Median	40	

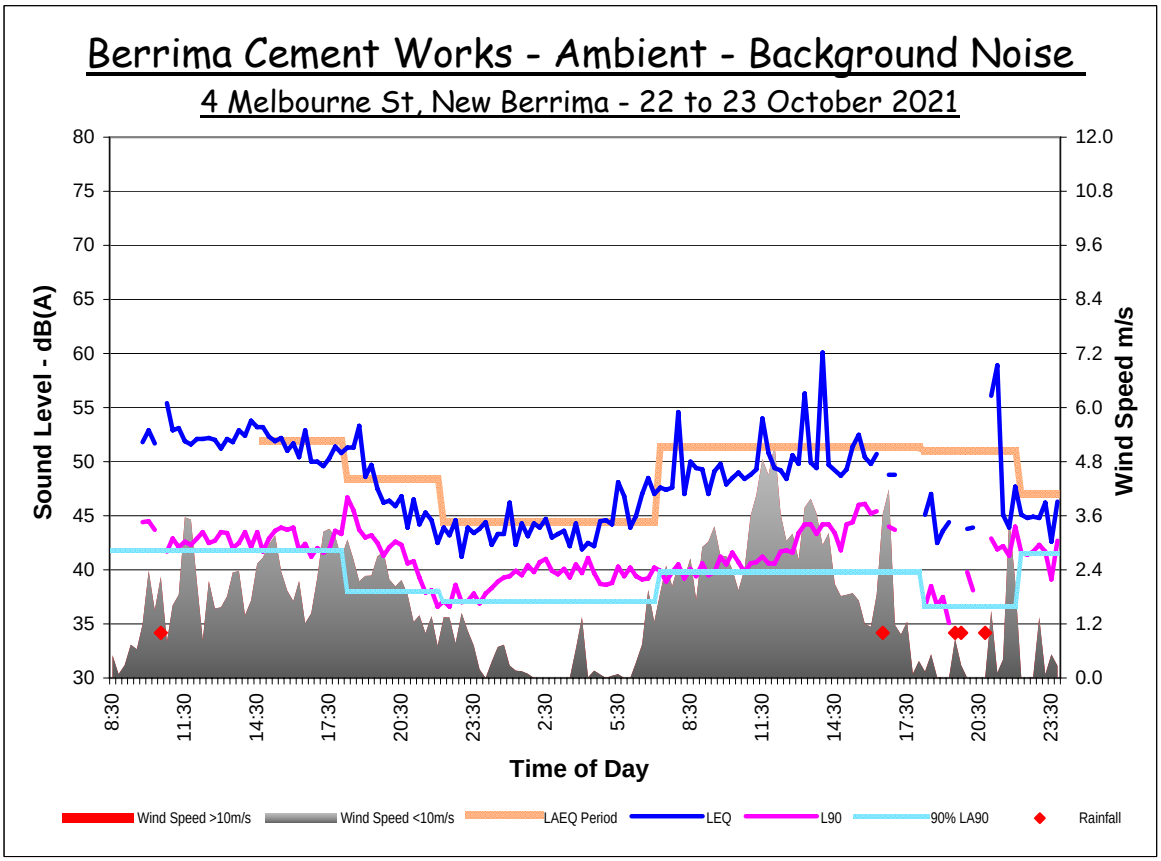
Evening LA90

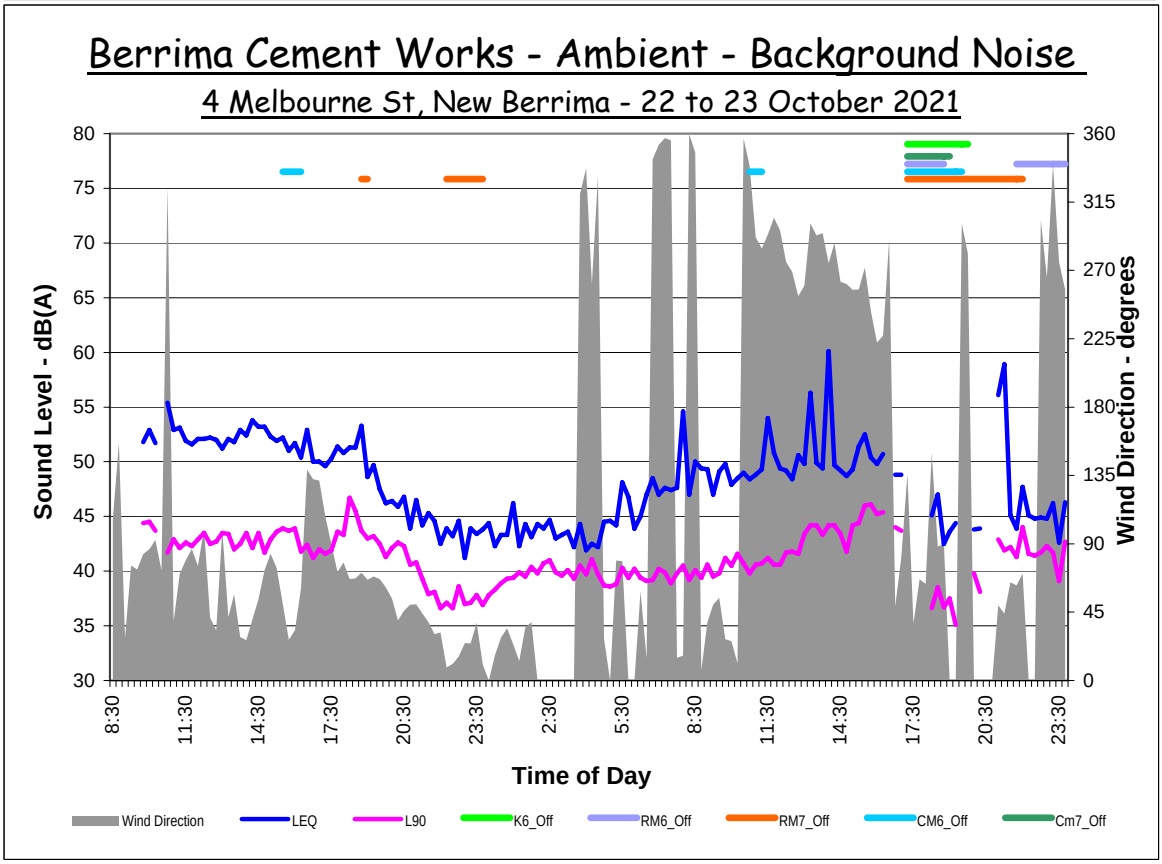
Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
18:00	43		41	44	46	44	40	49	41	43	40	43	42	49	40	43	2.6
18:15	47	37	39	44	45	43	40	50	42	43	40	44	42	50	37	42	3.4
18:30	46	39	41	43	45	42	40		43	43	40	42	42	45	39	42	1.9
18:45	44	37	41	42	45	44	41	48	43	43	40	43	42	48	37	42	2.8
19:00	43	38	38	41	45	43	41	46	42	42	40	43	41	46	38	42	2.4
19:15	43	35	39	40	45	43	40	45	42	42	40	43	42	45	35	41	2.7
19:30	43		44	41	44	43	40	46	41	43	40	42	41	46	40	42	1.9
19:45	41		45	44	43	43	40	43	41	43	39	41	40	45	39	42	1.9
20:00	42	40	47	44	44	43	40	43	42	43	38	42	39	47	38	42	2.4
20:15	43	38	45	45	45	45	40	42	42	42	38	41	40	45	38	42	2.7
20:30	42		43	45	43	44	39	42	41	43	36	41	41	45	36	42	2.4
20:45	41		42	45	43	43	39	41	43	42	35	41	41	45	35	41	2.5
21:00	41	43	44	44	43	42	40	41	42	41	36	40	40	44	36	41	2.3
21:15	39	42	44	43	42	42	39	42	43	41	37	40	40	44	37	41	2.0
21:30	38	42	43	43	41	41	38	41	42	40	35	39	40	43	35	40	2.3
21:45	38	41	43	43	41	41	38	41	41	40	36	38	39	43	36	40	2.0
22:00	37	44	42	43	41	41	38	41	42	41	38	38	40	44	38	41	2.0
Max	47	44	47	45	46	45	41	50	43	43	40	44	42	50	40	44	2.7
Min	37	35	38	40	41	41	38	41	41	40	35	38	39	41	35	39	2.0
Ave	42	40	42	43	44	43	40	44	42	42	38	41	41	44	38	42	1.7
SD	2.7	2.9	2.3	1.5	1.6	1.1	1.0	3.1	0.7	1.1	1.8	1.7	1.1	3.1	0.7	1.7	0.8
90%	38	37	39	41	41	41	38	41	41	40	36	38	39	41	36	39	1.8
															Median	39	

Night LA90

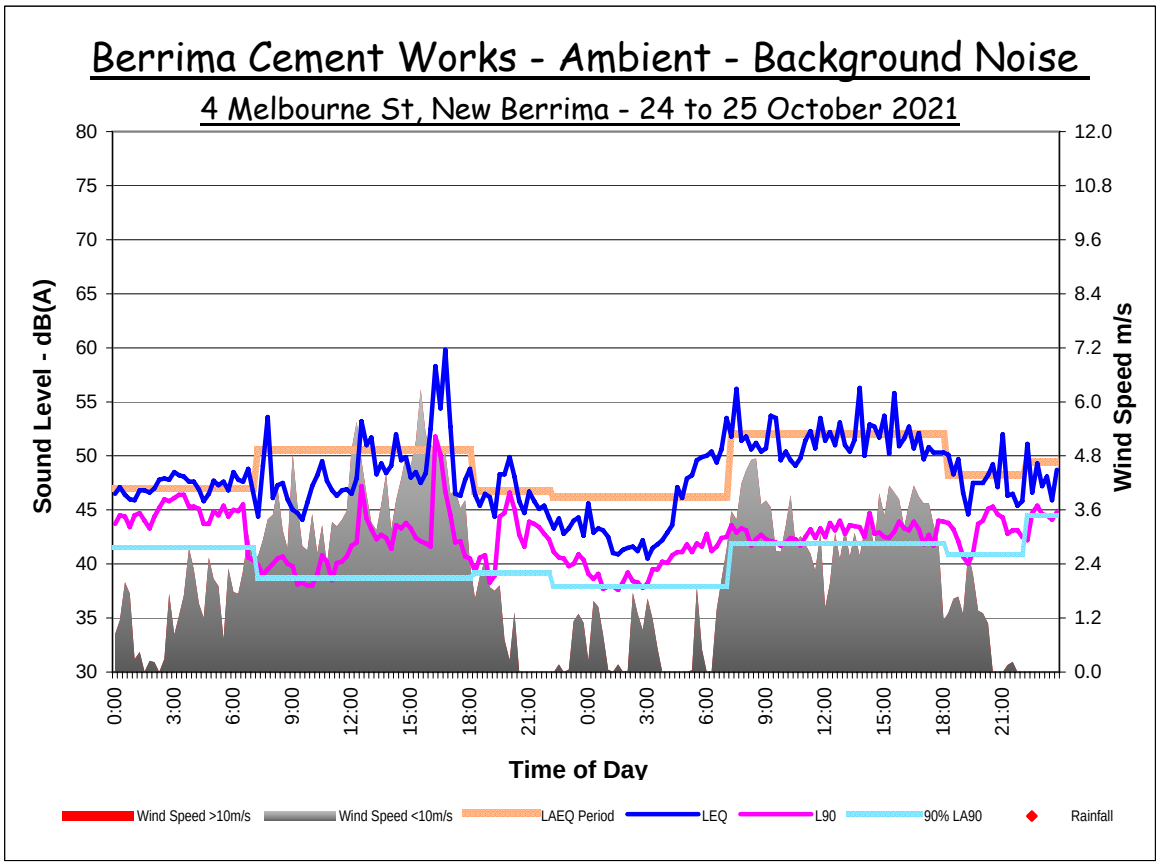
Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	**Maximum**	**Minimum**	**Average**	**SD**
22:00	37	44	42	43	41	41	38	41	42	41	38	38	40	44	38	41	2.0
22:15	37	42	41	42	41	42	38	41	41	41	39	39	40	42	38	41	1.4
22:30	37	41	41	45	40	43	37	41	41	40	40	39	39	45	37	41	2.0
22:45	39	42	41	45	40	41	38	40	40	40	40	38	41	45	38	41	1.9
23:00	37	42	40	45	41	42	38	40	37	40	39	39	40	45	37	40	2.1
23:15	37	42	40	45	40	42	39	39	37	39	40	39	39	45	37	40	2.0
23:30	38	39	41	44	39	41	37	40	39	39	39	38	37	44	37	39	1.9
23:45	37	43	40	45	40	40	38	39	40	40	41	38	38	45	38	40	2.0
0:00	38	44	39	45	40	39	38	40	43	39	40	37	40	45	37	40	2.5
0:15	38	45	39	45	41	40	38	42	43	39	40	38	39	45	38	41	2.5
0:30	39	44	39	46	39	40	38	42	42	40	40	37	39	46	37	41	2.7
0:45	39	43	38	46	40	40	37	42	42	39	40	37	39	46	37	40	2.8
1:00	39	45	38	46	39	40	37	42	43	38	41	35	40	46	35	40	3.1
1:15	40	45	38	46	40	40	38	41	43	38	39	36	41	46	36	40	3.1
1:30	40	44	38	46	40	39	37	41	44	36	38	36	40	46	36	40	3.2
1:45	40	43	38	47	39	38	38	39	43	36	40	36	40	47	36	40	3.2
2:00	40	44	39	46	39	39	37	39	43	37	40	36	41	46	36	40	3.1
2:15	41	45	38	45	39	40	37	38	44	37	40	37	41	45	37	40	3.0
2:30	41	46	38	45	40	40	38	37	47	38	40	37	42	47	37	41	3.4
2:45	40	46	38	46	39	40	37	37	46	38	40	37	42	46	37	40	3.6
3:00	40	46	38	47	40	41	37	37	44	39	39	36	42	47	36	41	3.4
3:15	40	46	40	46	40	40	38	38	43	38	40	36	42	46	36	41	3.3
3:30	39	46	40	47	40	40	37	38	45	36	41	37	43	47	36	41	3.9
3:45	41	45	40	47	41	40	38	39	46	36	41	38	43	47	36	41	3.5
4:00	40	45	40	47	40	40	37	39	47	36	42	37	42	47	36	41	3.8
4:15	41	45	41	46	40	44	36	39	46	37	43	38	43	46	36	41	3.6
4:30	40	44	41	46	38	43	37	38	47	37	43	37	43	47	37	41	3.6
4:45	39	44	41	49	39	45	38	37	42	39	44	37	46	49	37	42	3.9
5:00	39	45	42	50	39	44	37	37	44	39	44	37	46	50	37	42	4.2
5:15	39	45	41	48	40	45	38	44	43	39	43	37	43	48	37	42	3.1
5:30	40	45	42	48	40	45	38	44	44	38	43	38	42	48	38	42	3.2
5:45	39	44	42	47	40	46	39	41	42	40	44	39		47	39	42	2.9
6:00	40	45	43	48	41	44	40	41	40	41	44	40	41	48	40	42	2.4
6:15	39	45	41	47	41	45	43	37	39	40	43	40	41	47	37	42	2.9
6:30	39	46	42	47	40	46	43	36	43	40	42	41	43	47	36	42	3.0
6:45	39	41	42	46	41	46	43	37	47	41	42	40	43	47	37	42	2.9
7:00	40	40	43	46	42	46	42	38	47	42	42	41	46	47	38	43	2.8
Max	41	46	43	50	42	46	43	44	47	42	44	41	46	50	41	44	2.7
Min	37	39	38	42	38	38	36	36	37	36	38	35	37	42	35	37	1.8
Ave	39	44	40	46	40	42	38	40	43	39	41	38	41	46	38	41	2.4
SD	1.3	1.8	1.5	1.6	0.8	2.4	1.8	2.0	2.7	1.6	1.8	1.4	2.1	2.7	0.8	1.8	0.5
90%	37	42	38	45	39	39	37	37	39	36	39	36	39	45	36	39	2.3
															Median	39	

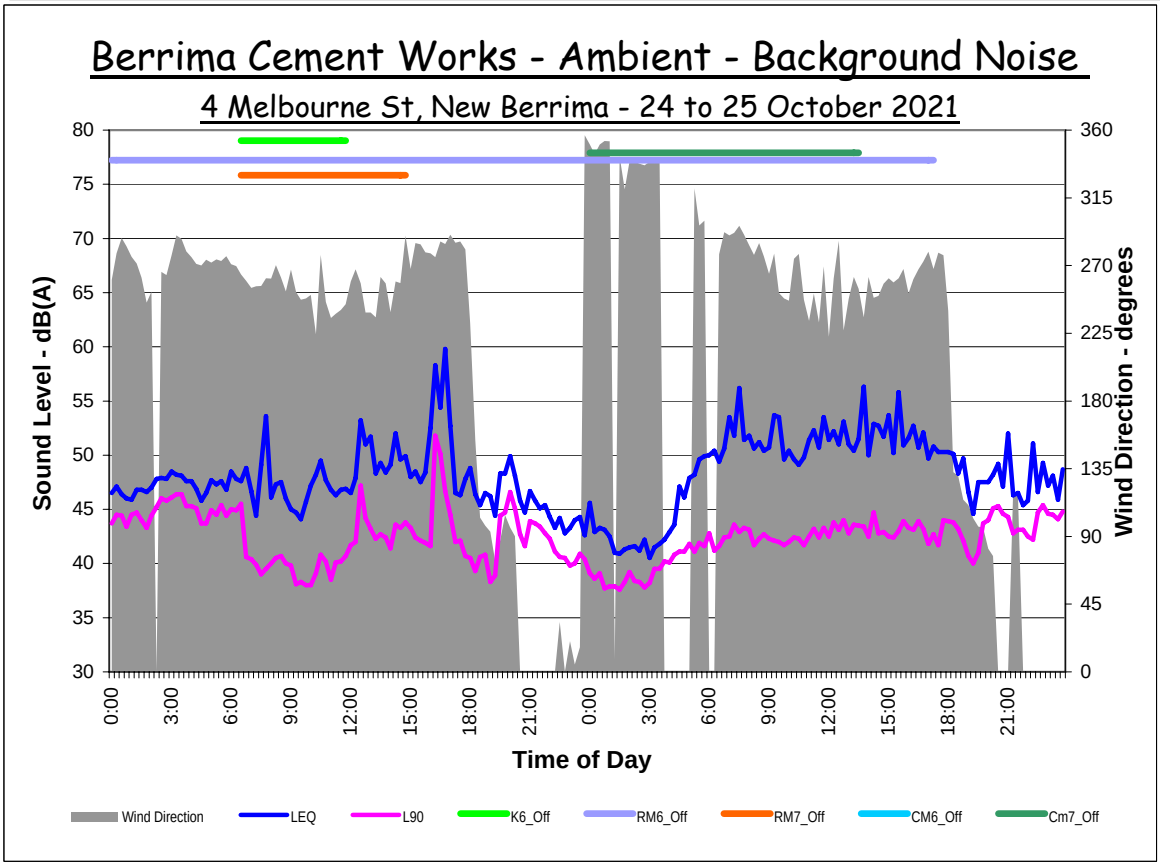
Two Day Results of Ambient Noise Monitoring

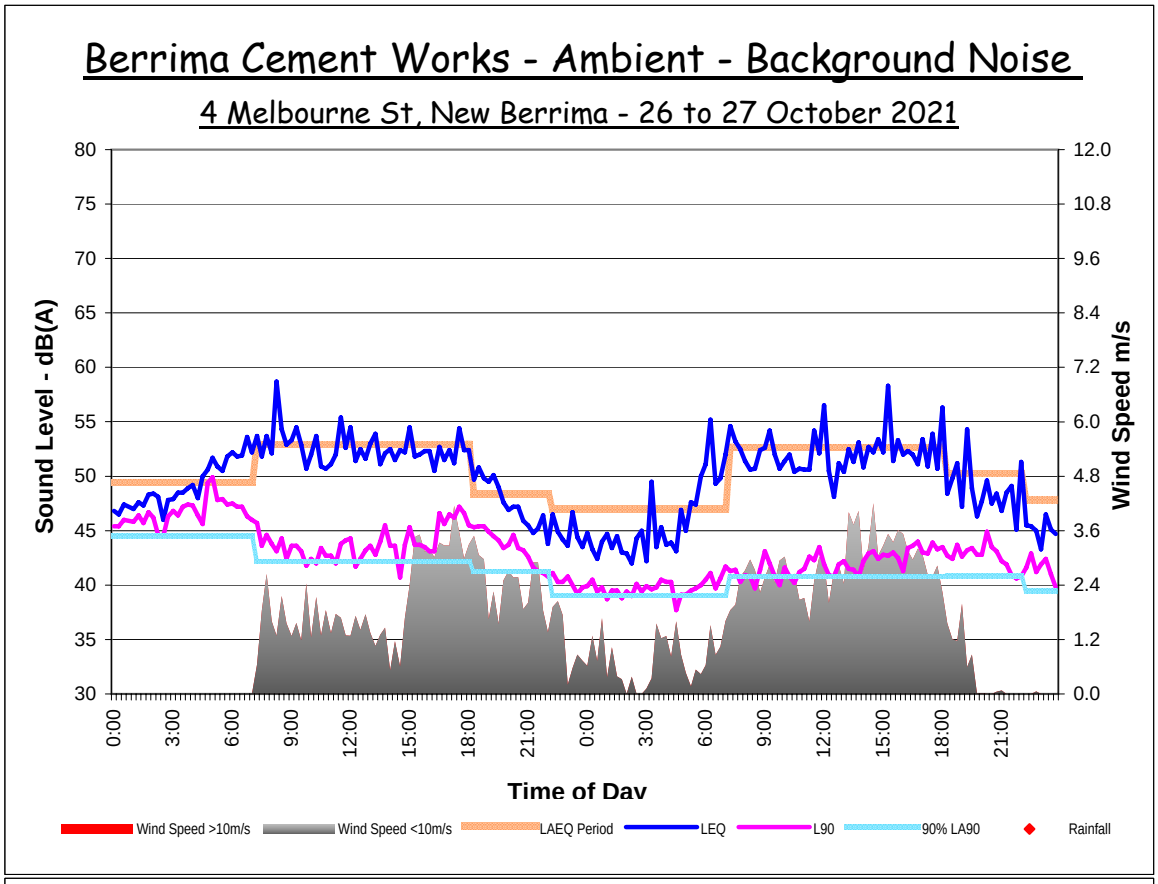


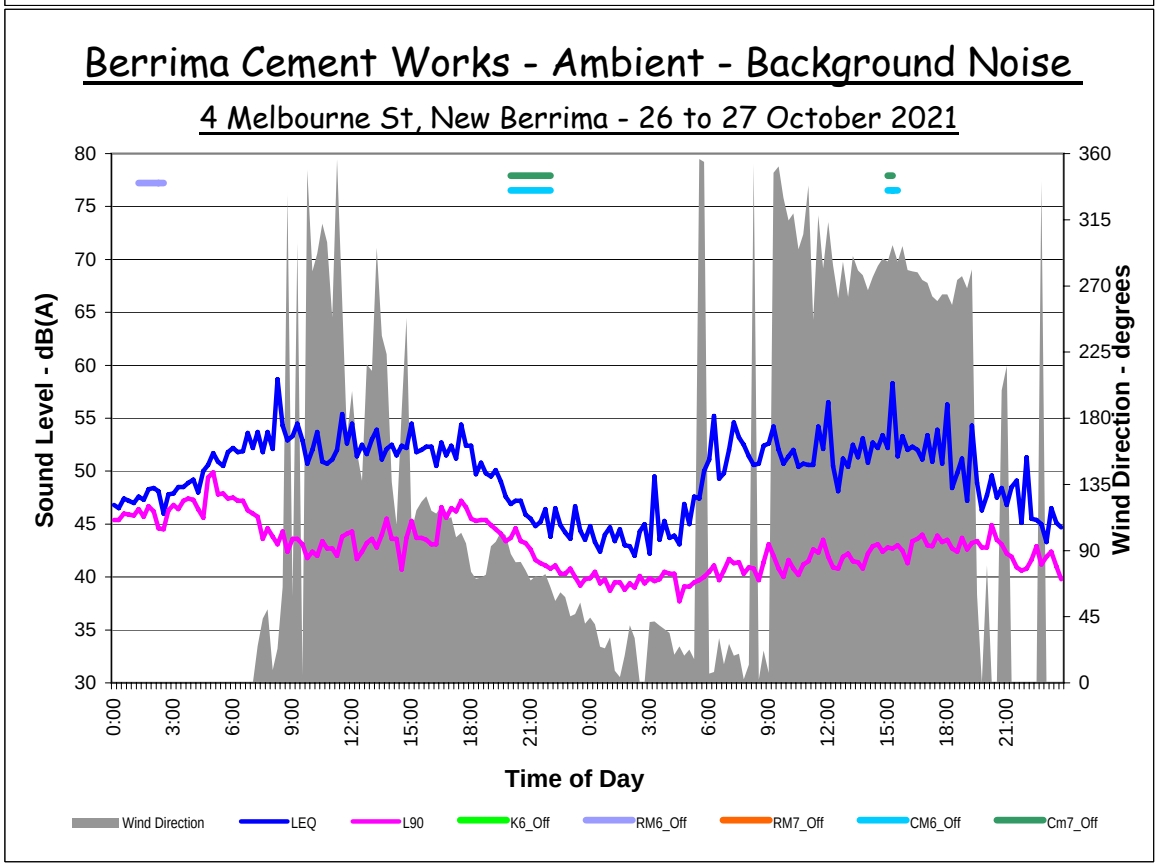


Two Day Results of Ambient Noise Monitoring

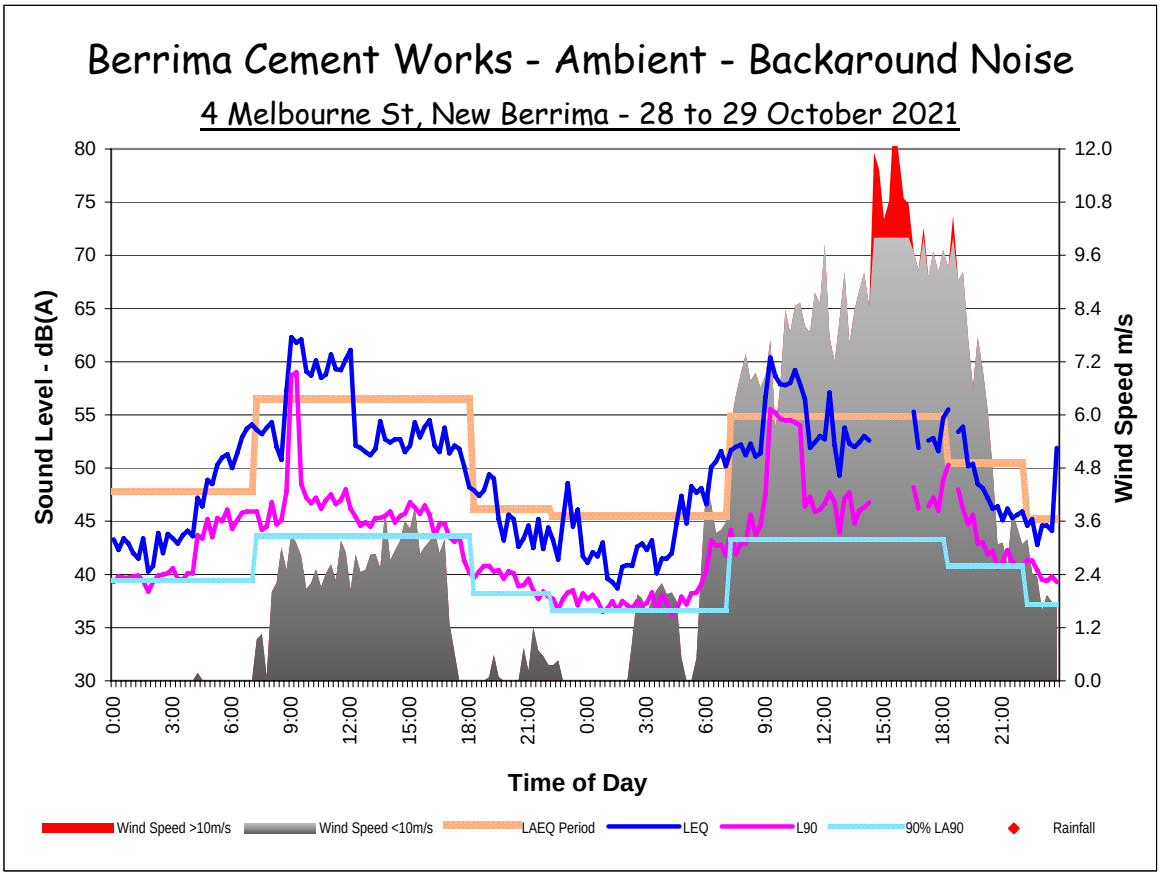


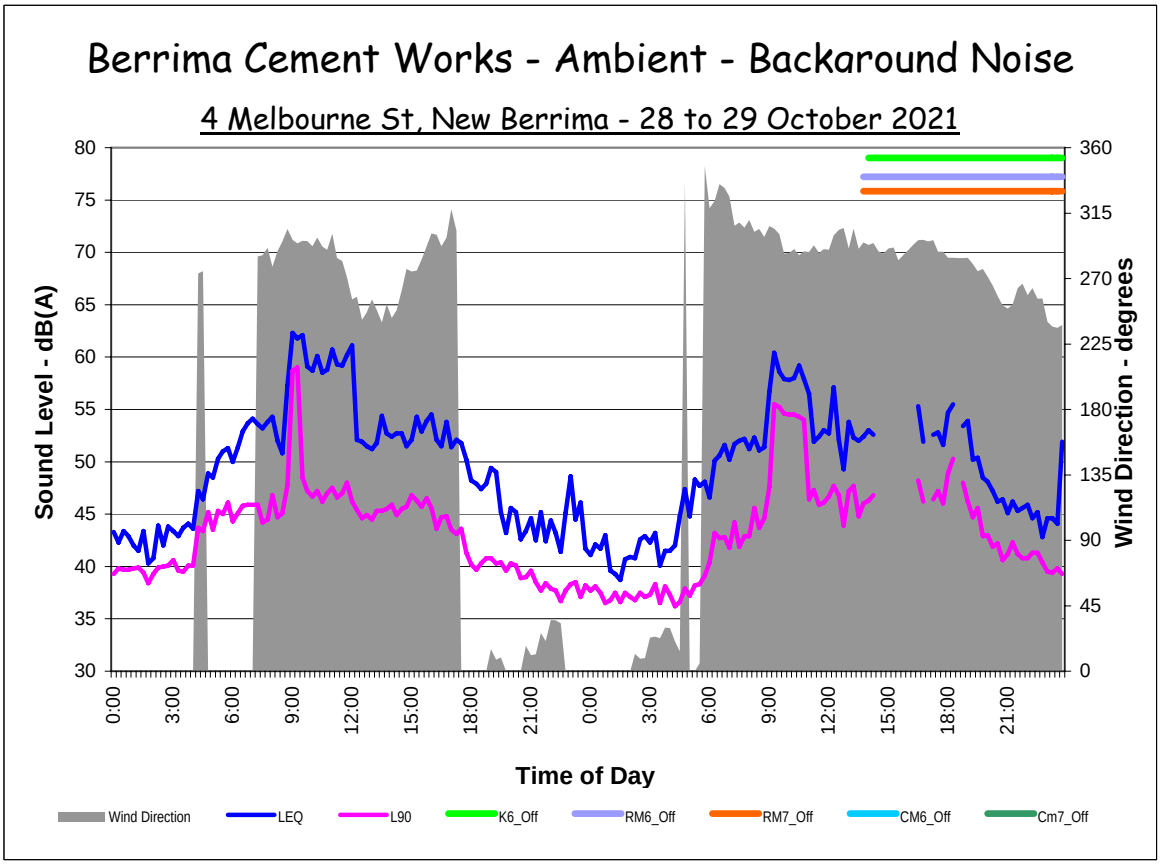



Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 26 to 27 October 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Dav
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

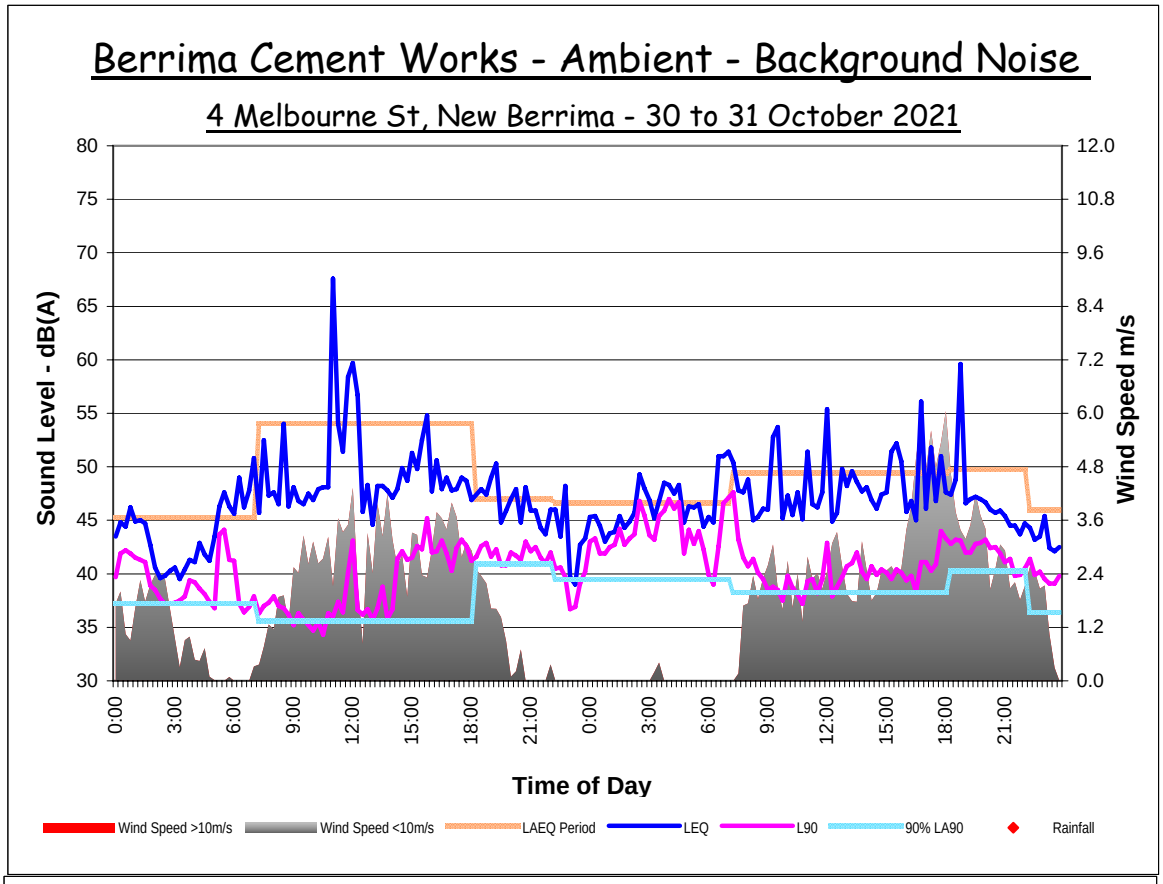

Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 26 to 27 October 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

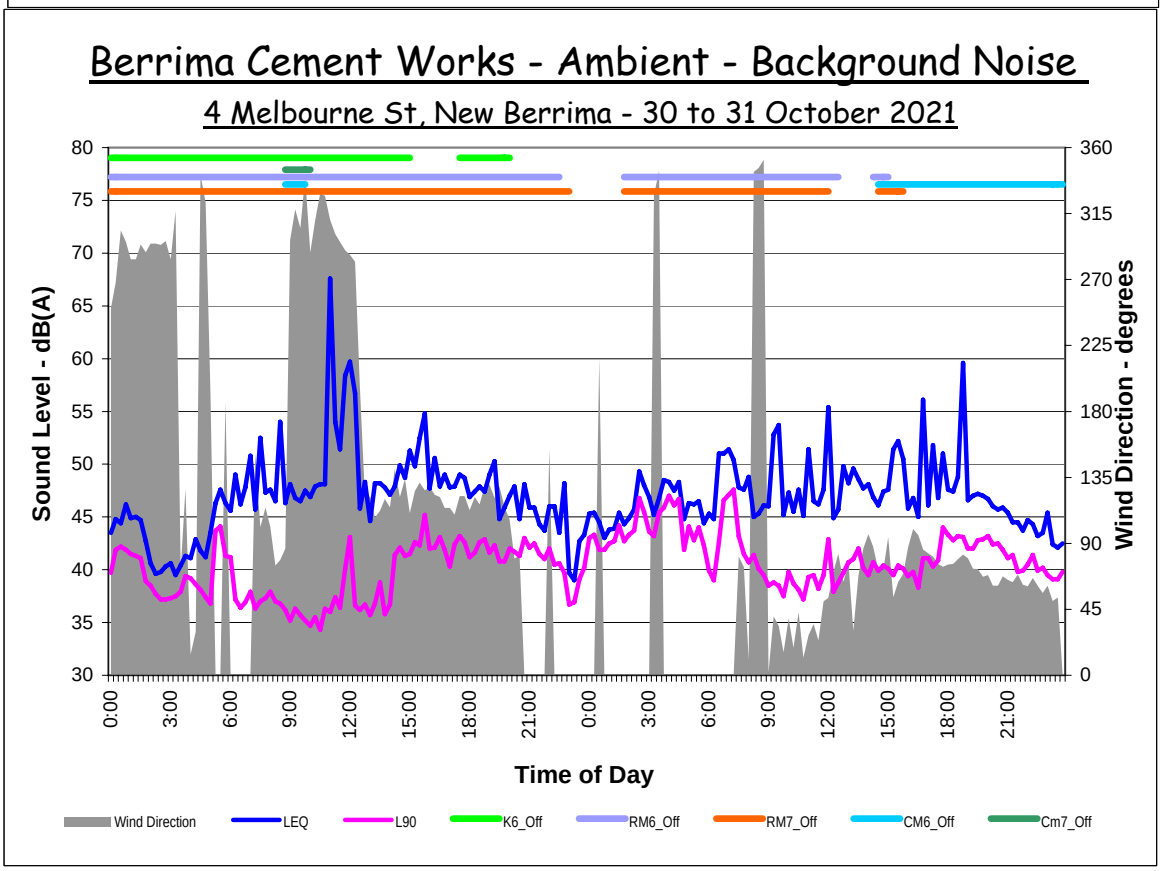
Two Day Results of Ambient Noise Monitoring



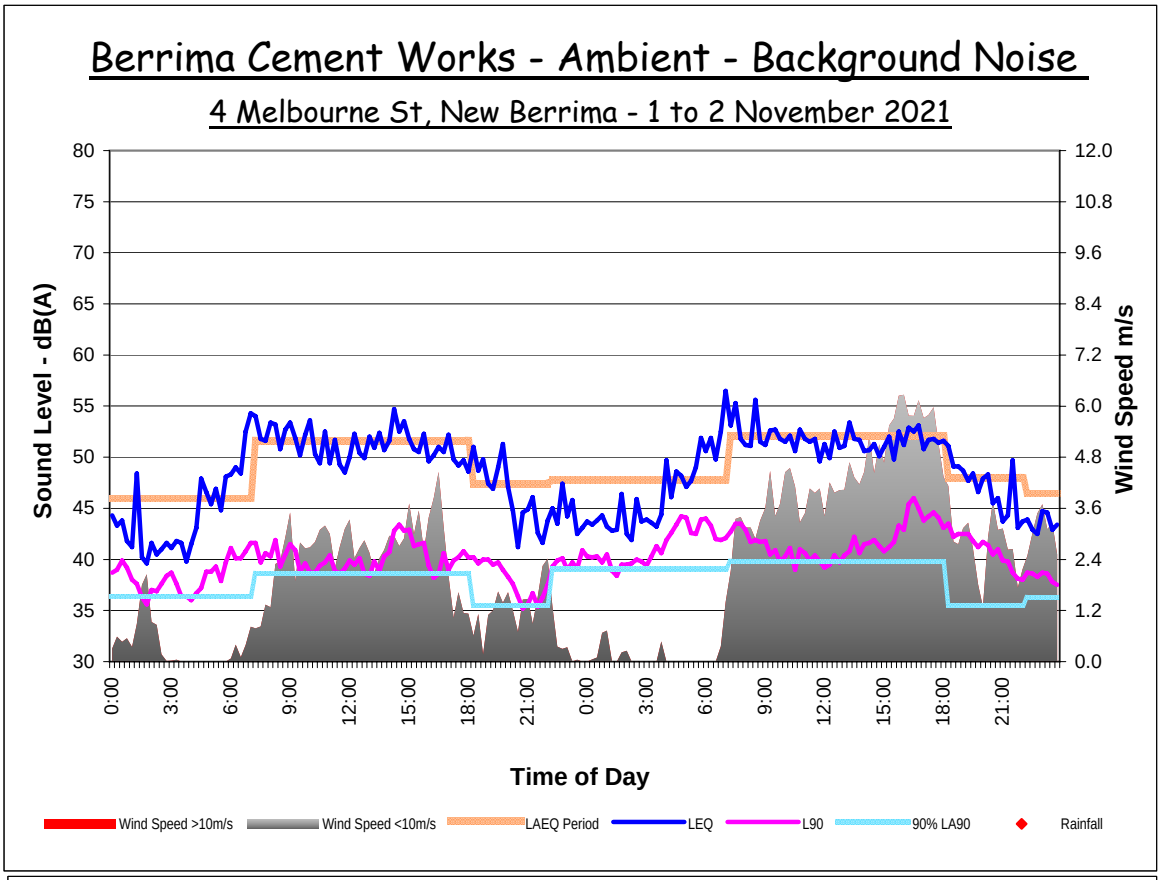


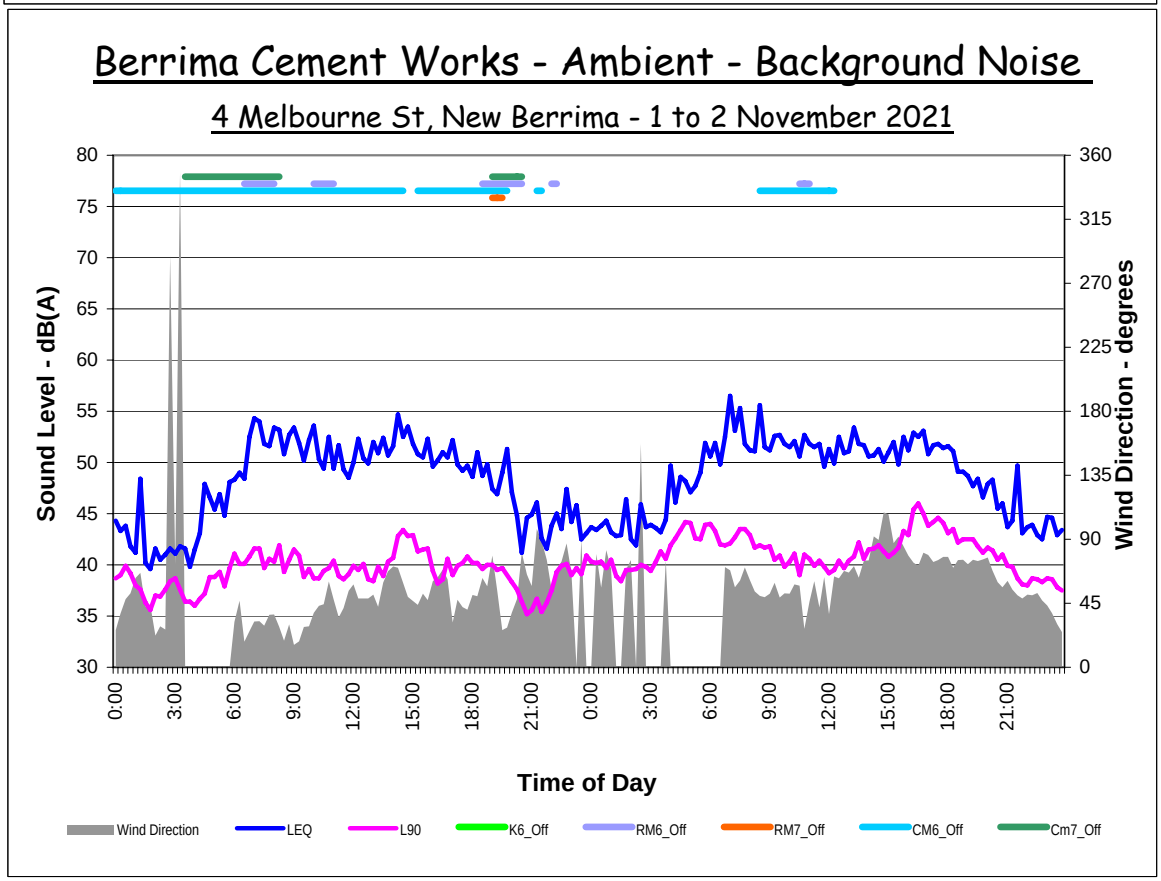
Two Day Results of Ambient Noise Monitoring



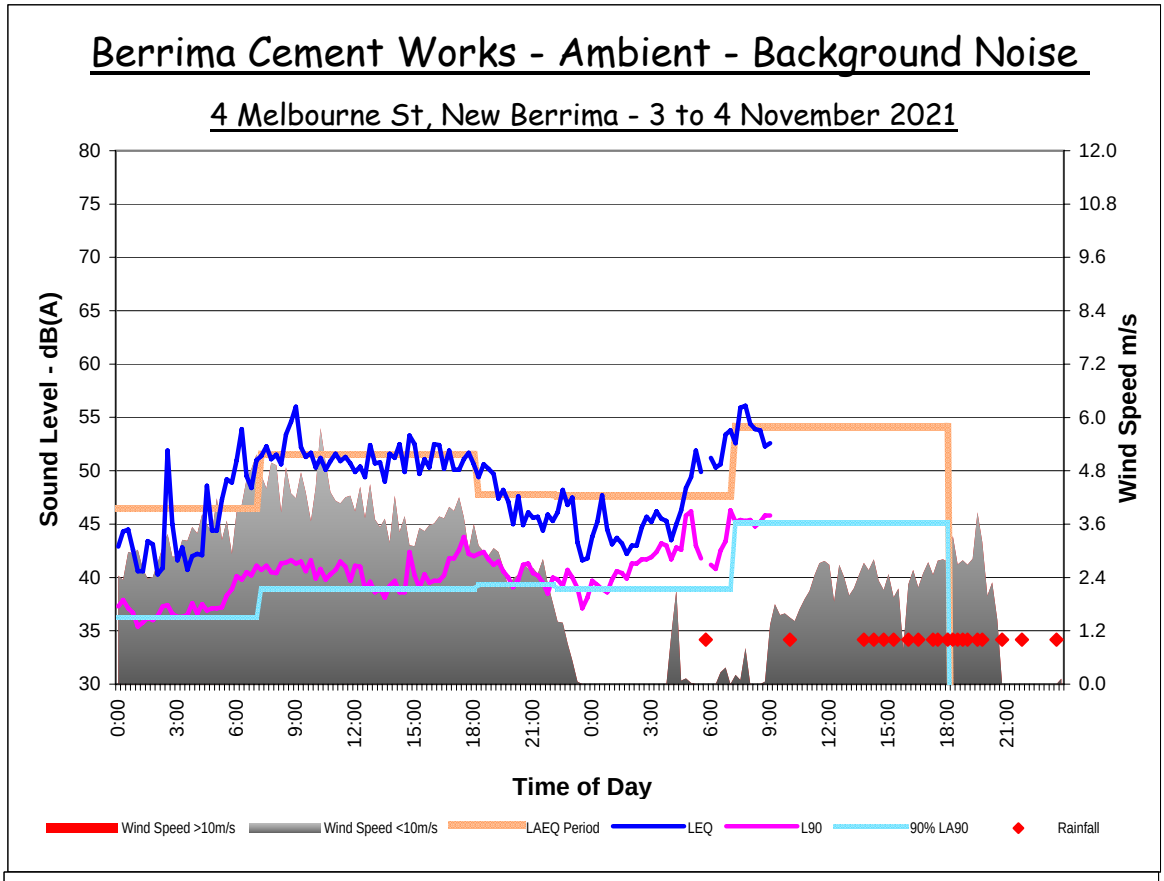


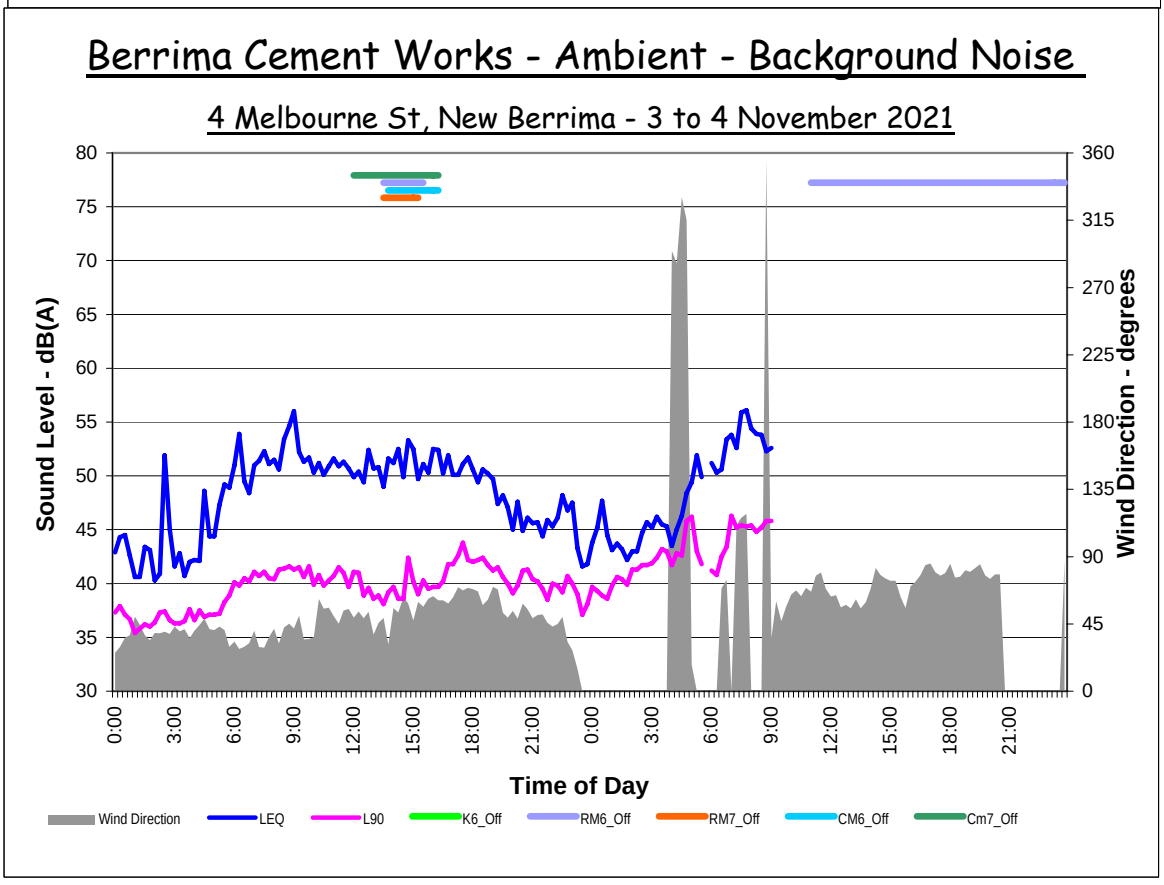
Two Day Results of Ambient Noise Monitoring

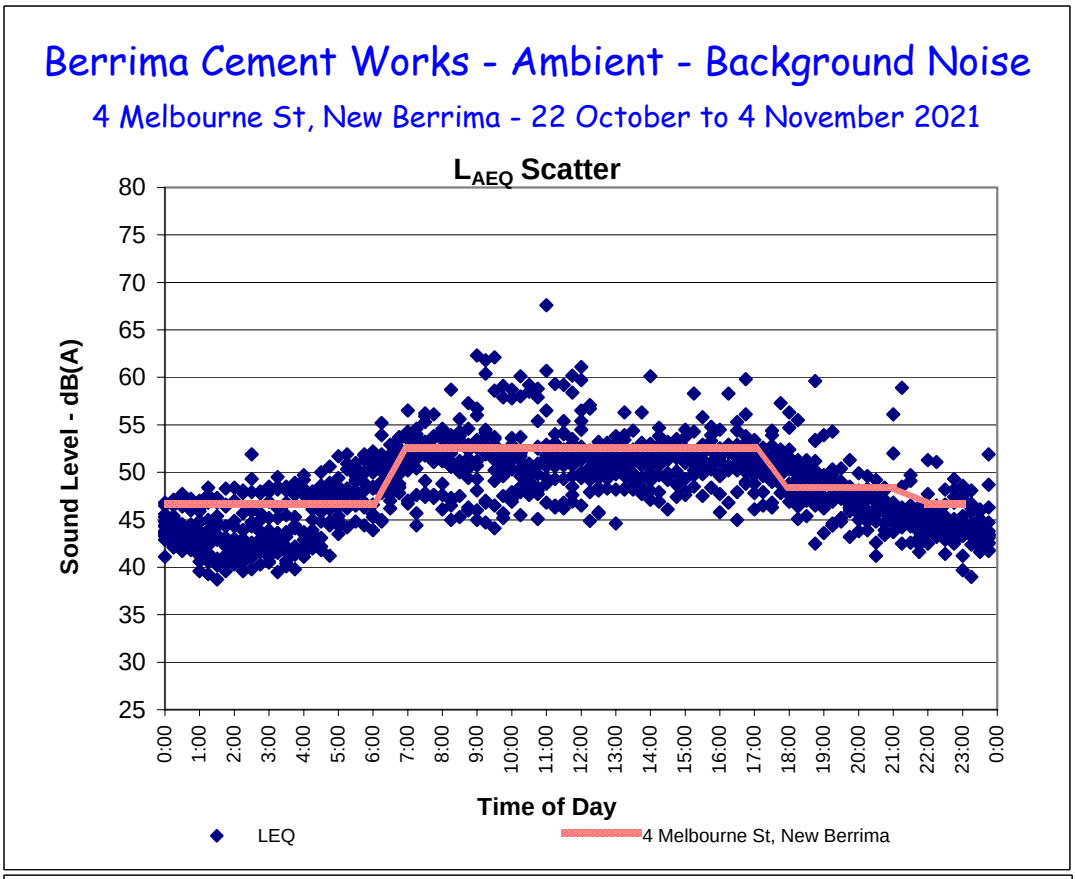


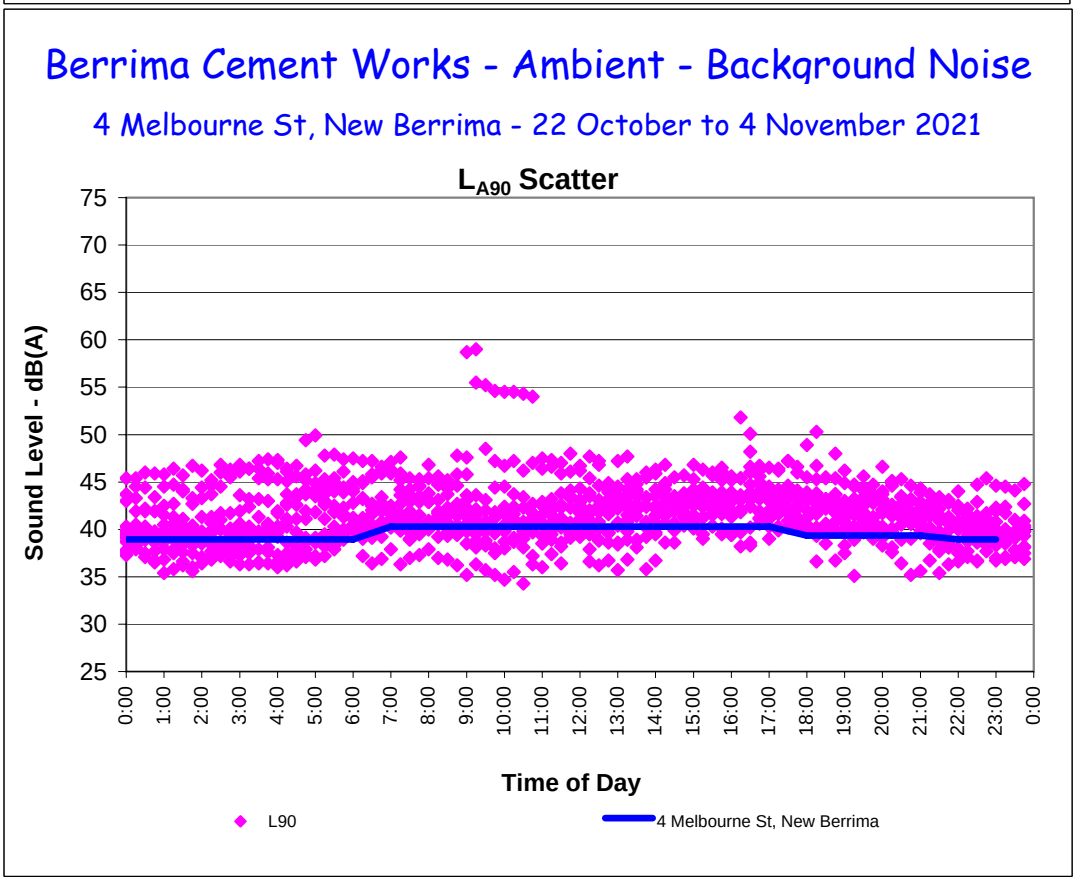


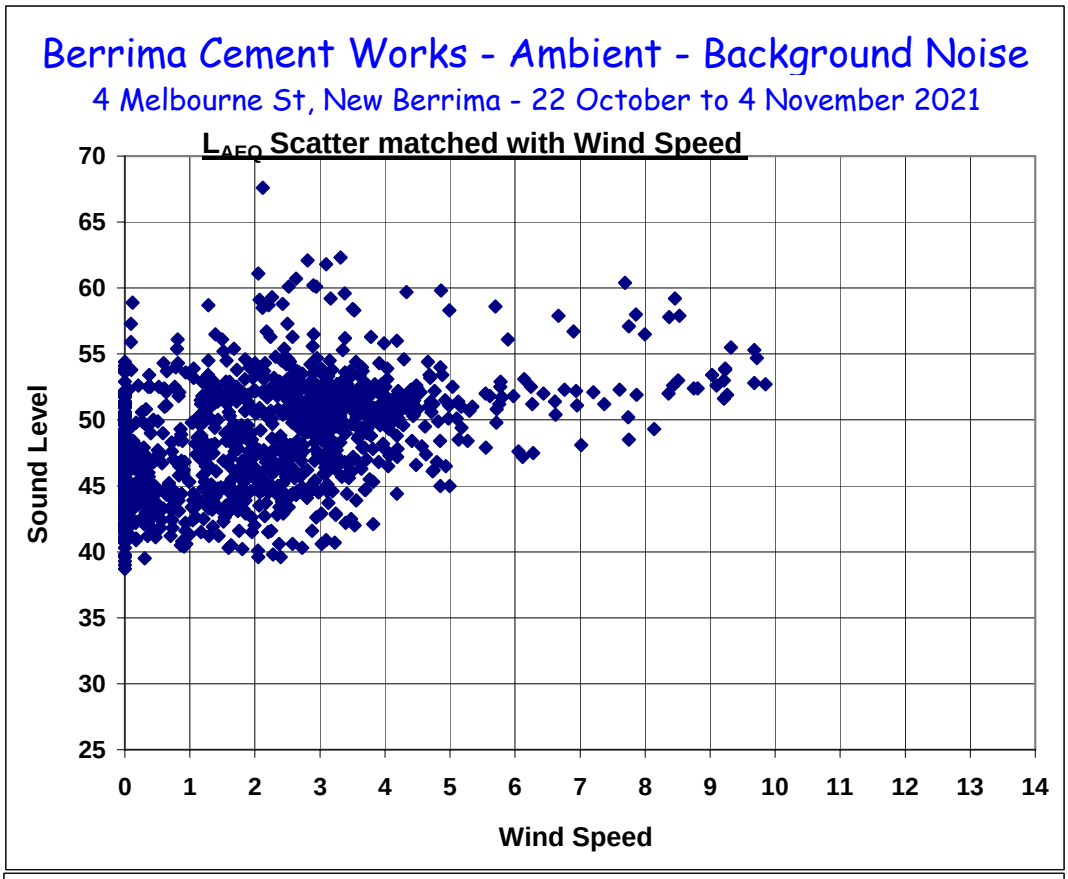
Two Day Results of Ambient Noise Monitoring

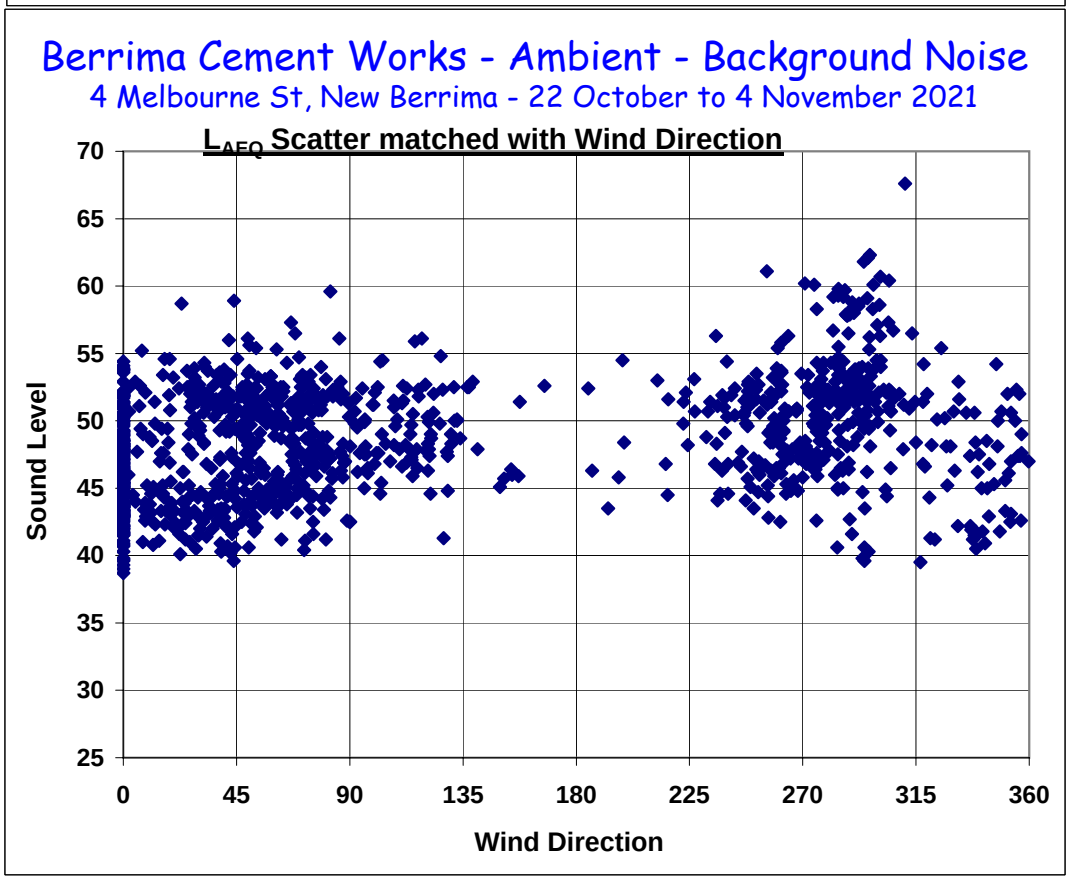


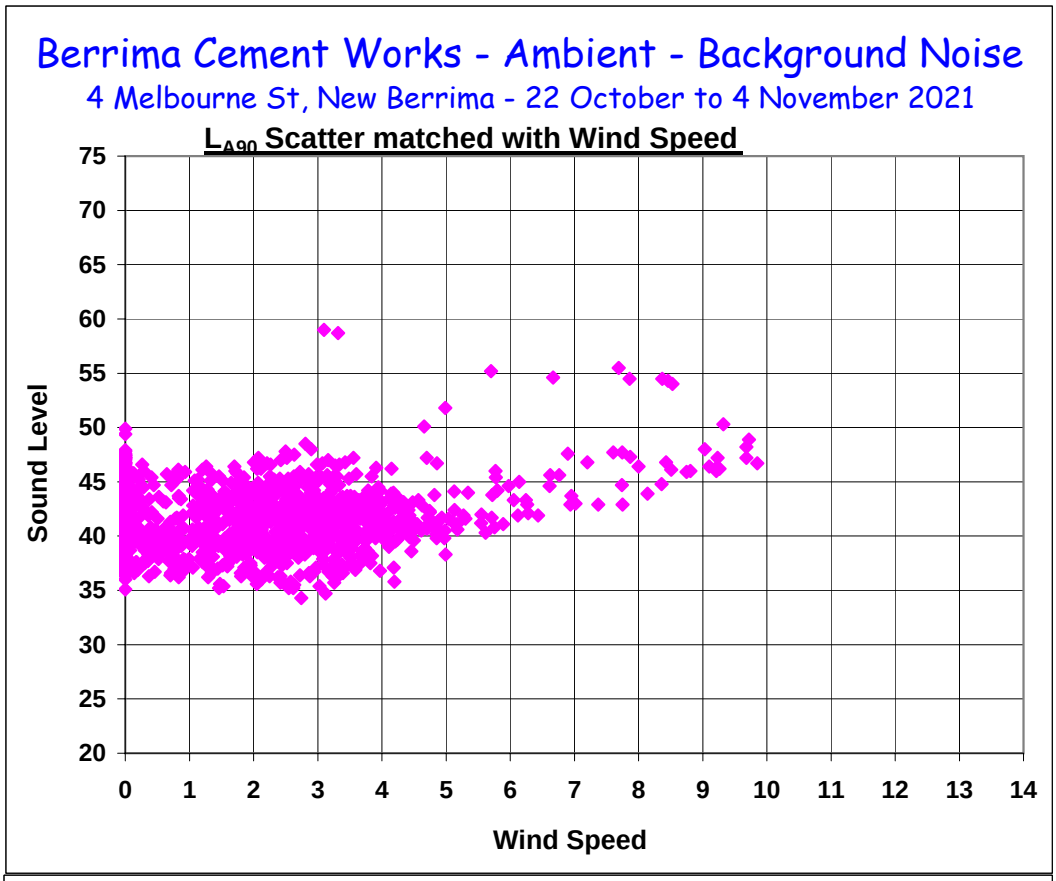


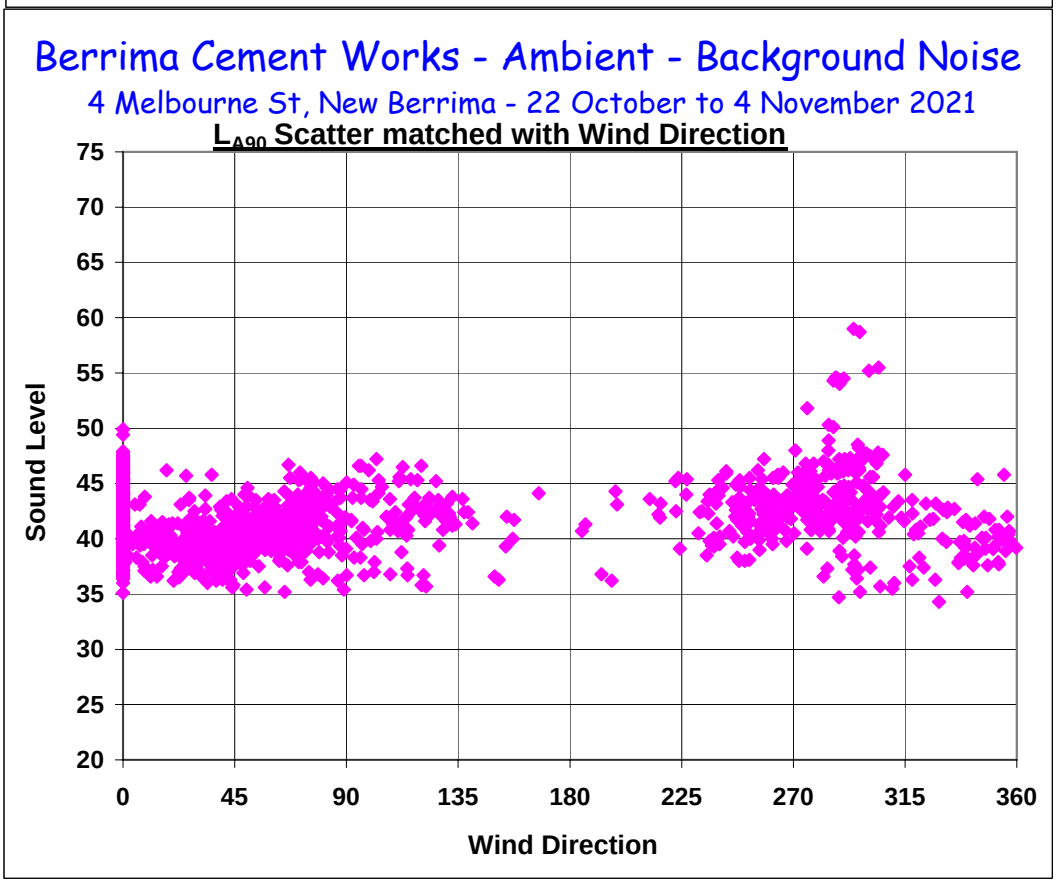

Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 22 October to 4 November 2021
LAEQ Scatter
Sound Level - dB(A)
80
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
LEQ
4 Melbourne St, New Berrima


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 22 October to 4 November 2021
LA90 Scatter
Sound Level - dB(A)
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
L90
4 Melbourne St, New Berrima


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 22 October to 4 November 2021
LAEQ Scatter matched with Wind Speed
Sound Level
70
65
60
55
50
45
40
35
30
25
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Wind Speed


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 22 October to 4 November 2021
LAEQ Scatter matched with Wind Direction
Sound Level
70
65
60
55
50
45
40
35
30
25
0 45 90 135 180 225 270 315 360
Wind Direction


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 22 October to 4 November 2021
L_{A90} Scatter matched with Wind Speed
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Wind Speed


Berrima Cement Works - Ambient - Background Noise
4 Melbourne St, New Berrima - 22 October to 4 November 2021
L_{A90} Scatter matched with Wind Direction
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0 45 90 135 180 225 270 315 360
Wind Direction

Recognition Research
ABN: 25 153 946 064
ACN: 153 946 064

Appendix C: Unattended environmental sound level results for Northern Boundary

North Fence - Cement Works

Daytime LAEQ **22 October to 4 November 2021**

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
7:00		49	51	52	53	51	54	53	48	54	49	51	50	54	48	51	2.0
7:15		50	49	51	53	50	53	50	49	51	48	51	50	54	48	51	1.6
7:30		52	50	50	53	50	56	52	49	50	50	51	50	56	49	51	1.9
7:45		49	51	51	53	51	53	50	49	52	48	51	49	54	48	51	1.6
8:00		49	50	51	51	49	52	51	48	49	48	50	49	52	48	50	1.4
8:15		49	53	50	51	48	52	52	48	50	48	50	49	53	48	50	1.8
8:30		49	51	50	52	48	52	53	48	48	48	50	50	53	48	50	1.8
8:45		49	50	50	52	49	53	56	47	48	50	50	50	56	47	50	2.3
9:00		49	51	50	52	50	52	58	48	49	50	49	52	58	48	51	2.5
9:15		49	48	50	50	50	51	56	46	49	49	49	49	56	46	50	2.2
9:30		48	48	50	49	49	49	53	45	47	51	48	49	53	45	49	2.0
9:45		48	48	50	50	49	49	55	44	48	47	51	48	55	44	49	2.8
10:00		47	48	50	50	49	48	53	44	46	49	49	49	53	44	49	2.1
10:15		50	49	50	51	49	50	54	44	47	49	49	49	59	44	50	3.6
10:30		48	58	49	52	49	49	51	46	48	49	50	53	58	46	51	3.6
10:45		51	48	50	51	49	50	50	46	49	48	51	48	51	46	49	1.4
11:00		49	55	51	50	49	51	52	46	50	47	49	48	55	46	50	2.4
11:15		51	51	50	53	50	52	52	47	49	50	49	49	53	47	50	1.7
11:30		48	49	50	50	53	53	52	46	47	48	51	48	53	46	50	2.3
11:45		48	50	50	53	52	53	52	50	47	50	48	50	53	47	50	1.9
12:00		53	50	51	49	49	53	52	46	46	48	48	49	53	46	49	2.3
12:15		48	50	50	51	51	52	51	46	48	48	49	48	52	46	49	1.8
12:30		48	53	51	50	51	54	51	47	49	47	48	47	54	47	50	2.4
12:45		49	55	50	49	50	51	53	46	50	48	49	47	55	46	50	2.6
13:00		49	51	51	50	49	52	54	47	51	48	50	46	54	46	50	2.2
13:15		49	52	52	52	49	52	52	48	49	49	50	46	52	46	50	2.1
13:30		49	51	51	52	50	52	54	48	48	48	49	46	54	46	50	2.1
13:45		50	50	50	52	51	52	54	49	48	49	49	46	54	46	50	2.1
14:00		50	52	51	51	50	52	54	54	48	49	50	48	54	48	51	2.1
14:15		48	51	51	49	51	52	58	51	49	50	50	46	58	46	50	2.9
14:30		48	51	52	54	50	52		50	50	50	52	47	54	47	50	2.0
14:45		48	51	50	52	50	52		50	50	51	53	47	53	47	50	1.8
15:00		50	51	50	50	52	52		51	49	49	50	45	52	45	50	1.8
15:15		53	50	50	51	48	52		53	49	49	49	47	53	47	50	1.8
15:30		52	50	51	50	48	50		51	49	49	51	46	52	46	50	1.7
15:45		51	48	51	50	48	53		50	49	47	51	47	53	47	49	1.8
16:00		51	53	50	51	49	49		50	49	47	52	47	53	47	50	1.9
16:15		50	52	50	52	50	51		52	48	48	52	46	52	46	50	2.1
16:30			53	52	52	50	51	56	51	50	49	51	49	56	49	51	2.0
16:45		54	53	48	53	50	48	58	50	49	49	51	48	58	48	51	2.9
17:00		52	48	50	53	49	48		51	48	56	52	50	56	48	51	2.3
17:15			50	49	54	50	48	58	52	50	48	52	49	58	48	51	3.1
17:30			52	54	54	50	47	57	52	52	50	52	49	57	47	52	2.6
17:45		47	49	58	53	50	50	61	51	52	51	51	49	61	47	52	4.0
18:00			49	53	53	50	48	60	51	55	49	51	49	60	48	51	3.6
Max		54	58	58	54	53	56	61	54	55	56	53	53	61	53	56	2.6
Min		47	48	48	49	48	47	50	44	46	47	48	45	50	44	47	1.8
Ave		49	51	51	51	50	51	54	48	49	49	50	48	54	48	50	1.7
SD		1.7	2.2	1.5	1.4	1.0	1.9	2.9	2.5	1.7	1.5	1.2	1.6	2.9	1.0	1.8	0.5
E Ave		50	51	51	52	50	52	55	49	50	49	50	49	55	49	51	1.9

Evening LAEQ

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
18:00			49	53	53	50	48	60	51	55	49	51	49	60	48	51	3.6
18:15		47	50	56	53	52	53	59	54	51	49	51	51	59	47	52	3.2
18:30		51	54	60	53	55	49		52	51	49	51	52	60	49	52	3.0
18:45	53	51	56	50	52	51	50	57	55	52	51	52	52	57	50	52	2.2
19:00	53	49	56	50	53	51	50	58	51	55	48	52	53	58	48	52	2.7
19:15	53	47	56	51	52	52	51	56	51	52	55	51	50	56	47	52	2.5
19:30	54		52	55	52	52	53	54	51	52	48	52	53	55	48	52	1.8
19:45	56		52	52	52	53	49	54	52	52	48	53	49	56	48	52	2.2
20:00	51	49	51	52	52	52	48	52	50	51	46	50	49	52	46	50	1.8
20:15	51	49	51	53	51	51	48	51	50	51	45	50	50	53	45	50	1.9
20:30	50		50	52	51	51	48	50	51	51	45	50	50	52	45	50	1.7
20:45	50		51	52	50	50	49	51	51	50	45	50	49	52	45	50	1.7
21:00	48	50	51	51	49	50	47	51	51	50	48	49	49	51	47	50	1.4
21:15	47	49	51	51	49	49	47	52	51	50	47	49	49	52	47	49	1.6
21:30	47	49	51	51	48	49	49	51	51	50	47	48	48	51	47	49	1.4
21:45	47	52	50	51	48	49	48	51	51	50	48	49	49	52	47	49	1.5
22:00	47	50	49	51	48	54	47	51	52	51	50	49	50	54	47	50	2.1
Max	56	52	56	60	53	55	53	60	55	55	55	53	53	60	52	55	2.5
Min	47	47	49	50	48	49	47	50	50	50	45	48	48	50	45	48	1.5
Ave	50	49	52	52	51	51	49	54	51	51	48	50	50	54	48	51	1.4
SD	3.1	1.5	2.3	2.4	1.9	1.7	1.9	3.2	1.3	1.4	2.4	1.3	1.5	3.2	1.3	2.0	0.6
E Avg	51	50	52	53	51	52	49	55	52	52	49	50	50	55	49	51	1.6

Night LAEQ

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
22:00	47	50	49	51	48	54	47	51	52	51	50	49	50	54	47	50	2.1
22:15	47	49	49	52	48	54	47	52	52	50	50	49	49	54	47	50	2.1
22:30	47	49	49	53	49	51	48	50	52	50	50	48	51	53	47	50	1.5
22:45	47	51	48	52	50	51	48	50	48	50	50	48	49	52	47	49	1.4
23:00	47	50	49	52	49	50	47	49	48	49	51	49	48	52	47	49	1.4
23:15	47	48	49	52	49	48	46	49	50	49	50	48	48	52	46	49	1.5
23:30	47	49	48	53	49	48	47	50	51	50	51	48	48	53	47	49	1.7
23:45	48	48	48	53	49	48	47	50	51	50	51	48	49	53	47	49	1.7
0:00	48	51	46	53	49	48	47	51	52	50	50	48	49	53	46	49	2.0
0:15	48	50	44	53	49	48	47	51	51	50	50	47	49	53	44	49	2.2
0:30	48	49	45	53	49	48	47	51	52	49	50	47	49	53	45	49	2.2
0:45	48	51	44	54	48	48	47	51	52	49	50	46	49	54	44	49	2.5
1:00	48	51	45	54	48	47	47	51	52	48	49	47	50	54	45	49	2.6
1:15	48	50	44	54	49	47	47	51	52	47	49	47	50	54	44	49	2.5
1:30	49	49	44	54	48	48	47	50	52	47	49	47	49	54	44	49	2.4
1:45	49	50	45	54	48	49	47	50	54	48	49	47	50	54	45	49	2.5
2:00	49	51	46	52	49	52	46	48	54	48	49	48	51	54	46	49	2.4
2:15	49	52	45	52	49	51	48	48	54	49	50	49	51	54	45	50	2.3
2:30	49	52	45	53	49	51	49	48	57	49	50	47	51	57	45	50	2.9
2:45	49	52	45	53	49	51	49	49	55	49	49	47	50	55	45	50	2.6
3:00	50	52	44	53	51	50	49	50	54	48	50	47	50	54	44	50	2.5
3:15	49	52	44	54	49	52	48	50	54	47	50	47	51	54	44	50	2.8
3:30	50	52	45	54	50	53	49	51	55	47	50	49	51	55	45	50	2.6
3:45	50	52	44	55	50	53	48	51	54	46	51	47	50	55	44	50	3.3
4:00	49	51	45	54	50	54	47	51	54	46	52	48	51	54	45	50	3.1
4:15	48	50	46	52	49	54	48	50	55	46	52	47	52	55	46	50	2.9
4:30	47	50	46	56	49	56	48	49	53	47	52	48	53	56	46	50	3.3
4:45	47	50	47	56	49	55	48	50	55	48	52	47	53	56	47	50	3.4
5:00	47	51	47	55	50	54	49	52	54	48	51	48	49	55	47	50	2.8
5:15	49	52	49	54	50	53	49	54	55	48	51	48	50	55	48	51	2.4
5:30	49	57	52	54	51	53	51	54	55	54	56	50	52	57	49	53	2.3
5:45	53	57	57	58	55	57	55	57	58	54	57	51		58	51	56	2.0
6:00	56	55	55	55	54	53	53	54	53	51	53	52	51	56	51	53	1.6
6:15	56	55	49	54	50	55	53	49	56	50	51	51	51	56	49	52	2.6
6:30	50	52	50	54	53	54	51	48	56	49	51	50	53	56	48	52	2.5
6:45	50	54	51	54	50	54	51	50	55	51	53	53	53	55	50	52	1.7
7:00	49	51	52	53	51	54	53	48	54	49	51	50	53	54	48	51	2.0
Max	56	57	57	58	55	57	55	57	58	54	57	53	53	58	53	56	1.7
Min	47	48	44	51	48	47	46	48	48	46	49	46	48	51	44	47	1.8
Ave	49	51	47	53	50	51	48	50	53	49	51	48	50	53	47	50	1.9
SD	2.2	2.1	3.2	1.3	1.6	2.8	2.2	2.0	2.1	1.8	1.7	1.6	1.5	3.2	1.3	2.0	0.5
E Avg	50	52	49	54	50	52	49	51	54	49	51	49	51	54	49	51	1.8
24hr	50	50	52	51	52	50	51	53	50	52	49	51	49	53	49	51	1.2

North Fence - Cement Works

Daytime LA90 **22 October to 4 November 2021**

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
7:00		48	47	48	52	47	52	49	44	52	47	49	47	52	44	49	2.5
7:15		46	47	49	50	46	50	48	46	50	46	49	47	51	46	48	1.9
7:30		47	46	49	51	46	50	47	46	49	47	50	46	51	46	48	1.9
7:45		46	47	48	51	46	51	48	47	48	47	49	46	51	46	48	1.8
8:00		46	47	48	49	46	51	48	45	47	46	47	47	51	45	47	1.7
8:15		47	48	48	47	45	50	49	44	47	46	47	46	51	44	47	1.9
8:30		46	47	47	48	46	50	50	46	46	46	47	47	51	46	47	1.8
8:45		46	46	47	49	47	51	50	44	45	46	46	47	51	44	47	2.2
9:00		45	45	48	48	47	50	53	44	45	46	46	47	53	44	47	2.6
9:15		46	45	48	48	46	49	51	43	45	45	46	46	51	43	47	2.2
9:30		45	45	48	46	46	47	50	42	43	45	45	47	50	42	46	2.2
9:45		45	44	47	47	46	47	51	42	44	44	47	45	51	42	46	2.3
10:00		45	45	46	47	46	46	49	41	43	45	47	46	49	41	45	2.0
10:15		45	46	47	49	45	46	50	40	44	45	45	46	54	40	46	3.2
10:30		45	45	47	48	46	47	48	42	44	45	47	45	54	42	46	3.0
10:45		45	45	47	47	46	48	47	42	44	45	47	46	48	42	46	1.7
11:00		45	45	48	47	47	48	49	41	45	44	46	45	49	41	46	2.1
11:15		45	47	48	49	46	47	49	42	43	45	46	46	49	42	46	2.2
11:30		44	45	48	47	49	51	49	42	43	44	46	45	51	42	46	2.6
11:45		45	47	48	49	49	50	49	41	44	45	45	45	50	41	46	2.6
12:00		46	47	49	47	47	51	49	41	43	44	45	46	51	41	46	2.6
12:15		45	47	47	47	48	49	48	42	45	45	46	44	49	42	46	2.1
12:30		46	48	48	47	49	50	48	43	45	44	45	44	50	43	46	2.3
12:45		47	48	48	47	47	49	50	40	46	45	46	43	50	40	46	2.6
13:00		47	48	49	46	46	49	51	42	47	46	47	43	51	42	47	2.4
13:15		46	48	49	48	47	49	49	45	47	46	48	43	49	43	47	1.9
13:30		46	48	49	50	47	49	50	42	45	45	46	43	50	42	47	2.5
13:45		47	47	48	48	47	49	51	45	44	46	46	43	51	43	47	2.1
14:00		47	49	49	48	47	49	49	47	45	46	47	43	49	43	47	1.9
14:15		46	48	48	46	48	49	51	48	45	47	47	43	51	43	47	2.0
14:30		46	48	48	49	46	50		48	46	47	47	43	50	43	47	1.9
14:45		46	48	47	49	47	50		47	46	47	46	43	50	43	47	1.8
15:00		47	48	47	49	46	50		47	46	47	46	43	50	43	47	1.7
15:15		49	48	47	48	46	49		47	46	46	47	44	49	44	47	1.6
15:30		49	47	48	48	46	48		48	46	46	48	42	49	42	47	1.9
15:45		47	46	48	48	45	47		48	46	45	48	43	48	43	46	1.6
16:00		48	47	47	48	47	46		47	46	43	50	44	50	43	47	1.9
16:15		48	46	48	50	46	46		49	45	44	50	44	50	44	47	2.2
16:30			46	48	50	47	46	52	48	47	45	49	45	52	45	47	2.2
16:45		50	46	46	51	47	46	52	47	46	46	49	46	52	46	48	2.4
17:00		50	45	47	51	46	45		48	45	45	49	47	51	45	47	2.0
17:15			46	47	52	47	45	52	49	47	45	49	47	52	45	48	2.5
17:30			46	49	51	47	45	53	48	49	45	49	46	53	45	48	2.5
17:45		42	46	49	51	47	45	54	48	49	45	48	46	54	42	48	3.0
18:00			45	49	51	48	46	56	48	49	46	49	46	56	45	48	3.0
Max		50	49	49	52	49	52	56	49	52	47	50	47	56	47	50	2.6
Min		42	44	46	46	45	45	47	40	43	43	45	42	49	40	44	2.3
Ave		46	46	48	49	47	48	50	45	46	45	47	45	51	45	47	1.9
SD		1.6	1.2	0.8	1.6	0.8	2.0	1.9	2.8	2.0	0.9	1.5	1.5	2.8	0.8	1.5	0.6
90%		45	45	47	47	46	46	48	41	43	44	45	43	49	41	45	2.1
															Median	45	

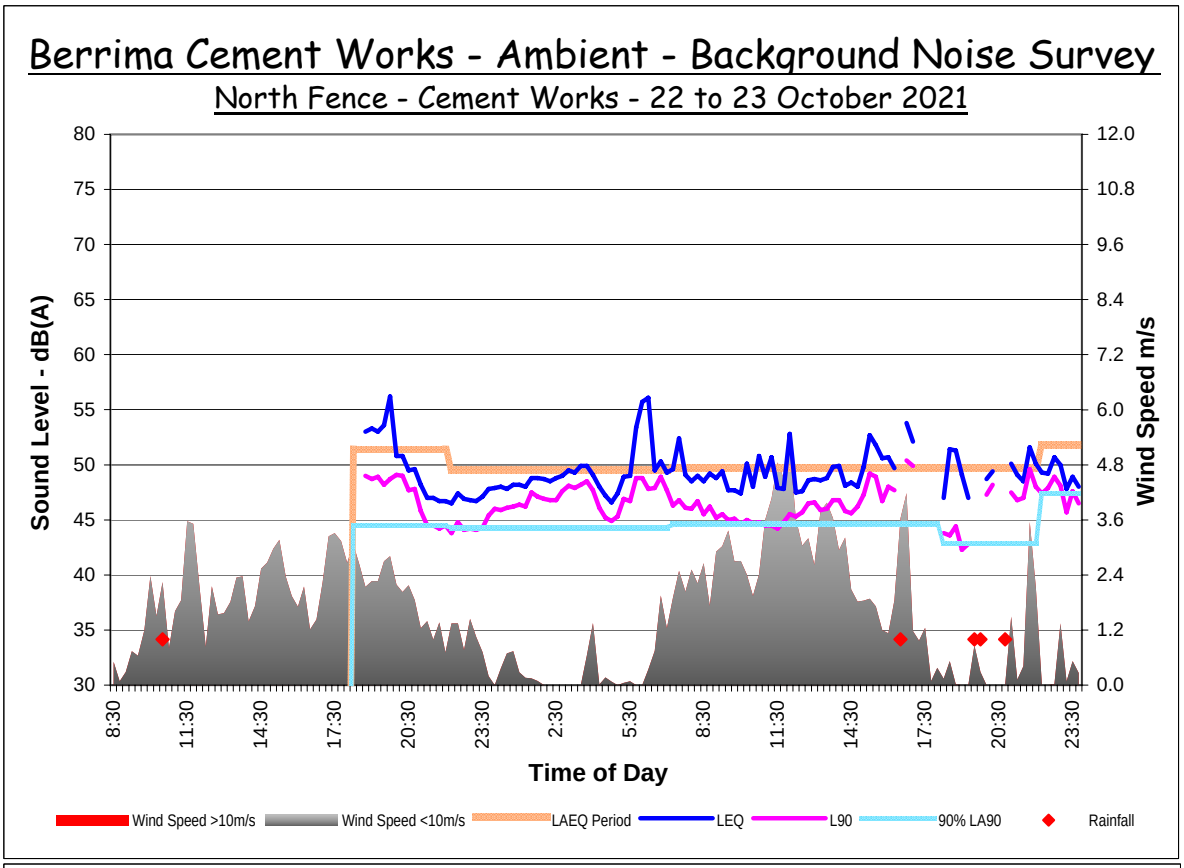
Evening LA90

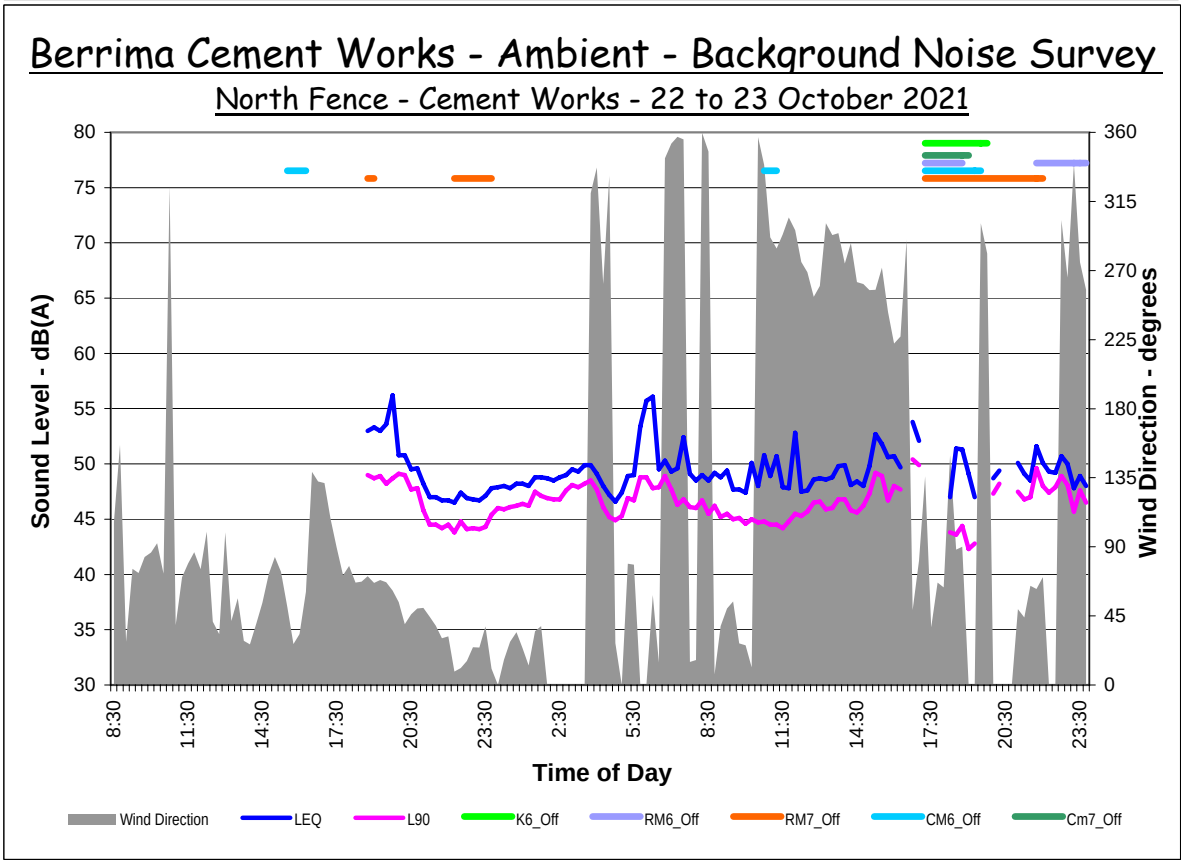
Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
18:00			45	49	51	48	46	56	48	49	46	49	46	56	45	48	3.0
18:15		44	46	50	51	48	46	52	49	49	46	48	48	52	44	48	2.4
18:30		44	46	48	51	50	47		49	49	46	48	47	51	44	48	2.1
18:45	49	44	47	48	50	49	47	52	49	48	47	49	47	52	44	48	1.9
19:00	49	42	48	48	51	50	47	50	48	49	46	49	48	51	42	48	2.2
19:15	49	43	50	49	50	51	47	50	48	49	46	48	47	51	43	48	2.3
19:30	48		50	50	49	50	46	49	49	50	45	48	46	50	45	48	1.8
19:45	49		50	50	50	49	47	49	48	50	45	49	46	50	45	48	1.8
20:00	49	47	50	51	50	51	47	48	48	49	45	48	47	51	45	48	1.9
20:15	49	48	49	51	49	50	46	49	48	49	44	48	48	51	44	48	1.8
20:30	48		48	50	49	50	46	48	49	49	43	48	47	50	43	48	1.9
20:45	48		49	50	48	49	46	48	49	48	43	48	47	50	43	48	1.9
21:00	46	48	50	50	47	49	46	49	49	48	45	47	47	50	45	48	1.4
21:15	45	47	49	50	47	48	46	49	49	47	45	47	47	50	45	48	1.5
21:30	45	47	49	50	47	48	46	49	49	48	45	46	46	50	45	47	1.5
21:45	44	50	49	50	47	48	45	49	50	48	46	46	47	50	45	48	1.5
22:00	45	48	48	50	47	49	46	49	51	48	48	47	47	51	46	48	1.5
Max	49	50	50	51	51	51	47	56	51	50	48	49	48	56	47	50	2.1
Min	44	42	45	48	47	48	45	48	48	47	43	46	46	48	42	46	1.8
Ave	47	46	48	50	49	49	46	50	49	49	45	48	47	50	45	48	1.4
SD	2.0	2.4	1.7	1.0	1.6	1.1	0.6	2.0	0.8	0.8	1.2	0.9	0.7	2.4	0.6	1.3	0.6
90%	45	43	46	48	47	48	46	48	48	48	44	47	46	48	43	46	1.8
															Median	47	

Night LA90

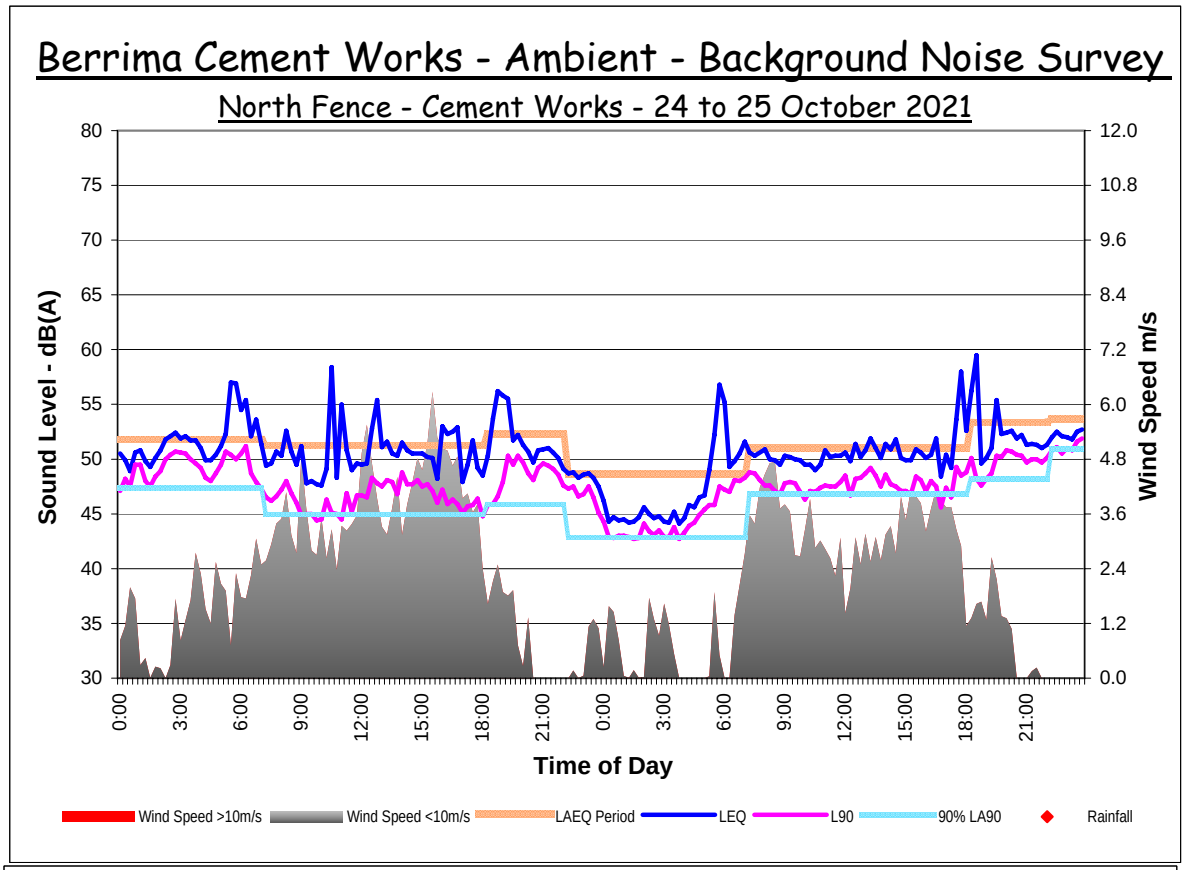
Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	**Maximum**	**Minimum**	**Average**	**SD**
22:00	45	48	48	50	47	49	46	49	51	48	48	47	47	51	46	48	1.5
22:15	44	47	47	51	47	51	45	49	51	47	48	47	47	51	45	48	1.9
22:30	45	48	48	51	47	49	46	47	49	48	48	46	48	51	46	48	1.4
22:45	44	49	47	51	48	50	46	47	46	47	48	47	46	51	46	48	1.4
23:00	44	48	47	51	47	49	46	47	46	47	49	47	46	51	46	47	1.5
23:15	44	46	48	51	47	47	45	47	48	47	48	46	46	51	45	47	1.6
23:30	44	48	47	52	46	47	45	47	50	48	49	45	46	52	45	47	2.0
23:45	45	47	45	52	47	47	46	47	51	47	49	46	47	52	45	47	2.1
0:00	46	47	44	52	47	47	45	49	51	48	49	45	47	52	44	48	2.3
0:15	46	48	43	52	46	47	46	49	49	47	49	45	47	52	43	47	2.4
0:30	46	48	43	52	47	46	45	49	50	47	48	45	47	52	43	47	2.4
0:45	46	50	43	53	46	47	45	49	51	47	48	43	48	53	43	47	2.8
1:00	46	50	43	54	46	47	46	49	51	46	47	44	48	54	43	47	3.0
1:15	46	48	43	53	47	46	46	49	51	44	47	44	48	53	43	47	2.8
1:30	48	48	43	53	46	47	46	48	50	44	47	44	48	53	43	47	2.8
1:45	47	48	43	53	46	48	46	48	53	45	47	45	49	53	43	47	3.0
2:00	47	49	44	51	46	49	45	46	53	46	48	45	49	53	44	48	2.8
2:15	47	50	43	51	47	50	46	46	53	47	48	45	50	53	43	48	2.8
2:30	47	50	43	52	47	50	47	46	55	47	48	45	50	55	43	48	3.2
2:45	48	51	44	52	47	50	47	46	54	47	48	45	49	54	44	48	2.9
3:00	48	51	43	52	48	49	47	48	53	45	48	45	49	53	43	48	2.9
3:15	48	51	43	53	47	49	46	48	52	45	49	45	50	53	43	48	3.1
3:30	48	50	44	53	48	50	47	49	53	45	49	45	49	53	44	48	3.0
3:45	49	50	43	54	48	51	46	49	53	44	50	45	48	54	43	48	3.4
4:00	48	49	43	52	48	52	46	49	53	44	50	45	50	53	43	48	3.2
4:15	46	48	44	51	47	52	46	49	54	44	51	45	50	54	44	48	3.3
4:30	45	48	44	54	47	53	45	48	49	46	51	45	52	54	44	49	3.3
4:45	45	49	45	54	47	53	46	48	54	46	51	44	51	54	44	49	3.5
5:00	45	50	45	53	48	52	46	51	52	46	50	45	47	53	45	49	2.8
5:15	47	51	46	53	48	51	46	51	52	47	50	46	47	53	46	49	2.7
5:30	47	50	46	52	47	52	48	51	51	48	51	46	49	52	46	49	2.2
5:45	49	50	48	54	48	52	50	51	52	49	52	47		54	47	50	2.2
6:00	49	51	47	52	48	52	51	47	51	47	50	47	48	52	47	49	2.0
6:15	48	51	47	51	47	53	50	47	55	47	49	47	50	55	47	49	2.7
6:30	48	49	48	53	47	52	49	45	54	47	50	47	51	54	45	49	2.7
6:45	49	48	48	53	47	52	48	45	53	48	49	47	52	53	45	49	2.6
7:00	48	47	48	52	47	52	49	44	52	47	49	47	52	52	44	49	2.6
Max	49	51	48	54	48	53	51	51	55	49	52	47	52	55	47	51	2.5
Min	44	46	43	50	46	46	45	44	46	44	47	43	46	50	43	45	1.9
Ave	46	49	45	52	47	50	47	48	51	46	49	45	49	52	45	48	2.2
SD	1.5	1.3	2.0	1.1	0.7	2.3	1.6	1.7	2.0	1.3	1.3	1.0	1.8	2.3	0.7	1.5	0.5
90%	44	47	43	51	46	47	45	46	49	44	48	44	46	51	43	46	2.2
															Median	46	

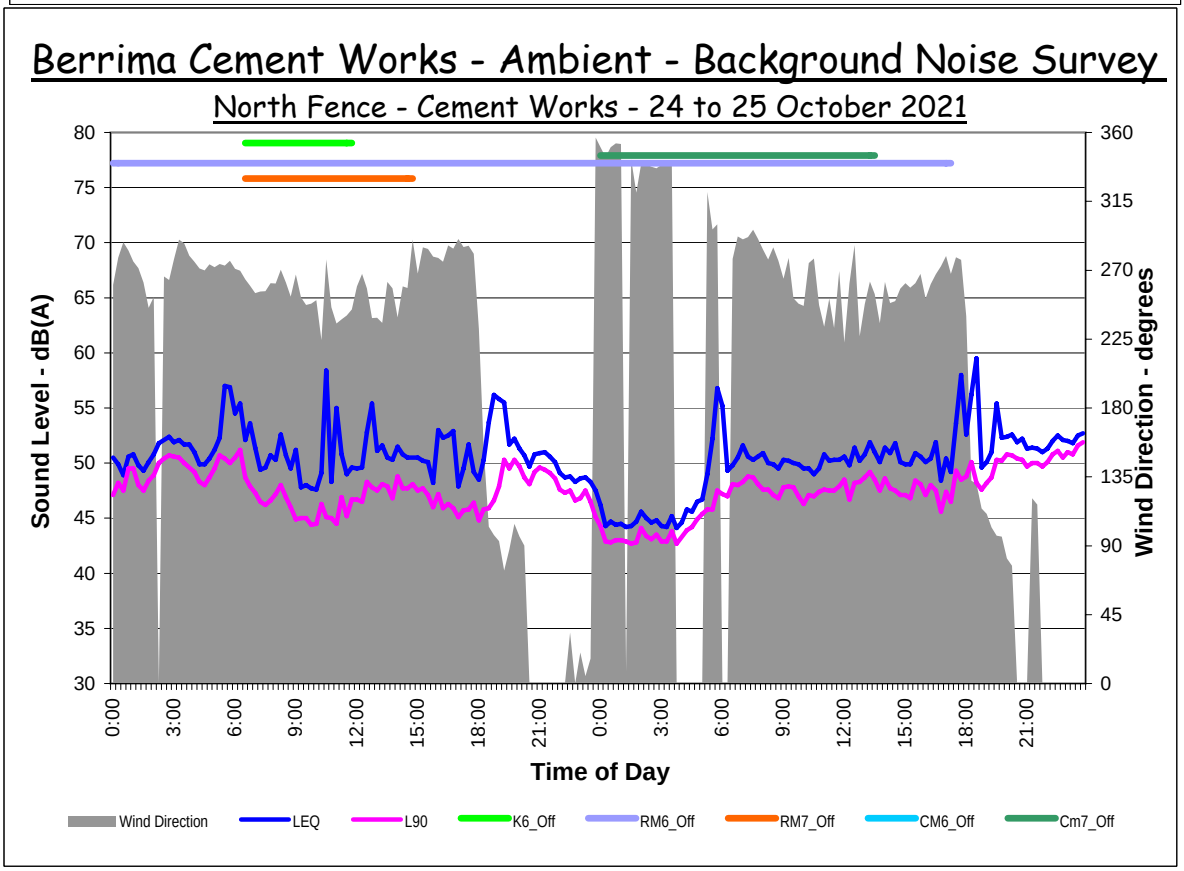
Two Day Results of Ambient Noise Monitoring



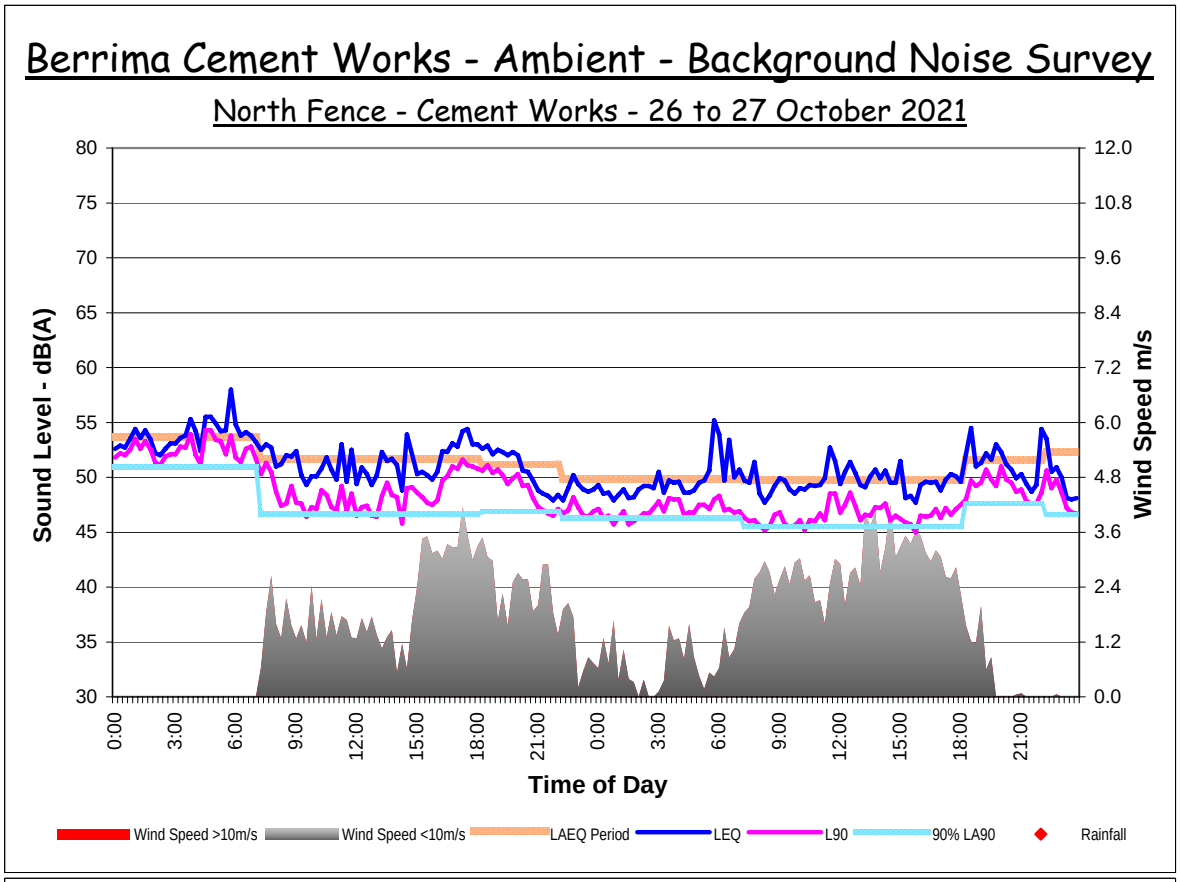


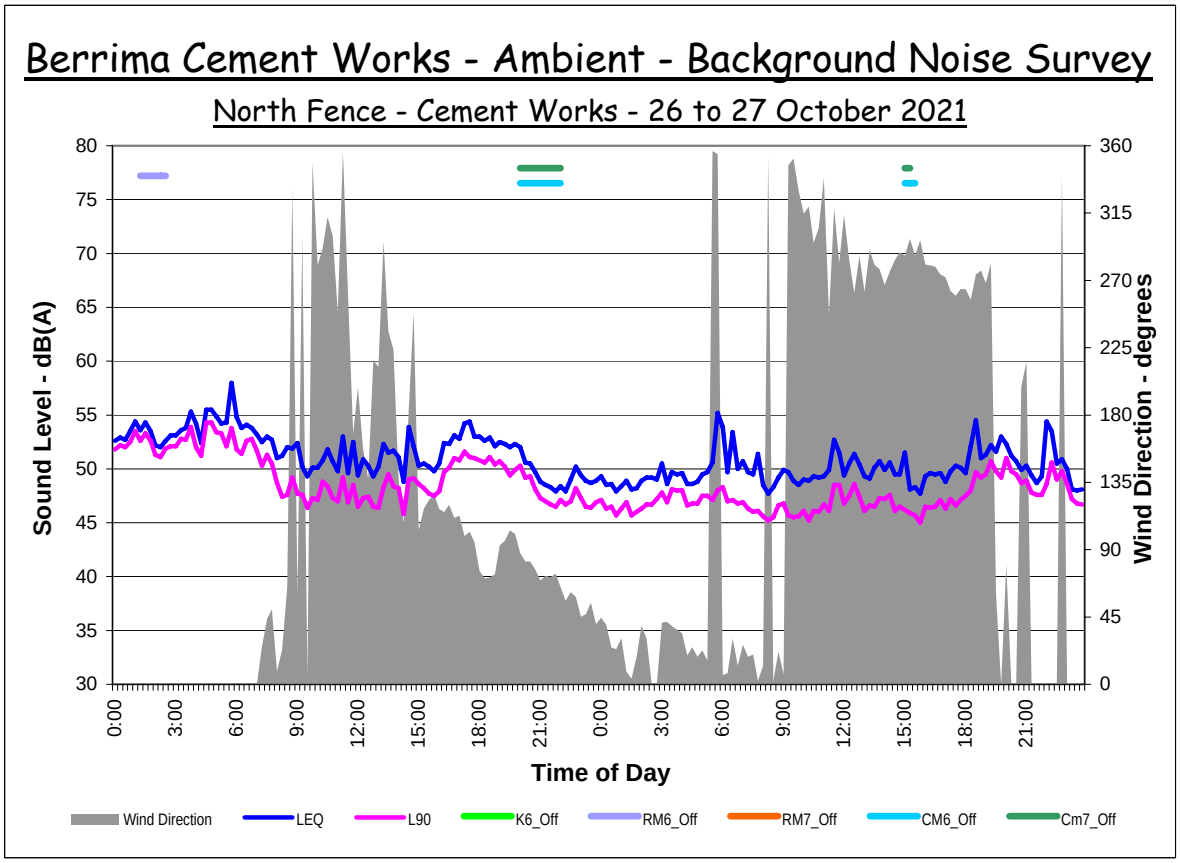
Two Day Results of Ambient Noise Monitoring



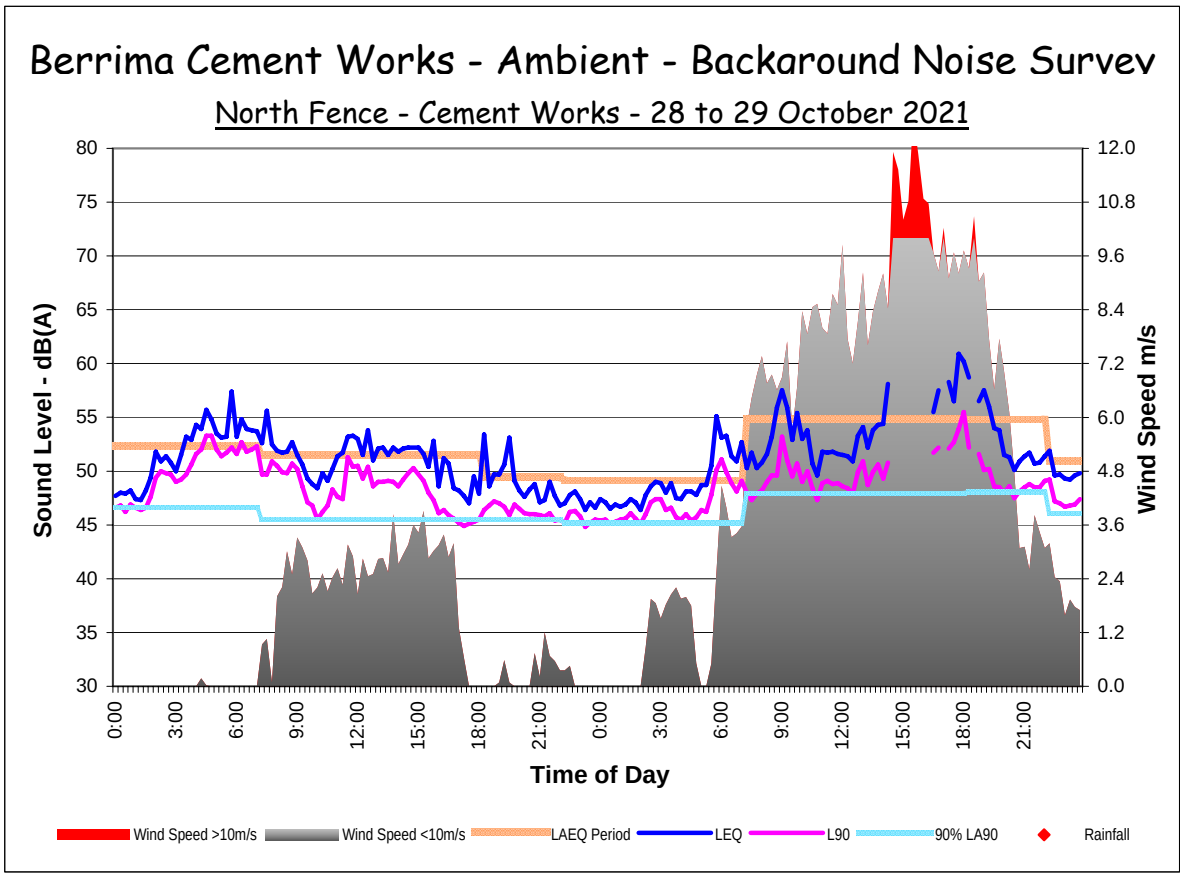


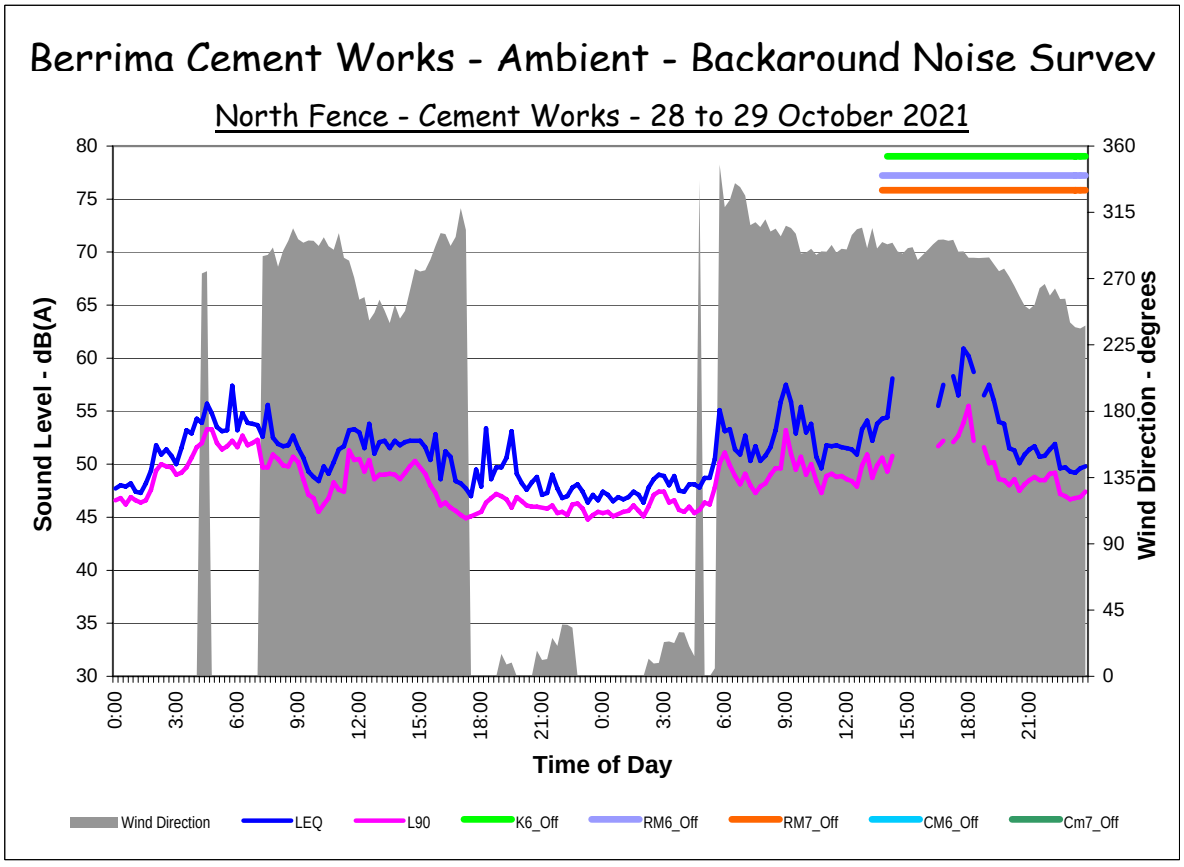
Two Day Results of Ambient Noise Monitoring

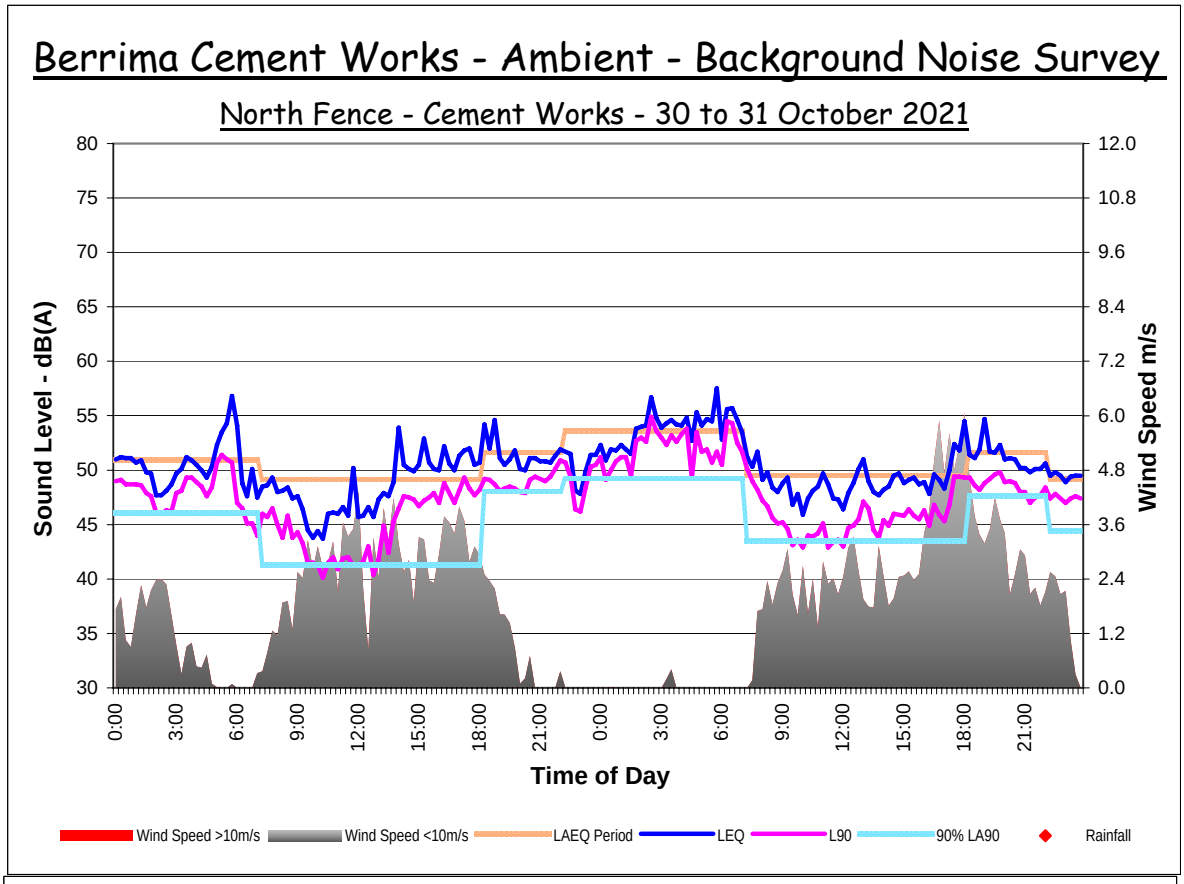


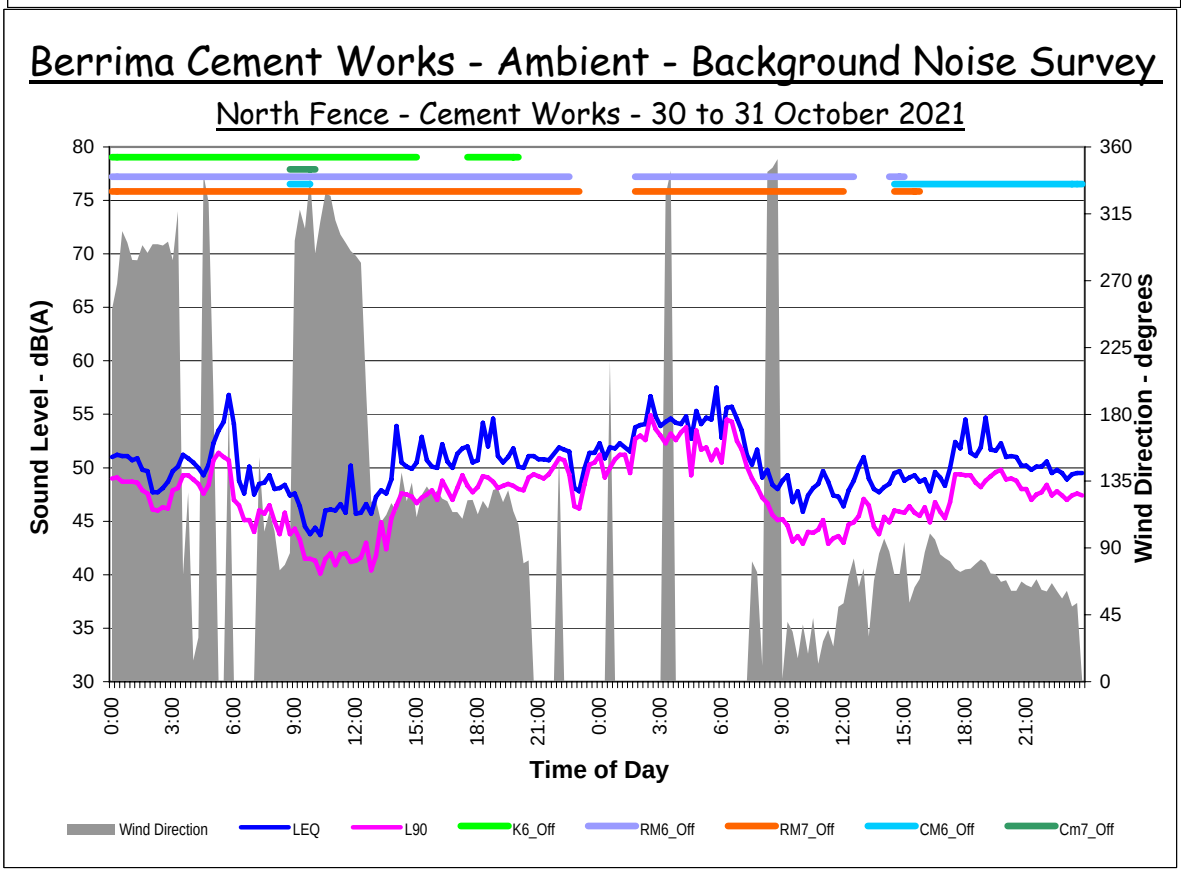


Two Day Results of Ambient Noise Monitoring

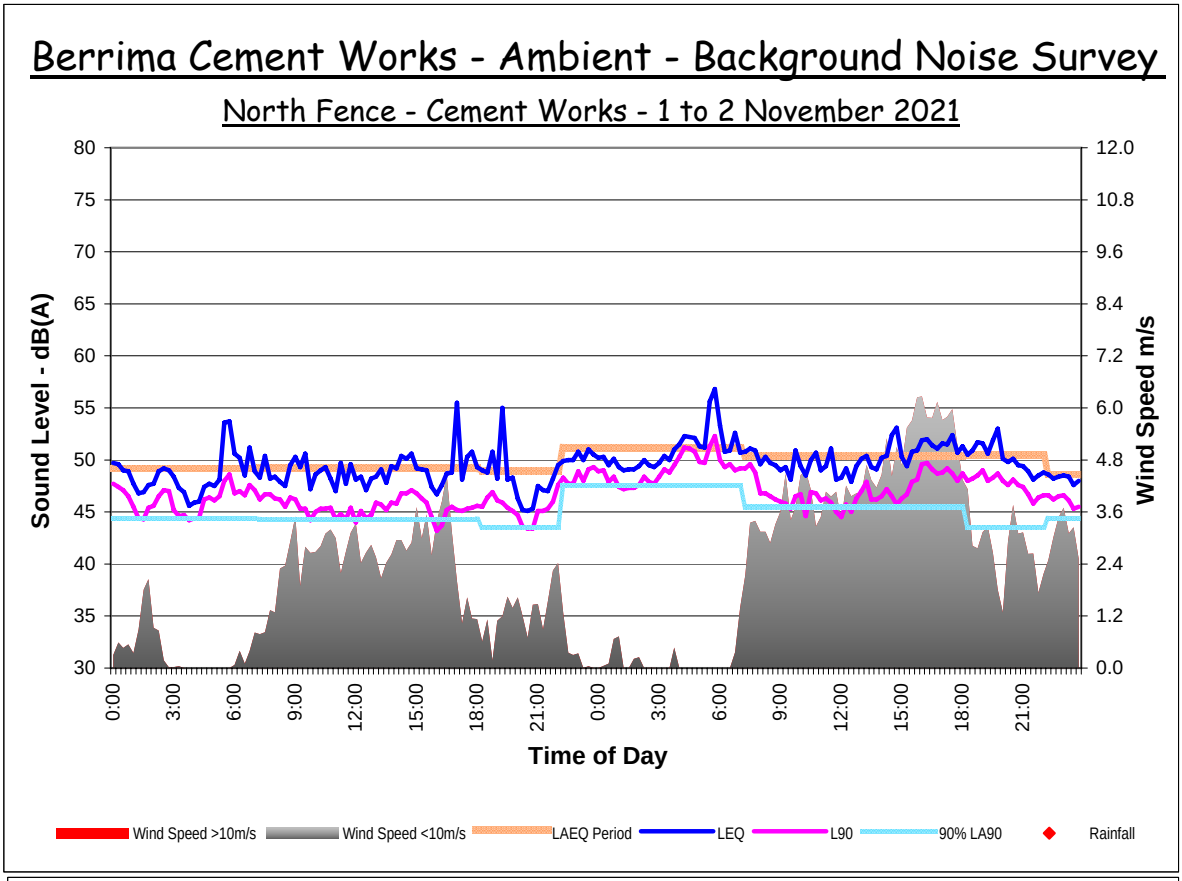


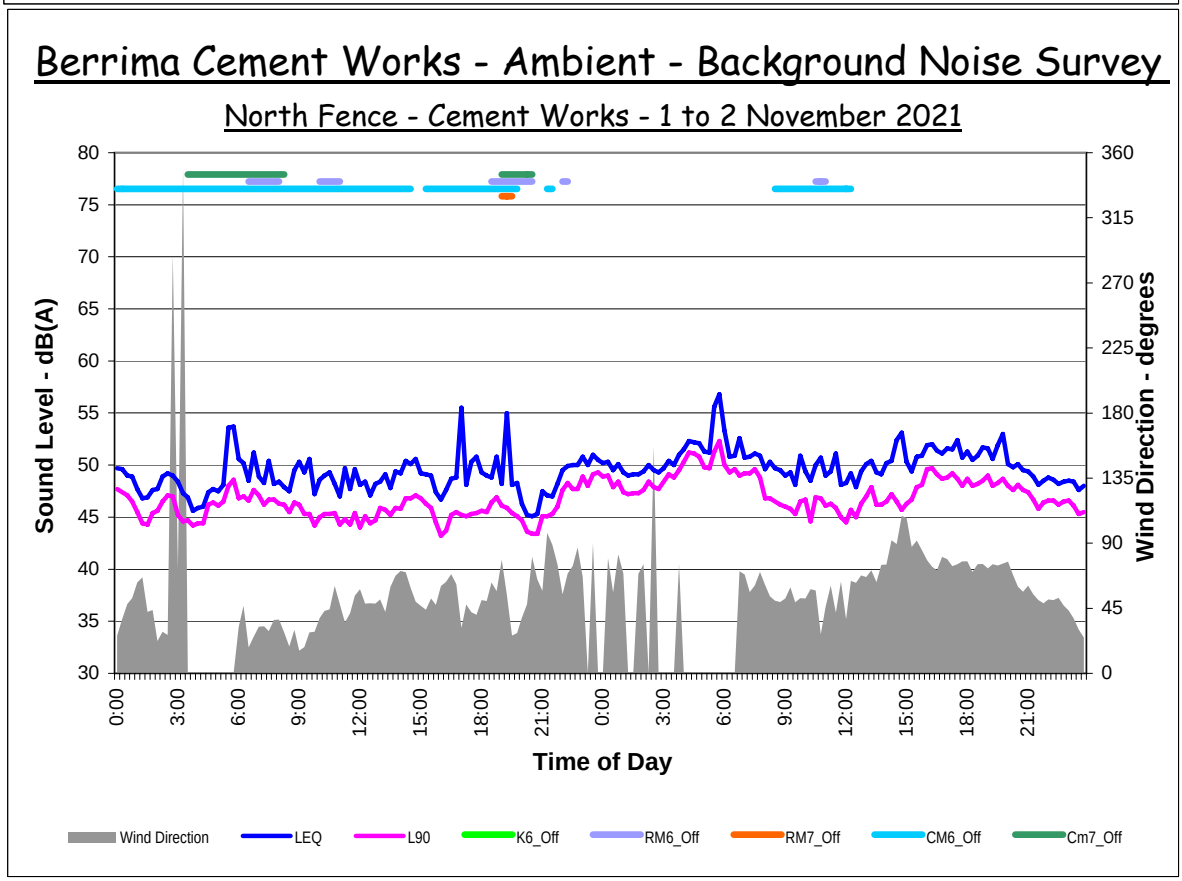


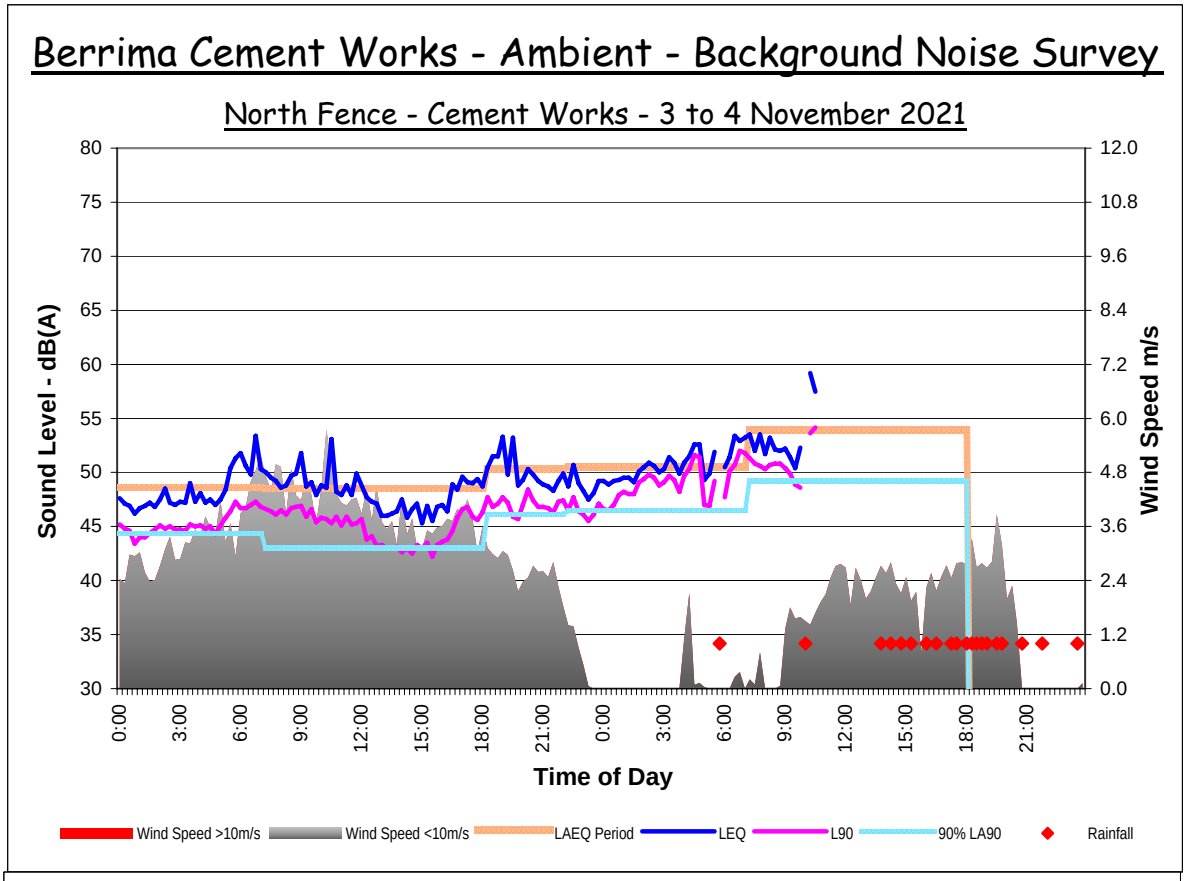

Berrima Cement Works - Ambient - Background Noise Survey
North Fence - Cement Works - 30 to 31 October 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

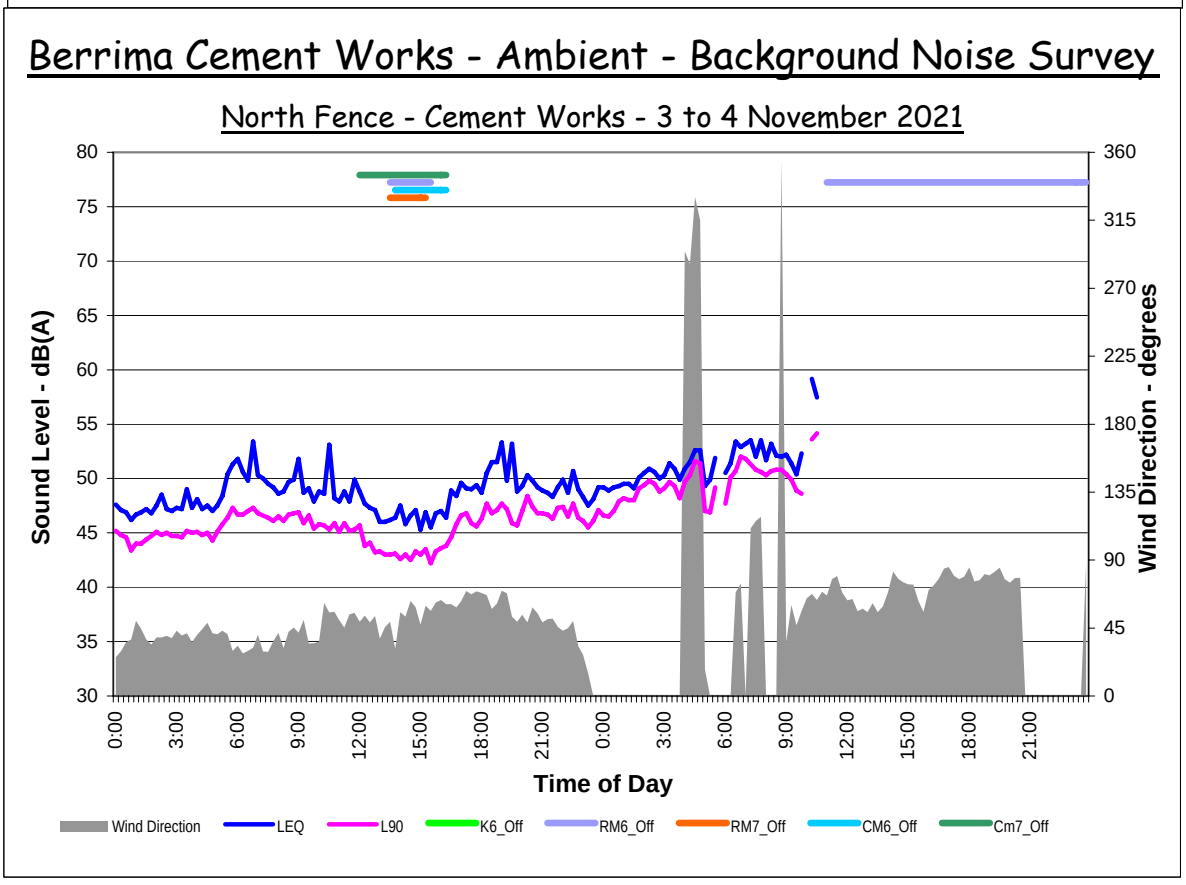

Berrima Cement Works - Ambient - Background Noise Survey
North Fence - Cement Works - 30 to 31 October 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

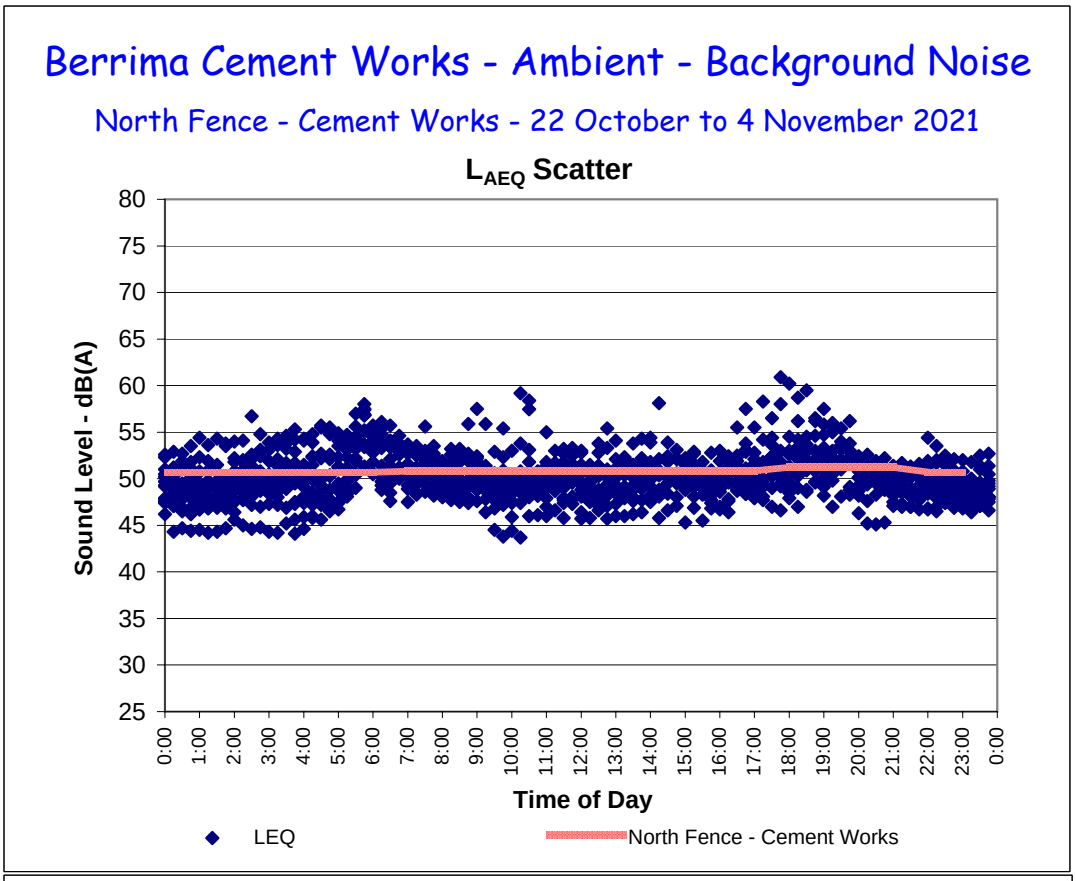
Two Day Results of Ambient Noise Monitoring

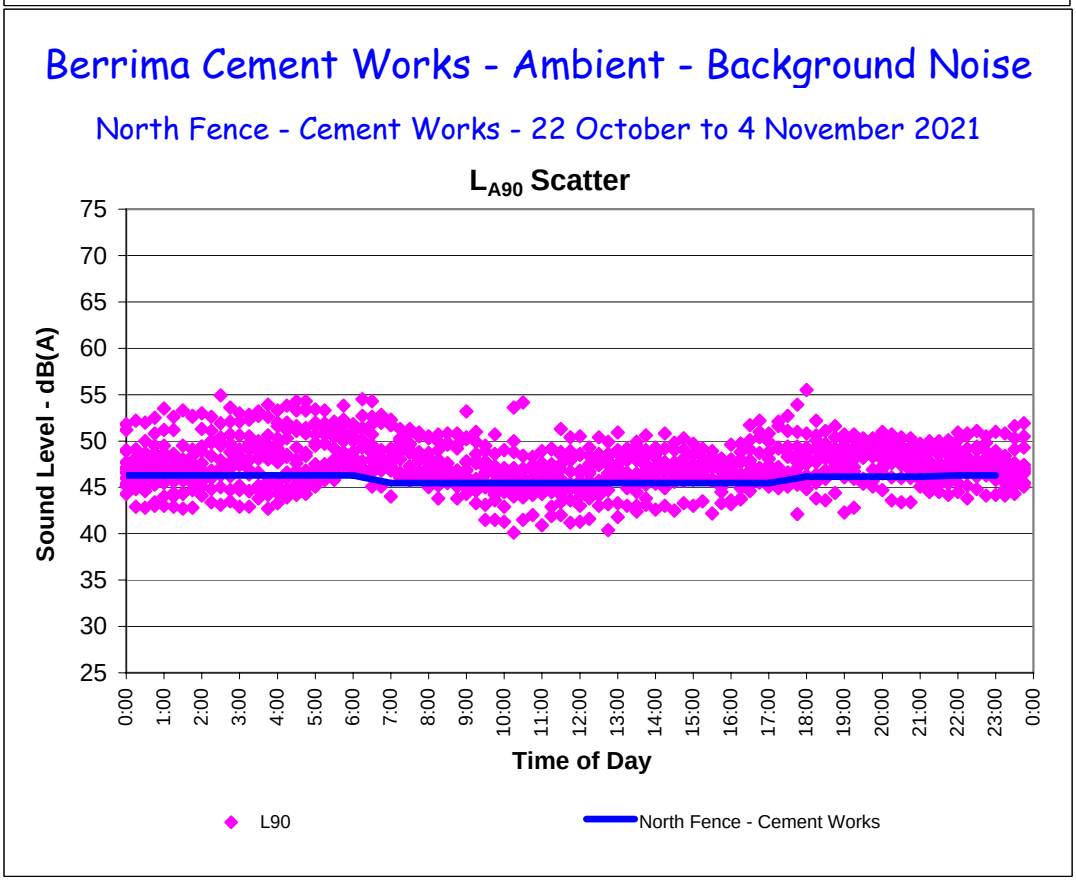


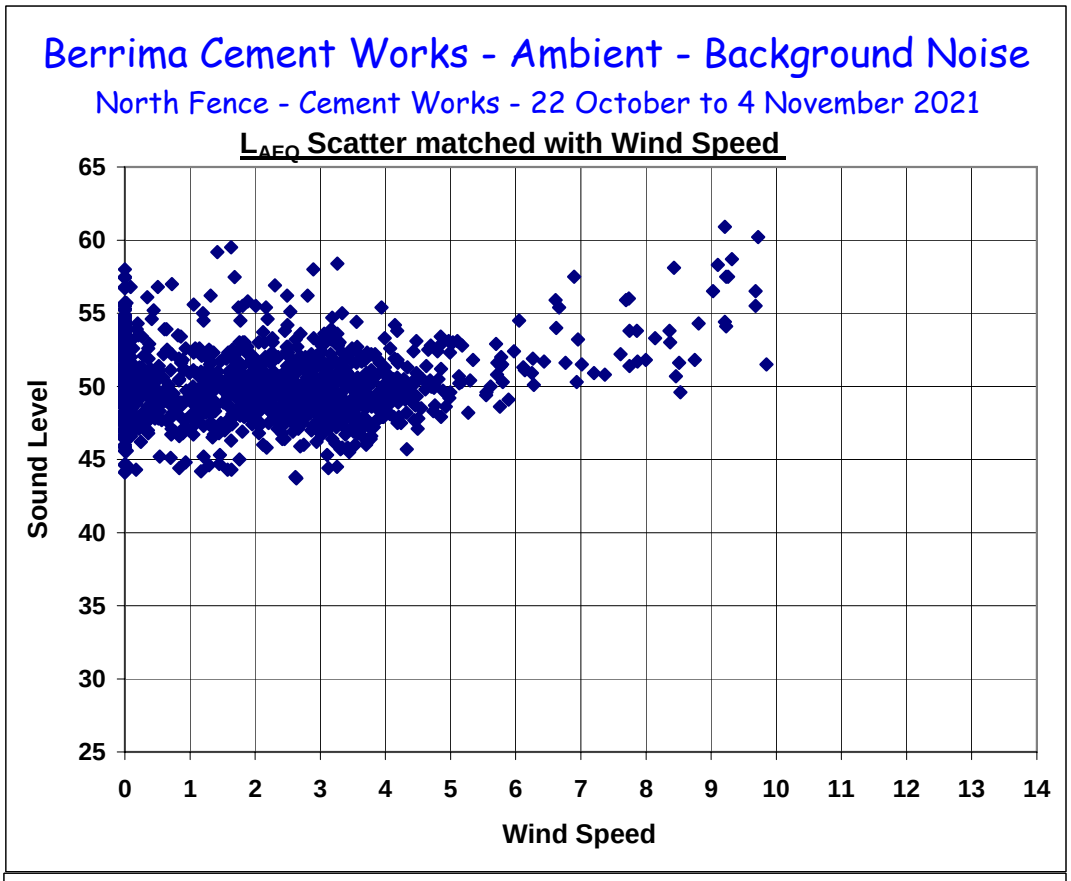


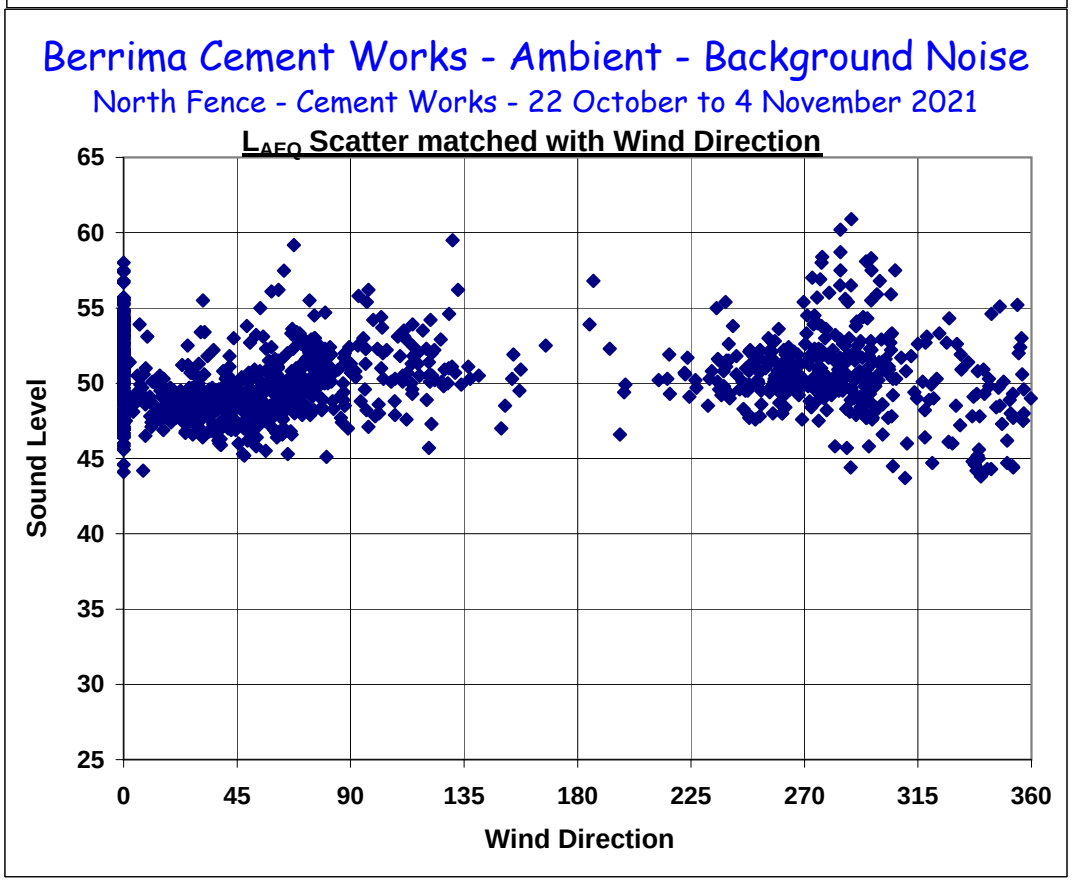

Berrima Cement Works - Ambient - Background Noise Survey
North Fence - Cement Works - 3 to 4 November 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

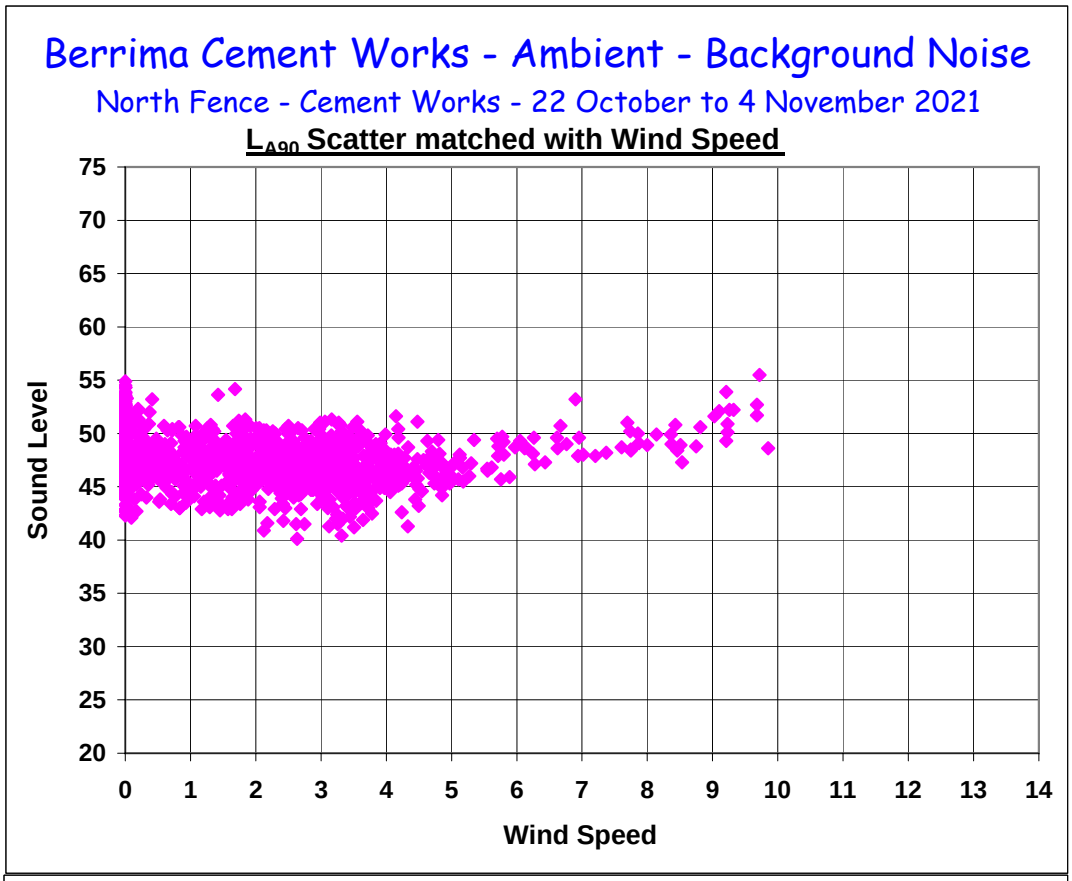

Berrima Cement Works - Ambient - Background Noise Survey
North Fence - Cement Works - 3 to 4 November 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

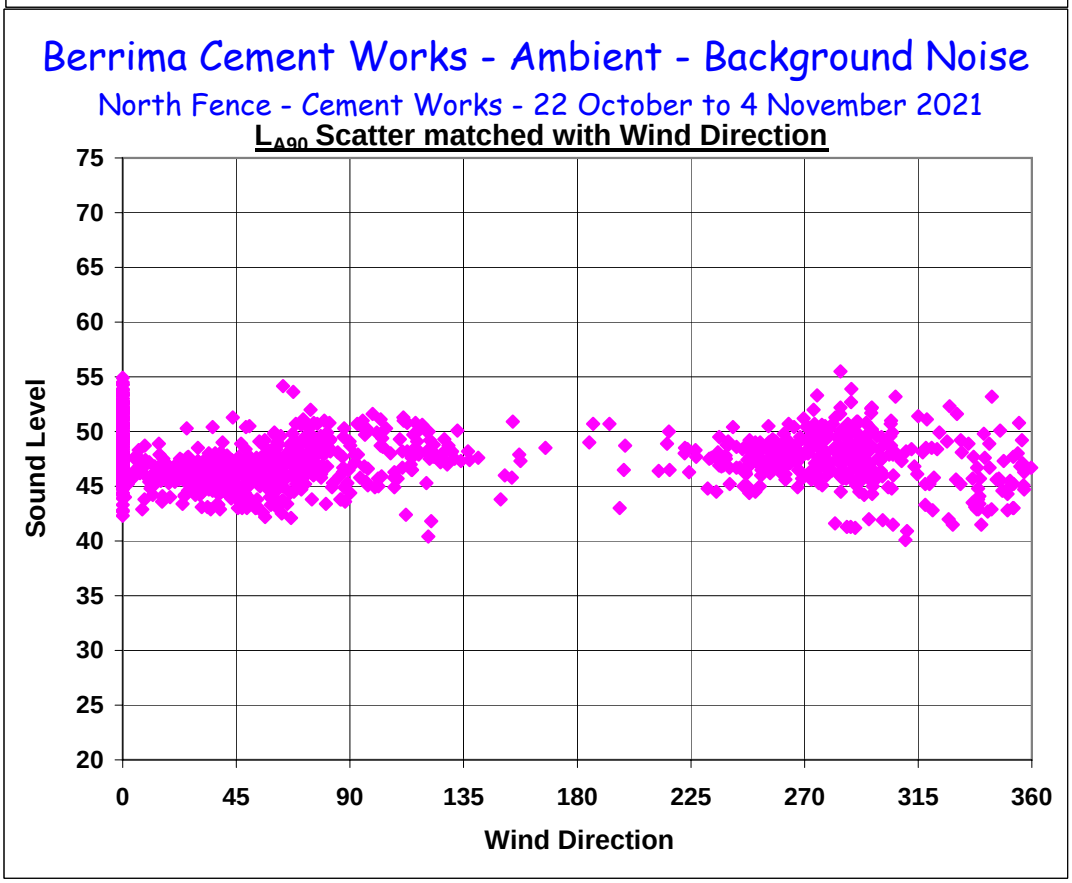

Berrima Cement Works - Ambient - Background Noise
North Fence - Cement Works - 22 October to 4 November 2021
LAEQ Scatter
Sound Level - dB(A)
80
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
LEQ
North Fence - Cement Works


Berrima Cement Works - Ambient - Background Noise
North Fence - Cement Works - 22 October to 4 November 2021
LA90 Scatter
Sound Level - dB(A)
75
70
65
60
55
50
45
40
35
30
25
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time of Day
L90
North Fence - Cement Works


Berrima Cement Works - Ambient - Background Noise
North Fence - Cement Works - 22 October to 4 November 2021
LAEQ Scatter matched with Wind Speed
Sound Level
65
60
55
50
45
40
35
30
25
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Wind Speed


Berrima Cement Works - Ambient - Background Noise
North Fence - Cement Works - 22 October to 4 November 2021
LAEQ Scatter matched with Wind Direction
Sound Level
65
60
55
50
45
40
35
30
25
0 45 90 135 180 225 270 315 360
Wind Direction


Berrima Cement Works - Ambient - Background Noise
North Fence - Cement Works - 22 October to 4 November 2021
L_{A90} Scatter matched with Wind Speed
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Wind Speed


Berrima Cement Works - Ambient - Background Noise
North Fence - Cement Works - 22 October to 4 November 2021
L_{A90} Scatter matched with Wind Direction
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0 45 90 135 180 225 270 315 360
Wind Direction

ABN: 25 153 946 064
ACN: 153 946 064

Appendix D: Unattended environmental sound level results for Compliance Monitoring Location 20 - Store Yard Close

Location 20 - Cement Works

Daytime LAEQ **22 October to 4 November 2021**

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	***Maximum***	***Minimum***	***Average***	***SD***
7:00		56	54	56	60	60	60	55	53	58	56	58	57	60	53	57	2.2
7:15		56	54	57	56	56	59	54	55	56	59	57	56	60	54	57	1.9
7:30		57	54	54	58	57	59	54	54	56	58	56	56	59	54	56	1.8
7:45		55	55	55	60	57	58	55	54	58	54	59	57	60	54	57	2.0
8:00		55	55	57	59	56	59	57	55	55	54	56	55	59	54	56	1.7
8:15		56	56	54	58	57	57	57	55	55	58	56	57	58	54	57	1.1
8:30		55	55	57	62	55	58	56	54	55	53	59	55	62	53	56	2.3
8:45		55	54	54	59	57	56	58	55	55	59	57	57	59	54	57	1.9
9:00		55	54	56	58	56	60	59	53	55	65	58	57	65	53	57	3.1
9:15		55	53	55	60	60	56	58	51	54	58	55	57	60	51	56	2.6
9:30		56	53	56	56	57	55	58	48	54	59	56	61	61	48	56	3.0
9:45		55	53	56	58	57	55	61	50	55	58	55	57	61	50	56	2.8
10:00		54	53	57	60	59	55	60	49	55	56	56	57	60	49	56	3.1
10:15		54	54	56	56	60	58	57	49	54	59	58	59	60	49	56	3.1
10:30		54	53	56	60	61	57	55	52	54	56	61	57	61	52	57	2.9
10:45		54	54	57	60	61	55	56	55	54	56	62	58	62	54	57	2.7
11:00		53	54	57	60	59	57	58	52	56	55	59	58	60	52	57	2.4
11:15		55	54	57	61	61	57	56	53	56	55	59	59	61	53	57	2.5
11:30		53	54	59	56	63	55	57	54	56	57	60	56	63	53	57	2.8
11:45	56	55	55	59	58	60	56	58	52	58	57	57	57	60	52	57	2.2
12:00	59	55	54	55	60	57	57	57	53	57	58	59	56	60	53	57	2.0
12:15	61	54	54	55	58	57	57	57	54	58	57	57	58	61	54	57	2.2
12:30	57	53	55	60	56	61	58	56	54	56	55	57	55	61	53	56	2.3
12:45	57	55	55	55	56	59	56	57	53	56	56	57	56	59	53	56	1.6
13:00	57	54	55	58	57	57	60	58	54	59	56	58	56	60	54	57	1.7
13:15	57	55	55	60	56	57	59	56	54	59	57	57	56	60	54	57	1.7
13:30	58	56	55	55	58	56	59	57	53	59	56	55	54	59	53	56	1.8
13:45	58	55	56	59	59	57	60	58	54	58	56	55	57	60	54	57	1.8
14:00	57	54	56	56	59	55	60	60	54	55	59	60	60	60	54	57	2.4
14:15	58	54	56	55	56	59	60	60	54	57	57	58	54	60	54	57	2.1
14:30	55	54	55	55	59	56	57		54	56	57	55	52	59	52	55	1.7
14:45	56	53	55	55	58	58	57		54	56	56	60	55	60	53	56	1.9
15:00	56	54	55	55	57	56	60		54	57	56	58	55	60	54	56	1.6
15:15	55	54	55	55	56	53	60		54	55	55	56	54	60	53	55	1.8
15:30	57	55	54	56	57	52	56		55	56	59	57	50	59	50	55	2.3
15:45	55	54	54	56	55	55	55		55	55	55	58	51	58	51	55	1.7
16:00	56	54	58	55	57	54	56		55	56	55	57	52	58	52	55	1.6
16:15	55	53	55	56	58	54	54		56	55	55	56	54	58	53	55	1.3
16:30	54		55	57	56	54	56	56	55	55	54	58	55	58	54	55	1.1
16:45	55	55	55	55	58	54	54	58	54	55	54	57	54	58	54	55	1.3
17:00	56	56	55	56	57	54	53		56	54	54	56	56	57	53	55	1.0
17:15	54		57	56	58	54	52	59	56	56	55	56	55	59	52	56	1.8
17:30	55		56	55	57	54	53	58	55	59	54	56	55	59	53	56	1.7
17:45	56	49	56	54	57	54	53	58	55	59	57	55	55	59	49	55	2.5
18:00	57		54	55	57	54	54	59	56	57	54	59	55	59	54	56	1.9
Max	61	57	58	60	62	63	60	61	56	59	65	62	61	65	56	60	2.2
Min	54	49	53	54	55	52	52	54	48	54	53	55	50	56	48	53	2.3
Ave	56	55	55	56	58	57	57	57	54	56	56	57	56	58	54	56	1.3
SD	1.6	1.4	1.1	1.5	1.6	2.5	2.3	1.7	1.8	1.5	2.1	1.6	2.1	2.5	1.1	1.7	0.4
E Ave	57	55	55	56	58	58	57	58	54	56	57	58	56	58	54	57	1.3

Evening LAEQ

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	***Maximum***	***Minimum***	***Average***	***SD***
18:00	57		54	55	57	54	54	59	56	57	54	59	55	59	54	56	1.9
18:15	56	50	54	55	56	56	53	57	57	57	54	56	56	57	50	55	2.0
18:30	55	50	54	54	57	56	54		56	55	55	56	55	57	50	55	1.8
18:45	55	50	55	53	56	59	53	57	55	55	54	56	55	59	50	55	2.0
19:00	55	49	54	54	57	55	54	56	55	56	54	56	55	57	49	55	1.9
19:15	55	49	56	55	57	55	53	57	54	56	53	55	55	57	49	55	2.2
19:30	55		56	56	56	55	53	54	56	56	53	56	55	56	53	55	1.2
19:45	55		56	57	58	56	53	55	56	56	54	56	54	58	53	56	1.5
20:00	55	54	56	57	57	56	55	56	55	56	52	55	56	57	52	55	1.2
20:15	55	55	56	57	54	56	54	55	55	56	52	55	55	57	52	55	1.2
20:30	55		55	56	54	55	56	54	56	55	52	55	55	56	52	55	1.2
20:45	54		55	57	53	56	55	54	55	55	52	55	55	57	52	55	1.3
21:00	55	54	56	56	53	56	52	54	55	55	54	55	55	56	52	55	1.1
21:15	54	54	56	56	52	54	52	54	55	55	54	55	54	56	52	54	1.1
21:30	54	54	55	56	52	55	57	54	55	56	54	55	54	57	52	55	1.2
21:45	53	56	55	56	52	56	54	54	55	55	55	55	55	56	52	55	1.1
22:00	54	55	54	56	53	59	53	55	55	55	56	55	56	59	53	55	1.5
Max	57	56	56	57	58	59	57	59	57	57	56	59	56	59	56	57	1.2
Min	53	49	54	53	52	54	52	54	54	55	52	55	54	55	49	53	1.7
Ave	55	53	55	56	55	56	54	55	55	56	54	55	55	56	53	55	1.0
SD	0.9	2.7	0.8	1.0	2.1	1.2	1.3	1.7	0.6	0.7	1.2	0.9	0.5	2.7	0.5	1.2	0.6
E Avg	55	53	55	56	55	56	54	56	55	56	54	56	55	56	53	55	0.9

Night LAEQ

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	**Maximum**	**Minimum**	**Average**	**SD**
22:00	54	55	54	56	53	59	53	55	55	55	56	55	56	59	53	55	1.5
22:15	53	55	54	58	52	57	55	55	55	55	55	54	55	58	52	55	1.3
22:30	53	55	54	58	55	56	53	54	55	55	56	54	55	58	53	55	1.2
22:45	54	56	54	57	55	57	54	54	53	55	56	55	55	57	53	55	1.2
23:00	53	55	54	56	55	57	53	54	54	54	57	55	54	57	53	55	1.3
23:15	54	54	54	57	54	55	52	54	55	55	57	54	54	57	52	55	1.2
23:30	54	54	54	57	54	54	53	54	56	55	59	54	54	59	53	55	1.5
23:45	54	53	54	57	55	54	53	54	56	54	56	54	55	57	53	55	1.1
0:00	54	55	53	57	55	53	53	55	56	55	56	54	56	57	53	55	1.2
0:15	54	55	51	57	55	54	53	56	55	55	56	54	55	57	51	55	1.5
0:30	54	55	51	57	55	56	53	56	56	55	55	54	56	57	51	55	1.4
0:45	54	55	51	57	54	55	53	55	56	54	56	53	55	57	51	55	1.5
1:00	55	55	51	58	56	56	54	55	56	54	55	54	55	58	51	55	1.5
1:15	55	54	51	58	55	55	55	55	56	54	55	54	55	58	51	55	1.7
1:30	55	54	51	58	55	56	54	55	57	54	55	54	55	58	51	55	1.6
1:45	55	55	51	57	55	57	54	55	57	54	55	54	55	57	51	55	1.5
2:00	55	55	51	57	55	58	53	54	58	54	55	54	55	58	51	55	2.0
2:15	55	56	51	57	56	58	53	54	56	54	55	55	56	58	51	55	1.7
2:30	54	56	51	57	56	57	53	54	58	54	55	55	55	58	51	55	1.9
2:45	55	57	51	57	55	58	53	54	58	55	55	54	55	58	51	55	1.9
3:00	55	56	51	57	56	59	53	56	56	55	55	54	55	59	51	55	1.9
3:15	54	56	51	57	55	58	53	56	57	54	55	55	55	58	51	55	1.9
3:30	55	56	51	57	55	59	56	55	58	54	55	56	55	59	51	56	1.9
3:45	55	56	51	59	55	59	53	55	57	52	56	54	55	59	51	55	2.3
4:00	55	56	51	58	55	59	54	55	57	52	56	54	55	59	51	55	2.2
4:15	54	56	52	57	54	59	55	55	58	51	56	54	55	59	51	55	2.2
4:30	54	55	51	59	55	60	53	54	58	52	57	54	56	60	51	55	2.7
4:45	54	56	52	59	55	59	53	54	58	53	56	54	56	59	52	55	2.3
5:00	54	56	52	59	55	61	57	56	57	53	55	54	55	61	52	56	2.4
5:15	58	57	52	61	59	58	55	55	58	55	58	56	60	61	52	57	2.5
5:30	56	59	54	60	59	59	55	56	59	54	60	58	60	60	54	58	2.3
5:45	56	57	53	60	57	59	57	56	59	57	60	59		60	53	57	2.0
6:00	56	56	54	57	57	60	57	56	59	58	59	59	59	60	54	58	1.8
6:15	55	57	58	59	58	59	60	54	59	57	58	60	58	60	54	58	1.8
6:30	55	55	54	60	58	61	59	55	58	55	58	57	59	61	54	57	2.3
6:45	55	55	57	59	57	59	56	56	57	58	60	58	60	60	55	58	1.7
7:00	56	54	56	60	60	60	55	53	58	56	58	57	57	60	53	57	2.2
Max	58	59	58	61	60	61	60	56	59	58	60	60	60	61	56	59	1.4
Min	53	53	51	56	52	53	52	53	53	51	55	53	54	56	51	53	1.5
Ave	55	55	53	58	56	58	54	55	57	54	56	55	56	58	53	56	1.5
SD	0.9	1.1	1.8	1.2	1.6	2.1	1.9	0.8	1.5	1.6	1.5	1.6	1.7	2.1	0.8	1.5	0.4
E Avg	55	56	53	58	56	58	55	55	57	55	57	56	56	58	53	56	1.5
24hr	56	55	55	56	58	57	57	56	55	57	56	57	56	58	55	56	1.0

Location 20 - Cement Works

Daytime LA90 **22 October to 4 November 2021**

Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
7:00		54	52	52	56	54	57	52	51	56	51	54	53	57	51	54	2.1
7:15		53	52	54	55	53	55	52	52	55	51	54	52	56	51	54	1.5
7:30		53	51	53	56	53	55	52	51	55	51	55	53	56	51	53	1.6
7:45		53	52	53	56	53	56	53	52	55	51	54	53	56	51	54	1.5
8:00		53	51	52	55	53	56	53	52	54	51	53	53	56	51	53	1.5
8:15		53	52	51	54	53	55	53	52	54	51	53	52	55	51	53	1.3
8:30		53	52	51	54	53	54	53	52	54	50	52	52	56	50	53	1.4
8:45		53	52	51	54	54	55	53	50	53	51	53	52	56	50	53	1.6
9:00		53	51	52	55	54	55	55	50	53	53	53	52	56	50	53	1.8
9:15		52	50	52	55	53	54	54	49	52	53	52	52	56	49	53	1.8
9:30		52	51	52	54	53	53	53	47	52	52	52	53	55	47	52	1.9
9:45		53	50	54	54	54	53	53	47	52	52	53	54	54	47	53	1.9
10:00		52	50	52	54	53	52	53	46	52	52	53	54	54	46	52	2.1
10:15		52	51	54	54	54	51	53	45	52	52	52	54	54	45	52	2.4
10:30		52	50	54	55	54	52	53	48	52	52	54	54	55	48	53	2.0
10:45		52	51	55	54	55	53	52	50	52	52	54	53	55	50	53	1.6
11:00		51	51	55	54	55	53	54	49	53	52	53	53	55	49	53	1.7
11:15		51	52	54	54	54	54	54	49	54	52	54	53	54	49	53	1.5
11:30		51	51	53	54	55	54	54	49	53	52	53	52	55	49	53	1.6
11:45	55	53	52	54	54	54	54	55	48	56	53	52	53	56	48	53	2.1
12:00	55	53	51	53	54	55	54	54	49	54	52	52	52	55	49	53	1.7
12:15	54	52	51	52	54	54	54	53	50	55	52	53	52	55	50	53	1.6
12:30	54	51	52	53	53	56	54	53	51	52	52	52	50	56	50	53	1.5
12:45	54	52	52	52	53	54	53	54	49	53	52	53	50	54	49	52	1.5
13:00	54	52	53	52	53	53	53	55	49	57	53	53	50	57	49	53	2.0
13:15	54	52	52	53	54	54	54	54	50	56	52	54	50	56	50	53	1.8
13:30	53	52	53	52	55	54	53	54	50	56	52	53	49	56	49	53	1.8
13:45	54	53	53	52	54	54	53	54	51	54	52	52	49	54	49	53	1.3
14:00	54	51	54	53	54	53	53	53	51	53	52	53	49	54	49	53	1.4
14:15	53	51	53	53	54	53	53	53	51	55	53	53	50	55	50	53	1.3
14:30	53	52	52	53	55	52	54		51	54	53	52	49	55	49	53	1.5
14:45	53	51	53	53	55	53	55		51	54	53	52	50	55	50	53	1.7
15:00	53	52	53	53	54	52	55		51	55	52	53	49	55	49	53	1.6
15:15	53	52	52	52	54	51	55		52	53	53	53	50	55	50	52	1.4
15:30	53	52	51	54	53	51	54		52	54	52	54	49	54	49	52	1.6
15:45	53	52	51	53	53	51	53		53	53	51	54	49	54	49	52	1.5
16:00	52	52	52	52	53	52	52		53	54	51	54	50	54	50	52	1.1
16:15	52	52	51	52	54	52	52		53	52	51	54	50	54	50	52	1.1
16:30	52		51	52	54	52	52	53	53	53	52	54	51	54	51	53	1.0
16:45	53	53	51	51	55	52	52	53	52	53	52	54	51	55	51	53	1.2
17:00	53	55	51	52	55	52	52		53	52	52	54	53	55	51	53	1.2
17:15	52		52	52	55	53	51	54	53	53	52	54	53	55	51	53	1.2
17:30	54		52	53	55	52	51	54	53	55	52	54	52	55	51	53	1.3
17:45	54	45	52	52	55	52	51	54	52	57	52	53	53	57	45	52	2.7
18:00	55		52	52	55	53	52	55	53	55	52	53	53	55	52	53	1.3
Max	55	55	54	55	56	56	57	55	53	57	53	55	54	57	53	55	1.2
Min	52	45	50	51	53	51	51	52	45	52	50	52	49	54	45	50	2.5
Ave	53	52	52	53	54	53	53	53	51	54	52	53	52	55	51	53	1.2
SD	0.8	1.4	0.8	1.0	0.7	1.1	1.4	0.8	2.0	1.4	0.7	0.8	1.6	2.0	0.7	1.1	0.4
90%	52	51	51	52	53	52	52	52	48	52	51	52	49	54	48	52	1.6
															Median	52	

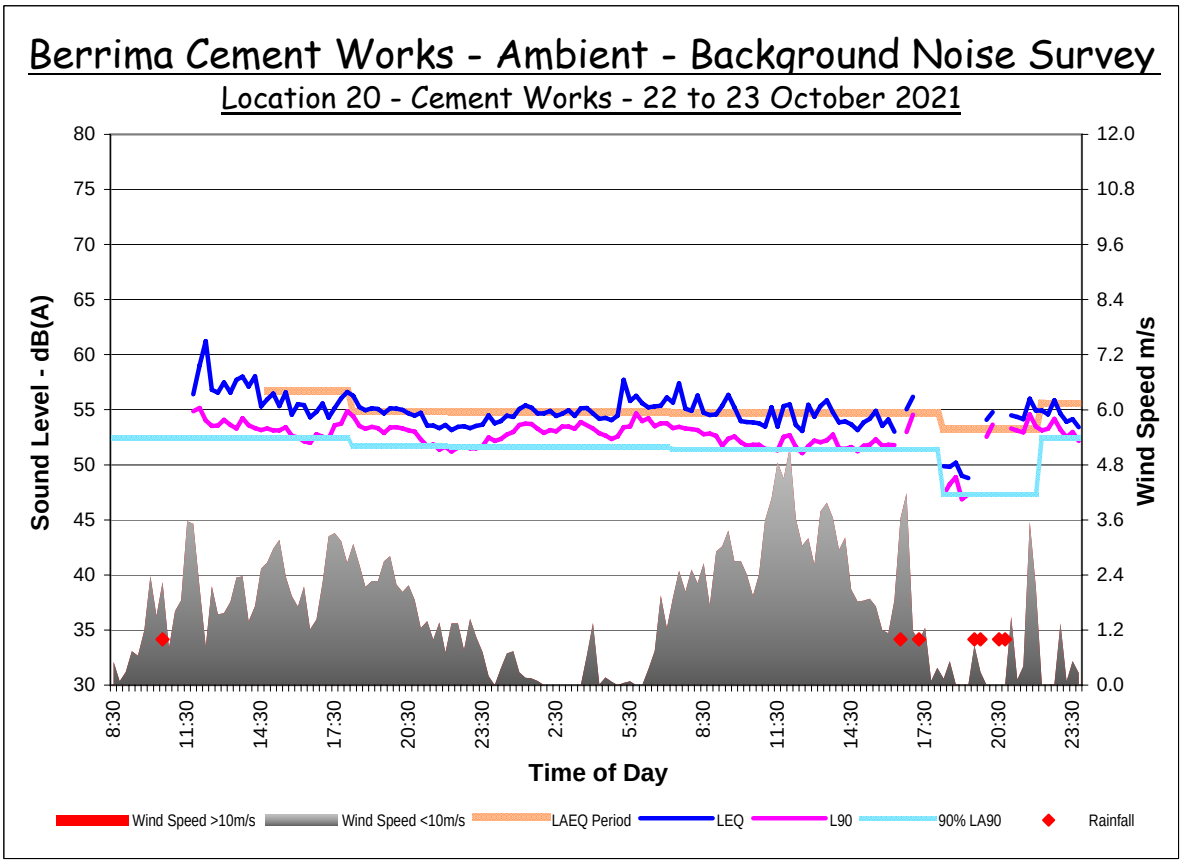
Evening LA90

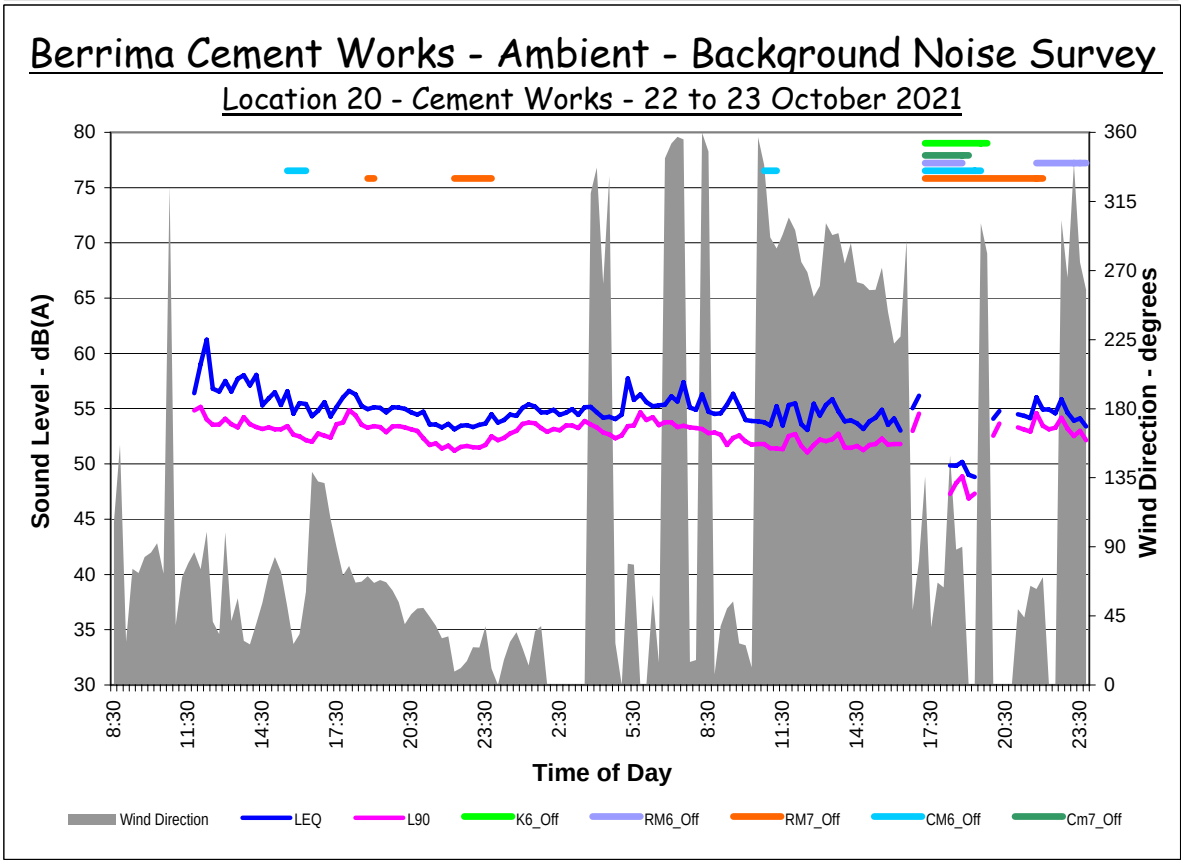
Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	*Maximum*	*Minimum*	*Average*	*SD*
18:00	55		52	52	55	53	52	55	53	55	52	53	53	55	52	53	1.3
18:15	54	47	52	52	55	53	52	54	53	55	52	53	53	55	47	53	1.9
18:30	54	48	52	51	55	53	52		53	53	53	54	53	55	48	52	1.7
18:45	53	49	51	51	55	53	52	53	53	53	53	54	53	55	49	52	1.5
19:00	53	47	52	52	55	53	52	53	52	53	52	54	53	55	47	52	1.9
19:15	53	47	54	53	55	54	52	53	52	54	52	53	53	55	47	53	2.0
19:30	53		54	54	54	54	51	52	53	54	52	54	53	54	51	53	1.1
19:45	53		55	54	55	54	52	52	53	54	51	54	52	55	51	53	1.2
20:00	53	53	54	55	55	55	52	53	53	54	51	54	53	55	51	53	1.3
20:15	53	54	54	55	53	54	52	52	52	54	50	53	54	55	50	53	1.3
20:30	53		53	55	53	54	51	52	54	53	50	53	53	55	50	53	1.4
20:45	53		54	55	52	55	51	52	54	53	50	53	53	55	50	53	1.5
21:00	52	53	54	55	52	54	51	52	54	53	52	53	53	55	51	53	1.1
21:15	52	53	54	55	51	54	51	51	53	53	52	53	52	55	51	53	1.2
21:30	52	53	54	55	51	54	51	52	54	53	52	52	53	55	51	53	1.2
21:45	51	55	54	55	51	54	52	52	54	53	53	53	53	55	51	53	1.3
22:00	52	53	53	55	51	55	51	52	54	54	54	53	53	55	51	53	1.2
Max	55	55	55	55	55	55	52	55	54	55	54	54	54	55	52	54	0.8
Min	51	47	51	51	51	53	51	51	52	53	50	52	52	53	47	51	1.5
Ave	53	51	53	54	53	54	52	52	53	54	52	53	53	54	51	53	0.9
SD	1.0	3.0	1.2	1.5	1.6	0.7	0.4	0.8	0.6	0.7	1.0	0.5	0.4	3.0	0.4	1.0	0.7
90%	52	47	52	52	51	53	51	52	52	53	50	53	52	53	47	52	1.5
															Median	52	

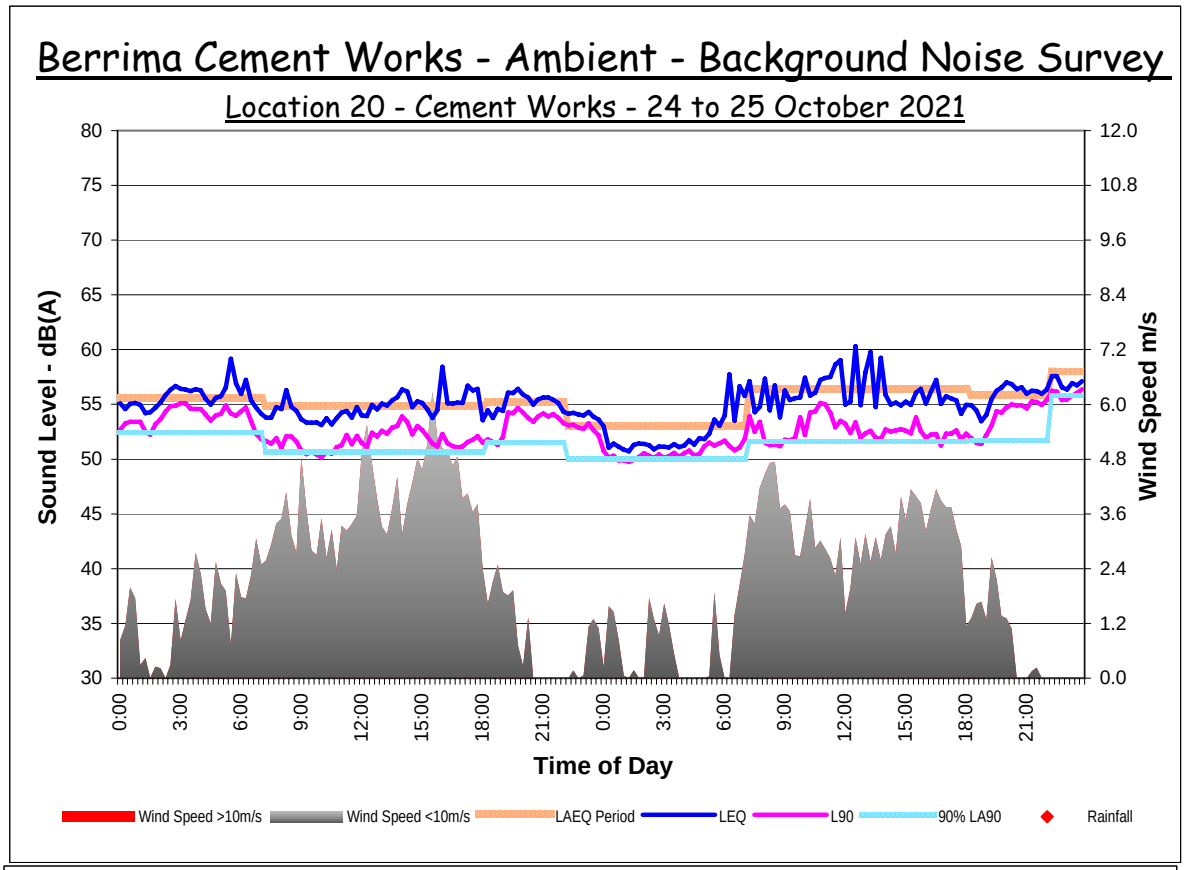
Night LA90

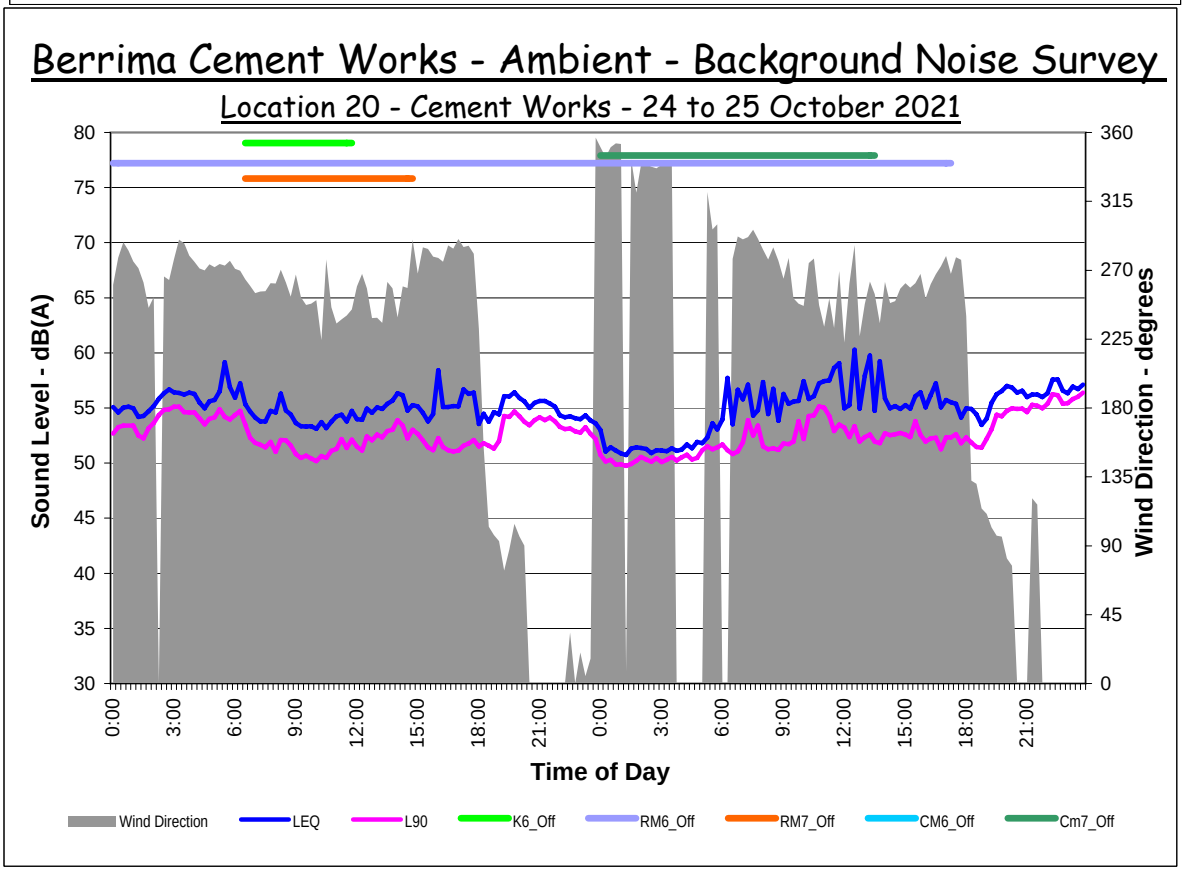
Time	22/10	23/10	24/10	25/10	26/10	27/10	28/10	29/10	30/10	31/10	1/11	2/11	3/11	**Maximum**	**Minimum**	**Average**	**SD**
22:00	52	53	53	55	51	55	51	52	54	54	54	53	53	55	51	53	1.2
22:15	51	53	53	56	51	56	51	52	54	53	54	53	53	56	51	53	1.5
22:30	52	53	53	56	52	55	52	52	54	53	54	52	53	56	52	53	1.4
22:45	52	54	53	55	54	56	52	51	52	53	54	53	53	56	51	53	1.4
23:00	52	53	53	55	53	56	51	52	53	53	56	53	52	56	51	53	1.5
23:15	51	53	53	56	53	53	51	51	54	53	55	53	52	56	51	53	1.4
23:30	52	53	53	56	53	52	51	52	55	53	55	52	52	56	51	53	1.4
23:45	53	52	52	56	53	52	52	52	55	53	55	52	53	56	52	53	1.4
0:00	52	53	51	56	53	52	52	53	55	53	55	52	53	56	51	53	1.5
0:15	52	53	50	56	53	53	52	53	55	53	55	52	53	56	50	53	1.6
0:30	53	53	50	56	53	53	51	53	55	53	54	52	53	56	50	53	1.5
0:45	53	53	50	56	53	54	52	53	55	53	54	51	54	56	50	53	1.8
1:00	54	53	50	57	53	55	53	53	56	52	54	52	54	57	50	53	1.8
1:15	54	52	50	58	53	54	53	53	55	52	53	52	54	58	50	53	1.9
1:30	54	52	50	57	53	55	52	53	56	52	53	52	54	57	50	53	2.0
1:45	53	53	50	56	54	55	52	54	56	52	54	52	54	56	50	53	1.7
2:00	53	54	51	56	54	56	52	53	57	52	53	52	54	57	51	54	2.0
2:15	53	54	50	56	54	57	52	53	56	53	54	52	54	57	50	54	1.9
2:30	53	55	50	56	54	56	51	53	57	53	53	52	54	57	50	54	2.0
2:45	53	55	50	56	54	57	51	53	57	53	53	52	54	57	50	54	2.0
3:00	53	55	50	56	54	57	51	54	55	53	54	52	54	57	50	54	2.1
3:15	53	55	50	57	53	56	51	54	55	52	54	52	55	57	50	54	2.0
3:30	54	55	51	57	53	58	51	54	56	52	54	52	54	58	51	54	2.3
3:45	54	55	50	58	54	58	51	54	56	51	54	52	54	58	50	54	2.6
4:00	53	55	51	57	53	57	51	54	56	51	55	52	54	57	51	54	2.3
4:15	53	54	51	56	53	58	52	54	57	50	55	52	55	58	50	54	2.5
4:30	53	54	50	57	53	59	51	53	56	51	55	52	55	59	50	54	2.7
4:45	52	54	50	57	53	58	51	53	56	51	55	51	55	58	50	54	2.6
5:00	53	54	51	57	53	57	51	55	56	52	54	52	53	57	51	54	2.2
5:15	53	55	52	57	53	56	52	54	56	52	55	52	53	57	52	54	1.9
5:30	53	54	51	56	53	56	52	55	57	52	56	52	54	57	51	54	2.0
5:45	55	54	51	57	54	57	53	54	57	52	56	52		57	51	54	2.1
6:00	54	54	52	56	54	58	54	53	57	51	56	52	54	58	51	54	2.0
6:15	54	55	51	56	54	57	54	52	57	51	56	52	55	57	51	54	2.1
6:30	54	53	51	57	54	57	53	52	57	51	56	52	55	57	51	54	2.3
6:45	54	52	51	57	53	57	52	52	56	52	55	53	55	57	51	54	2.2
7:00	54	52	52	56	54	57	52	51	56	51	54	53	56	57	51	54	2.1
Max	55	55	53	58	54	59	54	55	57	54	56	53	56	59	53	55	1.8
Min	51	52	50	55	51	52	51	51	52	50	53	51	52	55	50	52	1.4
Ave	53	54	51	56	53	56	52	53	56	52	54	52	54	56	51	54	1.6
SD	0.9	0.9	1.1	0.6	0.7	1.8	0.8	1.0	1.3	0.9	0.8	0.5	0.9	1.8	0.5	0.9	0.3
90%	52	52	50	56	53	53	51	52	54	51	53	52	53	56	50	52	1.5
															Median	52	

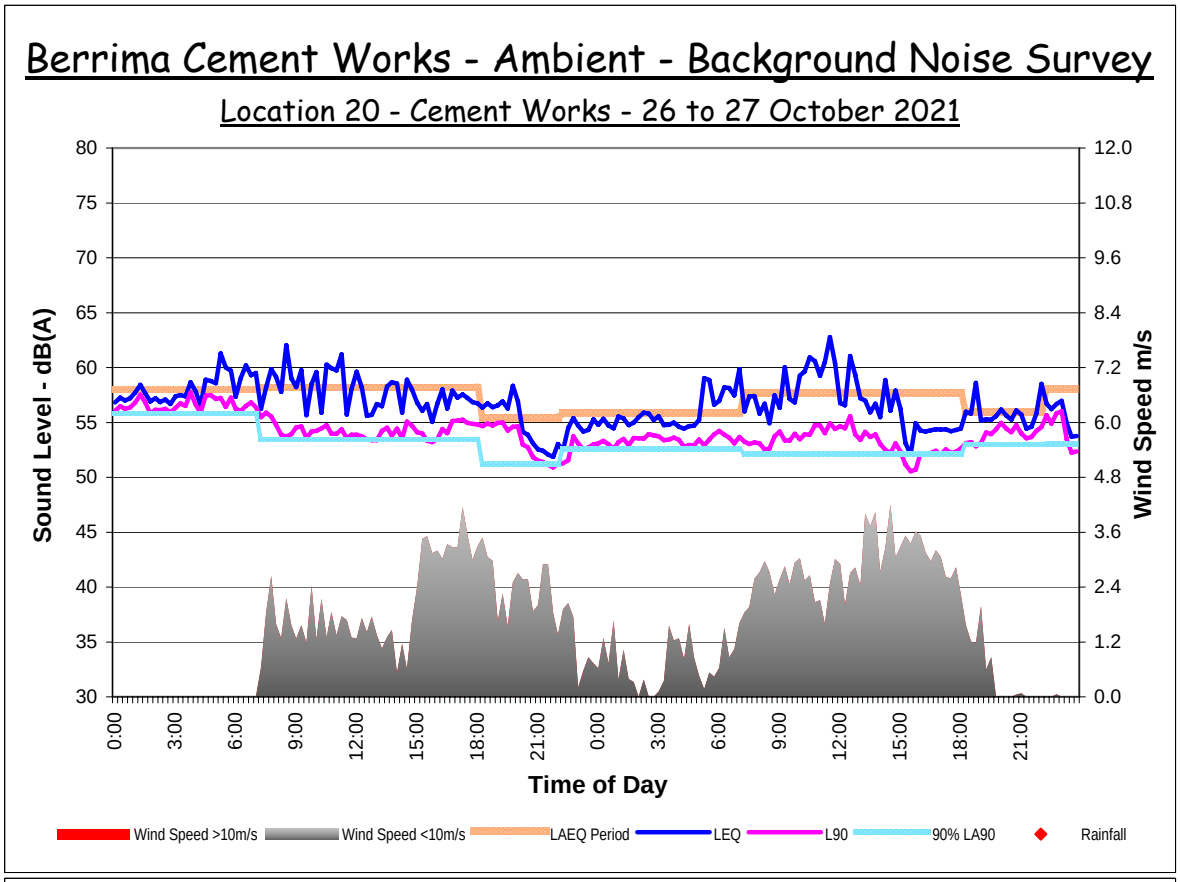
Two Day Results of Ambient Noise Monitoring

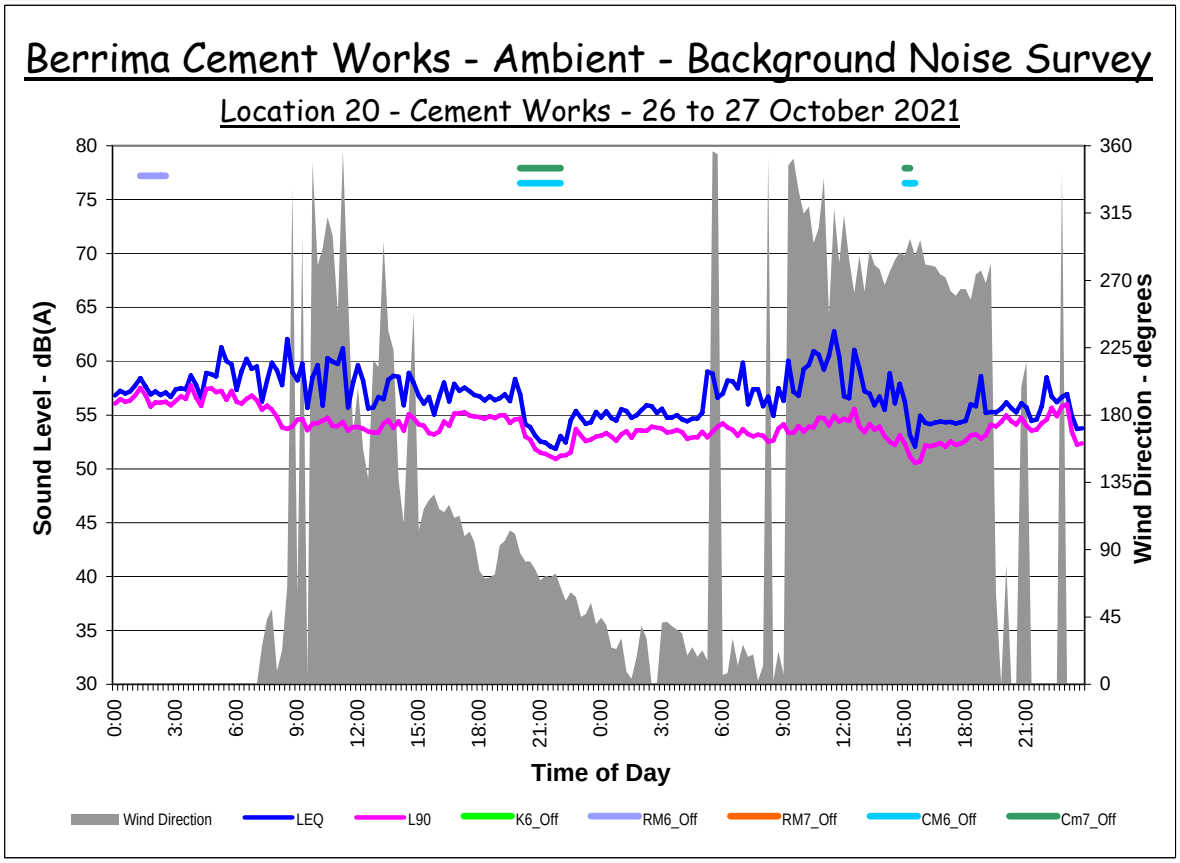




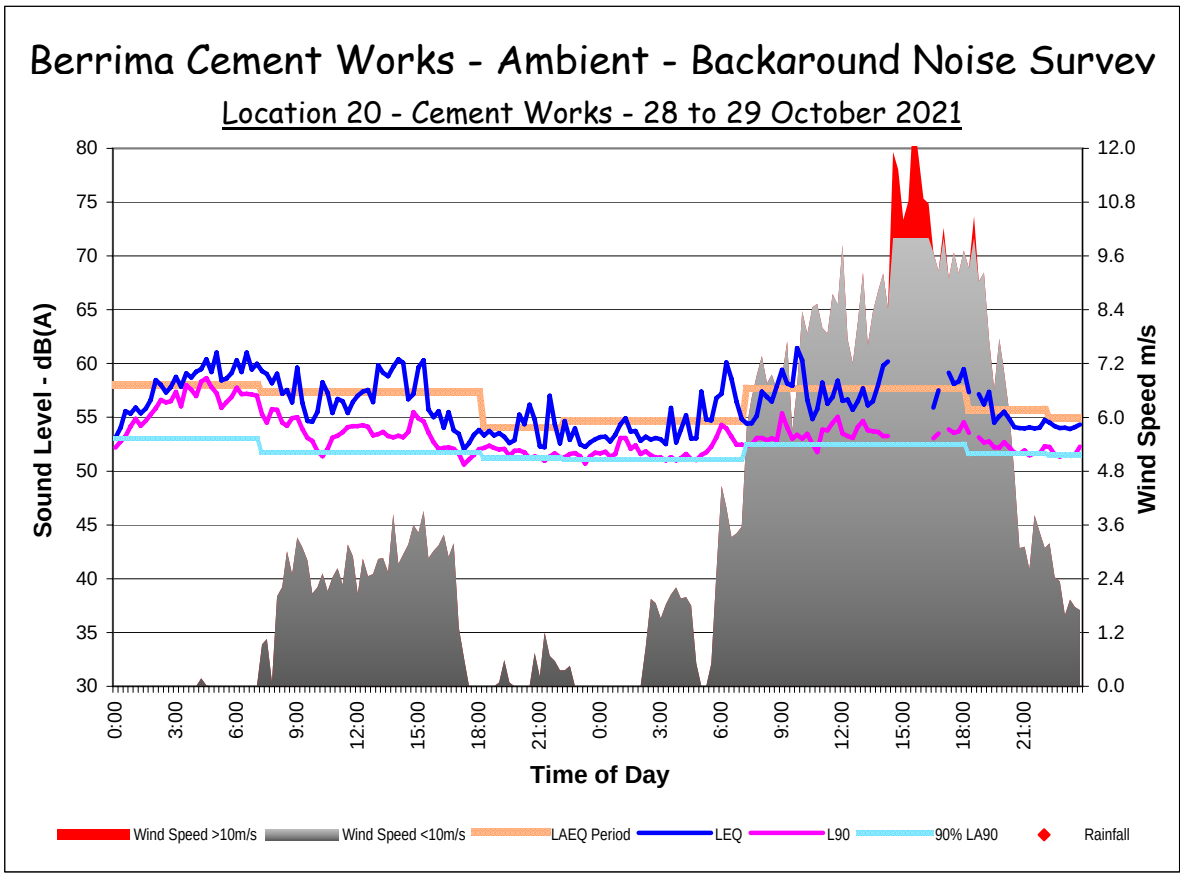

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 24 to 25 October 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

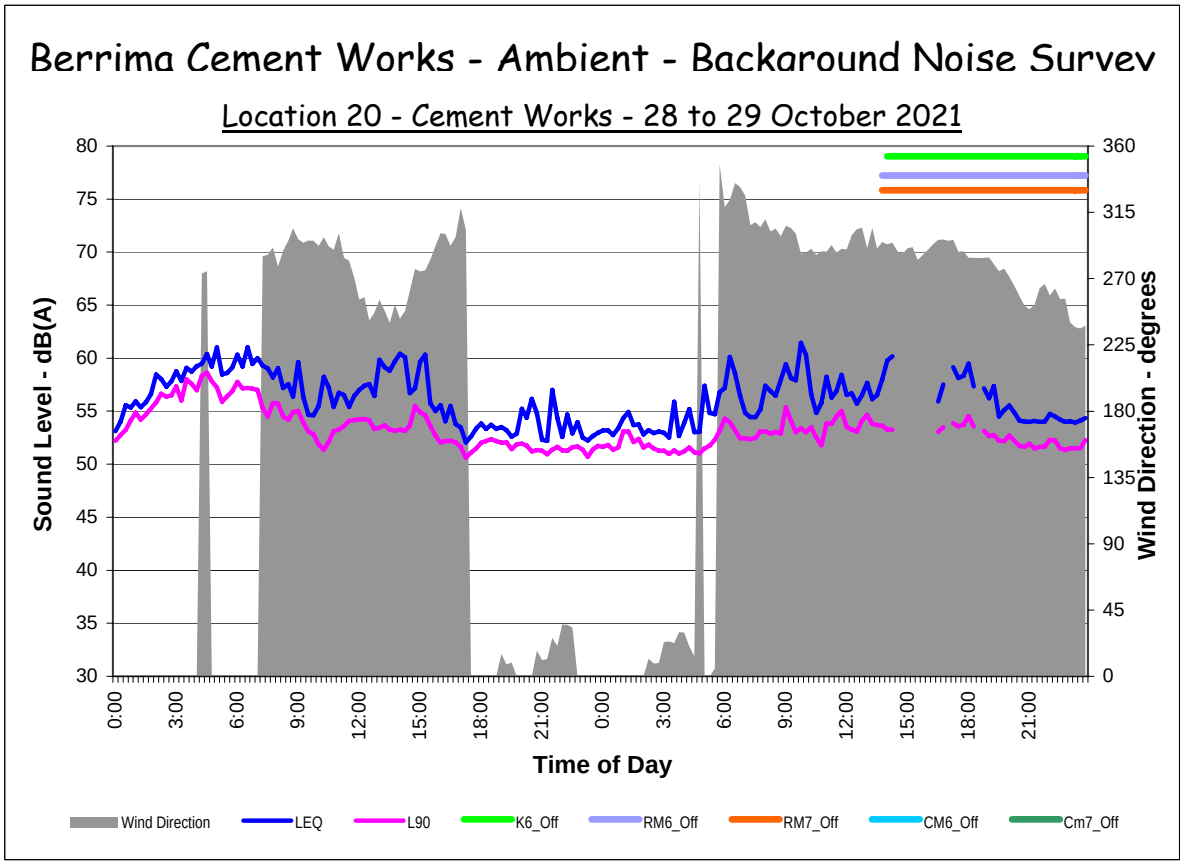

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 24 to 25 October 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

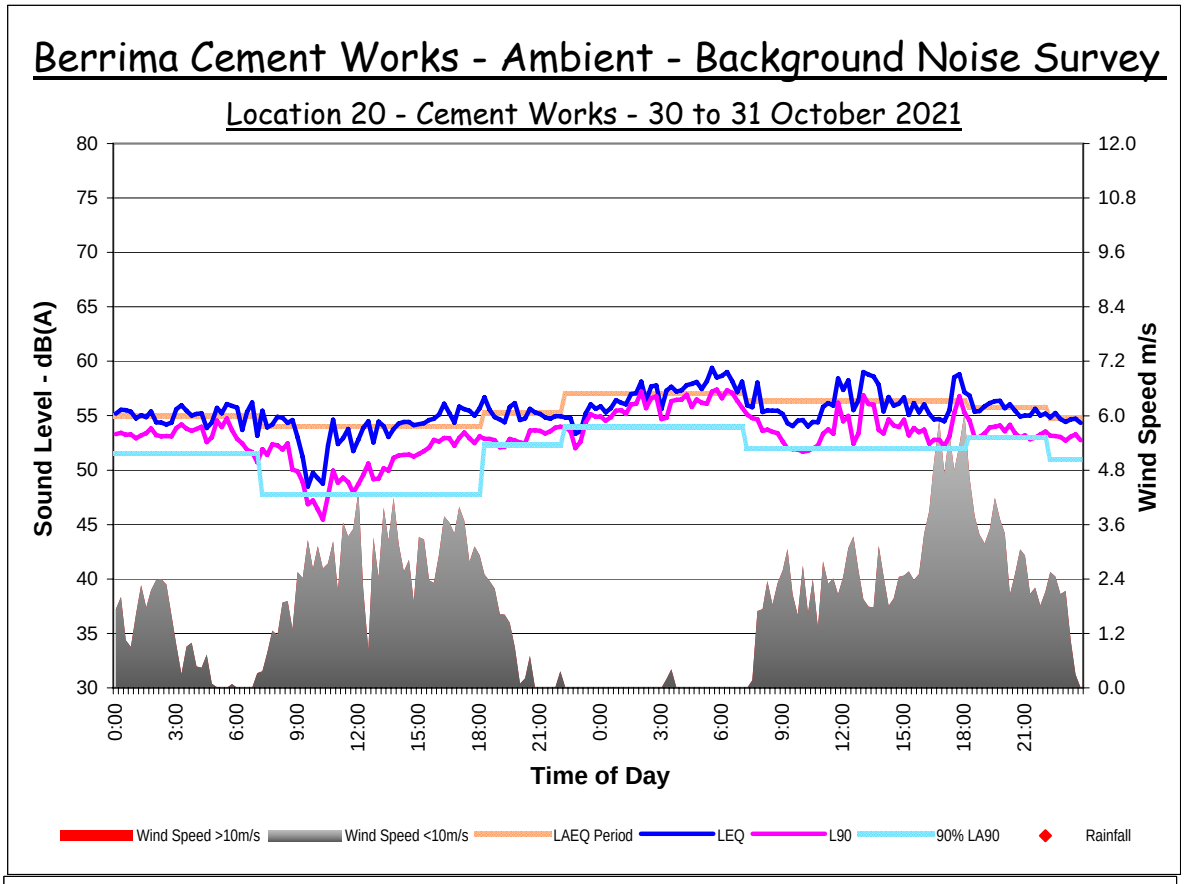

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 26 to 27 October 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

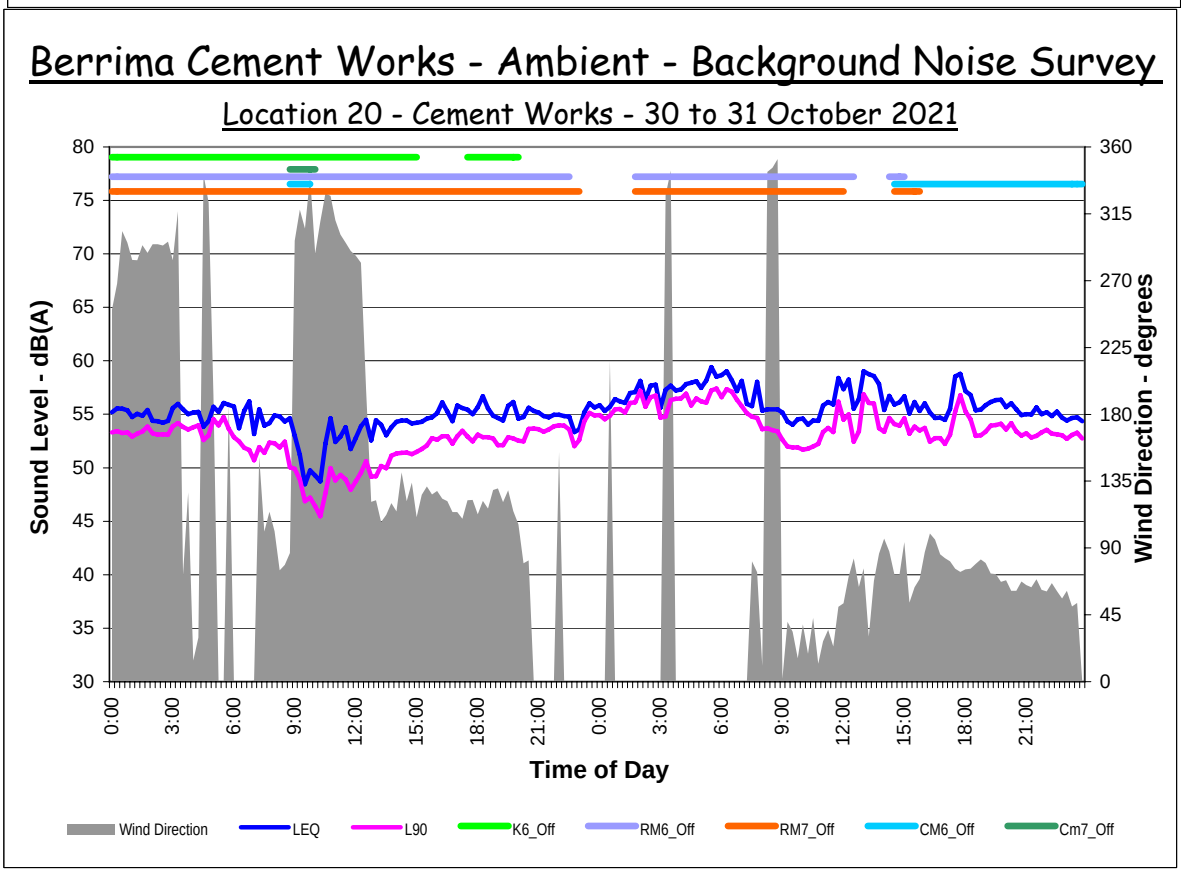

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 26 to 27 October 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

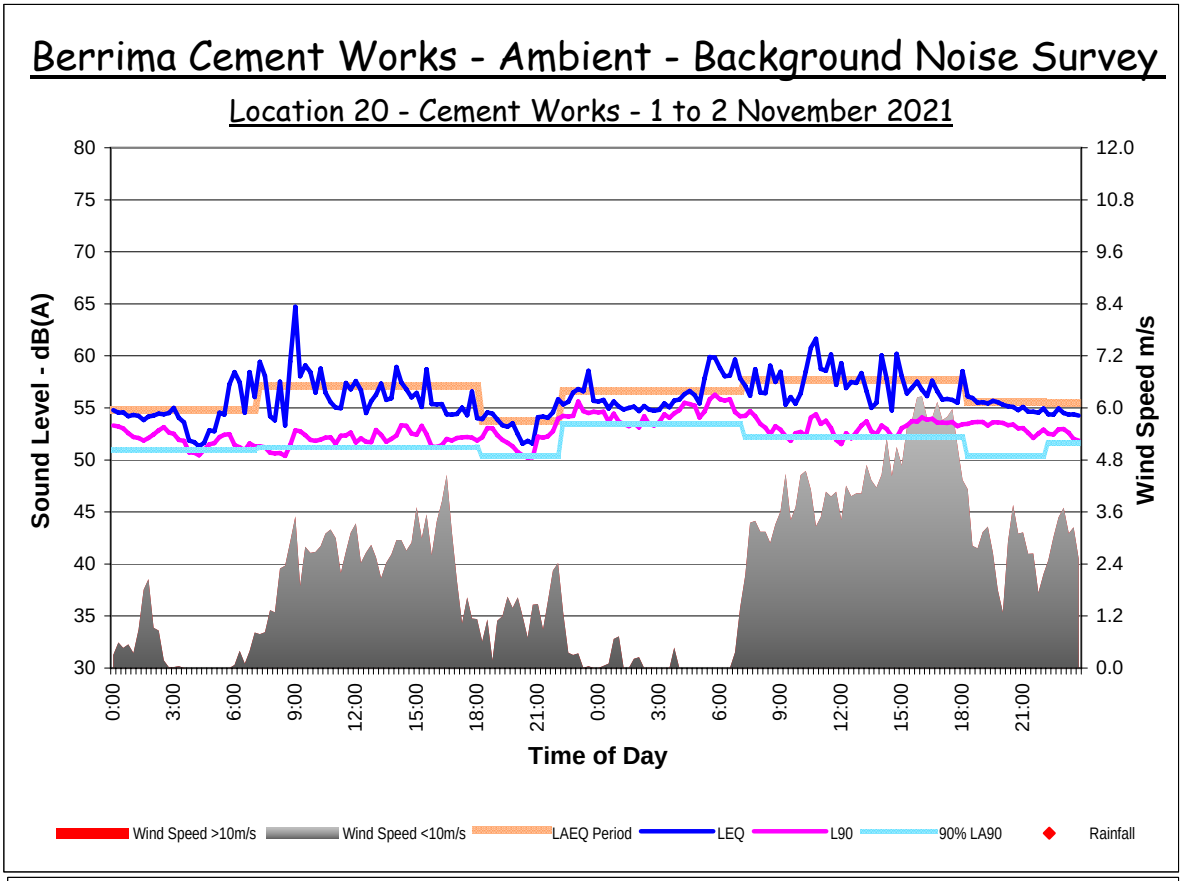
Two Day Results of Ambient Noise Monitoring

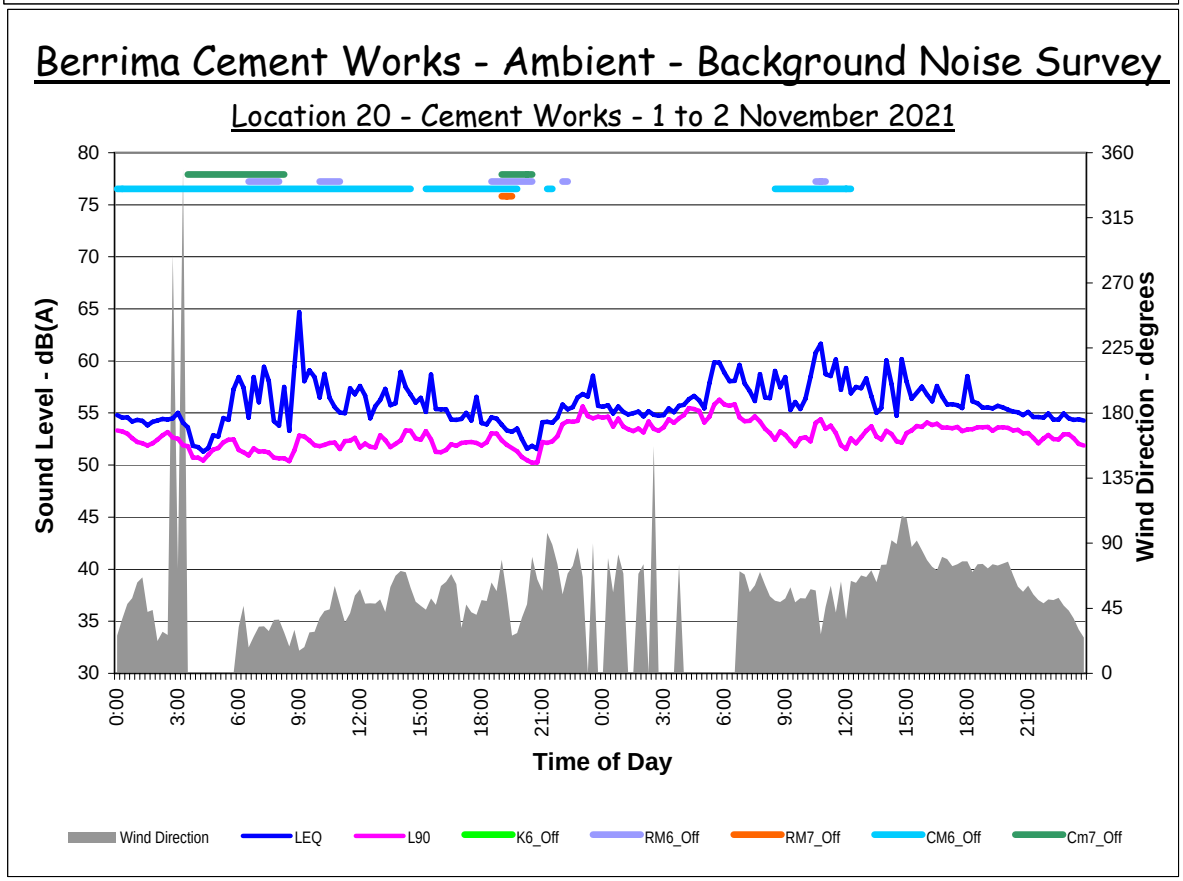


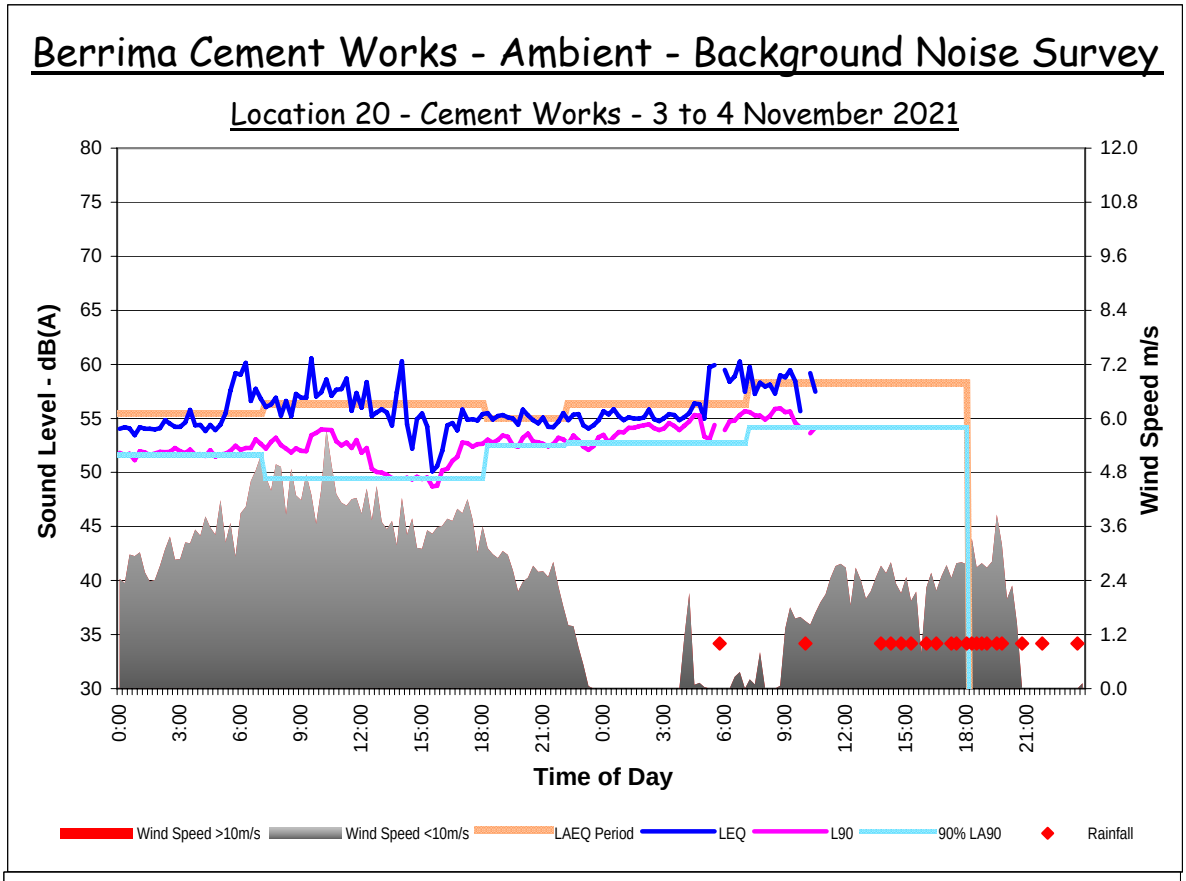


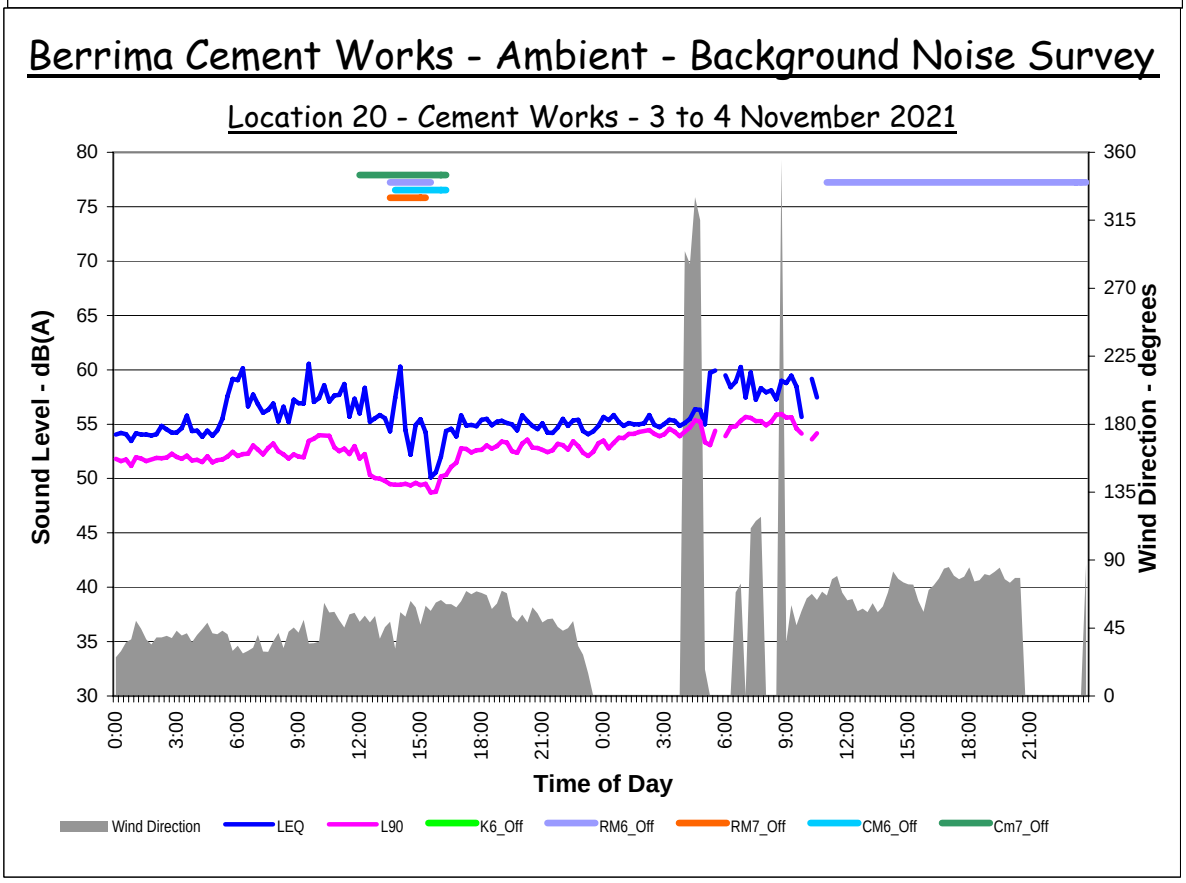

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 30 to 31 October 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

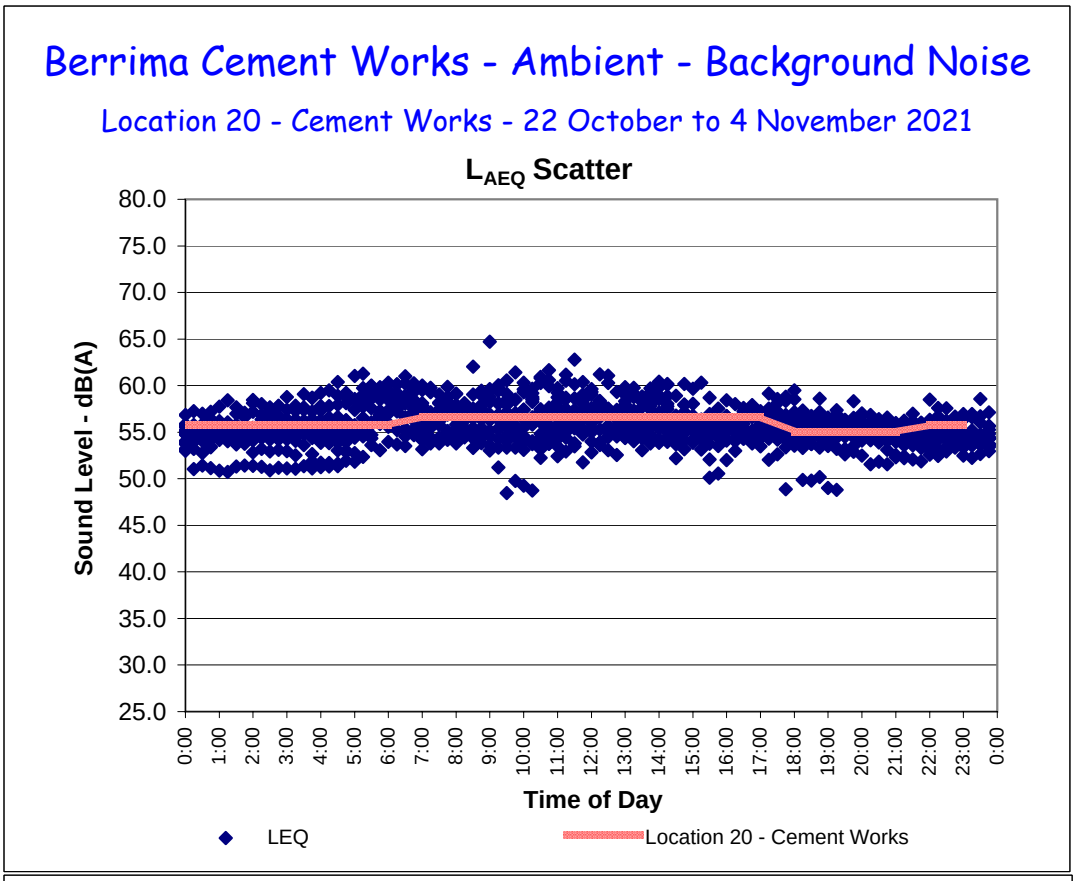

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 30 to 31 October 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

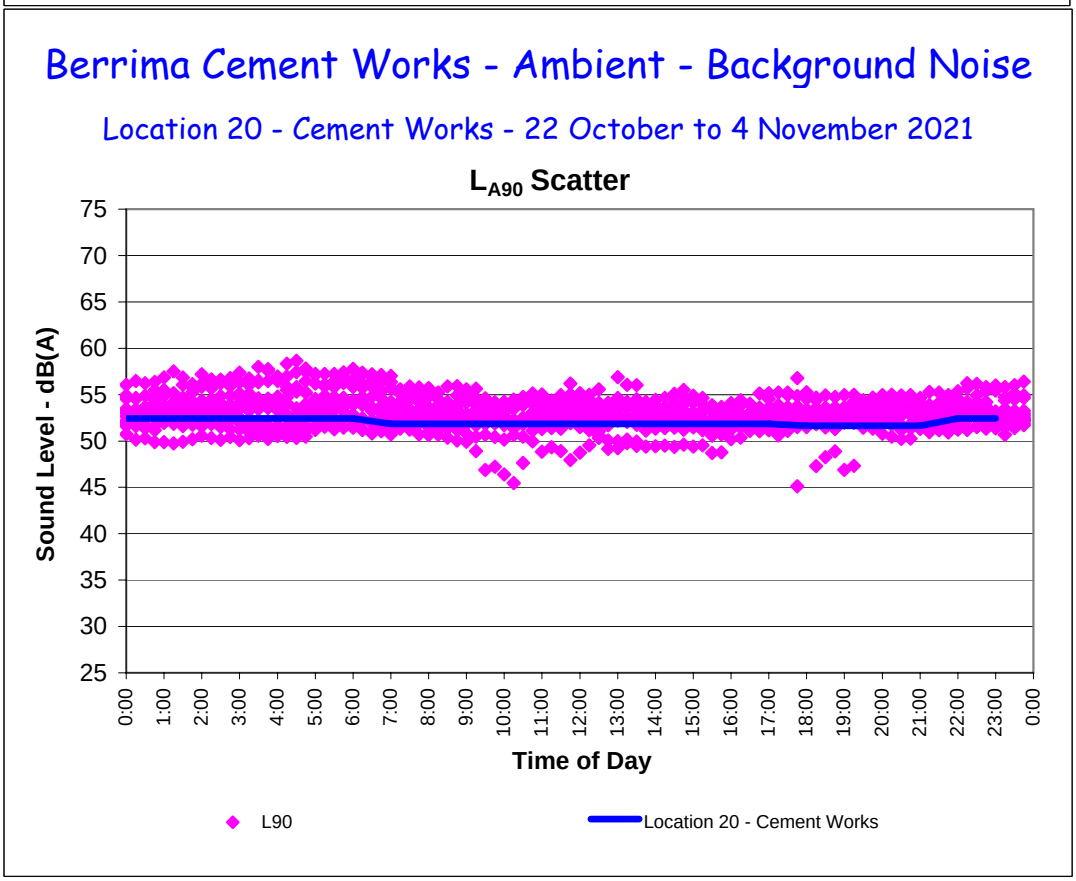

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 1 to 2 November 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

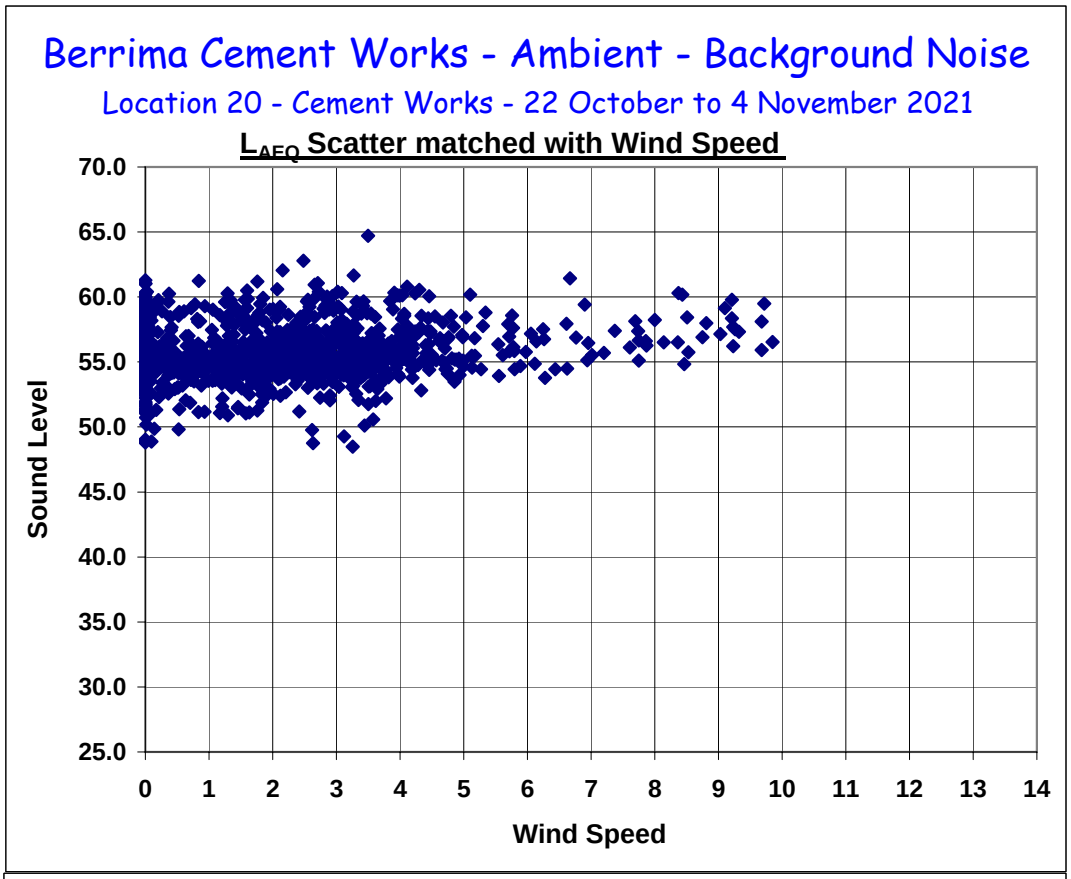

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 1 to 2 November 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

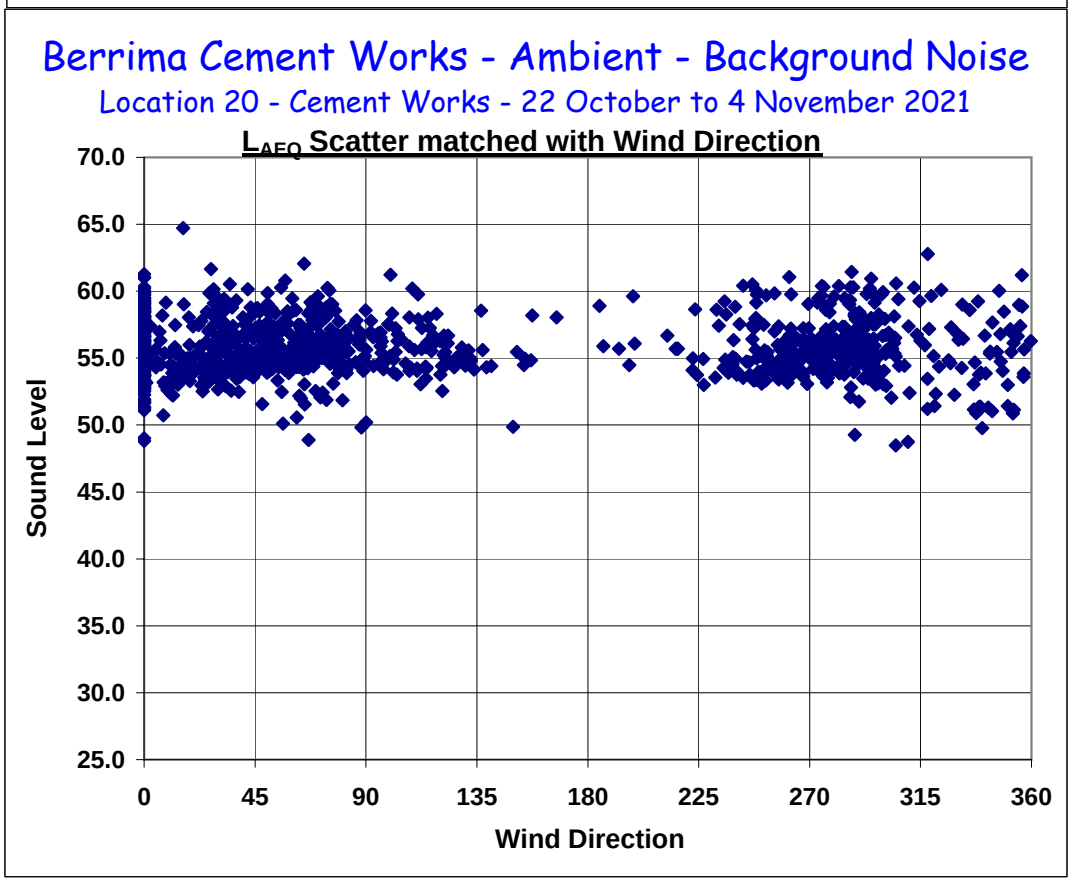

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 3 to 4 November 2021
Sound Level - dB(A)
Wind Speed m/s
Time of Day
Wind Speed >10m/s
Wind Speed <10m/s
LAEQ Period
LEQ
L90
90% LA90
Rainfall

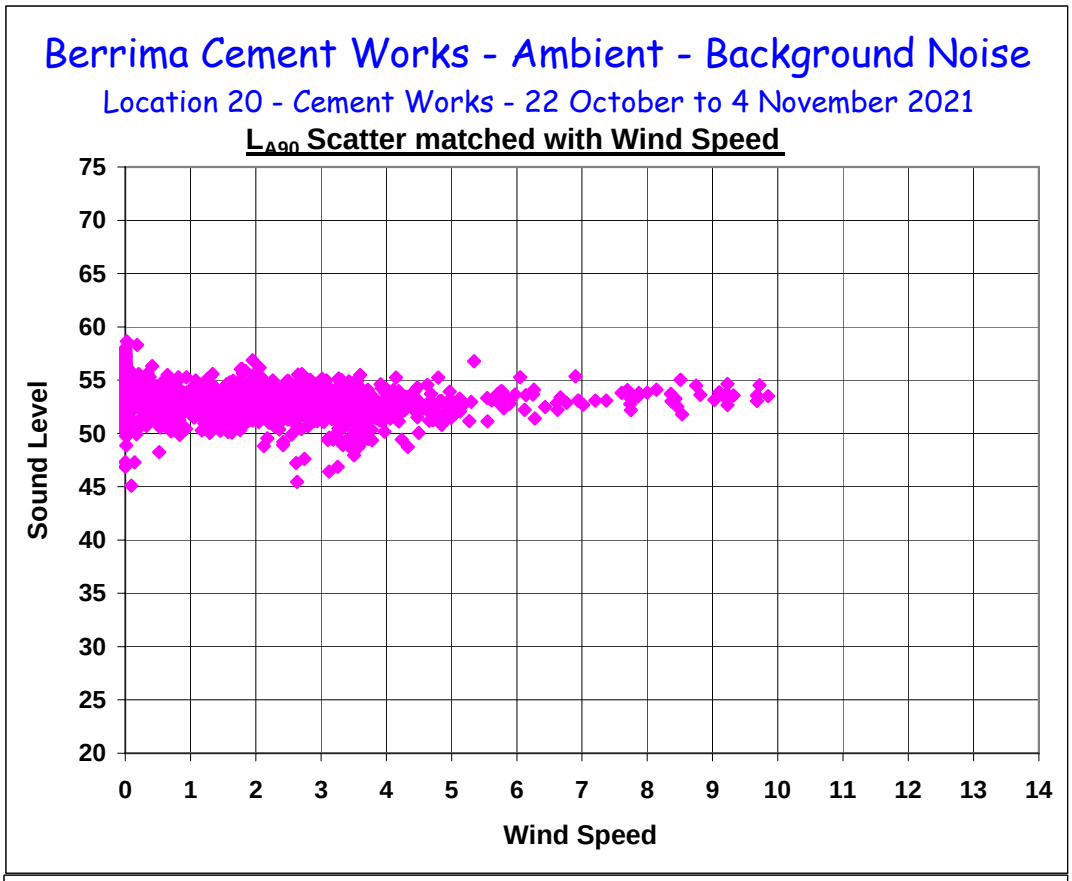

Berrima Cement Works - Ambient - Background Noise Survey
Location 20 - Cement Works - 3 to 4 November 2021
Sound Level - dB(A)
Wind Direction - degrees
Time of Day
Wind Direction
LEQ
L90
K6_Off
RM6_Off
RM7_Off
CM6_Off
Cm7_Off

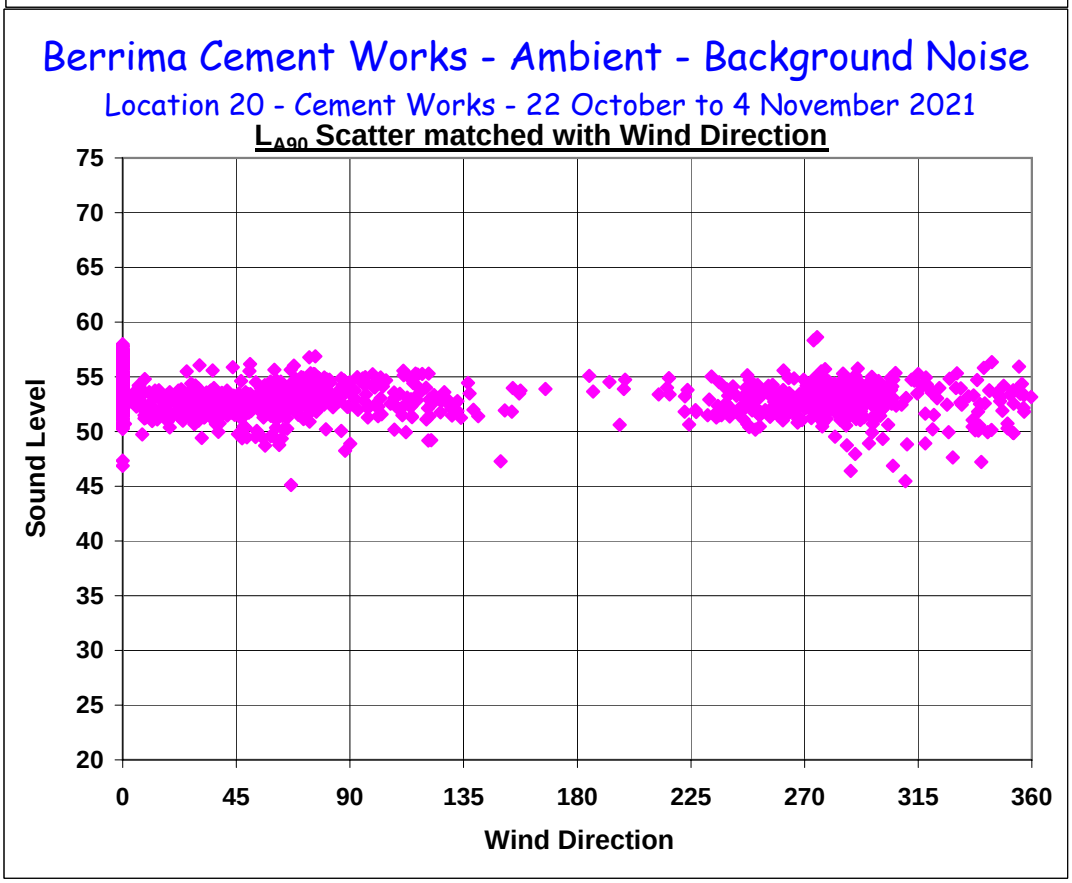

Berrima Cement Works - Ambient - Background Noise
Location 20 - Cement Works - 22 October to 4 November 2021
LAEQ Scatter
Sound Level - dB(A)
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Time of Day
LEQ
Location 20 - Cement Works


Berrima Cement Works - Ambient - Background Noise
Location 20 - Cement Works - 22 October to 4 November 2021
LA90 Scatter
Sound Level - dB(A)
75
70
65
60
55
50
45
40
35
30
25
0:00 1:00 2:00 3:00 4:00 5:00 6:00 7:00 8:00 9:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00 0:00
Time of Day
L90
Location 20 - Cement Works


Berrima Cement Works - Ambient - Background Noise
Location 20 - Cement Works - 22 October to 4 November 2021
LAEQ Scatter matched with Wind Speed
Sound Level
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Wind Speed


Berrima Cement Works - Ambient - Background Noise
Location 20 - Cement Works - 22 October to 4 November 2021
LAEQ Scatter matched with Wind Direction
Sound Level
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
0 45 90 135 180 225 270 315 360
Wind Direction


Berrima Cement Works - Ambient - Background Noise
Location 20 - Cement Works - 22 October to 4 November 2021
L_{A90} Scatter matched with Wind Speed
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Wind Speed


Berrima Cement Works - Ambient - Background Noise
Location 20 - Cement Works - 22 October to 4 November 2021
L_{A90} Scatter matched with Wind Direction
Sound Level
75
70
65
60
55
50
45
40
35
30
25
20
0 45 90 135 180 225 270 315 360
Wind Direction

ABN: 25 153 946 064
ACN: 153 946 064

Appendix E: Narrow-band spectra from attended measurement recordings

Figure E1: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 4 Melbourne St 8:45 Morning 22 October 2021

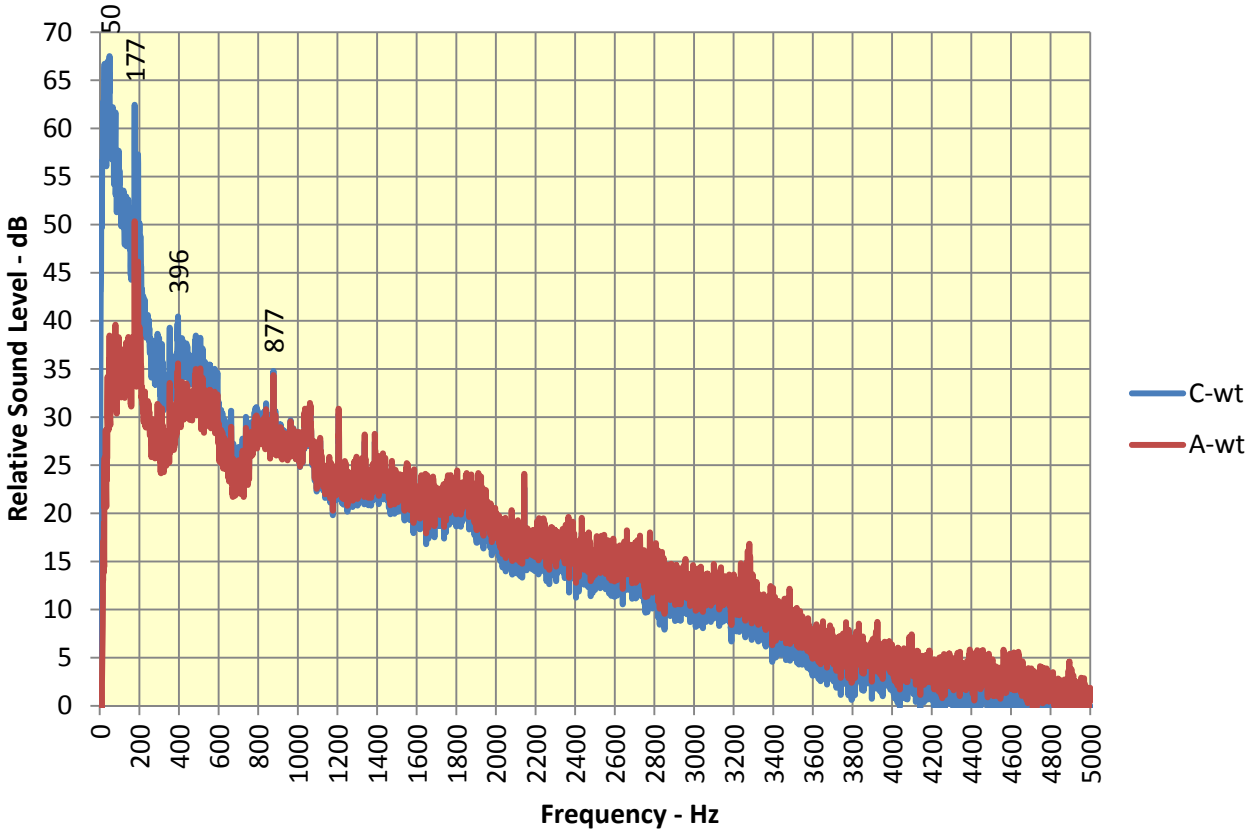


Figure E2: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 4 Melbourne St 8:45 Morning 22 October 2021

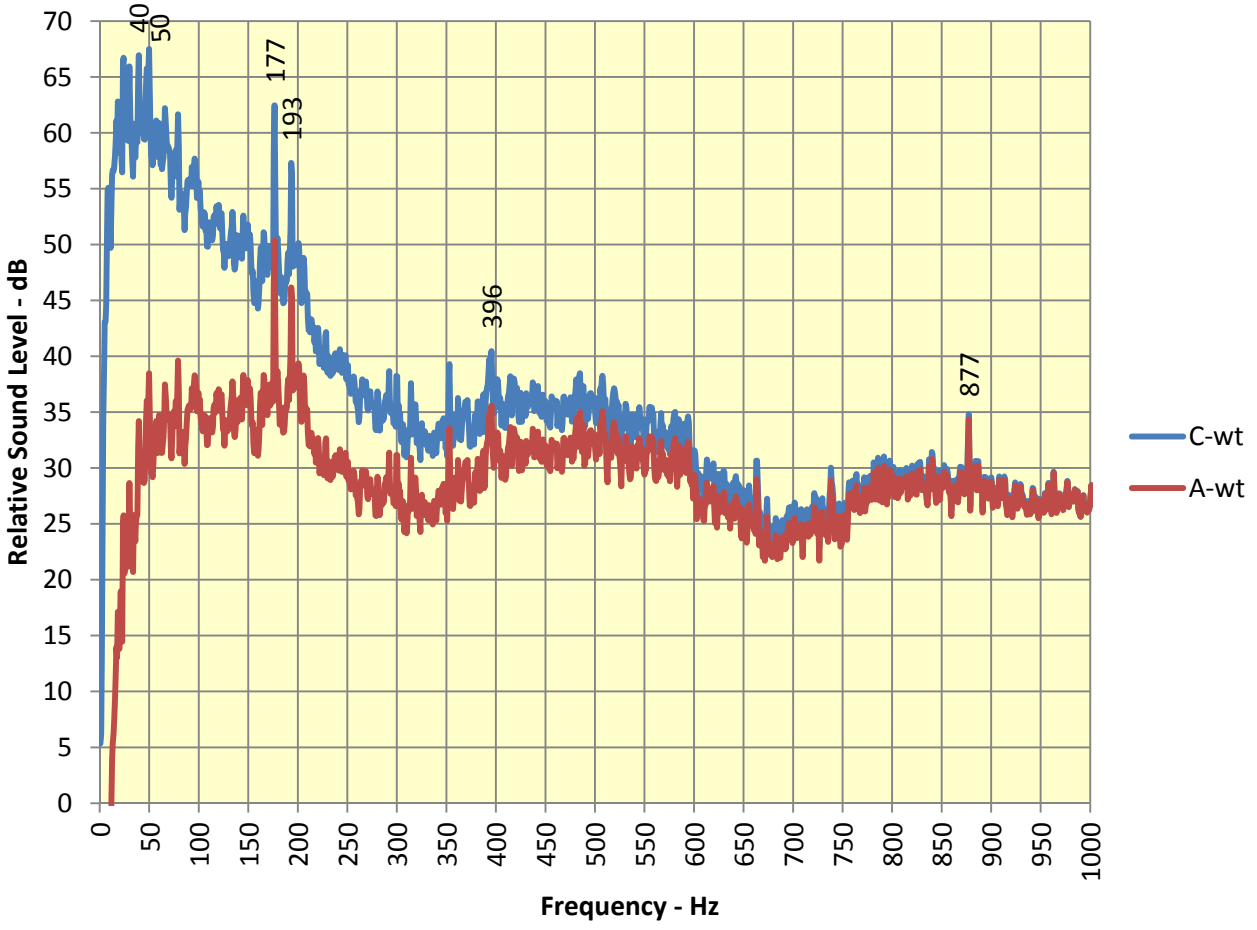


Figure E3: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 4 Melbourne St 18:52 Evening 22 October 2021

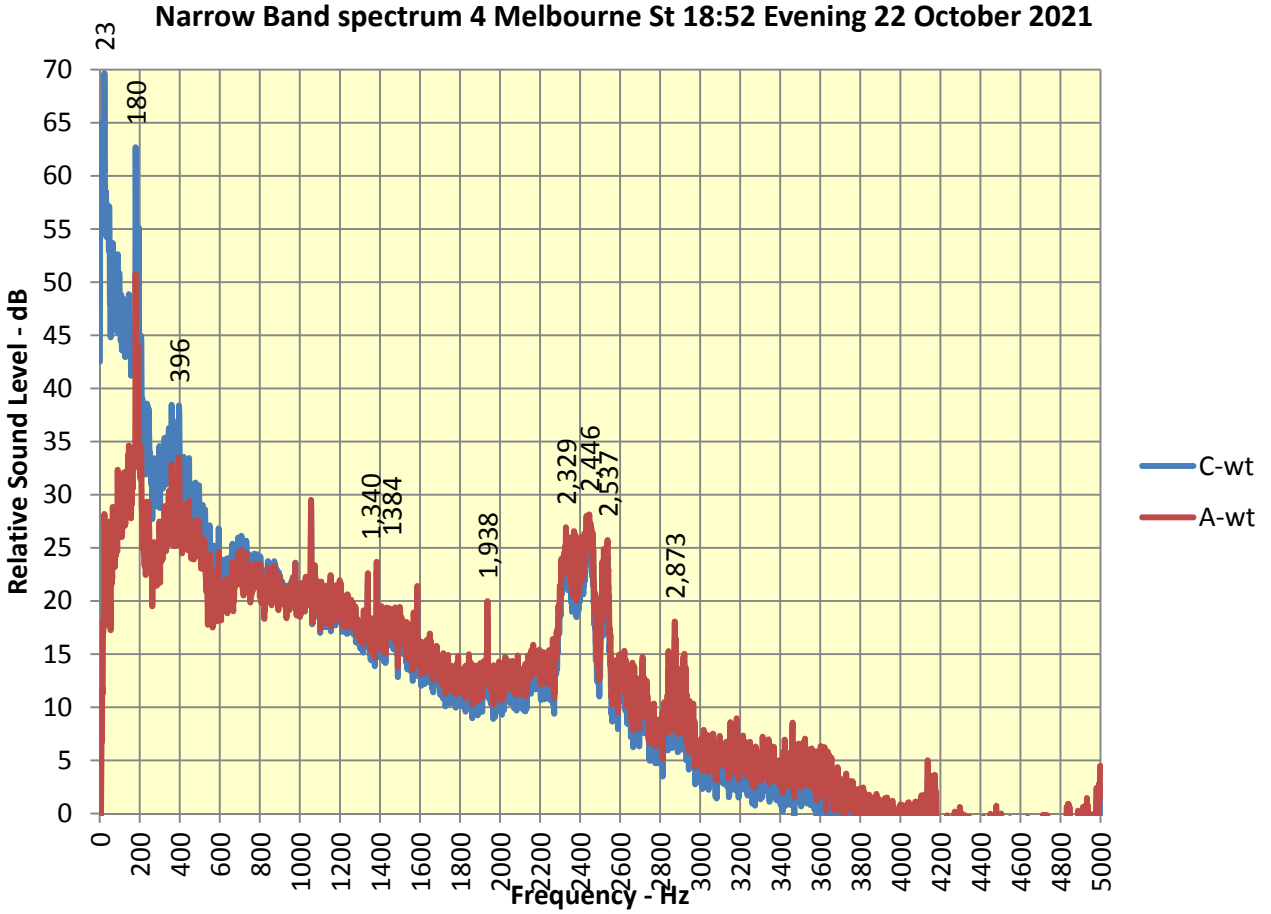


Figure E4: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 4 Melbourne St 18:52 Evening 22 October 2021

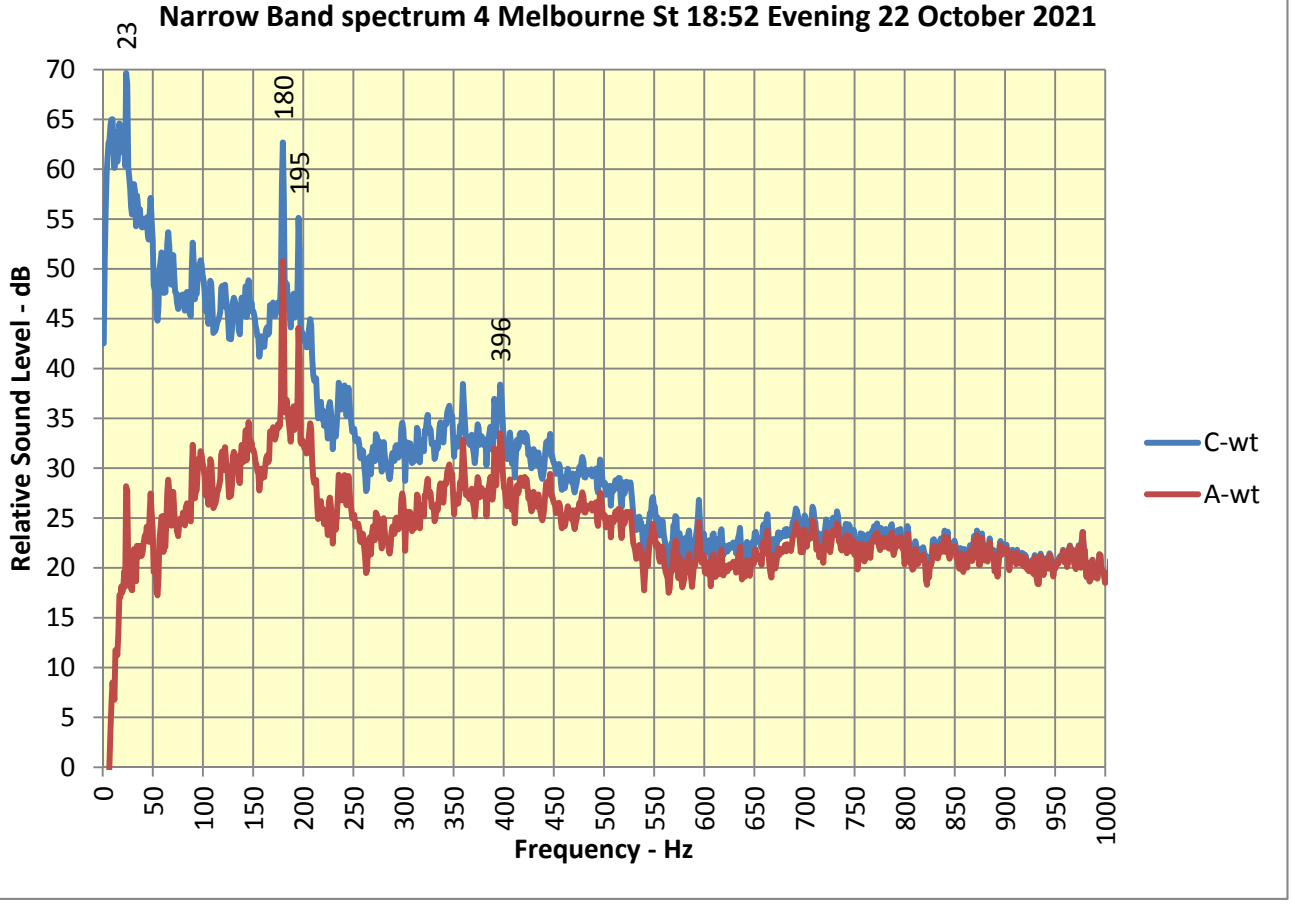


Figure E5: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 23/10 18:00 4s to 6s Plant all off: Z and A-weighting

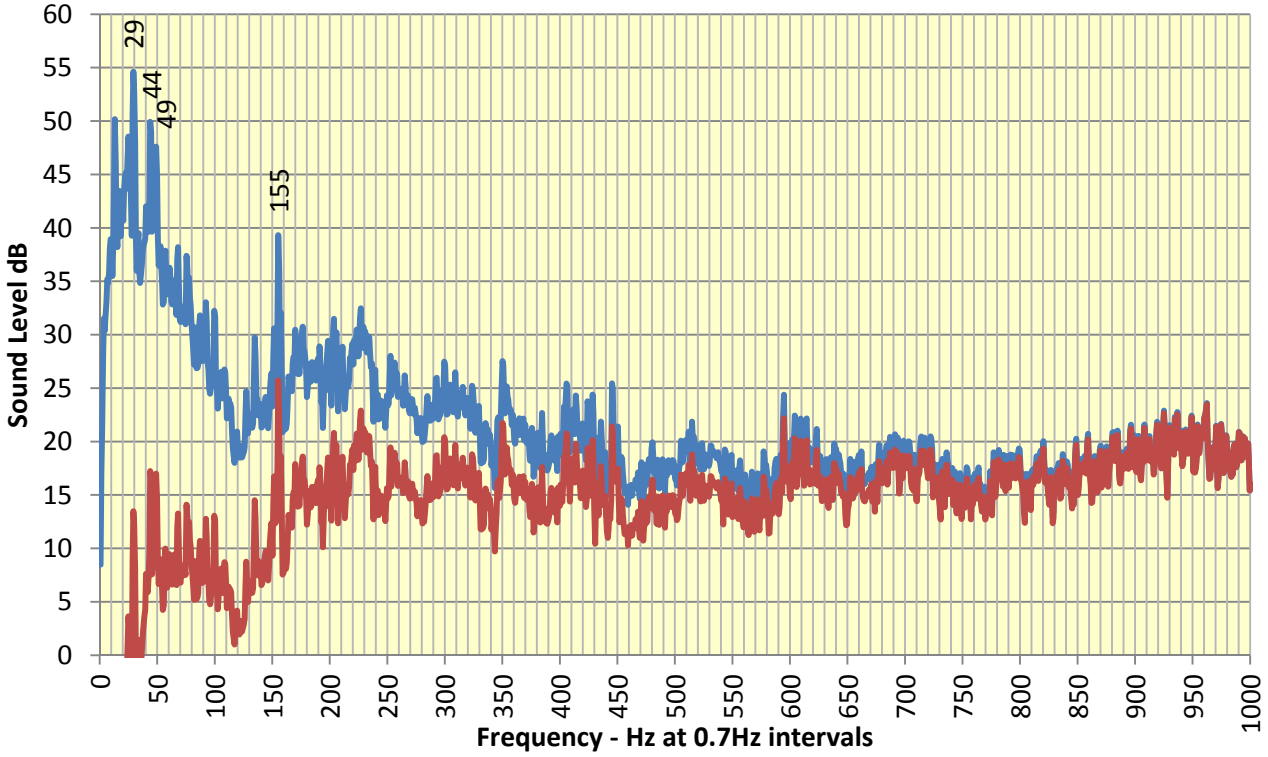
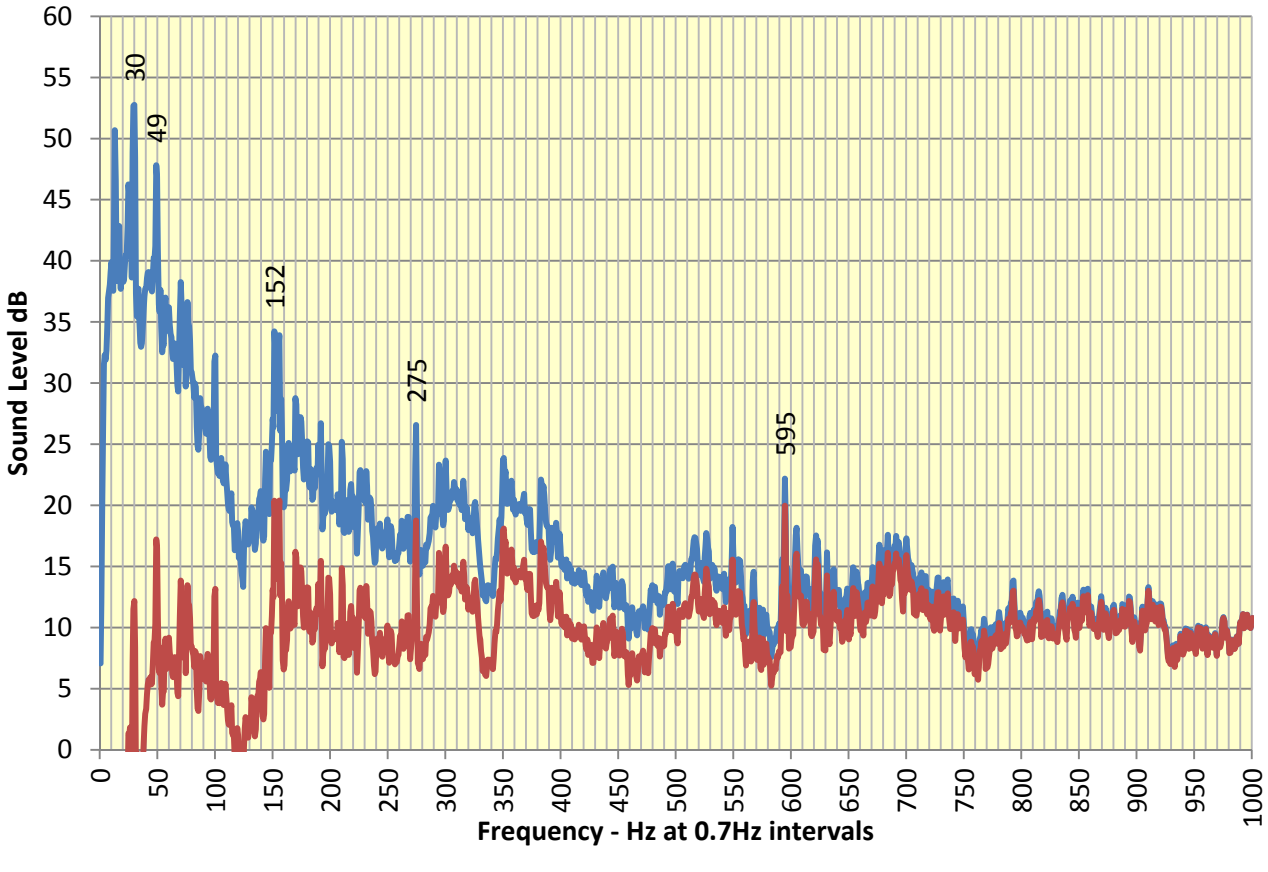


Figure E6: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 23/10 18:00 7m8s to 7m42s Plant all off: Z and A-weighting



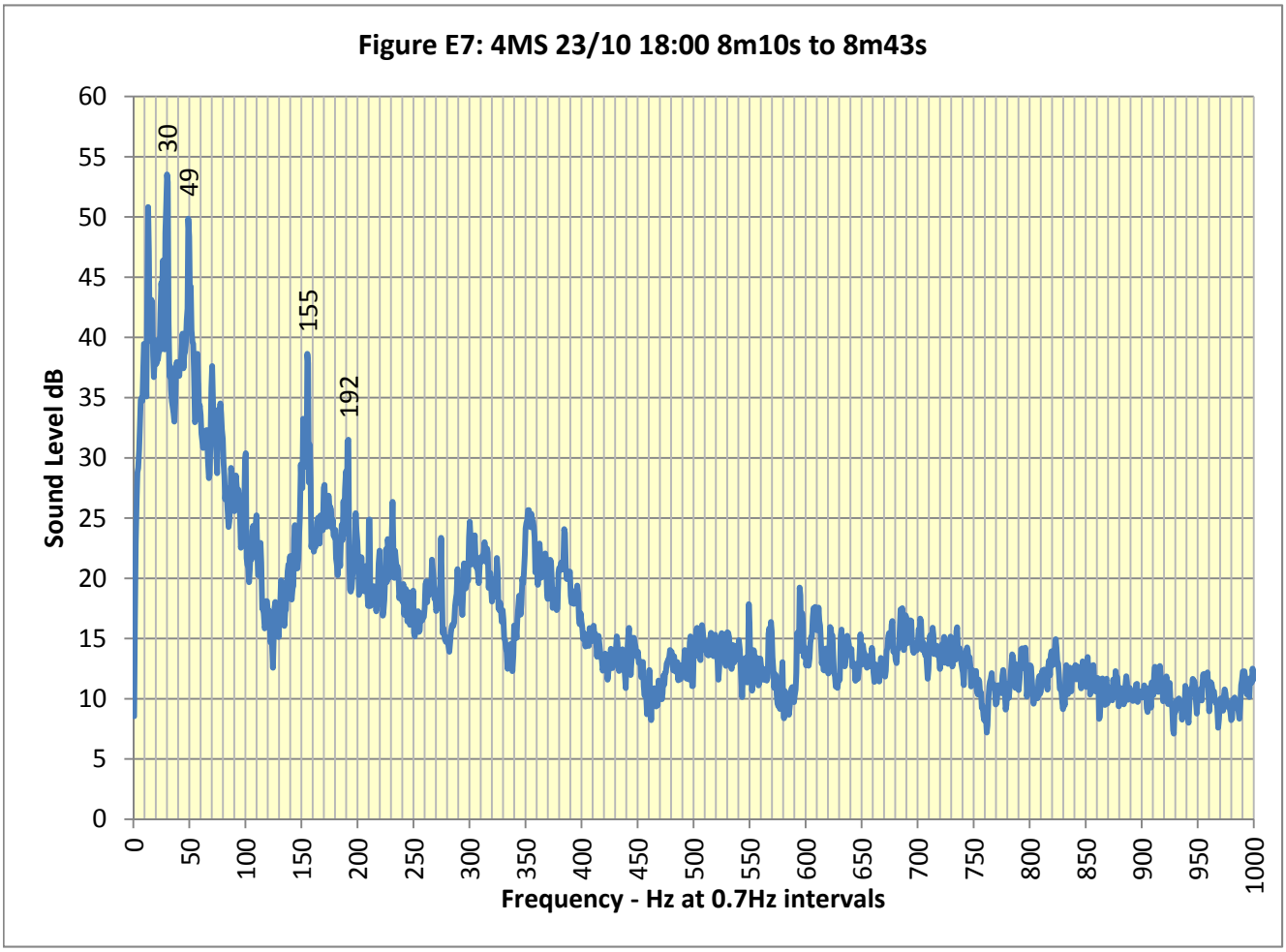


Figure E7: 4MS 23/10 18:00 8m10s to 8m43s
Sound Level dB
Frequency - Hz at 0.7Hz intervals
30
49
155
192
0
5
10
15
20
25
30
35
40
45
50
55
60
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000

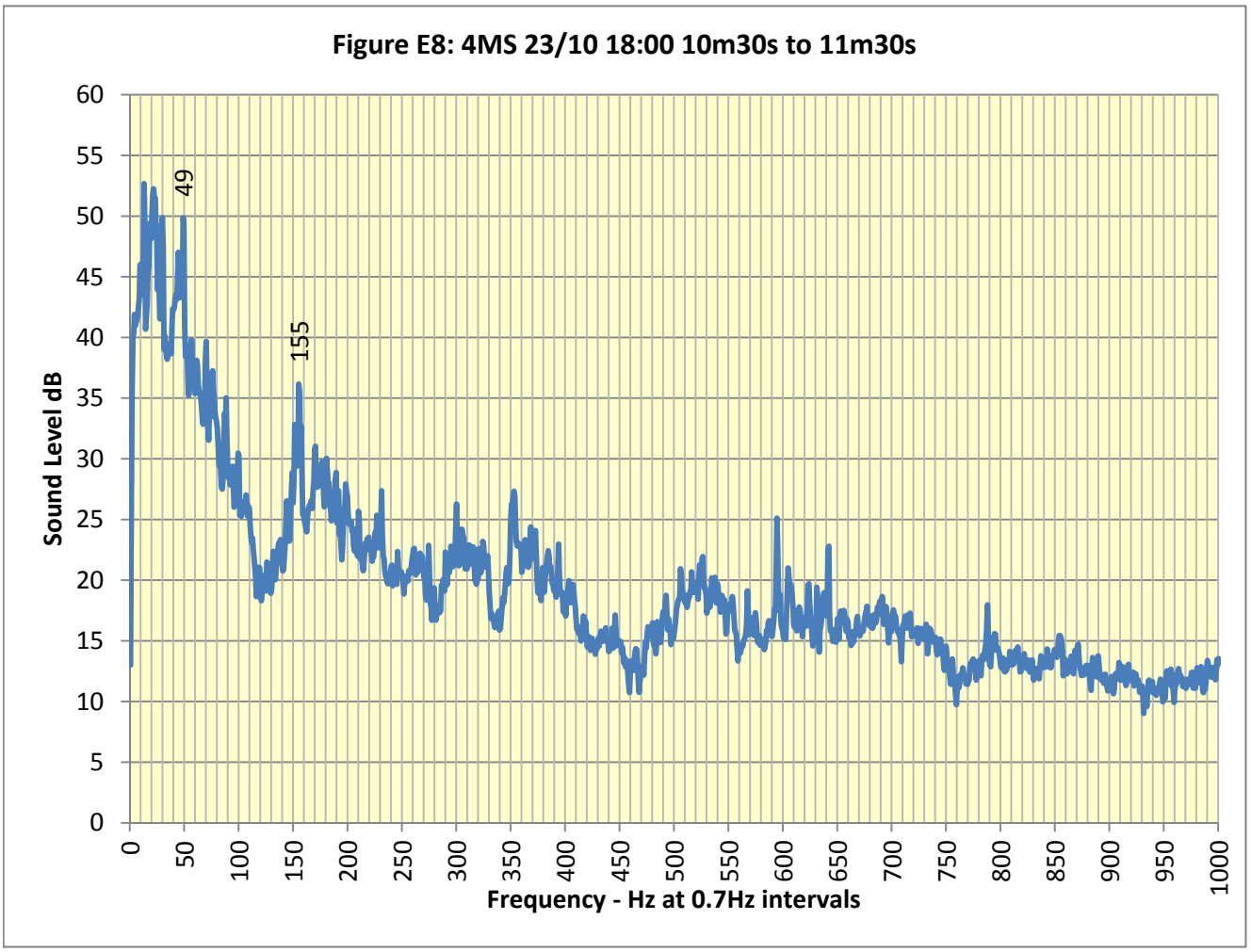


Figure E8: 4MS 23/10 18:00 10m30s to 11m30s
Sound Level dB
Frequency - Hz at 0.7Hz intervals
49
155
0
5
10
15
20
25
30
35
40
45
50
55
60
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000

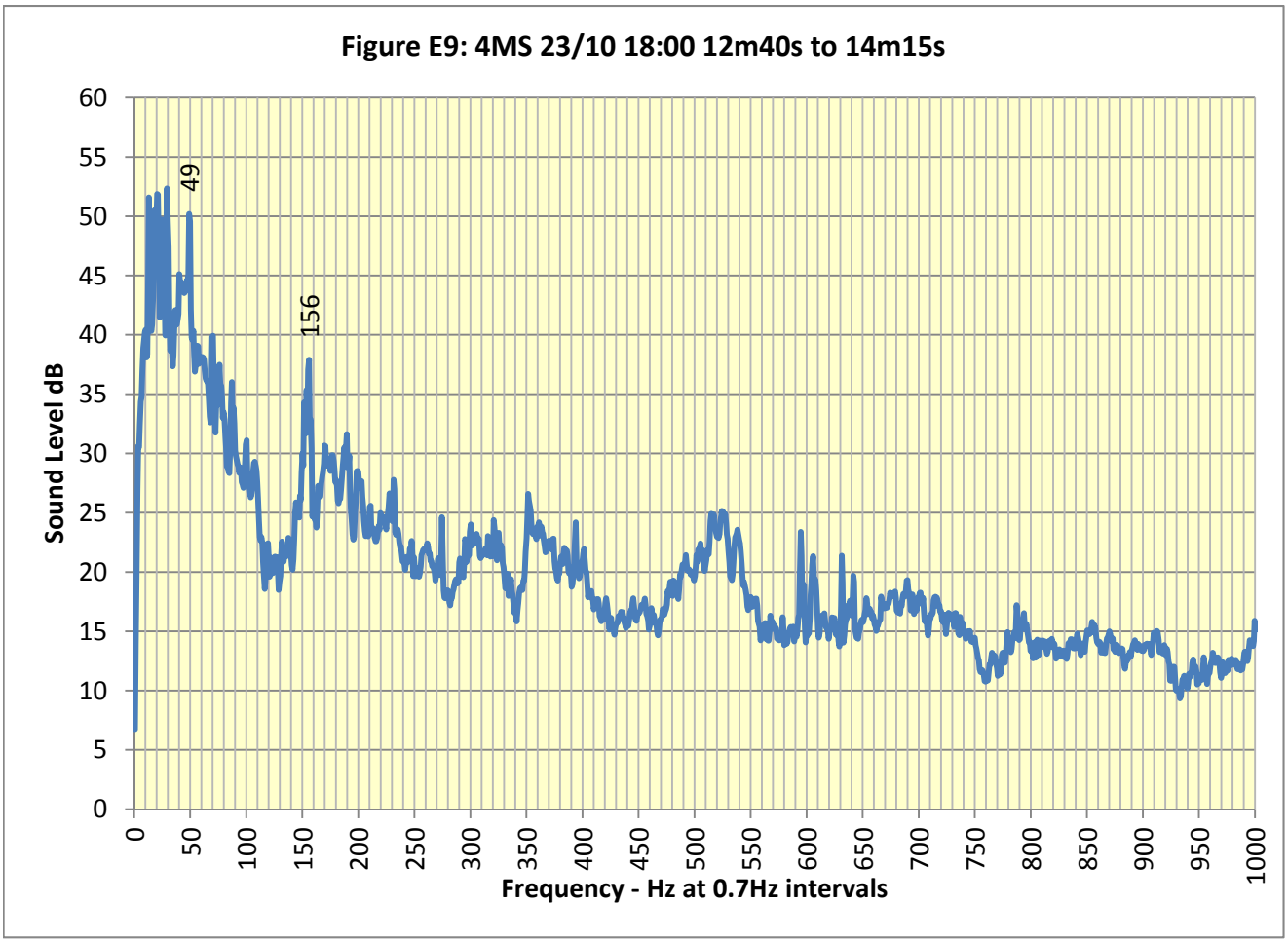


Figure E9: 4MS 23/10 18:00 12m40s to 14m15s
Sound Level dB
Frequency - Hz at 0.7Hz intervals
49
156

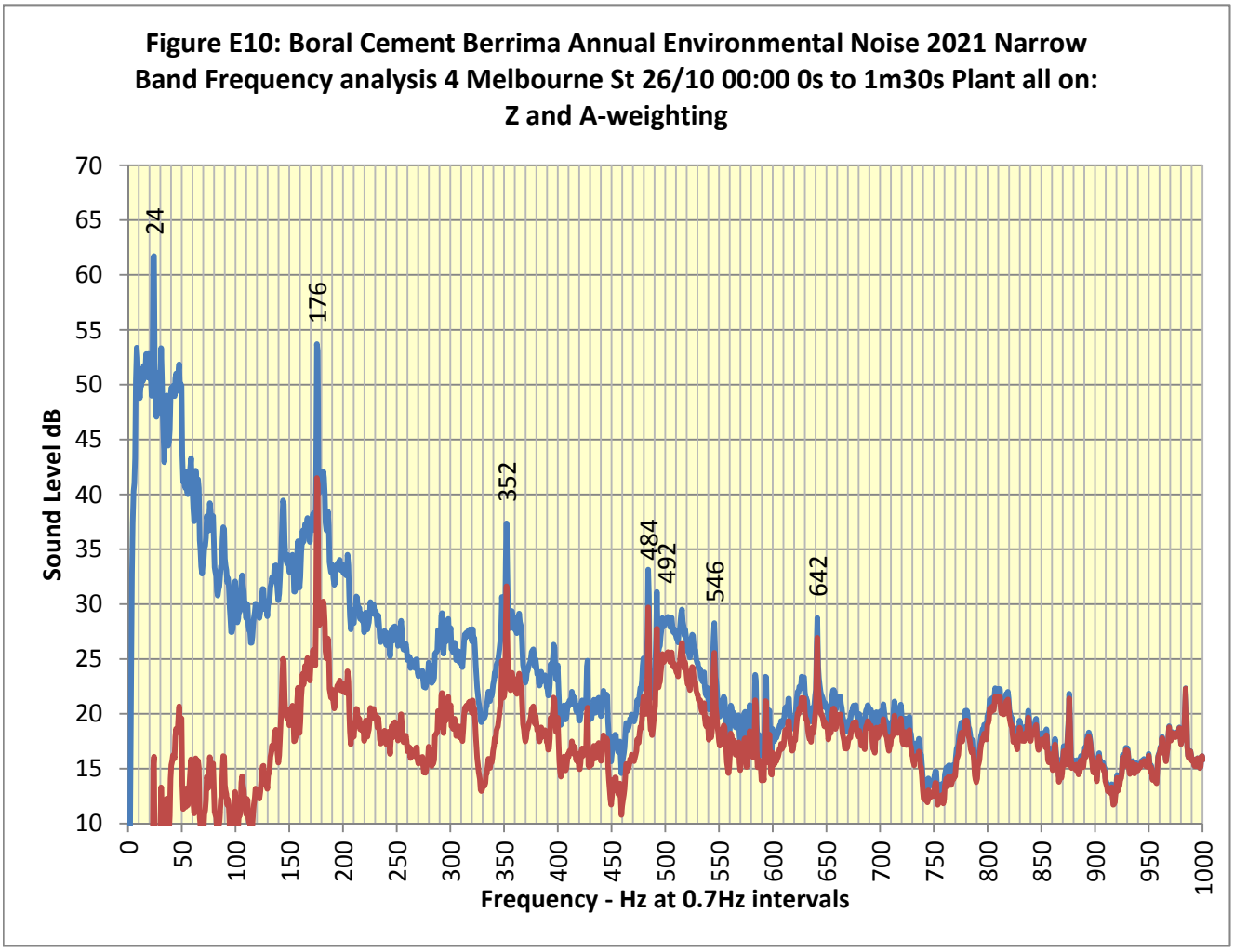


Figure E10: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 26/10 00:00 0s to 1m30s Plant all on: Z and A-weighting
Sound Level dB
Frequency - Hz at 0.7Hz intervals
24
176
352
484
492
546
642

Figure E11: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 26/10 00:00 1m43s to 4m4s Plant all on: Z and A-weighting

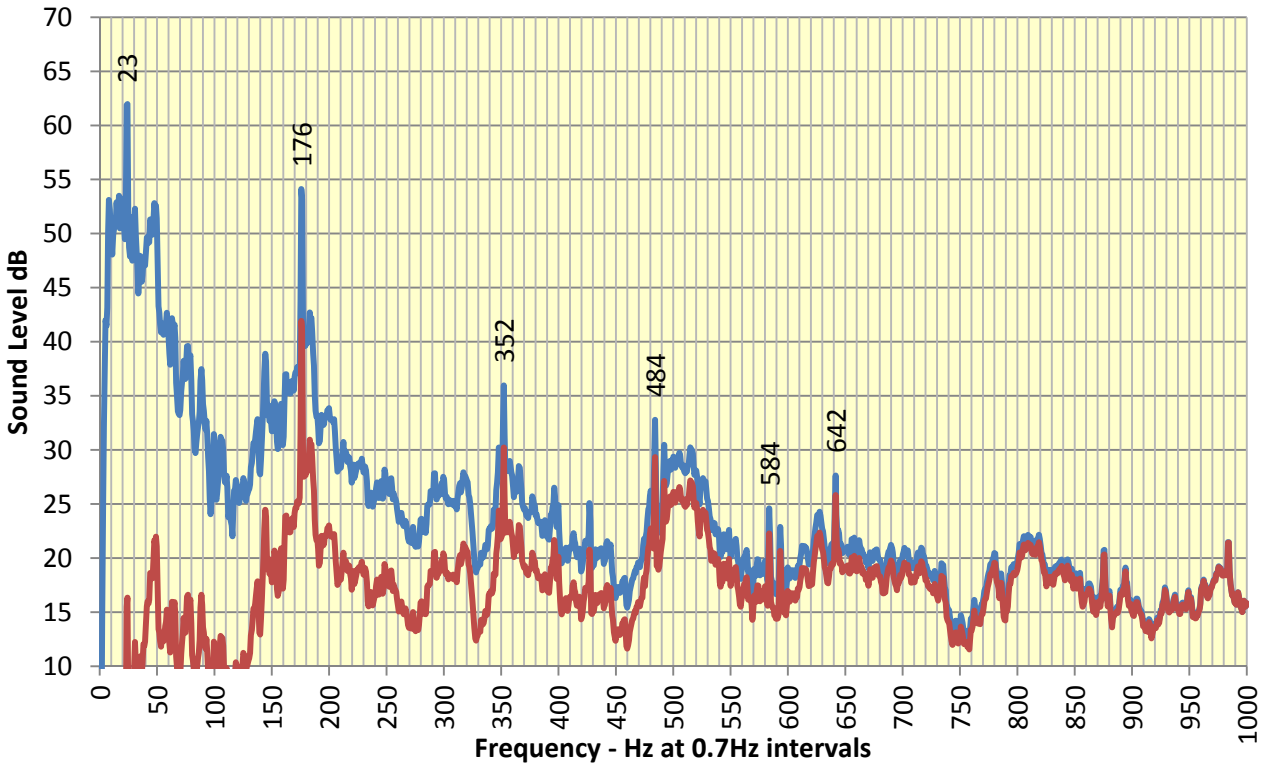
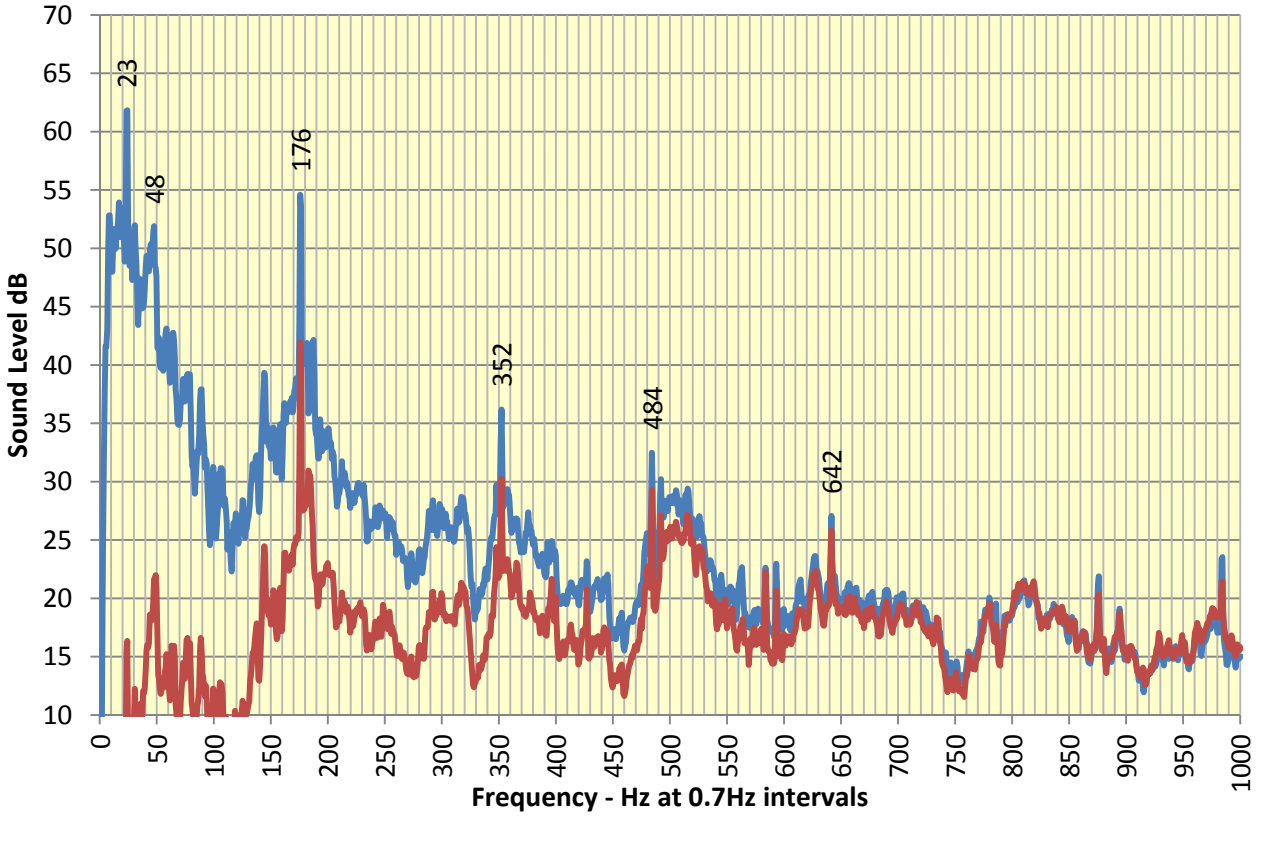


Figure E12: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 26/10 00:00 4m31s to 6m02s Plant all on: Z and A-weighting



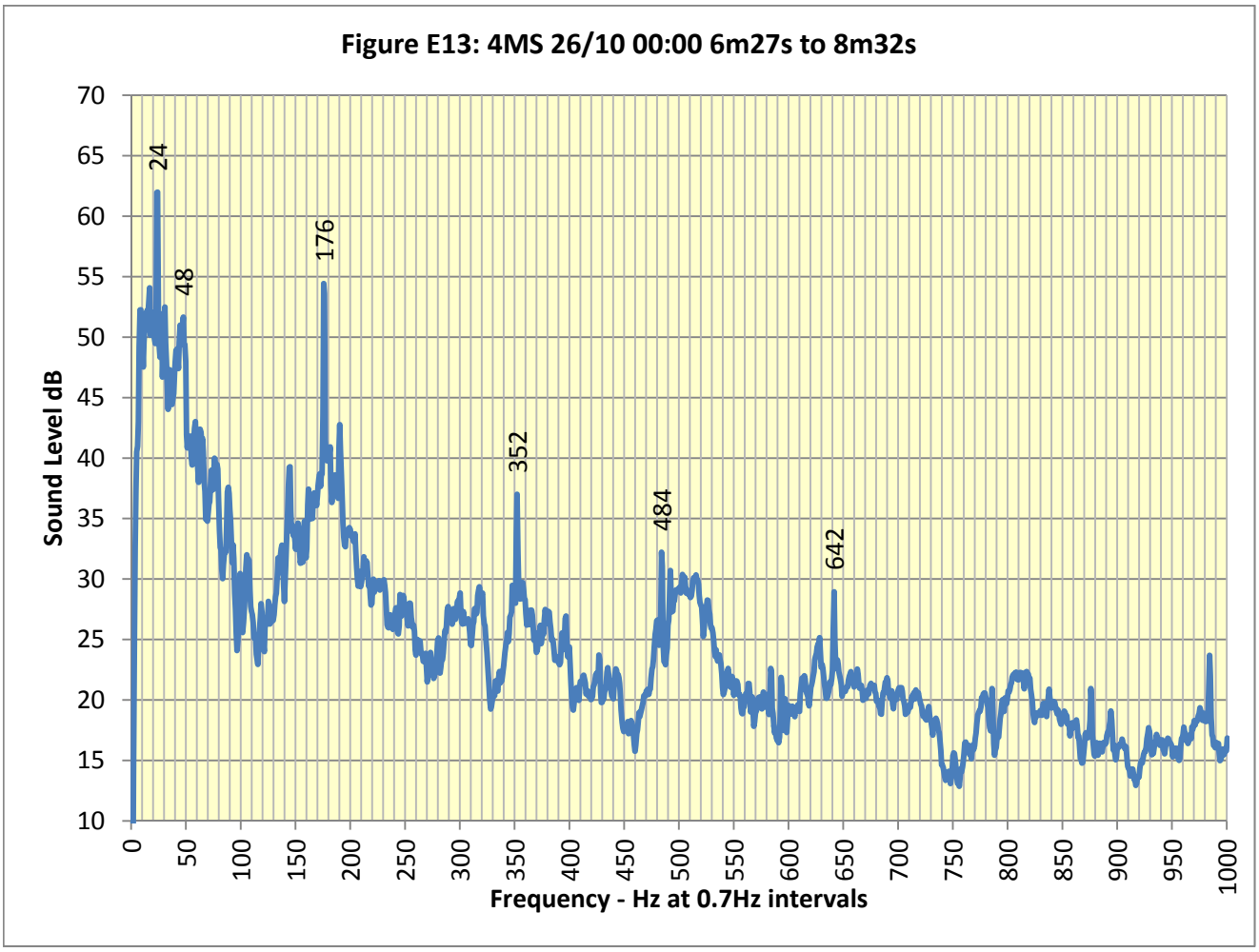


Figure E13: 4MS 26/10 00:00 6m27s to 8m32s
Sound Level dB
70
65
60
55
50
45
40
35
30
25
20
15
10
24
48
176
352
484
642
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
Frequency - Hz at 0.7Hz intervals

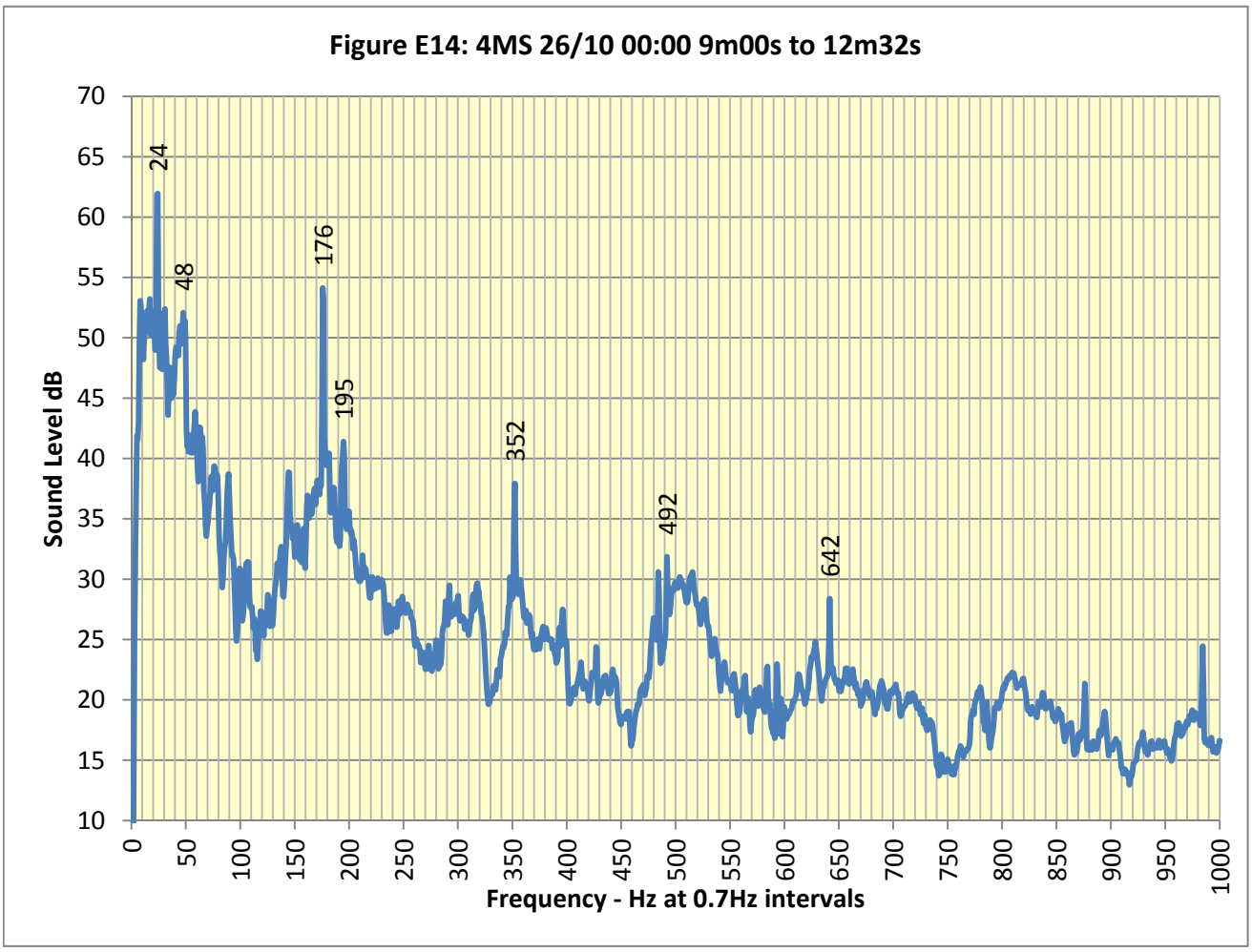


Figure E14: 4MS 26/10 00:00 9m00s to 12m32s
Sound Level dB
70
65
60
55
50
45
40
35
30
25
20
15
10
24
48
176
195
352
492
642
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
Frequency - Hz at 0.7Hz intervals

Figure E15: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 28/10 19:00 2m45s to 4m10s Plant all on: Z and A-weighting

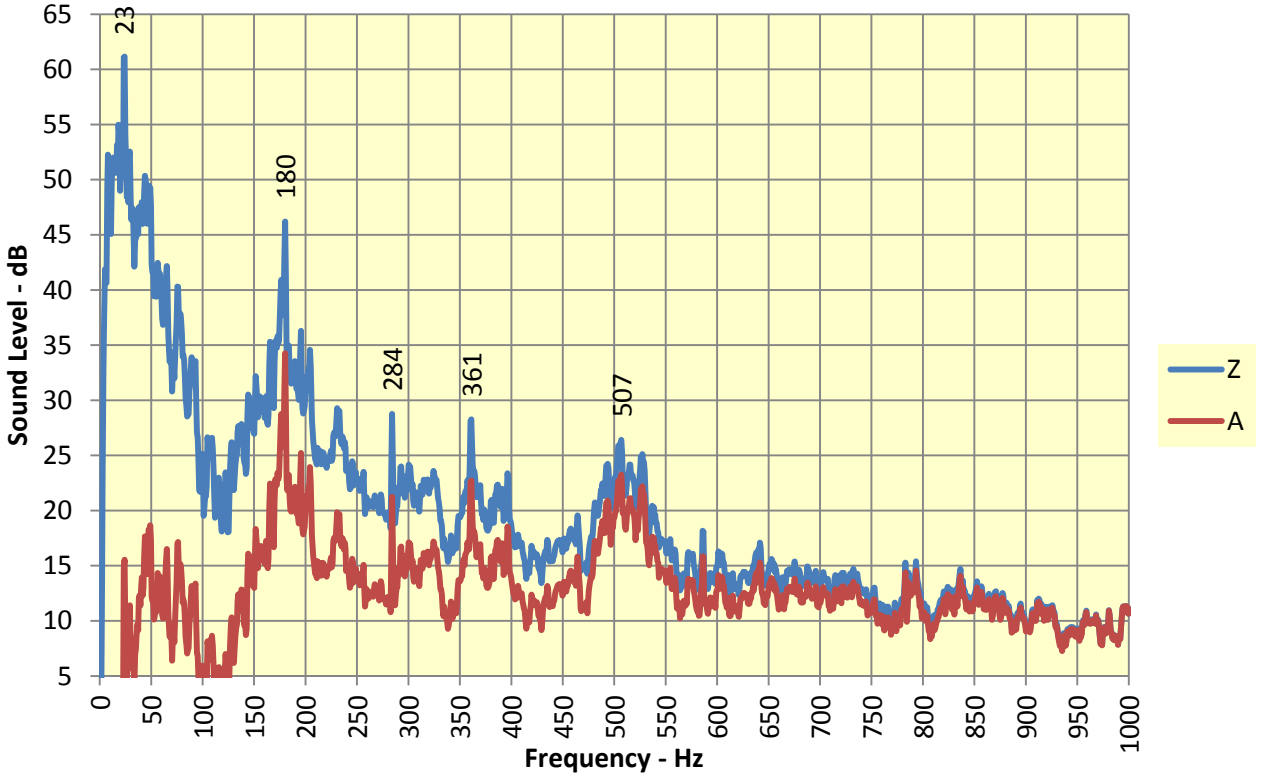


Figure E16: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 28/10 19:00 6m31s to 7m20s Plant all on: Z and A-weighting

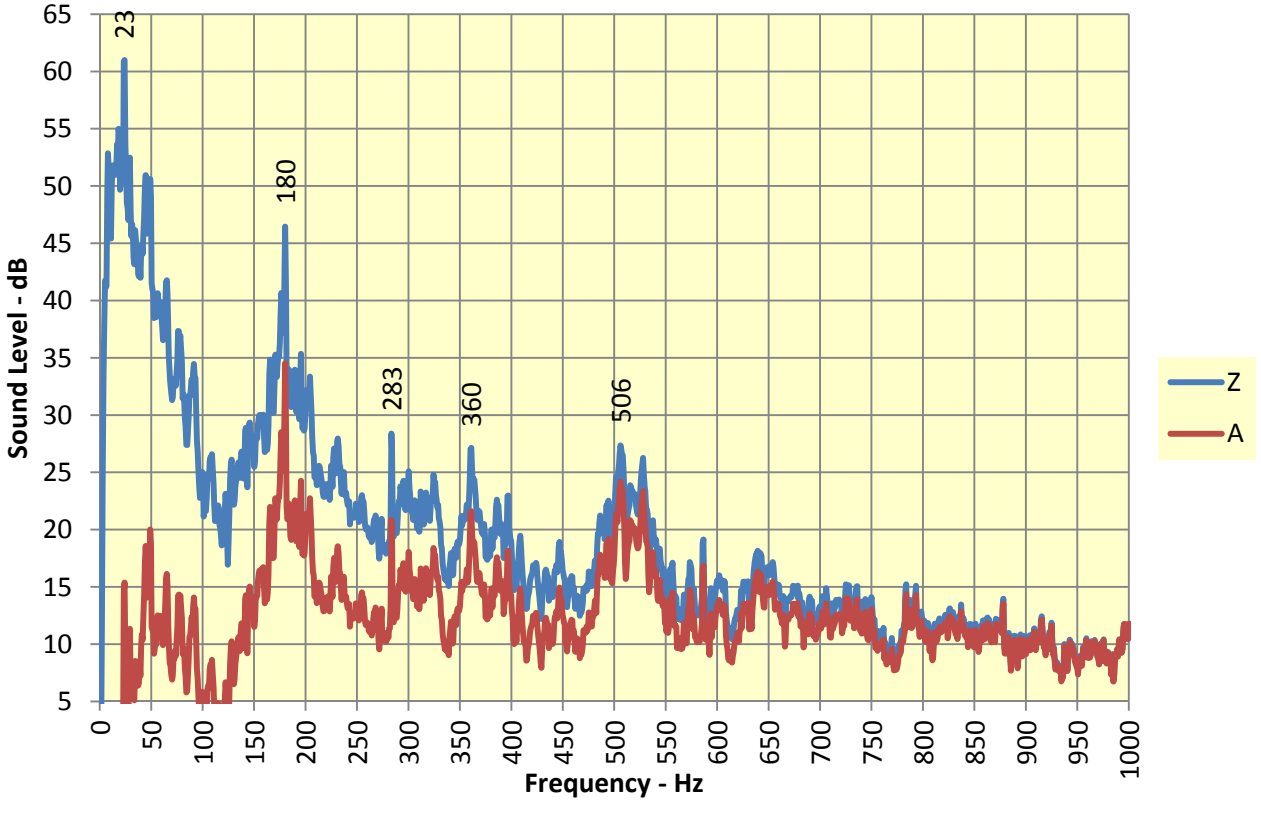


Figure E17: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 28/10 19:00 14m20s to 15m00s Plant all on: Z and A-weighting

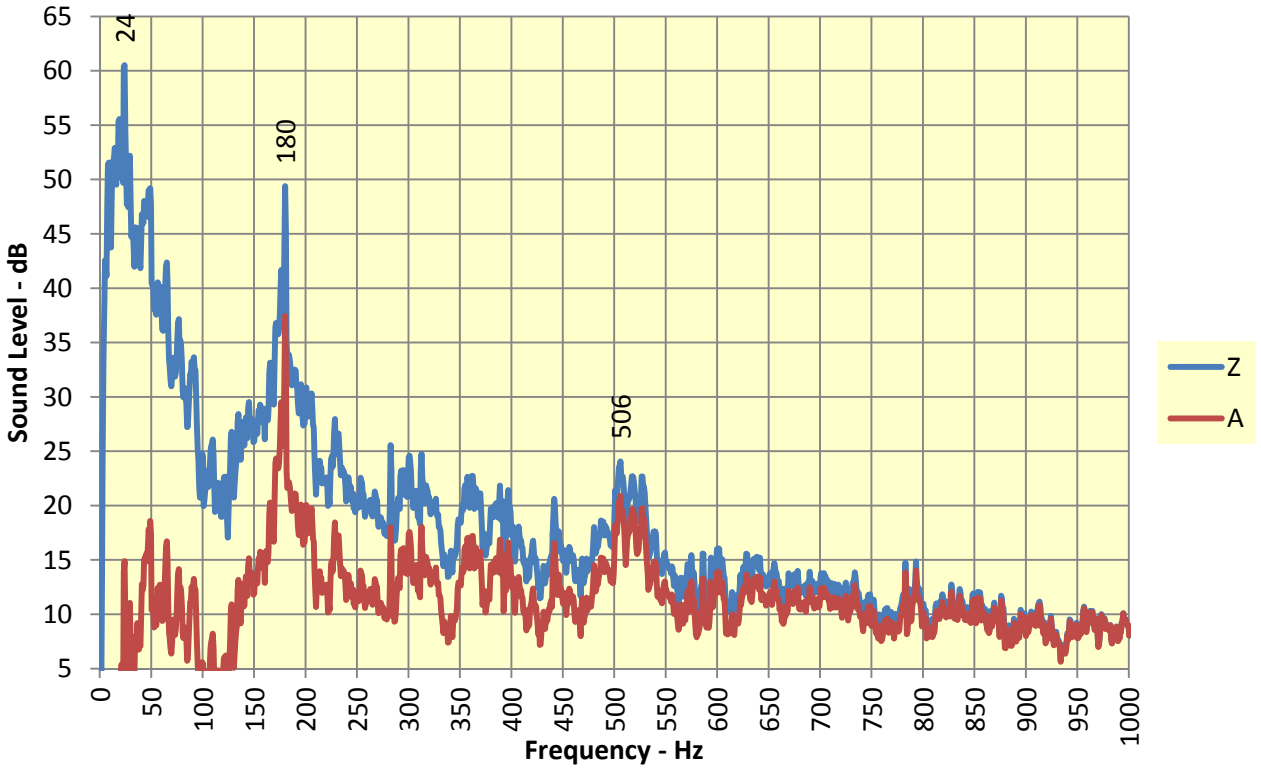


Figure E18: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 29/10 00:00 1m0s to 3m32s Plant all on: Z and A-weighting

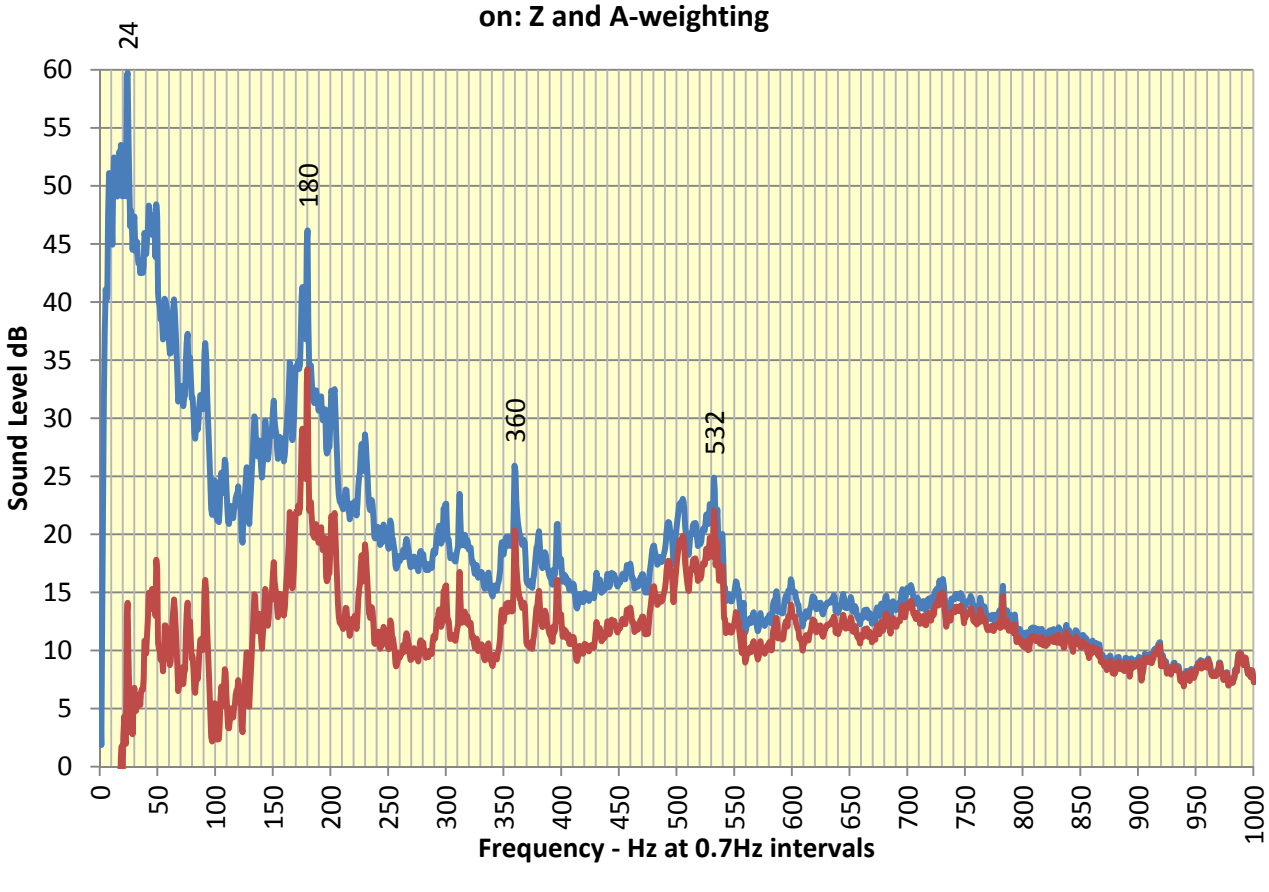


Figure E19: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 29/10 00:00 3m25s to 3m35s Plant all on: Z and A-weighting

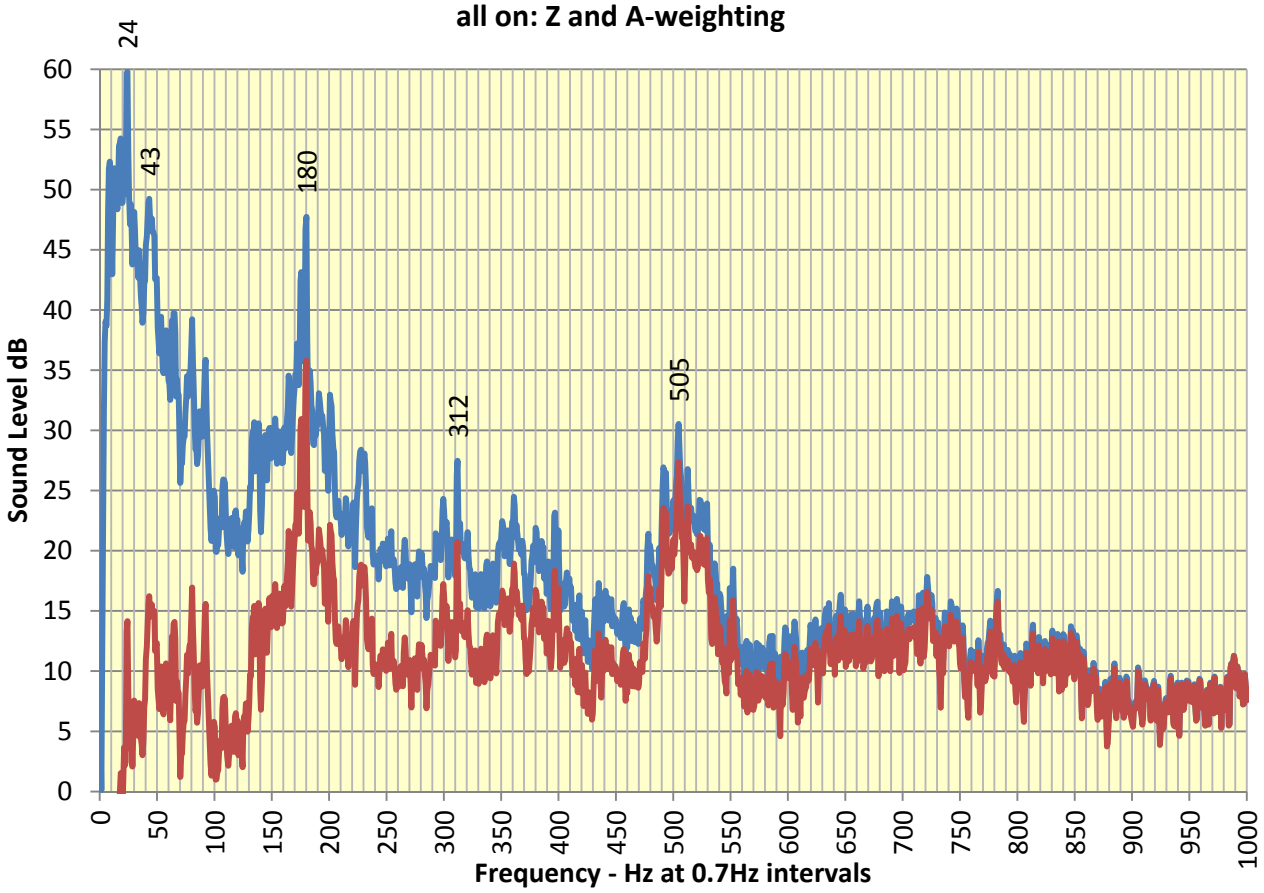


Figure E20: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 29/10 00:00 5m0s to 5m20s Plant all on: Z and A-weighting

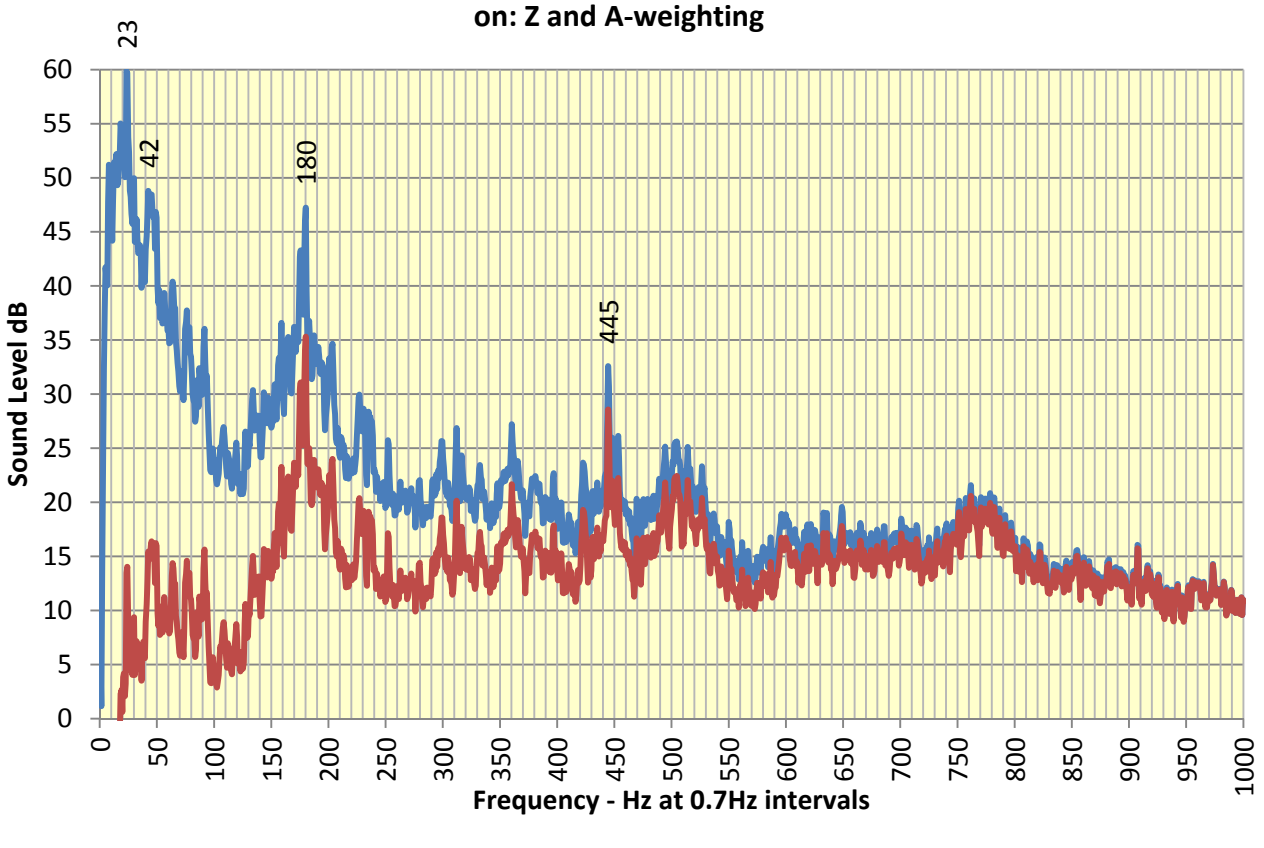


Figure E21: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 29/10 00:00 6m0s to 9m0s Plant all on: Z and A-weighting

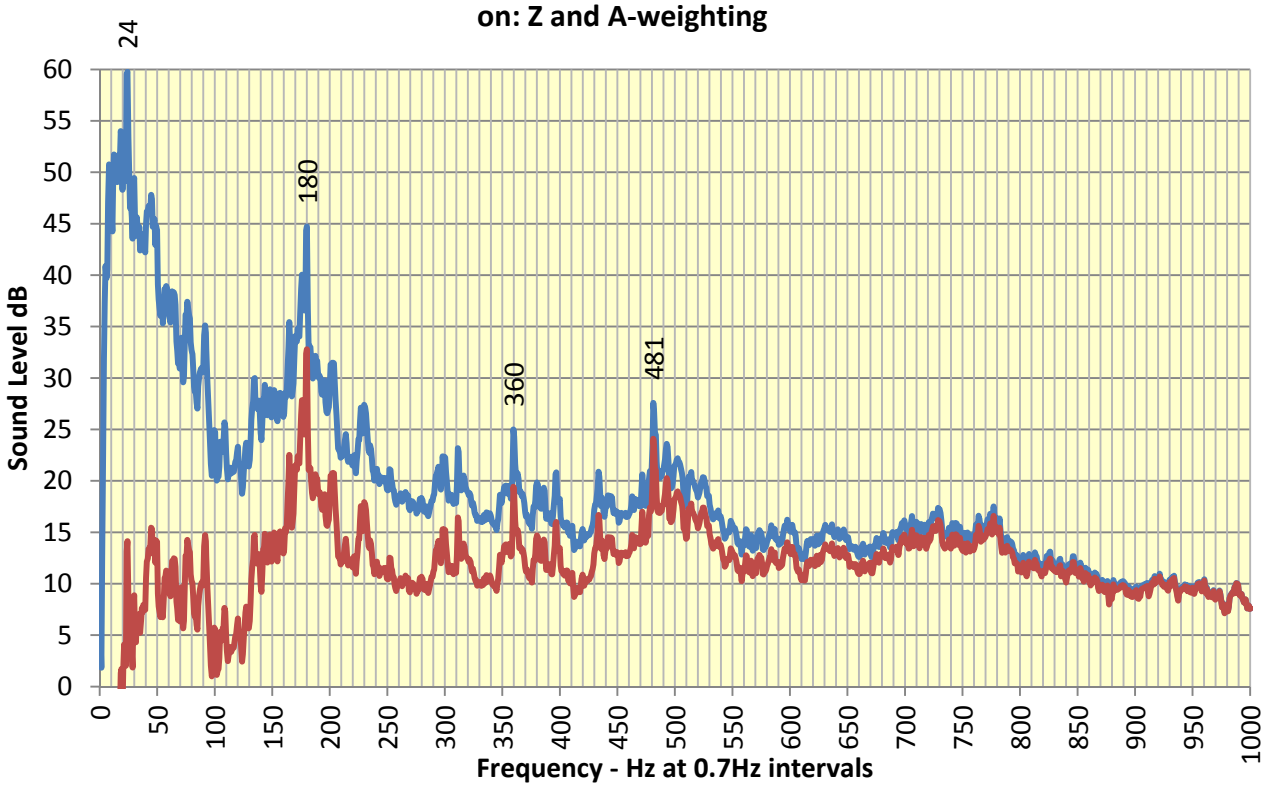
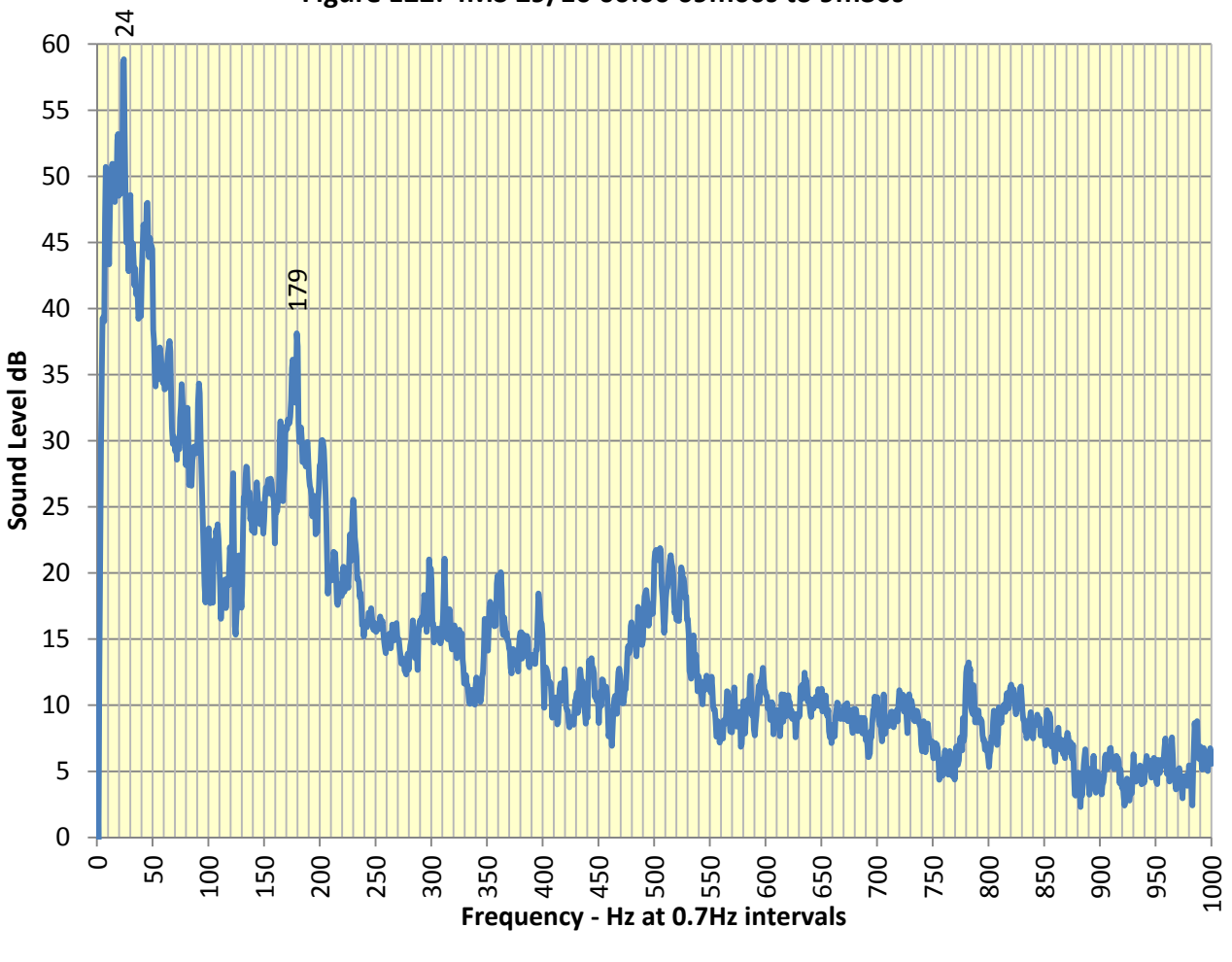


Figure E22: 4MS 29/10 00:00 09m00s to 9m30s



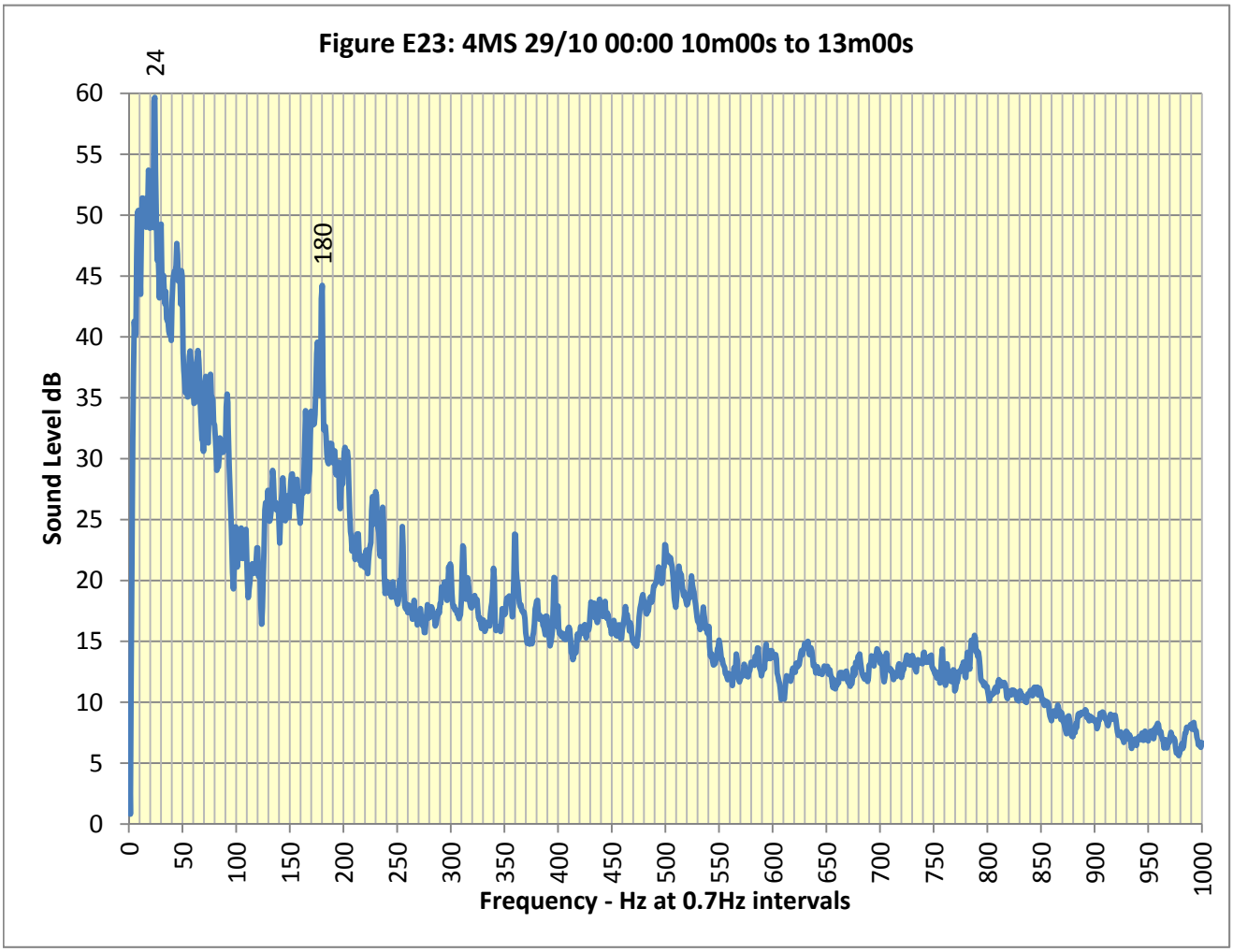


Figure E23: 4MS 29/10 00:00 10m00s to 13m00s
24
180
Sound Level dB
0
5
10
15
20
25
30
35
40
45
50
55
60
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
Frequency - Hz at 0.7Hz intervals

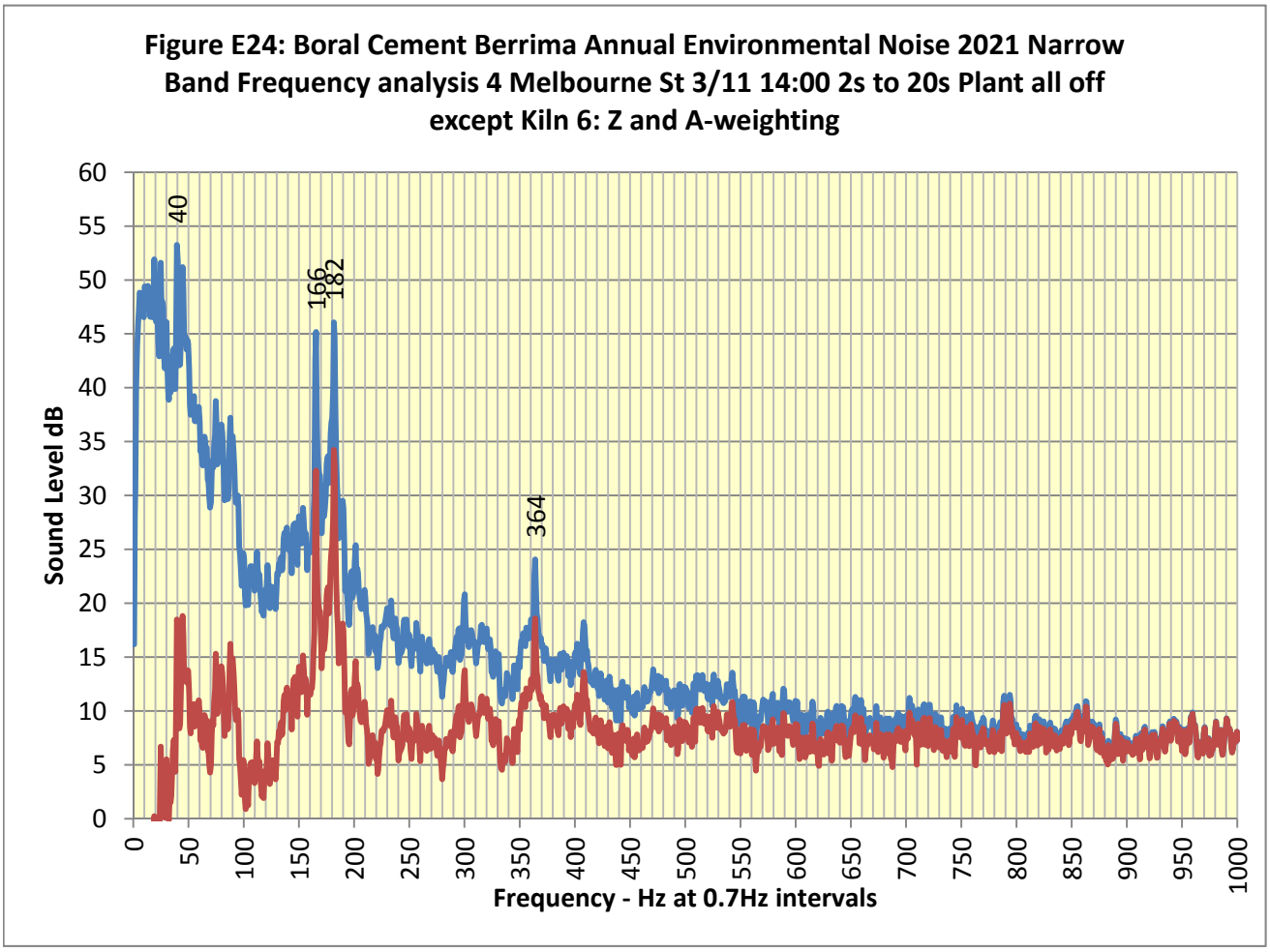


Figure E24: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 3/11 14:00 2s to 20s Plant all off except Kiln 6: Z and A-weighting
40
166
182
364
Sound Level dB
0
5
10
15
20
25
30
35
40
45
50
55
60
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
Frequency - Hz at 0.7Hz intervals

Figure E25: Boral Cement Berrima Annual Environmental Noise 2021 Narrow Band Frequency analysis 4 Melbourne St 3/11 14:00 2m25s to 2m42s Plant all off except Kiln 6: Z and A-weighting

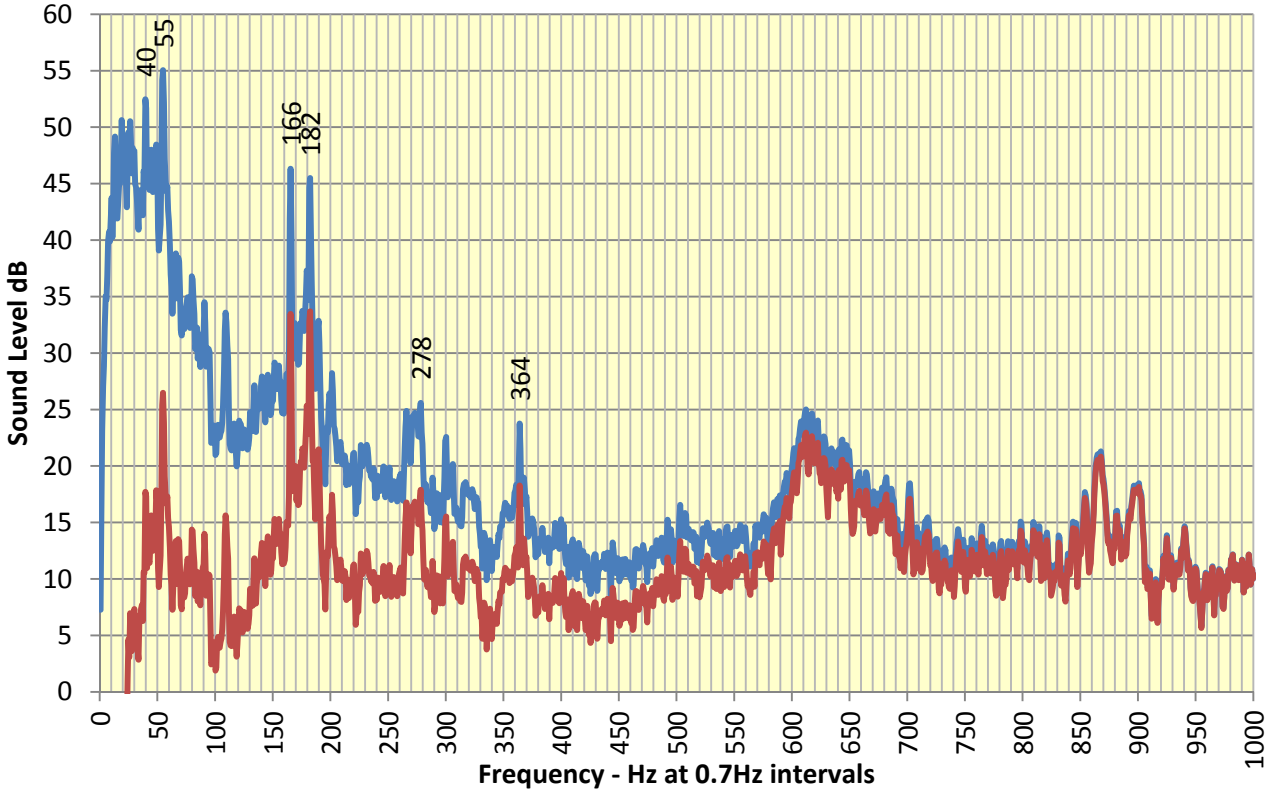


Figure E26: 4MS 3/11 14:00 3m45s to 4m34s

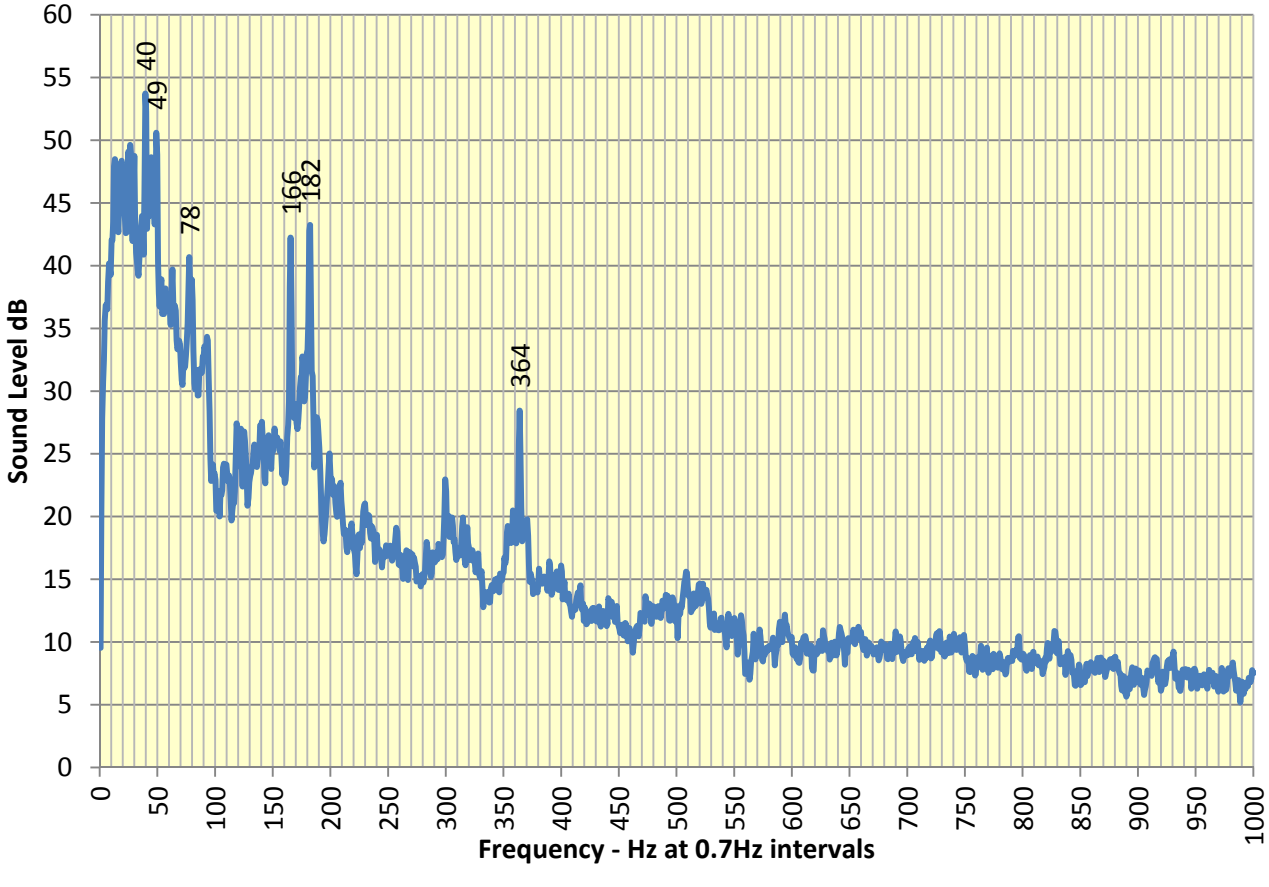


Figure E27: 4MS 3/11 14:00 7m33s to 7m53s

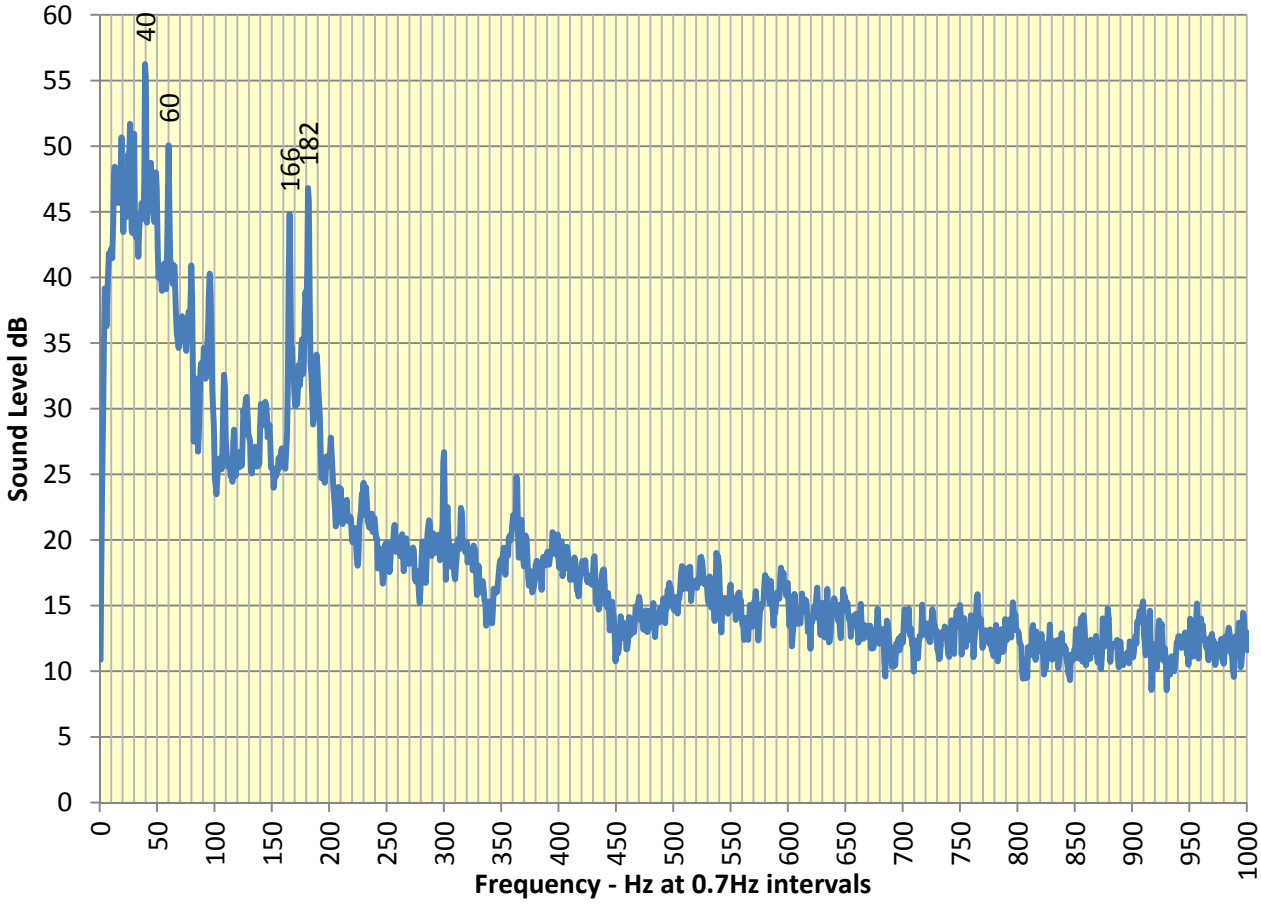


Figure E28: 4MS 3/11 14:00 4m42s to 11m00s

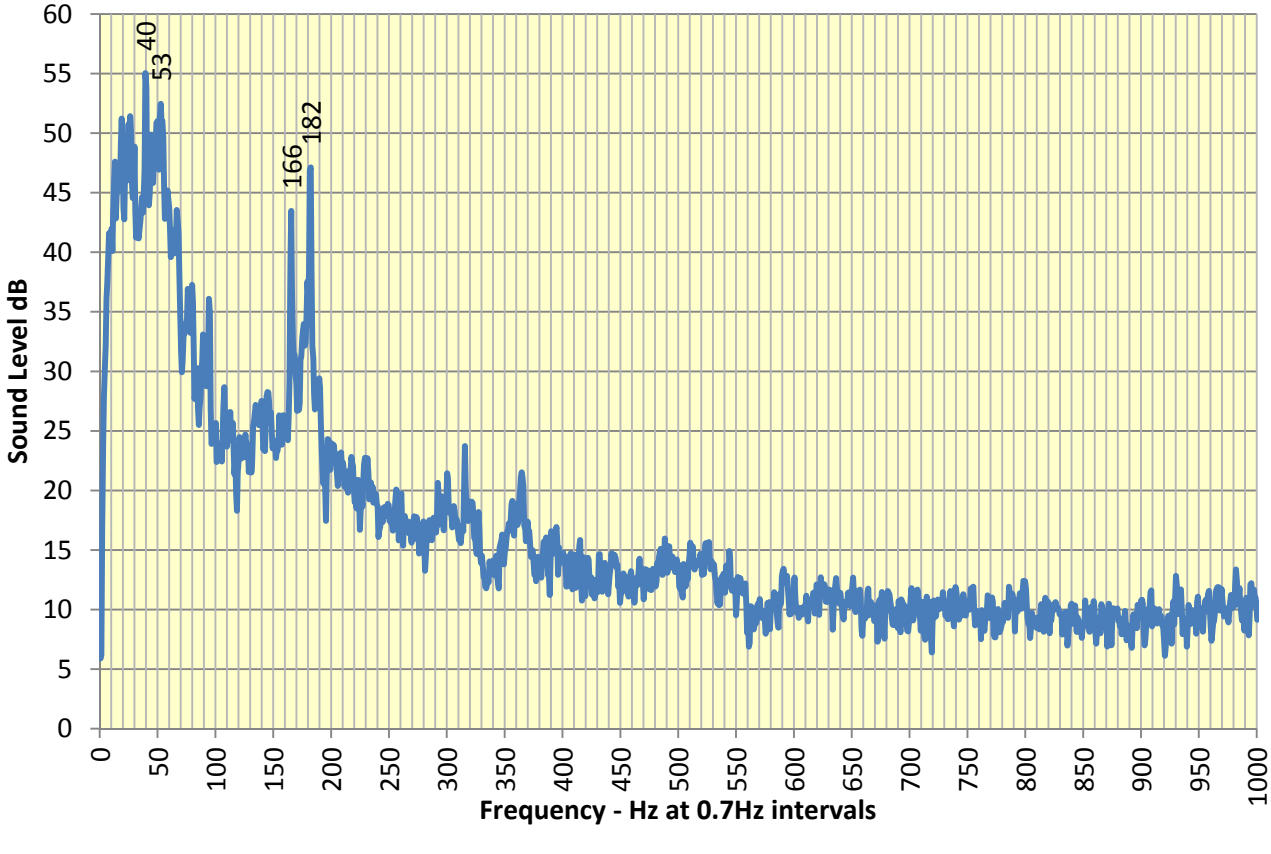


Figure E29: 4MS 3/11 14:00 12m56s to 13m25s

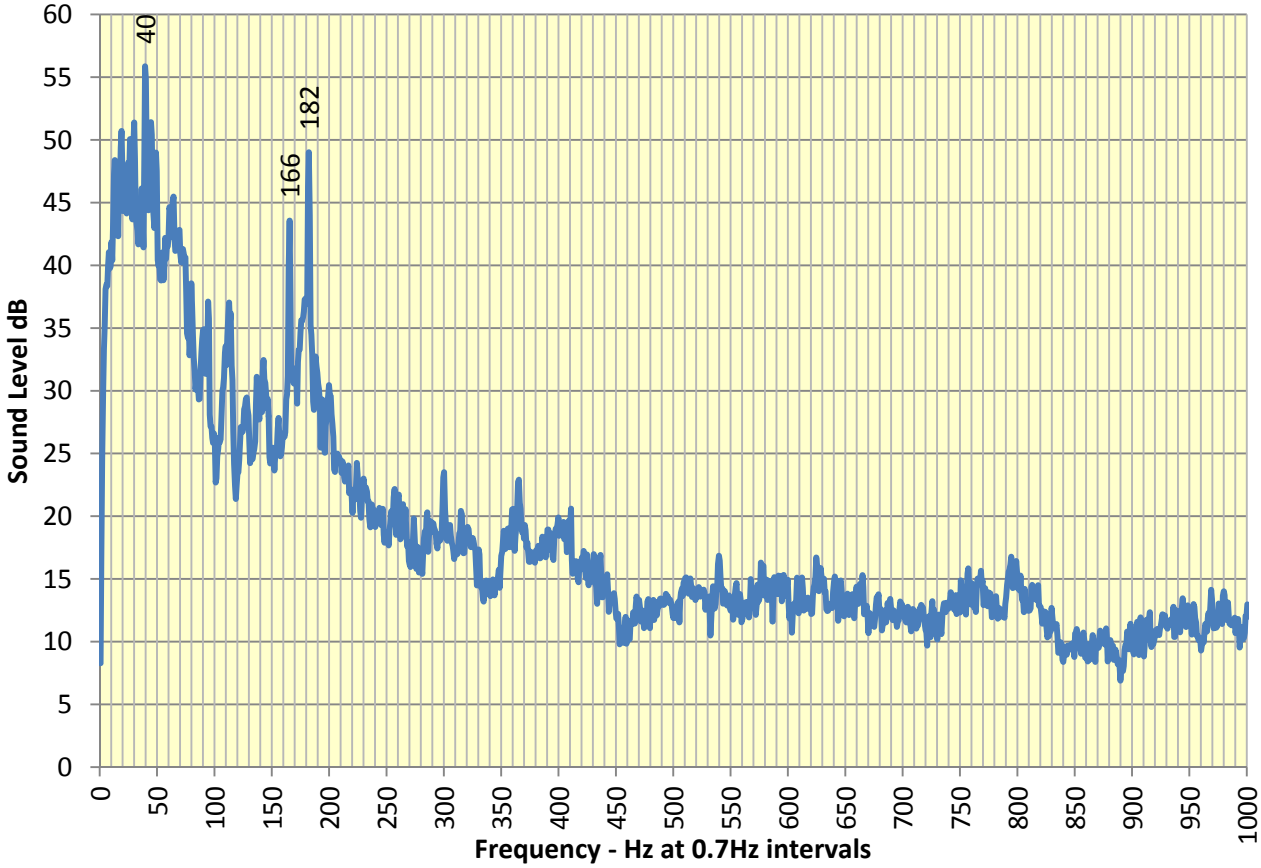


Figure E30: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 4 Melbourne St 9:00 Morning 4 November 2021

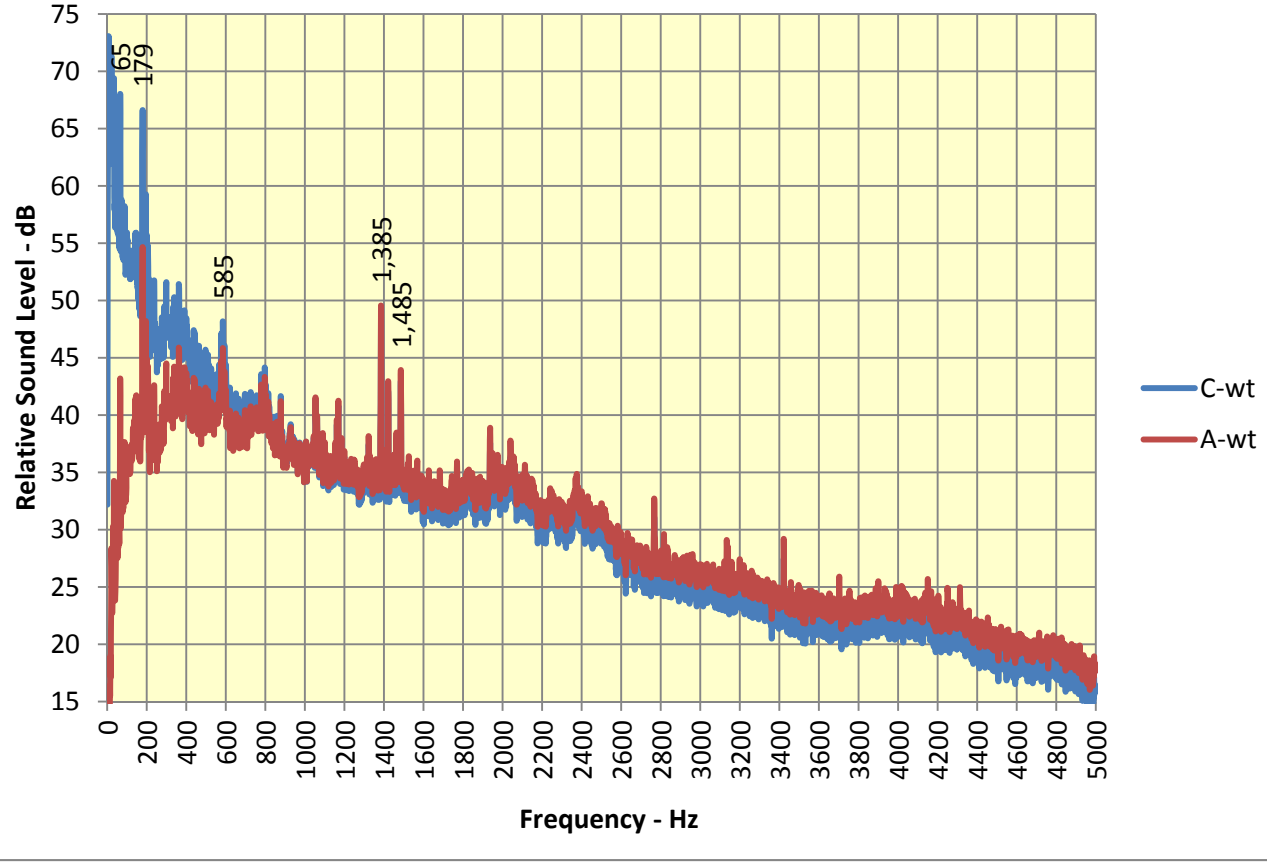


Figure E31: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 4 Melbourne St 9:00 Morning 4 November 2021

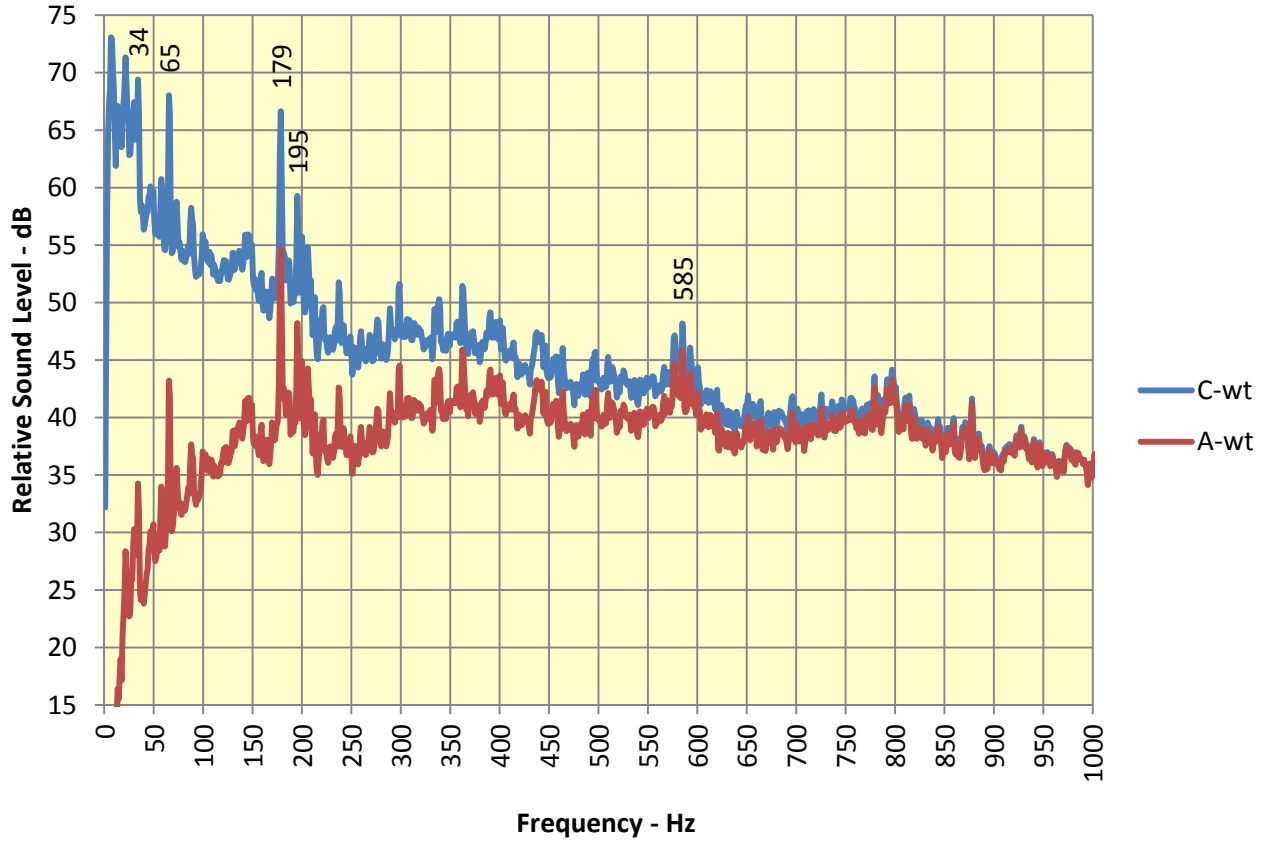
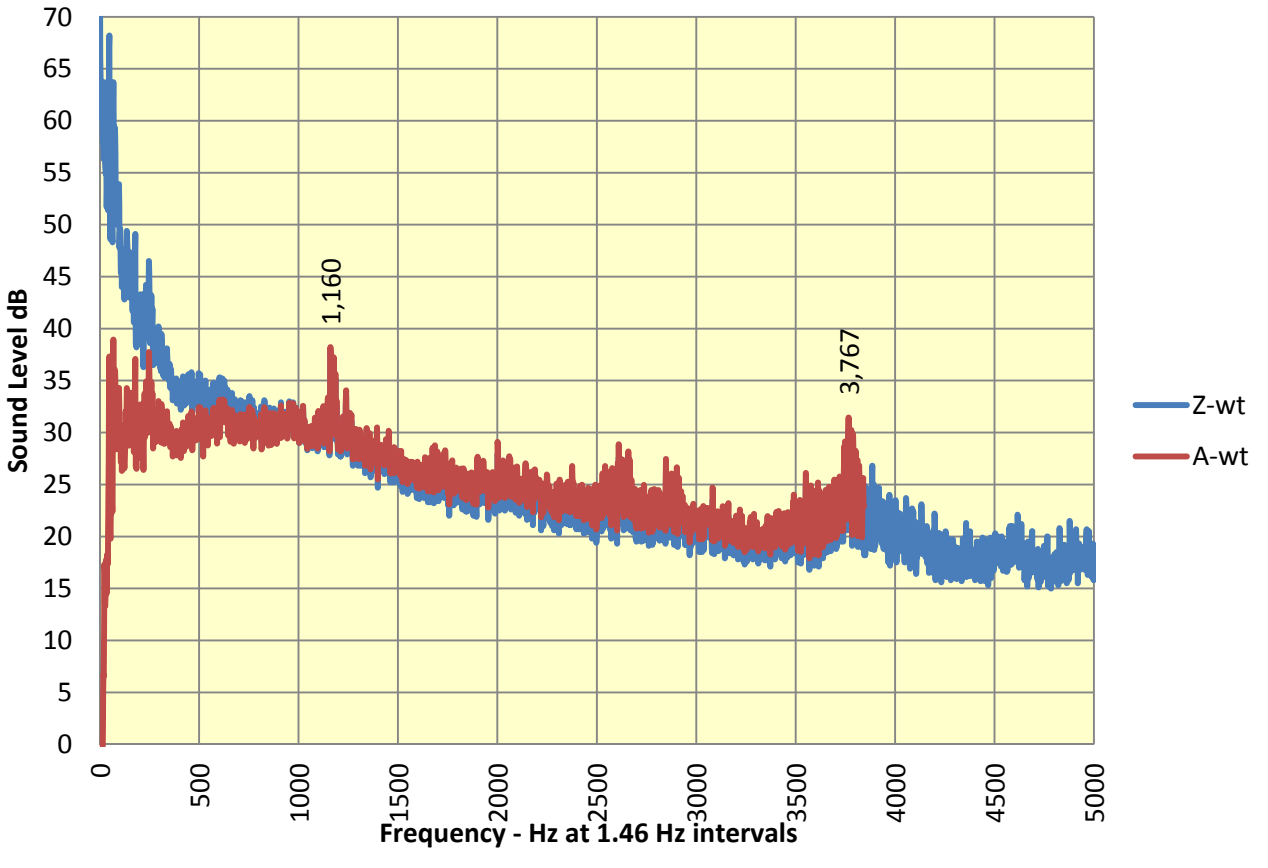


Figure E32: Boral Cement Berrima Annual Environmental Noise - Narrow Band Spectral Analysis 4 Melbourne St 4/11 13:56 AM F62



app e r1 narrow band attended 2021

Figure E33: Boral Cement Berrima Annual Environmental Noise - Narrow Band Spectral Analysis 4 Melbourne St 4/11 13:56 AM F62

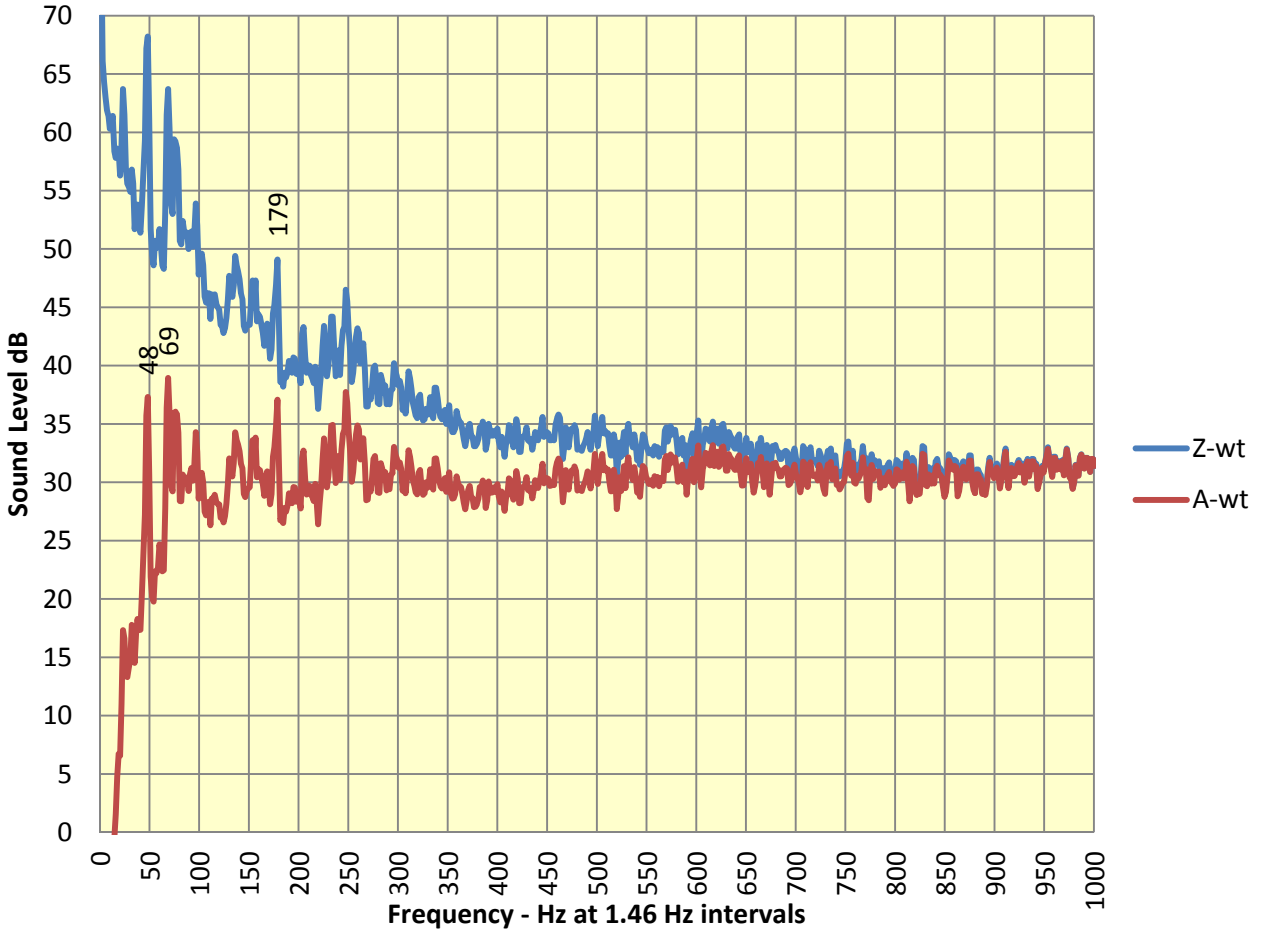


Figure E34: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum Adelaide St near Taylor 18:15 Evening 22 October 2021

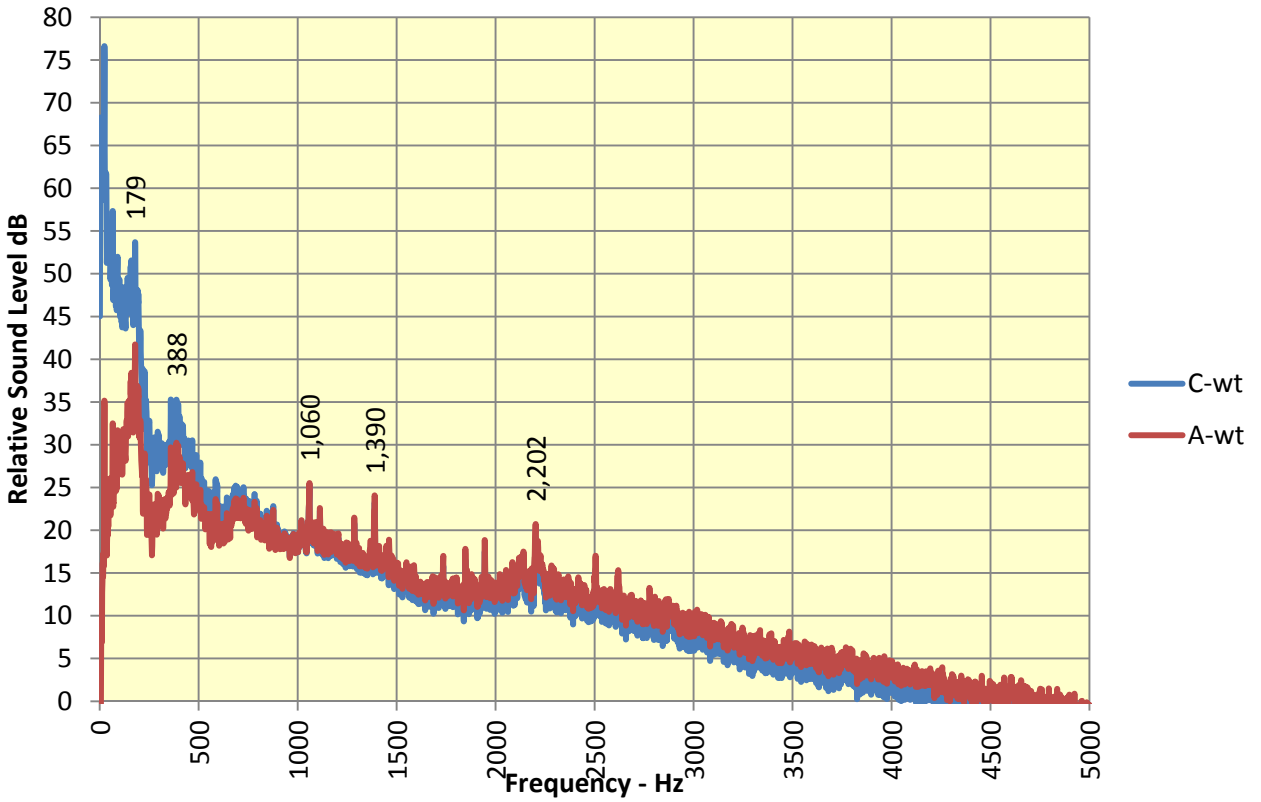


Figure E35: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum Adelaide St near Taylor 18:15 Evening 22 October 2021

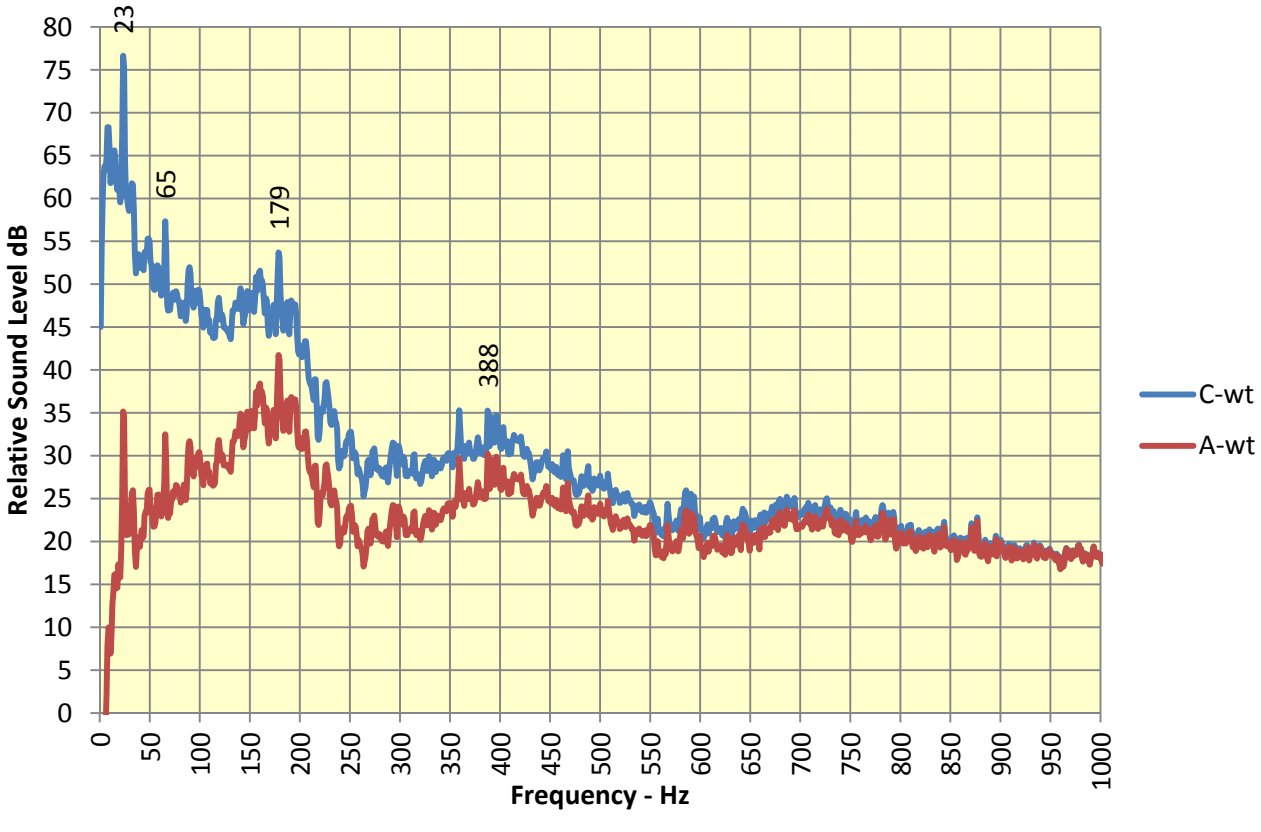


Figure F36: Boral Cement Berrima Annual Environmental Noise Assessment 2021: Attended monitoring narrow band Adelaide St 4/11 13:31 #61

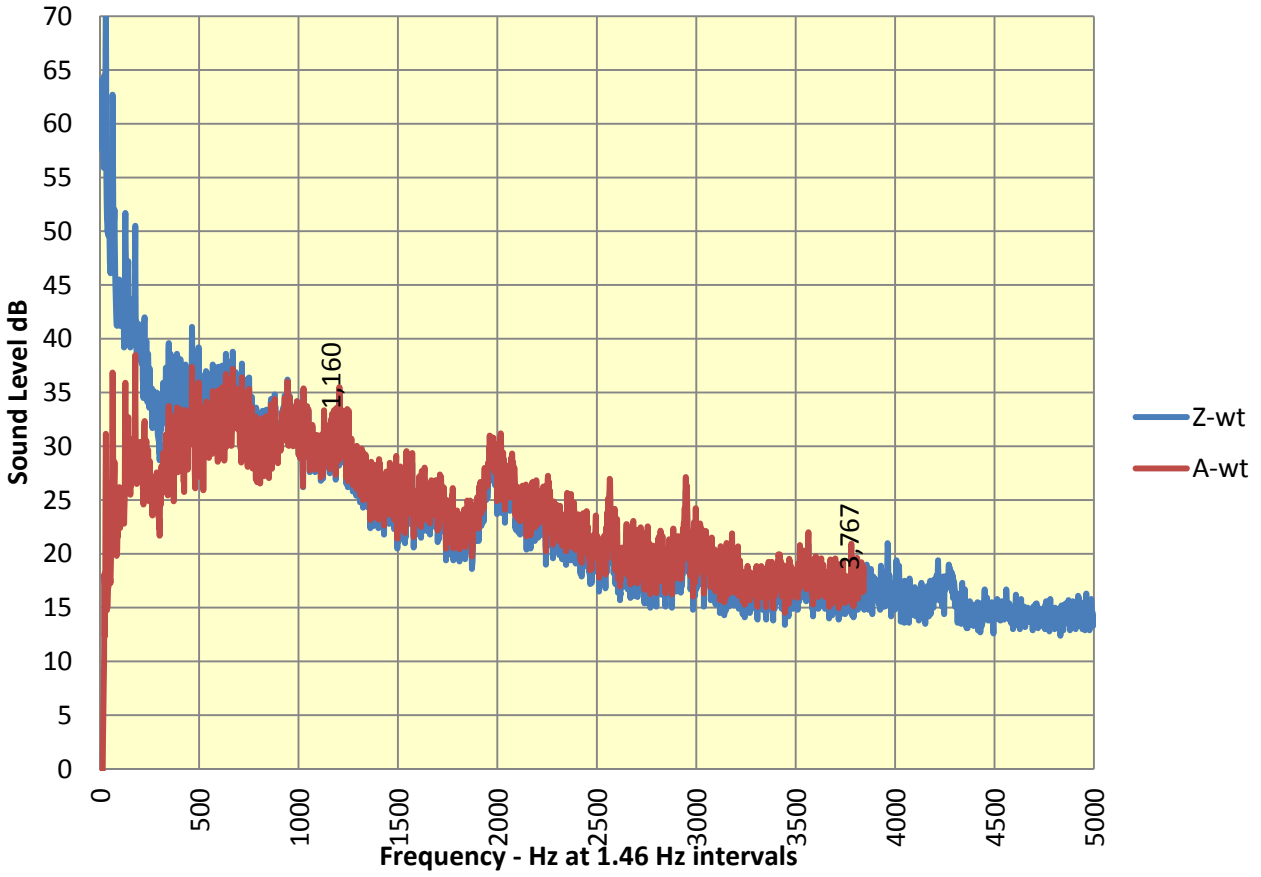


Figure F37: Boral Cement Berrima Annual Environmental Noise Assessment 2021: Attended monitoring narrow band Adelaide St 4/11 13:31 #61

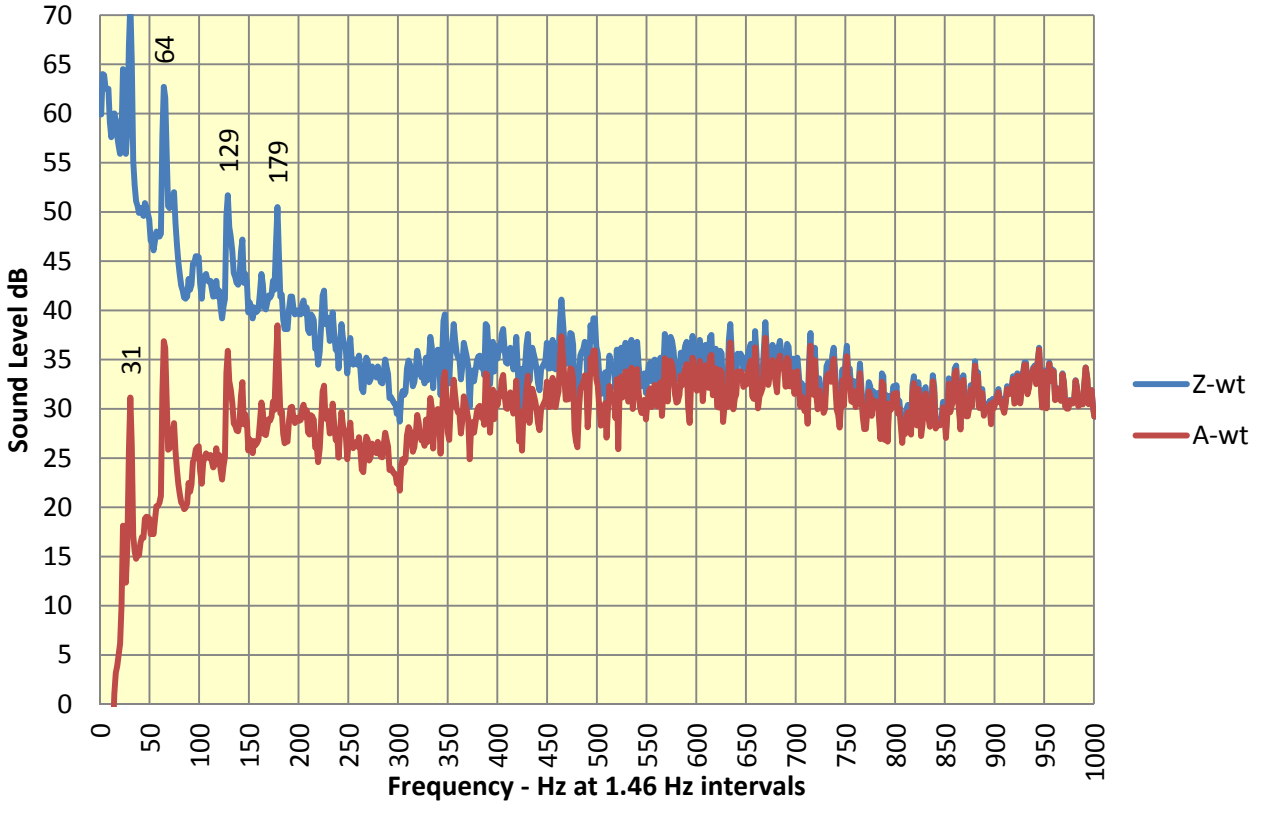


Figure E38: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 12 Brisbane St 18:18 Evening 22 October 2021

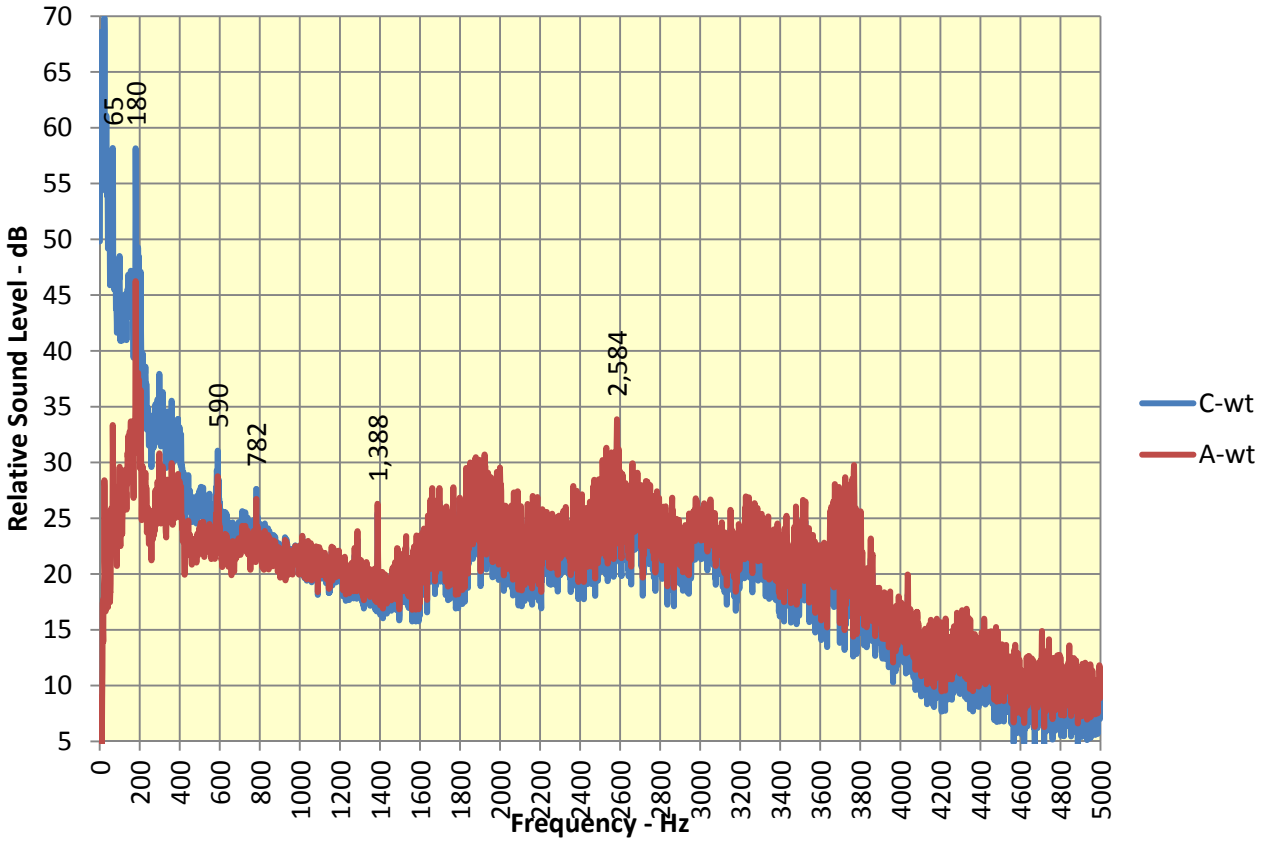


Figure E39: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 12 Brisbane St 18:18 Evening 22 October 2021

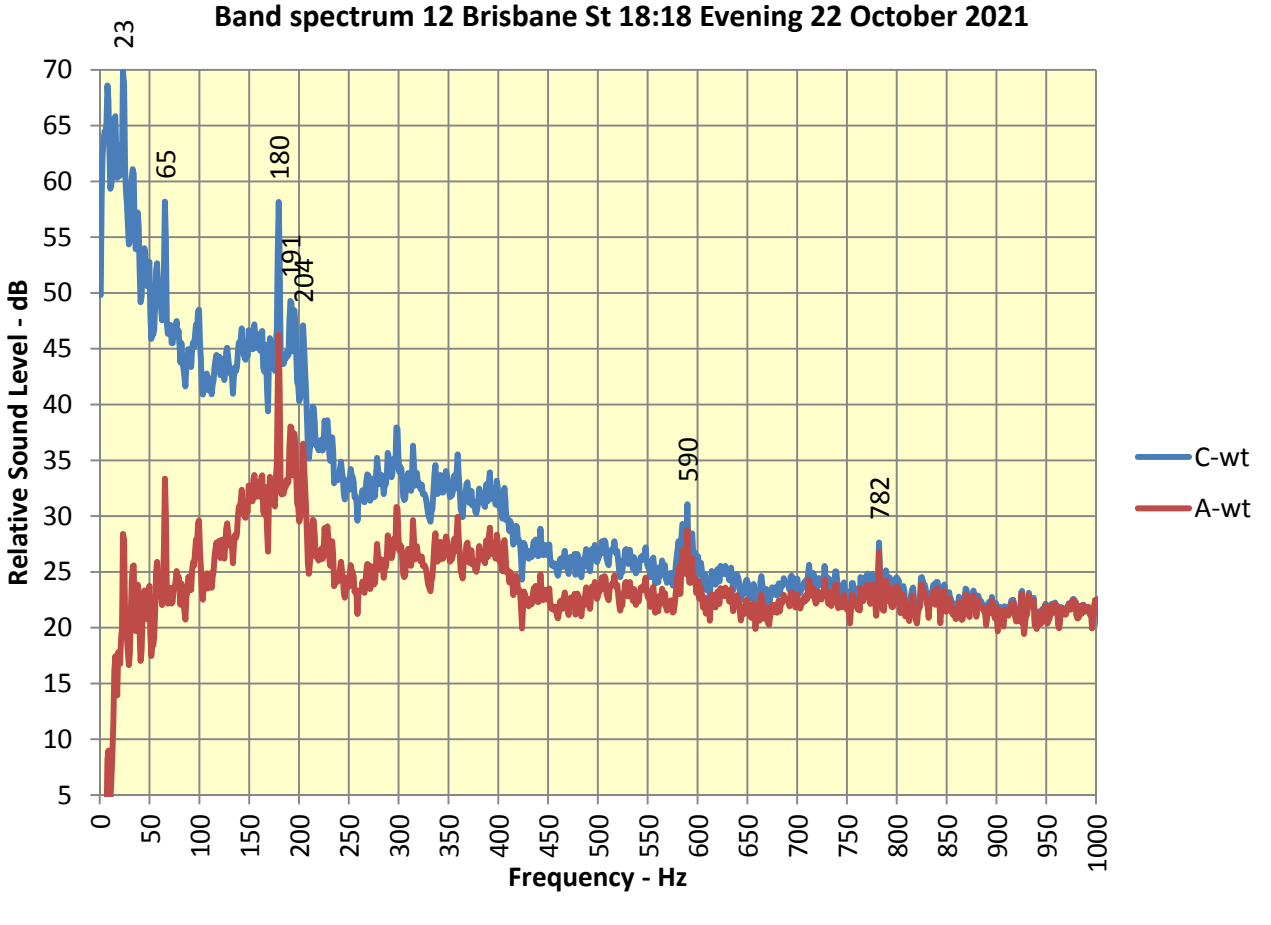


Figure E40: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 12 Brisbane St 13:50 Daytime 4 November 2021

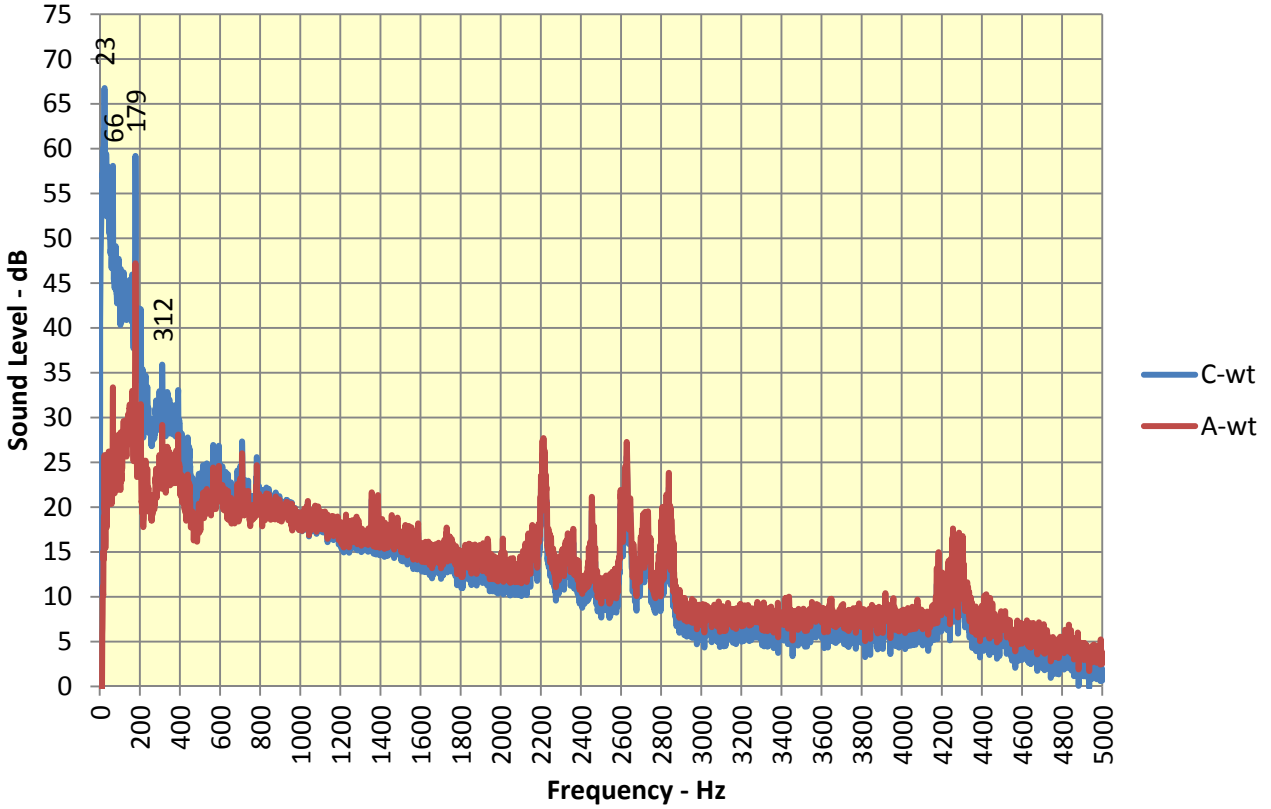


Figure E41: Boral Cement Berrima Annual Environmental Noise 2021: Narrow Band spectrum 12 Brisbane St 13:50 Daytime 4 November 2021

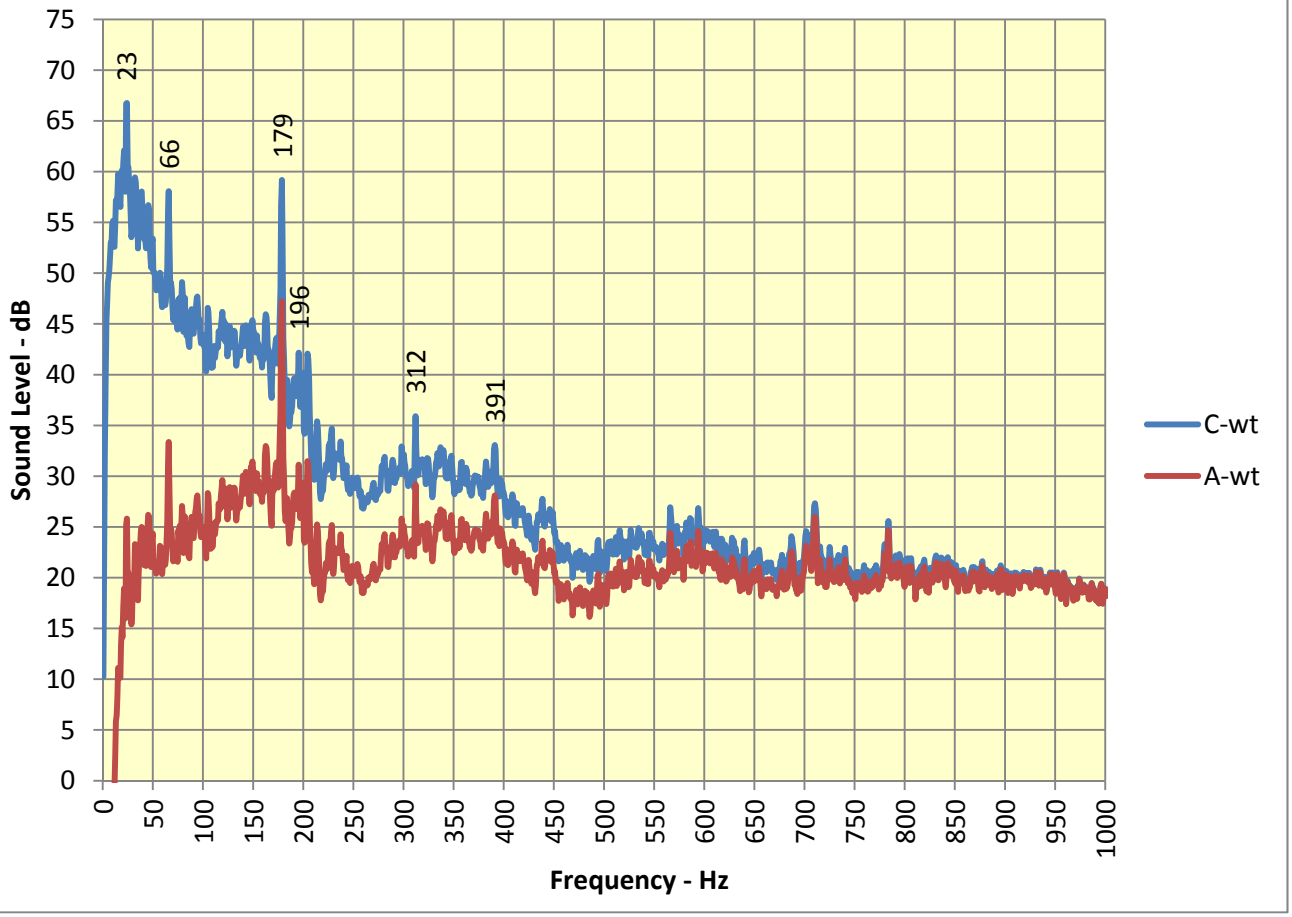


Figure E42: Boral Cement Berrima Annual Environmental Noise Assessment 2021: Attended monitoring narrow band spectra North Fence 26/10 00:00

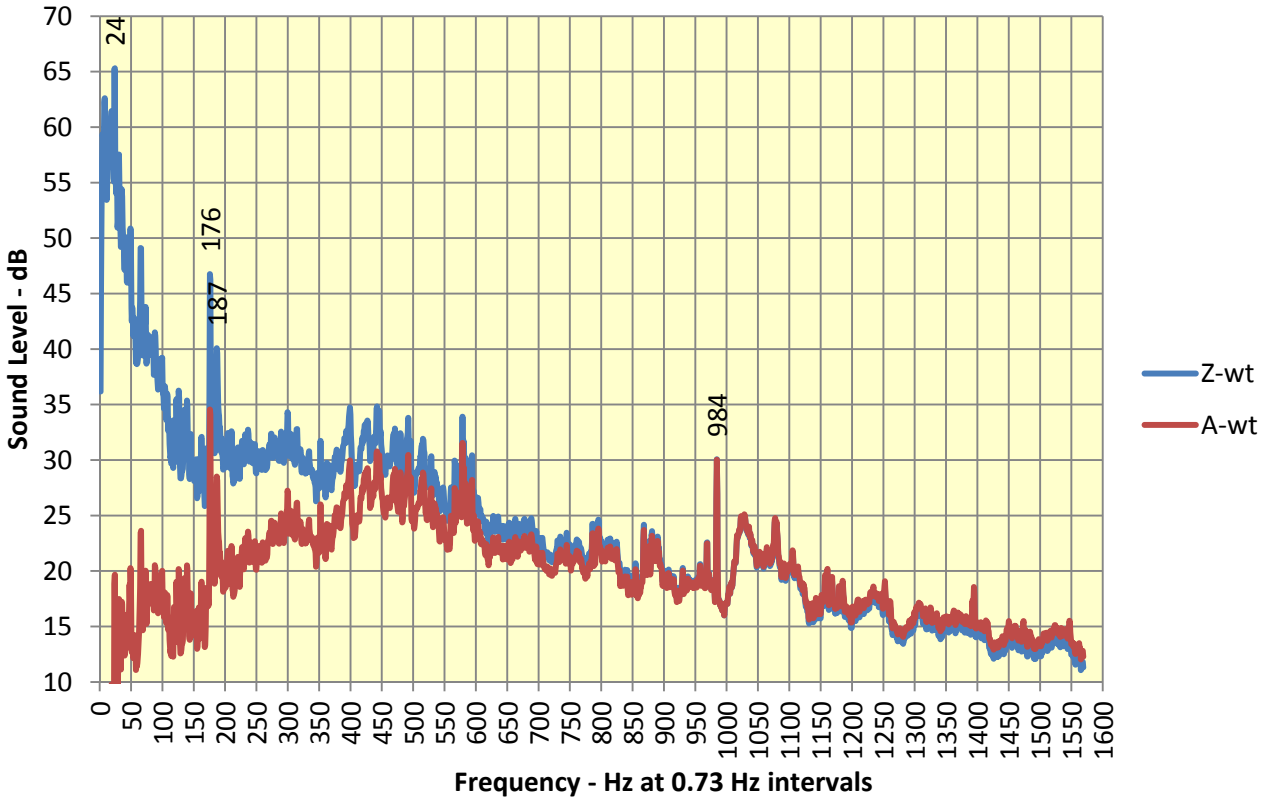


Figure E43: Boral Cement Berrima Annual Environmental Noise Assessment 2021: Attended monitoring narrow band spectra Location 20 23/10 18:00

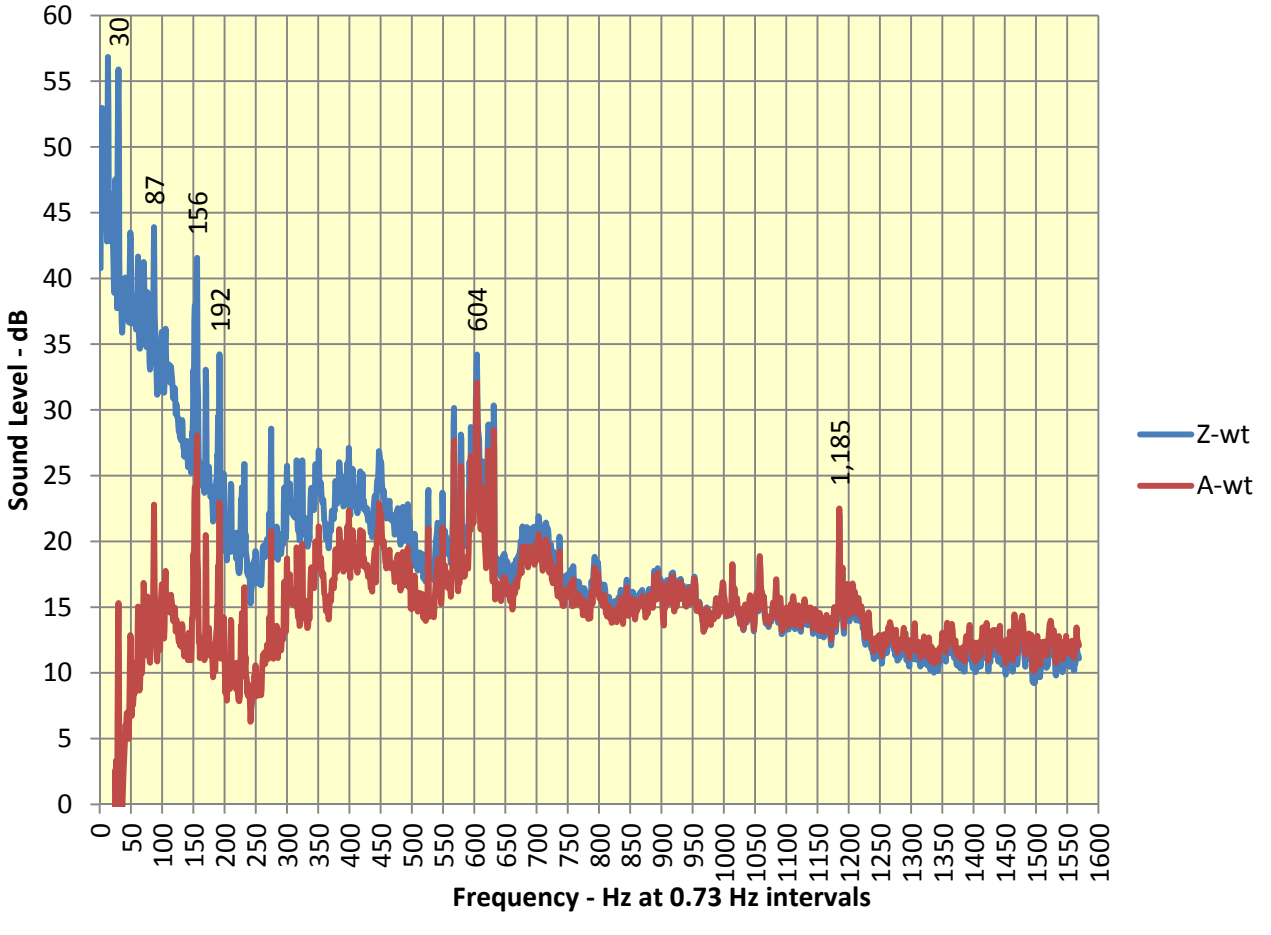


Figure E44: Boral Cement Berrima Annual Environmental Noise Assessment 2021: Attended monitoring narrow band spectra Location 20 26/10 00:00

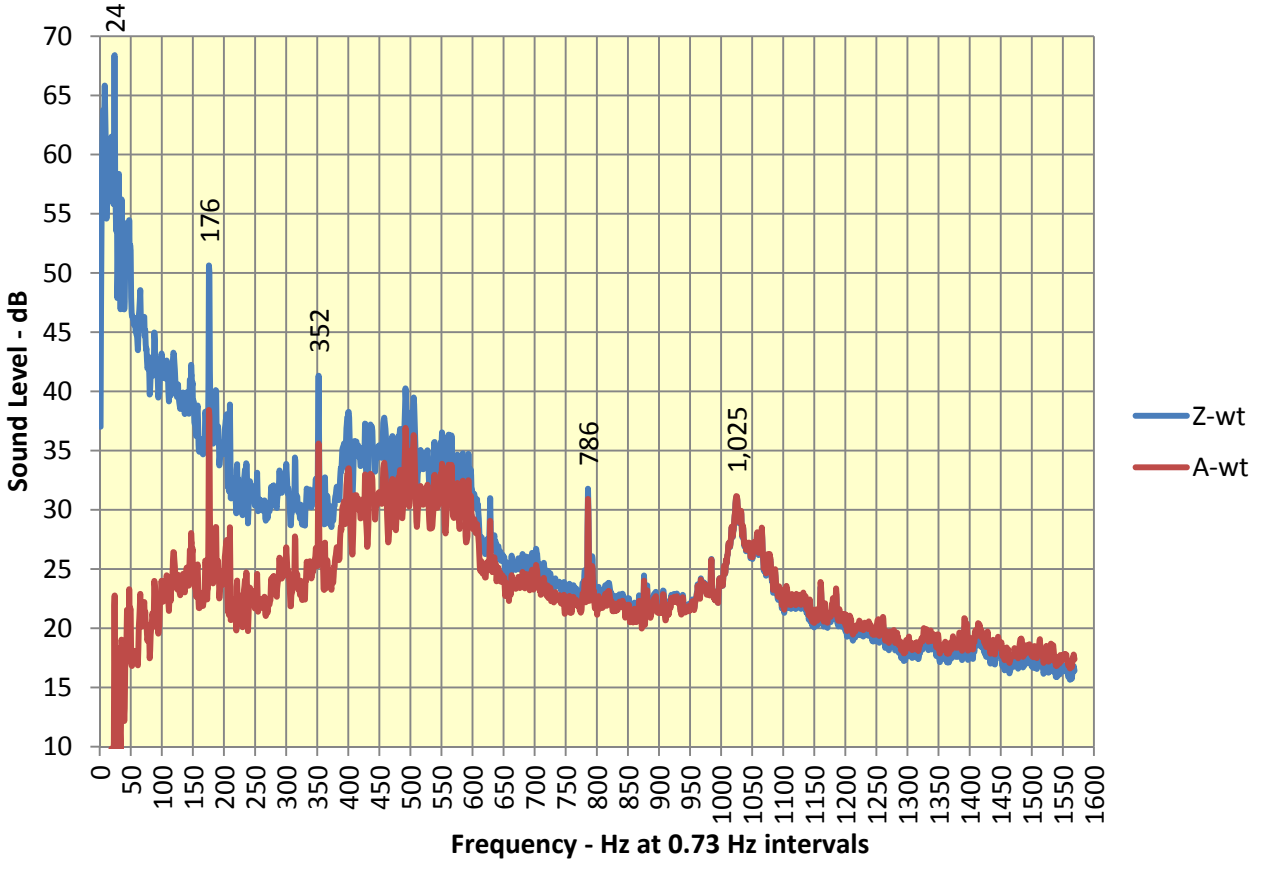
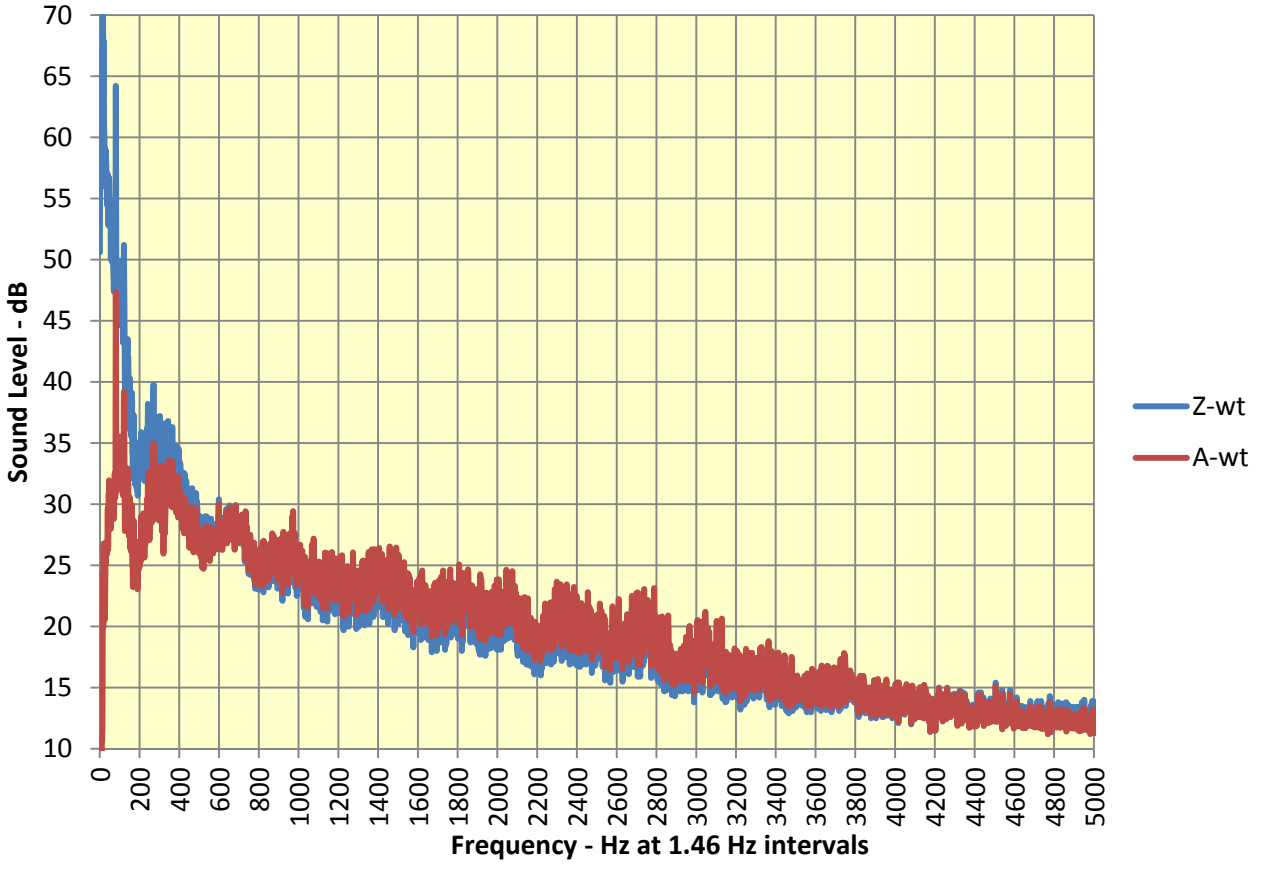


Figure E45: Boral Cement Berrima Annual Environmental Noise Assessment 2021: Attended monitoring narrow band spectra Location 20 4/11 10:52 #44



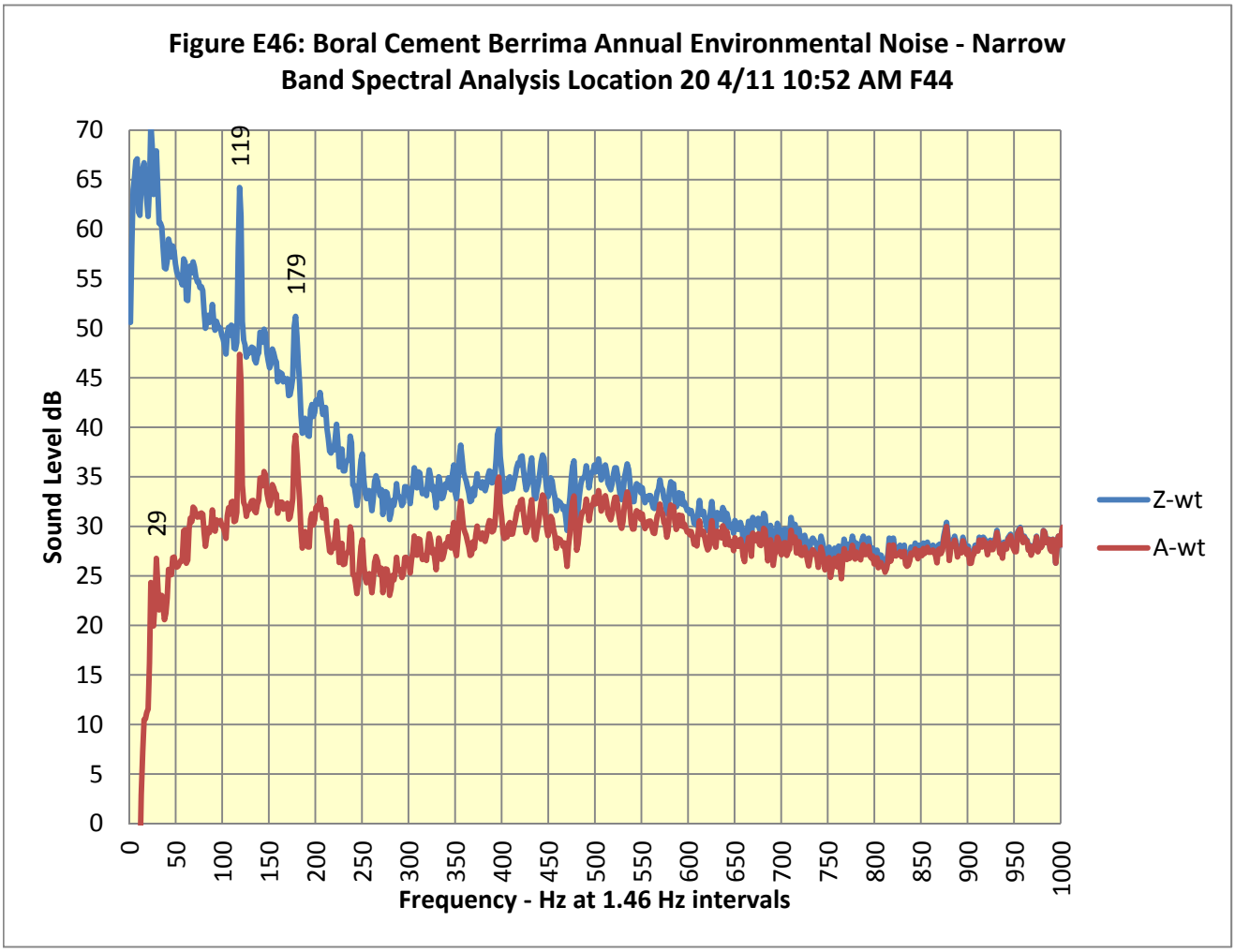


Figure E46: Boral Cement Berrima Annual Environmental Noise - Narrow Band Spectral Analysis Location 20 4/11 10:52 AM F44
Sound Level dB
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
119
179
29
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
Frequency - Hz at 1.46 Hz intervals
Z-wt
A-wt

Figure E47: Boral Cement Berrima Annual Environmental Noise - Narrow Band Spectral Analysis Location 20 4/11 10:53 AM F45

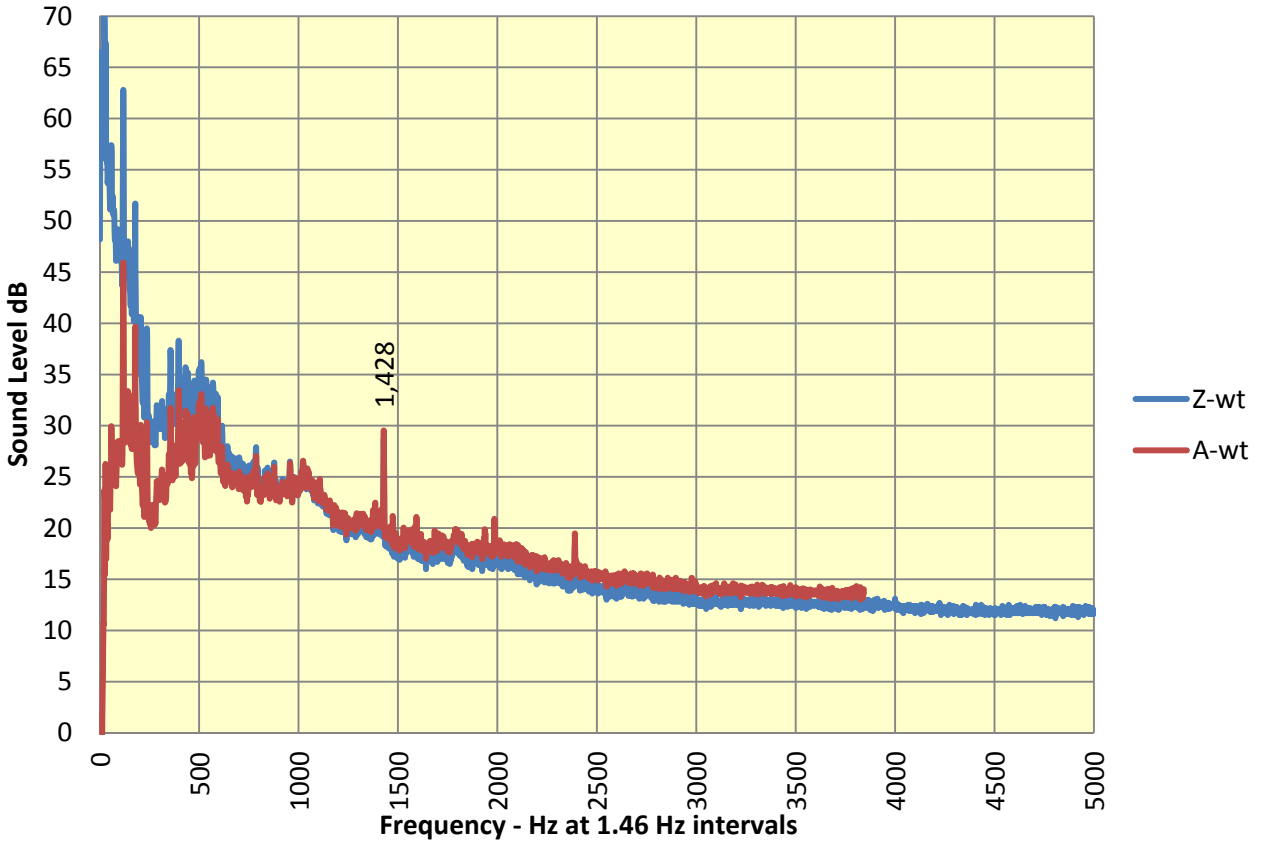
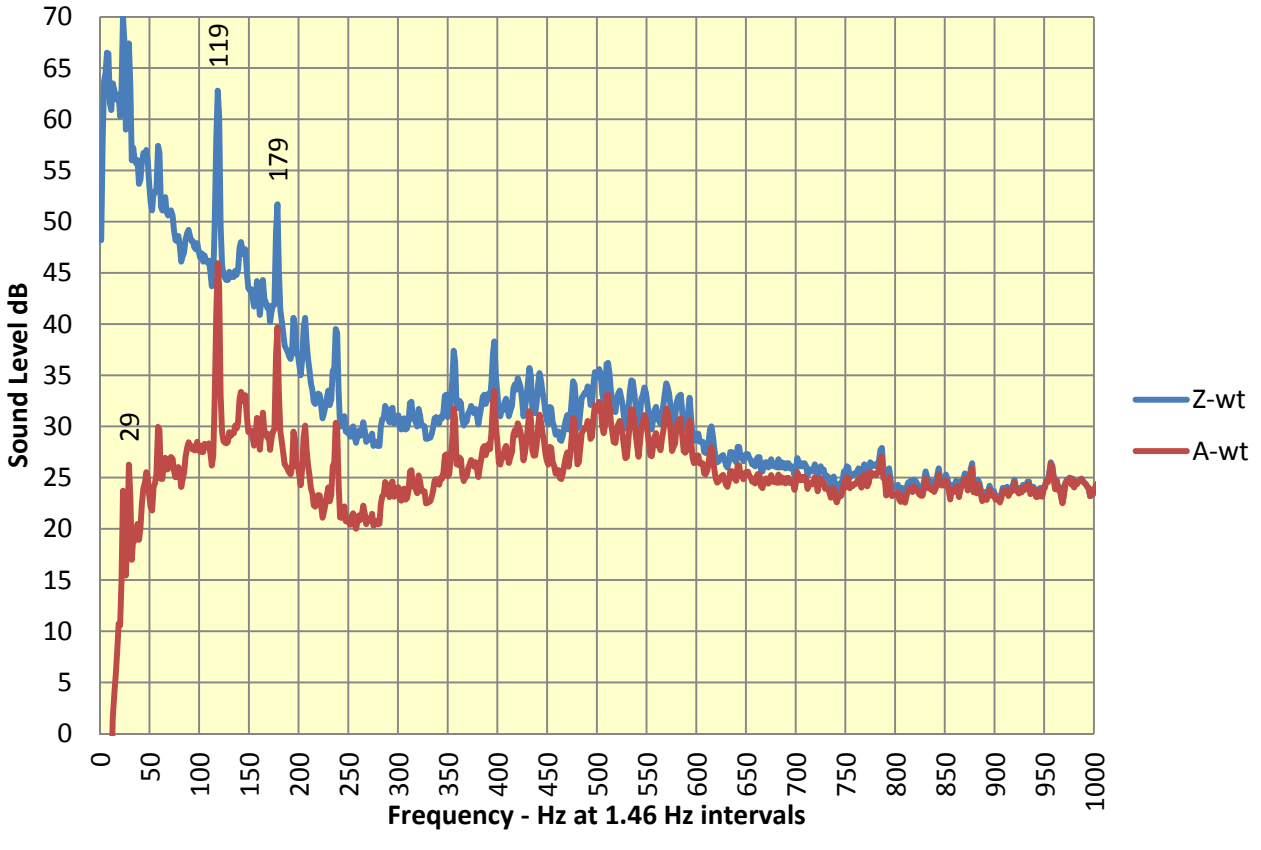


Figure E48: Boral Cement Berrima Annual Environmental Noise - Narrow Band Spectral Analysis Location 20 4/11 10:53 AM F45



ABN: 25 153 946 064
ACN: 153 946 064

Appendix F: Attended monitoring results

Boral Cement Berrima Annual Environmental Noise Assessment 2021
Attended Monitoring

Location	Date	Start hh:mm	File No	Period d:mm:ss	Statistical Sound Level - dBA					Comments
					$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
4 Melbourne St	22/10/21	8:28 am	1	00d 00:15:00	60	71	50	71	11	16^{o}C, 4/8 cc, sunny overhead. Wind 0 to 0.5m/s N. Ambient 49 to 50. Passing traffic significant - Trucks 68 to 75, cars 60 to 68. Magpies and other birds to 70. Street traffic 66 to 70
4 Melbourne St	22/10/21	6:37 pm	313	00d 00:15:00	56	66	47	66	10	20^{o}C, 1/8 cc, sunny. Wind 0 to 1m/s N to NNW, mostly < 0.2m/s. Road traffic main source Trucks 67-68, cars 60 to 66, birds to 80. Ambient 46 to 48. Plant is in background.
4 Melbourne St (logger)	23/10/21	6:00 pm		00d 00:15:00	45	56	37	58	13	17oC, wind calm to 0.2m/s SSE. Plant off from lightning strike earlier. Birds 55 to 69, trucks 55 to 60, cars 50 to 60. Dogs barking 50 to 55. Ambient quiet 37 to 40.
Loc 20	23/10/21	6:00 pm		00d 00:15:00	50	54	47	62	12	17oC, wind calm to 0.2m/s SSE. Plant off from lightning strike earlier.Ambient - industrial Noise 47 to 49; Birds 53 to 64, trucks 55 to 60, cars 50 to 60. Dogs barking 50 to 55. Ambient - industrial Noise 50 to 53 (11 min along)
North Fence	23/10/21	6:00 pm		00d 00:15:00	47	54	44	60	13	17oC, wind calm to 0.2m/s SSE. Plant off from lightning strike earlier.Ambient - industrial Noise 43 -48 ;Birds prominent 43 - 54 with peaks of 64; Cars 48-51 ; alarm
4 Melbourne St (logger)	26/10/21	12:00 am		00d 00:15:00	47	51	45	63	16	5oC, wind calm. Very stable sound level 46 to 47 dBA, 5 cars 54 to 59, 1 truck to 58.
Loc 20	26/10/21	12:00 am		00d 00:15:00	57	59	56	70	13	5oC, wind calm. Very stable sound level of industrial noise 56 to 58 dBA; observed a hint of rail squeal and alarm
North Fence	26/10/21	12:00 am		00d 00:15:00	53	54	52	68	15	5oC, wind calm. Very stable industrial noise 52-54 ; hint of rail squeal and shunting; alarm
4 Melbourne St (logger)	29/10/21	12:00 am		00d 00:15:00	42	51	38	61	19	13.5oC, wind calm. Relatively stable sound level 36 to 45. 1 truck pass 62, 1 car pass 51, dog bark 46.
Loc 20	29/10/21	12:00 am		00d 00:15:00	53	56	52	69	16	13.5oC, wind calm. Ambient Industrial noise 51-54 ;Noise associated with Rail Movement - Thumps 57 (6x) ; possible loco acceration 55-56
North Fence	29/10/21	12:00 am		00d 00:15:00	47	50	46	67	20	13.5oC, wind calm. Ambient Industrial noise (variable) 44-49 ;Noise associated with Rail Movement - Thumps 50-51 ; possible loco acceration 47-49
4 Melbourne St (logger)	3/11/21	2:00 pm		00d 00:15:00	53	64	39	65	13	20oC, wind ave. 3.5m/s NE. Road traffic major noise with little time between vehicles. Trucks 60 to 66, cars 50 to 59, birds to 73. Dog bark 58. Quiet between vehicles sometimes 37 but rare. Ambient more often 40 to 45

Location	Date	Start hh:mm	File No	Period d:mm:ss	Statistical Sound Level - dBA					Comments
					$L_{Aeq,t}$	$L_{A01,t}$	$L_{A90,t}$	$L_{Ceq,t}$	L_{Ceq}-L_{Aeq}	
Loc 20	3/11/21	2:00 pm		00d 00:15:00	54	64	50	69	15	20oC, wind ave. 3.5m/s NE. Work truck around stockyard traffic noise: 60 to 65; Truck Local 72; car local 55-61 , Ambient at start 49 to 51 increasing to 51 to 54.
North Fence	3/11/21	2:00 pm		00d 00:15:00	46	52	43	64	19	20oC, wind ave. 3.5m/s NE. Work truck around stockyard traffic noise: 49 - 54 ; Truck over bump 51-55 ; car 49; Birds 50-53
4 Melbourne St (logger)	4/11/21	8:30 am		00d 00:15:00	52	62	46	67	15	16oC, wind calm to 1m/s N. Ambient quiet 45 to 48. Road traffic main source Trucks to 65, cars 54 to 64. Occasional birds. Plant is background.
4 Melbourne St	4/11/21	9:38 am		00d 00:12:00	58	69	48			16°C, overcast 8/8cc, wind calm to 0.4m/s N. Ambient 49 to 50. Passing trucks 65 to 70. Light rain started at 11 min.
Adelaide St 30m to Taylor Ave	22/10/21	6:00 pm	309	00d 00:14:00	58	70	47	69	11	20°C, 2/8 cc, sunny. Wind 0 to 0.5m/s NW. Road traffic main source Trucks 70, cars 60 to 68, birds to 73. Plant screw conveyor just audible. Quiet ambient 47.
12 Brisbane St W side	22/10/21	6:18 pm	312	00d 00:15:00	54	67	44	65	10	20°C, 1/8 cc, sunny. Wind 0 to 1m/s N but mostly < 0.2m/s. Road traffic main source but more distant. Birds to 73. Children 58. Quiet ambient 45. Plant level varies slightly on wind
12 Brisbane St W side	4/11/21	1:36 pm	449	00d 00:15:00	52	64	42	60	9	16°C, overcast, light rain, wind 0 to 3m/s N. Traffic on Taylor is main source - trucks 56 to 63, birds regular 45 to 50, cars pass in street 60 to 71, distant dog 50, ambient 40. No rain or wind noise.
Location 20	22/10/21	11:51 am	005.NBF	00d 00:12:08	70	58	62	76	14	Car Passing Stock yard 63; iso container train moving, rail squeal 60-65; Truck local road 72; Rail squeal 65; Heavy vechicle 70; Train movement 60; Horn 82
Location 20	22/10/21	12:22 pm	007.NBF	00d 00:15:00	62	55	57	73	15	Industrial Noise 58; Car Passing Stock yard 63; iso container unloading train 58; 66; 59; 58; Truck over bump 66; Reversing beacon 59
North Fence	22/10/21	5:56 pm	031.NBF	00d 00:15:00	58	52	54	69	15	Slight Breeze from SW Industrial Noise 52 Truck Taylor road 55 Birdss 62, 54 , 55
North Fence	4/11/21	10:00 am	041.NBF	00d 00:15:00	56	50	53	70	17	16oC, overcast, wind 0 to 3m/s NE; Indutrial noise 49-50; Thump 52,53; Truck Local 53, 51 Truck Taylor 52,54,54 Remote Hammering infrequent; Tran movement 55 Loco 56-58
Location 20	4/11/21	10:24 am	042.NBF	00d 00:15:00	71	54	58	73	14	16oC, overcast, wind 0 to 3m/s NE; Truck Local 75; Birds 59
Location 20	4/11/21	10:52 am	043.NBF	00d 00:12:06	72	55	58	74	15	16oC, overcast, wind 0 to 3m/s NE; Over cast Industrial Noise 57; Truck Local 59, 75 Truck Taylor 56; Birds 56-57; Possible vacumm truck 56-57; FFT recorded - 44S
4 Melbourne St	4/11/21	1:55 pm	063.NBF	00d 00:15:00	71	47	59	71	12	16oC, overcast, wind 0 to 3m/s N; Ambient 46; Car 59- 63; Truck 66-75; Dog Barking 53; Birds 52-64
Adelaide St 30m to Taylor Ave	4/11/21	1:31 pm	060.NBF	00d 00:15:00	75	45	62	75	12	16oC, overcast, wind 0 to 3m/s N; Ambient industrial noise 44-47; Many Trucks and Cars; Cars 58- 74; Truck 66-75; Dog Barking 58; Birds 50-65; Gate Alarm

Table 4.9: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring one-third octave band spectra and tonality

Type	File Date time	A-weighted 15-minute Sound Level $L_{An,15\text{-}min}$ dBA in One-third Octave Band Centre Frequency - Hz																														
		Total A	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
4 Melbourne St																																
Leq	1 22/10 8:28	60	18	21	25	29	41	37	39	49	47	48	44	44	48	50	49	50	50	49	47	47	44	43	45	43	39	36	32	26	18	
L90	1 22/10 8:28	50	14	16	20	23	27	29	33	35	40	42	36	34	37	39	36	34	36	34	32	30	26	23	20	16	12	9	7	5	3	-1
Leq	313 22/10 18:37	56	17	17	21	24	30	30	34	40	41	44	39	41	41	42	43	44	44	43	41	40	42	49	49	42	39	35	29	23	15	6
L90	313 22/10 18:37	47	14	13	16	19	24	26	30	32	38	39	32	35	34	34	34	33	33	32	31	28	26	22	19	15	11	9	7	5	2	-2
Leq	Log 23/10 18:00	45	10	14	17	20	21	22	23	22	27	27	29	29	30	31	33	35	36	36	36	39	33	31	29	26	24	21	15	11	6	
L90	Log 23/10 18:00	37	2	8	12	14	13	15	15	13	20	21	21	23	24	24	26	27	26	26	25	22	20	16	14	11	10	9	7	6	3	
Leq	Log 26/10 00:00	47	17	16	21	25	22	22	20	23	39	38	31	34	34	39	36	37	37	33	31	28	23	17	12	10	9	8	7	5	2	
L90	Log 26/10 00:00	45	14	12	17	20	18	19	18	21	37	36	29	32	33	37	35	35	34	30	29	25	20	13	9	8	8	8	7	5	2	
Leq	Log 28/10 19:00	45	17	15	21	24	31	32	28	32	36	39	34	33	34	36	36	38	38	36	34	31	29	29	31	27	19	18	10	6	5	
L90	Log 28/10 19:00	40	14	11	15	19	18	18	16	18	30	33	25	27	28	31	28	28	26	23	21	17	14	13	11	10	9	8	7	5	4	
Leq	Log 29/10 00:00	42	15	11	18	21	19	20	19	21	32	34	27	27	30	34	31	32	30	27	24	21	18	14	12	10	9	8	7	5	2	
L90	Log 29/10 00:00	38	12	7	14	17	15	16	15	17	28	30	23	24	26	28	26	26	24	21	17	13	10	8	8	8	8	8	7	5	2	
Leq	Log 3/11 14:00	53	15	18	26	28	34	32	30	32	38	40	41	40	40	40	41	42	44	43	42	40	39	35	33	30	30	29	29	27	13	
L90	Log 3/11 14:00	39	4	8	17	17	17	17	16	17	25	26	22	23	24	25	25	27	27	27	25	23	21	19	17	15	12	10	8	6	4	
Leq	Log 4/11 8:30	52	17	18	25	28	36	38	29	32	40	40	38	38	39	41	41	42	43	42	40	38	38	34	32	32	26	25	16	9	5	
L90	Log 4/11 8:30	46	12	12	18	21	23	21	20	22	33	36	31	33	34	37	35	35	34	32	31	29	25	20	15	12	10	8	7	5	3	
Leq	Log 4/11 13:55	59	19	23	26	32	36	38	43	47	48	48	44	44	46	47	48	48	50	48	47	48	46	45	44	42	40	37	33	27	20	12
L90	Log 4/11 13:55	47	14	14	18	21	25	27	30	31	36	37	29	31	34	33	32	32	33	33	32	31	29	27	26	23	20	16	14	10	6	2
Adelaide St near 74 Taylor Ave																																
Leq	309 22/10 18:00	58	24	20	22	26	30	33	37	39	43	41	39	40	43	43	45	47	47	46	45	47	50	49	46	42	37	31	25	18	10	3
L90	309	47	22	15	16	21	25	28	31	33	38	37	31	32	35	34	35	34	34	34	31	29	28	24	21	17	14	11	9	6	3	-1
Leq	Nor 60 4/11 13:31	62	22	28	28	37	41	46	42	46	50	47	45	47	51	51	52	53	53	53	51	50	48	47	46	43	40	38	34	31	24	15
L90	Nor 60 4/11 13:31	45	18	18	18	22	25	27	29	31	36	37	29	29	30	29	29	30	31	31	30	29	26	23	21	17	14	11	8	6	3	1
12 Brisbane St																																
Leq	312 22/10 18:18	54	17	18	19	22	28	31	31	35	40	42	36	36	36	37	38	39	40	39	39	46	48	46	44	41	37	26	20	15	7	1
L90	312 L90	44	14	14	15	17	23	23	26	30	35	36	30	32	31	31	32	30	30	29	27	25	23	20	19	15	12	9	7	5	2	-1
Leq	449 4/11 13:36	52	18	25	22	27	33	33	32	37	39	39	36	37	38	39	41	43	43	42	41	39	36	35	35	31	28	25	22	16	12	6
L90	449 L90	42	14	14	16	17	20	22	24	27	31	32	25	27	28	27	28	29	28	28	27	25	24	23	21	19	16	12	9	6	3	-1
Northern Fence																																
Leq	Nor 131 22/10 17:56	58	24	23	23	25	29	32	34	37	41	46	36	38	45	46	44	44	44	43	41	39	37	33	33	35	33	25	21	18	12	6
L90	Nor 131 22/10 17:56	54	22	19	20	21	26	29	31	34	37	40	32	35	41	42	42	42	41	41	39	37	34	29	25	19	14	11	8	6	3	1
Leq	Log 23/10 18:00	47	13	19	15	20	22	26	26	26	27	26	31	34	36	37	38	37	35	35	33	34	35	28	26	26	32	38	23	6	6	-1
L90	Log 23/10 18:00	44	5	13	11	15	17	21	22	21	21	22	29	32	33	33	35	35	33	33	31	28	25	20	18	13	11	10	7	6	3	1
Leq	Log 26/10 00:00	53	23	22	24	27	27	30	31	30	35	38	39	41	45	46	44	42	43	40	38	36	32	26	20	13	8	7	5	1	-2	-4
L90	Log 26/10 00:00	52	20	18	20	22	24	27	28	28	33	36	37	40	43	45	43	41	42	39	37	35	30	24	17	10	10	9	7	6	3	1
Leq	Log 28/10 19:00	51	24	21	23	24	25	28	29	27	32	36	36	36	39	42	39	38	37	35	35	41	44	39	34	30	28	27	17	10	3	-2
L90	Log 28/10 19:00	47	21	18	20	20	22	25	26	24	29	34	34	34	37	39	37	36	35	33	30	27	22	18	17	10	10	9	7	6	3	1
Leq	Log 29/10 00:00	47	24	22	23	23	24	27	27	25	30	35	35	35	38	41	39	38	35	33	30	27	23	19	12	8	8	7	4	1	-2	-4
L90	Log 29/10 00:00	46	21	18	20	20	21	24	24	22	27	32	32	33	36	38	37	35	33	31	29	25	21	17	11	10	10	9	7	6	3	1
Leq	Log 3/11 14:00	46	13	20	25	26	30	32	30	33	34	34	32	33	33	34	35	35	35	34	32	32	30	27	27	28	22	26	16	8	4	-2
L90	Log 3/11 14:00	43	8	15	21	21	22	24	25	24	27	29	28	30	30	31	33	33	33	32	30	28	24	21	18	16	14	14	8	6	3	1
Leq	Nor 41 4/11 10:00	56	24	26	28	30	35	34	34	35	40	43	35	37	41	44	43	42	43	41	40	38	35	35	34	30	31	27	25	22	18	15
L90	Nor 41 4/11 10:00	53	21	21	24	25	26	29	29	29	37	40	31	33	38	39	39	38	38	36	34	33	30	26	22	18	14	12	9	6	3	1
Location 20 Compliance point																																
Leq	Nor 5 22/10 11:51	62	25	23	35	38	40	40	53	47	48	50	44	46	50	52	55	52	54	50	48	48	45	44	41	37	33	28	28	20	12	6
L90	Nor 5 22/10 11:51	58	22	19	31	31	33	36	41	42	44	44	39	39	47	48	45	46	45	44	42	42	38	36	31	24	18	12	7	6	3	1
Leq	Nor 7 22/10 12:22	57	25	24	33	34	35	38	40	42	47	50	41	40	44	49	47	47	44	45	43	43	39	37	33	28	23	20	18	16	8	7
L90	Nor 7 22/10 12:22	55	22	20	30	29	30	33	37	39	45	47	38	37	41	46	44	44	41	42	40	39	35	33	29	21	13	9	7	6	3	1
Leq	Log 23/10 6pm	50	13	18	16	23	23	28	30	30	34	32	29	35	39	42	43	39	39	39	38	35	33	34	27	33	32	25	10	9	6	1
L90	Log 23/10 6pm	48	4	13	11	17	19	25	26	26	31	28	27	32	36	37	40	37	37	36	35	32	28	24	19	15	11	9	7	6	3	1
Leq	Log 26/10 00:00	57	23	22	24	27	27	30	31	30	35	38	39	41	45	46	44	42	43	40	38	36	32	26	20	13	8	7	5	1	-2	-4
L90	Log 26/10 00:00	56	24	18	23	27	28	30	33	36	39	40	38	42	47	50	47	44	47	44	42	39	36	31	25	17	11	9	7	6	3	1
Leq	Log 28/10 7pm	53	25	20	24	28	30	31	33	37	39	39	37	39	44	47	45	42	42	42	40	39	35	28	23	17	13	9	7	6	3	1
L90	Log 28/10 7pm	52	23	16	20	25	27	29	31	35	37	37	35	38	42	45	43	41	41	40	37	35	30	24	17	10	10	9	7	6	3	1
Leq	Log 29/10 00:00	53	26	21	25	28	30	32	34	37	39	38	36	39	44	48	45	42	42	41	38	36	33	29	23	16	11	8	7	5	3	0
L90	Log 29/10 00:00	52	24	17	20	25	27	29	31	35	36	35	34	37	42	45	43	41	40	39	37	34	31	26	21	13	10	9	7	6	3	1
Leq	Log 3/11 2pm	54	16	22	29	32	36	36	37	39	41	43	39	41	41	43	44	44	45	45	43	42	40	38	35	32	28	25	19	17	8	2
L90	Log 3/11 2pm	50	10	15	25	25	27	28	30	33	37	37	33	36	37	38	39	39	38	38	35	34	30	28	22	16	12	9	8	6	3	1
Leq	Nor 42 4/11 10:24	58	26	21	27	32	35	43	40	48	49	43	44	43	46	48	47	47	47	48	47	45	43	42	41	39	36	32	29	25	18	12
L90	Nor 42 4/11 10:24	54	23	17	22	27	30	33	37	42	40	38	36	39	43	44	44	43	43	41	39	39	35	31	27	21	15	10	7	6	3	1
Leq	Nor 43 4/11 10:52	58	26	21	26	32	39	45	41	50	49	45	42	42	47	48	47	47	47	46	45	45	42	42	40	37	35	32	30	24	17	8
L90	Nor 43 4/11 10:52	55	24	17	22	28	32	33	38	46	41	41	35	38	43	45	44	43	43	41	39	39	35	32	28	24	20	16	13	10	6	1

attended results

Table 4.9A: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring one-third octave band spectra and tonality

Type	File Date time	Tonality in A-weighted 15-minute Sound Level $L_{An,15\text{-}min}$ dBA in One-third Octave Band Centre Frequency - Hz																															
		Total A	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000	
4 Melbourne St		**Objective**		**15**	**15**	**15**	**15**	**15**	**15**	**15**	**8**	**8**	**8**	**8**	**8**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**		
Leq	1 22/10 8:28			1	0	4	7	3	4	6	1	2	2	2	1	2	1	0	1	0	1	1	1	1	2	1	1	1	1	1			
L90	1 22/10 8:28			2	1	1	1	1	1	2	2	4	2	2	0	3	1	1	2	0	1	0	0	0	0	0	1	0	0	0	1		
Leq	313 22/10 18:37			2	0	1	3	2	1	2	0	3	3	0	0	0	0	0	1	0	0	2	2	3	3	2	1	1	0	1	1		
L90	313 22/10 18:37			3	0	1	2	1	1	2	2	4	5	1	0	0	0	0	0	1	0	0	1	1	1	0	1	0	0	0	1		
Leq	Log 23/10 18:00			1	0	1	0	0	0	2	2	0	1	0	0	0	0	1	1	0	2	5	2	0	0	1	0	1	1	1			
L90	Log 23/10 18:00			1	1	1	2	1	1	5	3	0	1	1	0	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0			
Leq	Log 26/10 00:00			3	0	3	1	1	2	7	9	3	5	1	2	3	1	0	2	1	1	0	1	0	2	0	0	0	1	0			
L90	Log 26/10 00:00			4	1	3	2	1	2	7	9	3	5	1	2	3	1	0	2	1	1	1	1	1	2	0	0	0	0	1			
Leq	Log 28/10 19:00			4	2	2	3	3	4	0	1	4	2	1	1	1	1	1	1	0	0	1	1	1	3	2	3	3	2	1			
L90	Log 28/10 19:00			4	1	2	1	1	2	5	5	5	4	0	1	3	1	1	0	0	1	1	1	0	0	1	0	0	0	0			
Leq	Log 29/10 00:00			5	2	3	2	2	2	5	5	4	3	1	1	4	2	1	1	0	0	0	0	0	0	0	0	0	0	1			
L90	Log 29/10 00:00			6	2	2	1	1	2	5	5	5	4	0	0	2	1	1	1	0	1	1	1	1	0	0	0	0	0	1			
Leq	Log 3/11 14:00			2	3	2	4	0	2	2	2	0	1	0	1	0	0	0	1	0	1	1	2	1	1	2	1	1	1	6			
L90	Log 3/11 14:00			3	4	0	0	0	1	4	4	3	3	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0			
Leq	Log 4/11 8:30			3	2	2	3	5	5	3	4	1	1	0	1	1	1	0	1	1	0	1	1	1	1	3	3	4	1	1			
L90	Log 4/11 8:30			3	1	1	2	0	1	4	4	4	4	1	2	3	1	0	0	0	1	0	1	0	1	1	0	0	0	0			
Leq	Log 4/11 13:55			1	1	1	1	1	0	2	0	2	2	1	1	0	0	1	1	0	1	2	1	0	1	0	0	0	1	1	1		
L90	Log 4/11 13:55			2	0	0	1	0	1	2	1	5	5	1	2	0	0	1	1	0	0	1	0	0	1	0	0	0	0	0	1		
Adelaide St near 74 Taylor Ave																																	
Leq	309 22/10 18:00			3	2	1	0	1	2	1	3	1	2	1	1	1	0	1	1	0	1	0	2	1	0	1	0	0	1	0	0		
L90	309			4	2	1	1	0	0	1	3	3	4	0	2	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	1		
Leq	Nor 60 4/11 13:31			3	4	2	1	5	5	1	3	0	2	1	2	1	0	1	0	1	1	1	0	0	1	0	0	0	0	2	1		
L90	Nor 60 4/11 13:31			0	2	0	1	0	1	2	2	5	4	1	1	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0		
12 Brisbane St																																	
Leq	312 22/10 18:18			0	1	2	2	1	2	0	1	3	2	0	0	1	0	0	1	1	3	2	2	0	1	0	4	2	1	1	0		
L90	312 L90			1	0	2	2	1	1	0	2	3	3	1	0	1	1	0	0	0	0	0	0	0	1	0	1	0	0	0	1		
Leq	449 4/11 13:36			5	4	1	4	0	3	2	1	2	3	1	0	1	0	1	0	0	0	1	1	0	1	0	1	1	1	1	1		
L90	449 L90			0	0	1	1	1	0	1	2	4	4	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1		
Northern Fence																																	
Leq	Nor 131 22/10 17:56			1	0	1	1	0	1	0	0	7	6	2	2	1	1	0	0	1	0	0	1	2	1	2	3	2	0	2	1		
L90	Nor 131 22/10 17:56			2	0	2	1	0	1	0	0	5	5	2	3	0	0	0	0	1	0	1	1	0	1	1	1	0	1	0	0		
Leq	Log 23/10 18:00			5	5	2	1	2	0	1	1	3	1	0	1	0	1	0	1	1	1	0	4	3	1	3	0	10	1	9	3		
L90	Log 23/10 18:00			6	4	1	1	2	1	0	1	2	1	1	0	1	1	1	1	1	0	1	0	1	1	2	0	1	1	0	0		
Leq	Log 26/10 00:00			1	1	1	1	1	1	3	1	2	1	0	1	2	0	1	2	1	0	1	1	0	0	1	2	1	1	0	1		
L90	Log 26/10 00:00			2	0	0	0	1	0	3	1	1	1	0	1	2	0	1	2	0	0	1	1	1	0	3	0	0	0	0	0		
Leq	Log 28/10 19:00			2	1	1	1	1	2	3	0	2	0	2	0	3	1	0	0	1	4	2	4	0	0	2	0	4	1	0	1		
L90	Log 28/10 19:00			3	1	1	1	1	2	3	0	2	0	1	0	2	1	0	0	0	0	1	0	2	3	3	0	0	0	0	0		
Leq	Log 29/10 00:00			2	1	1	1	2	1	4	1	2	0	1	0	2	0	0	0	0	0	0	0	2	2	2	0	1	0	0	1		
L90	Log 29/10 00:00			3	1	1	1	1	1	4	0	2	1	1	0	1	0	0	0	0	0	1	0	1	3	0	0	0	0	0	0		
Leq	Log 3/11 14:00			1	2	1	0	2	2	1	0	2	2	1	0	0	0	0	0	1	1	0	1	1	1	4	5	7	1	2	1		
L90	Log 3/11 14:00			0	3	1	0	0	1	2	1	1	2	1	0	0	1	0	0	1	0	1	0	0	0	1	0	3	2	0	0		
Leq	Nor 41 4/11 10:00			0	0	2	3	0	1	2	1	6	5	1	1	2	0	1	1	0	0	1	1	0	2	3	2	0	0	1	1		
L90	Nor 41 4/11 10:00			2	1	0	1	1	0	4	3	6	5	1	1	1	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0		
Location 20 Compliance point																																	
Leq	Nor 5 22/10 11:51			7	5	0	1	6	9	3	1	4	4	1	1	0	3	2	3	0	2	2	1	1	0	0	0	2	4	0	1		
L90	Nor 5 22/10 11:51			7	6	1	1	1	2	0	1	3	3	4	3	3	2	1	0	1	1	2	1	1	1	0	1	1	1	0	0		
Leq	Nor 7 22/10 12:22			5	4	0	1	0	0	1	2	5	4	3	0	4	1	1	2	1	1	2	1	1	1	1	1	0	0	3	3		
L90	Nor 7 22/10 12:22			6	5	1	1	0	1	2	2	5	4	2	1	4	1	1	2	2	1	2	1	1	2	0	1	2	0	0	0		
Leq	Log 23/10 6pm			4	5	3	2	1	1	2	3	0	4	0	1	1	2	2	0	0	1	0	1	4	6	3	3	4	7	1	1		
L90	Log 23/10 6pm			5	4	2	2	2	1	3	4	1	3	1	1	1	3	1	0	0	1	1	0	0	0	0	1	0	0	0	0		
Leq	Log 26/10 00:00			1	1	1	1	1	1	3	1	2	1	0	1	2	1	0	1	2	1	0	1	1	0	0	1	2	1	1	0	1		
L90	Log 26/10 00:00			5	0	2	1	1	0	0	1	2	3	1	1	3	0	3	3	1	1	1	0	1	1	1	2	0	0	0	0		
Leq	Log 28/10 7pm			4	1	2	0	0	1	1	1	1	2	1	1	2	0	1	0	1	1	1	2	1	1	1	0	1	0	0	0		
L90	Log 28/10 7pm			5	1	1	0	0	1	1	1	1	2	1	1	2	0	1	0	1	0	1	1	0	0	3	0	0	0	0	0		
Leq	Log 29/10 00:00			4	0	1	0	0	1	1	1	0	2	1	1	3	0	1	0	1	0	0	0	1	0	1	1	1	0	0	0		
L90	Log 29/10 00:00			5	1	1	0	0	1	1	1	0	3	1	1	2	0	1	0	1	0	1	0	1	1	2	1	0	0	0	0		
Leq	Log 3/11 2pm			0	3	1	2	0	0	0	0	3	3	1	0	0	0	0	0	1	0	0	0	1	0	0	0	2	2	3	1		
L90	Log 3/11 2pm			2	5	1	1	1	0	1	2	2	4	1	0	0	1	0	0	1	0	1	1	2	0	1	1	0	0	0	0		
Leq	Nor 42 4/11 10:24			5	0	1	2	6	6	4	3	4	1	2	0	1	0	0	1	2	0	0	1	0	1	0	0	0	0	2	0		
L90	Nor 42 4/11 10:24			6	0	1	0	1	1	4	1	0	2	1	1	1	0	0	1	0	1	2	0	0	1	0	1	1	1	1	0		
Leq	Nor 43 4/11 10:52			5	1	0	0	5	7	5	2	1	2	2	2	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1		
L90	Nor 43 4/11 10:52			6	0	1	2	2	1	6	2	3	5	1	2	1	0	1	1	0	1	1	0	0	1	0	0	0	0	0	0		

Pink shaded cells indicate tonality exceeds objective

Figure F1: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq}

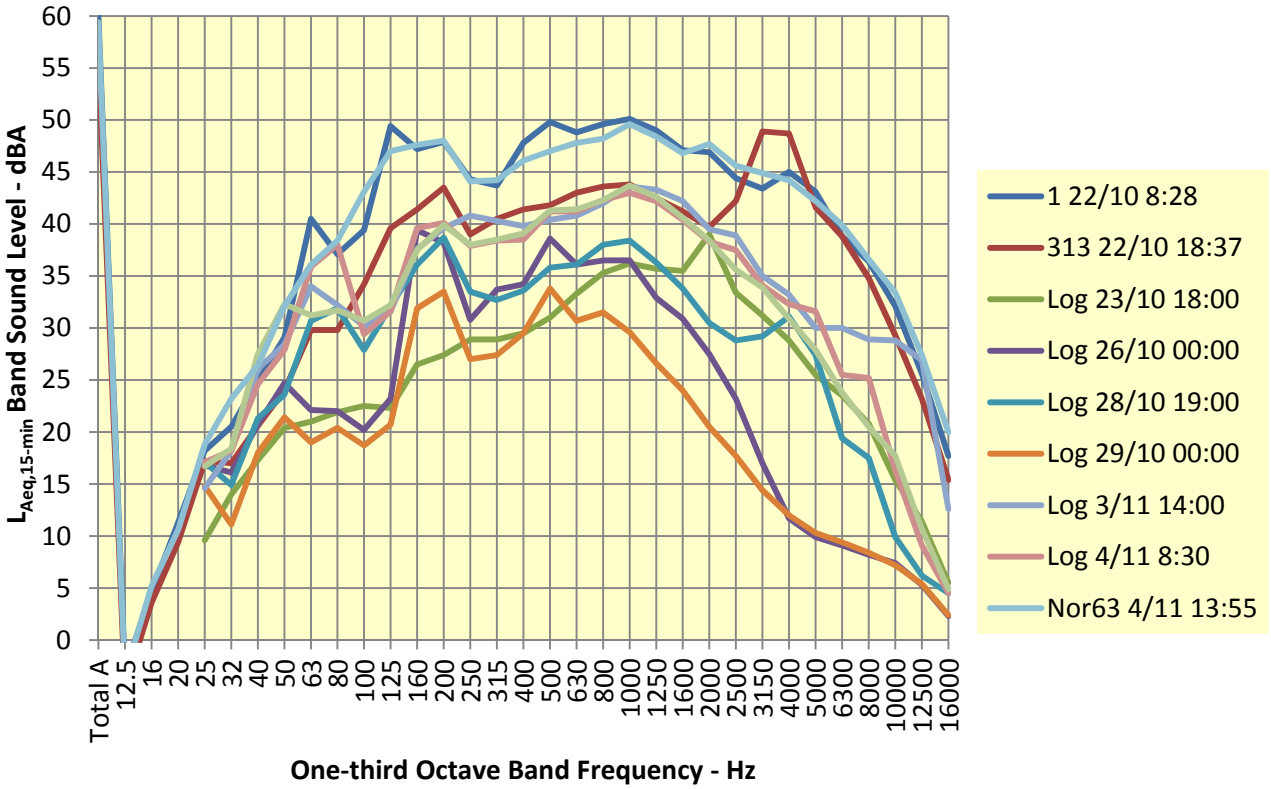


Figure F2: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{A90}

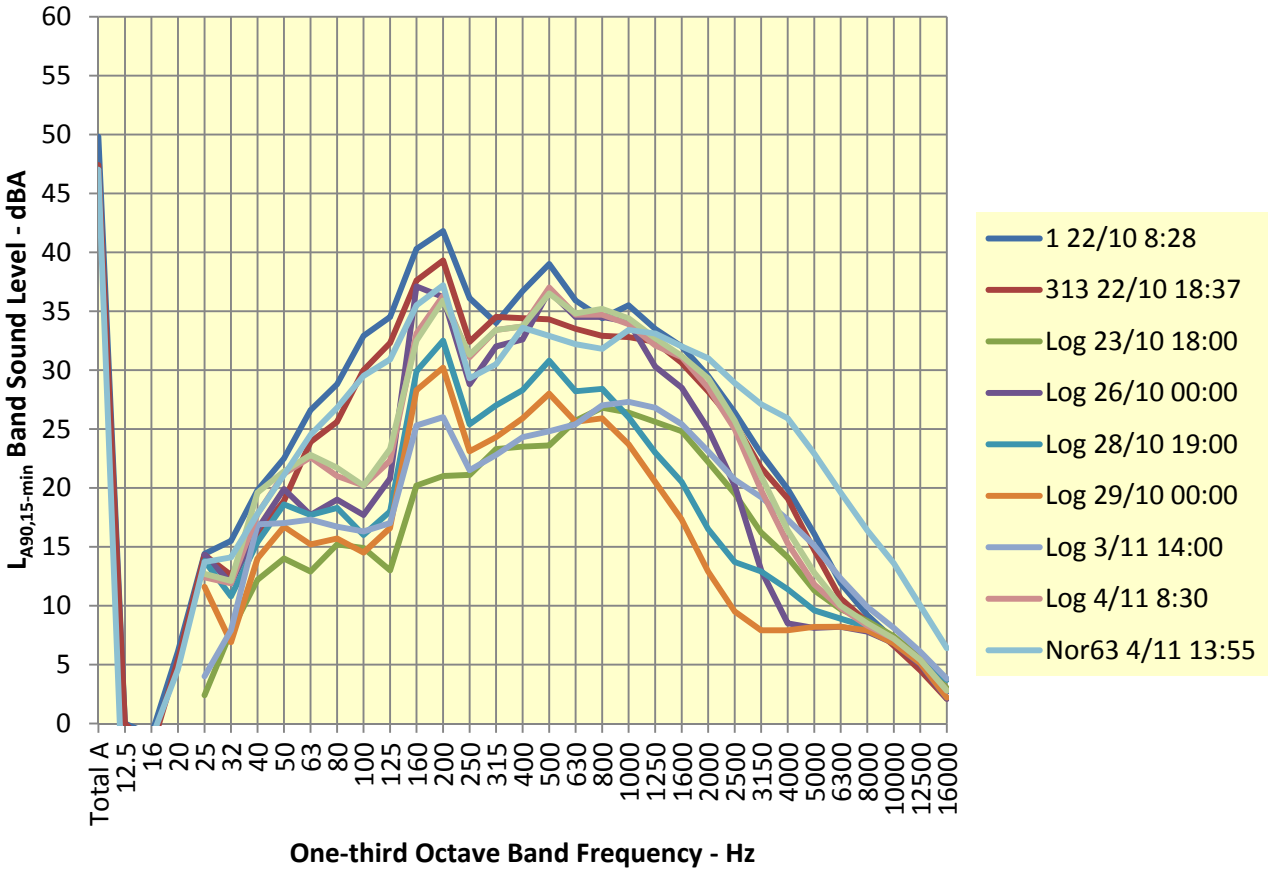


Figure F3: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra: 4 Melbourne St L_{Aeq}

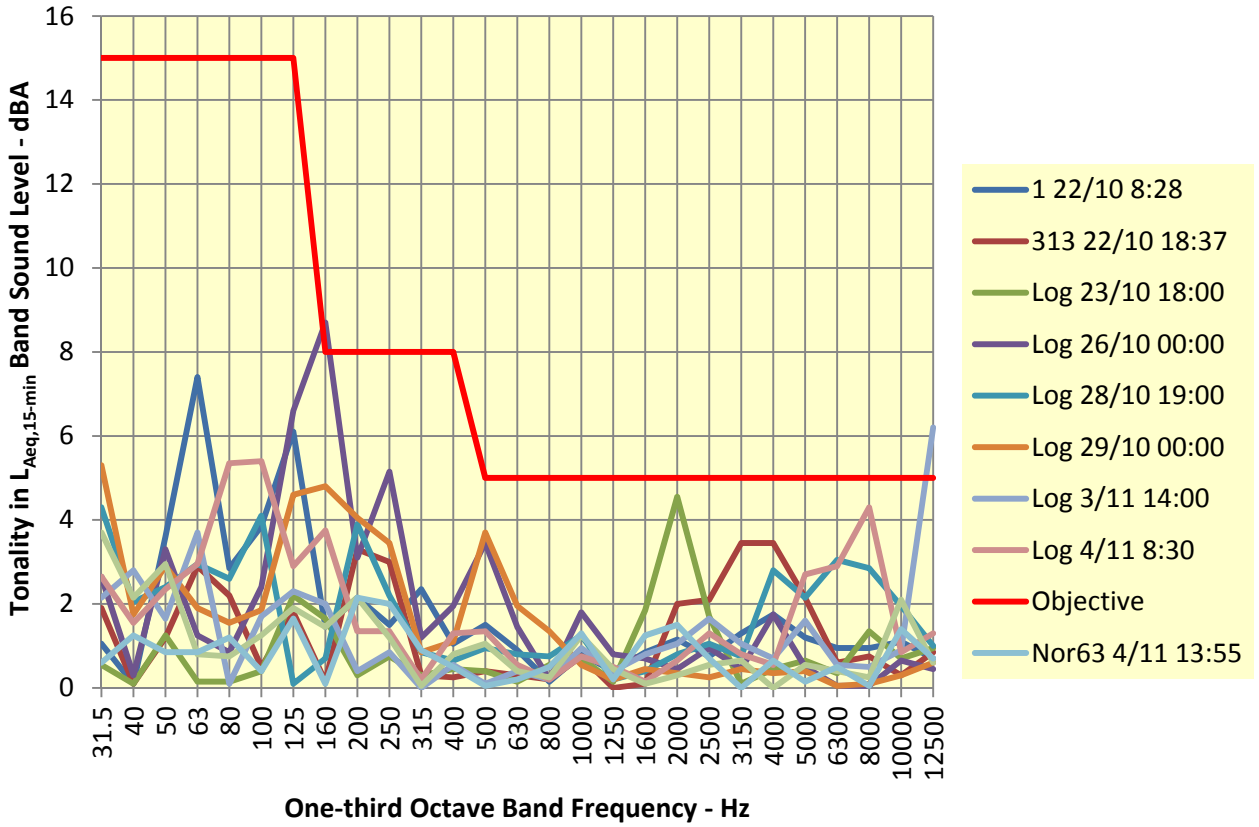


Figure F4: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra: 4 Melbourne St L_{A90}

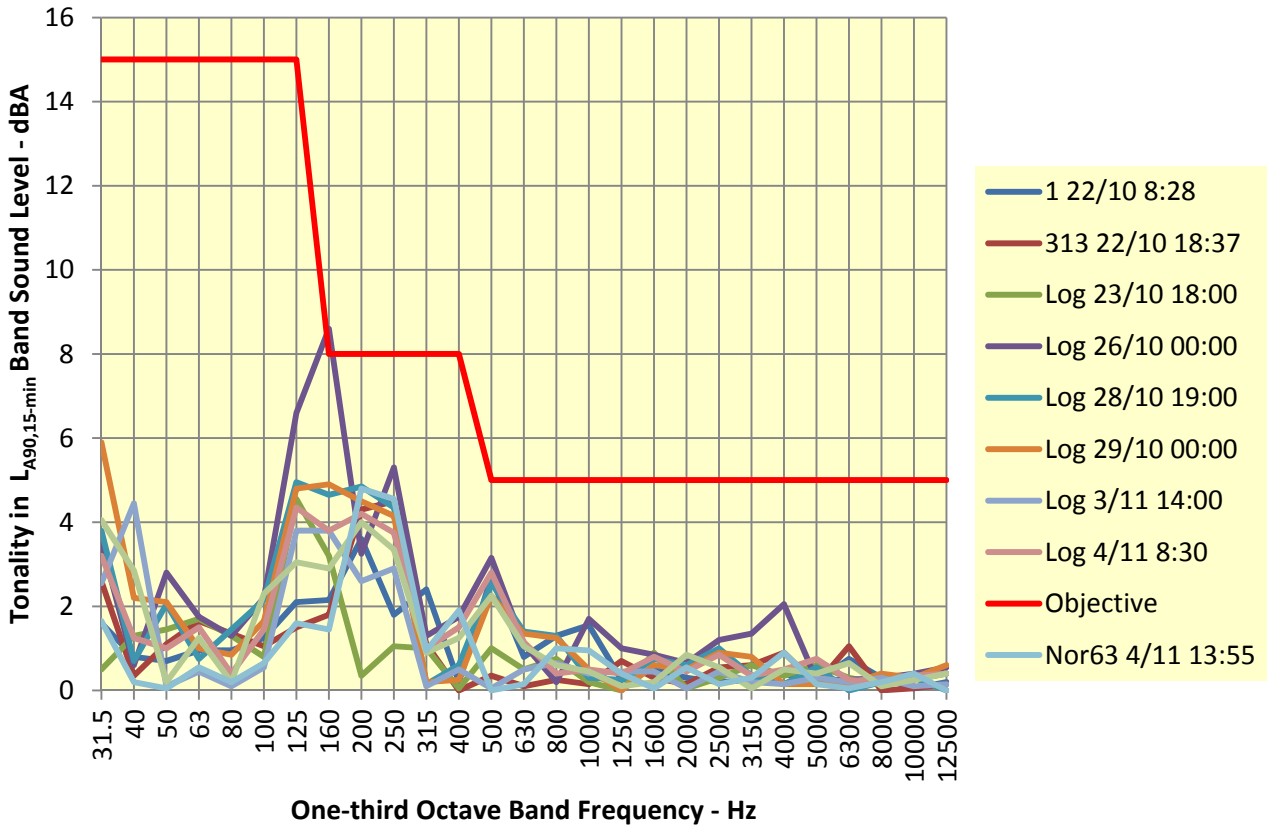


Figure F5: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 22/10 8:28am

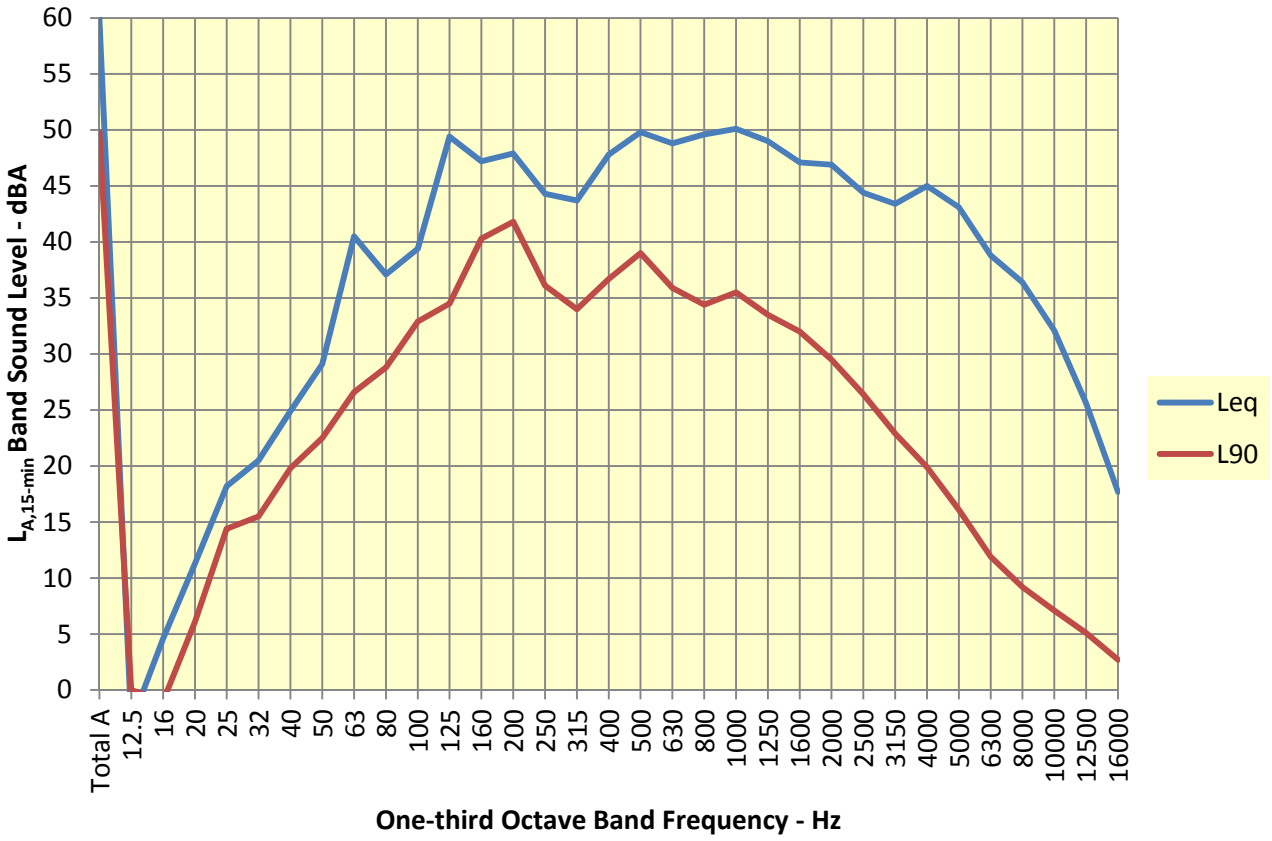


Figure F6: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 22/10 18:37pm

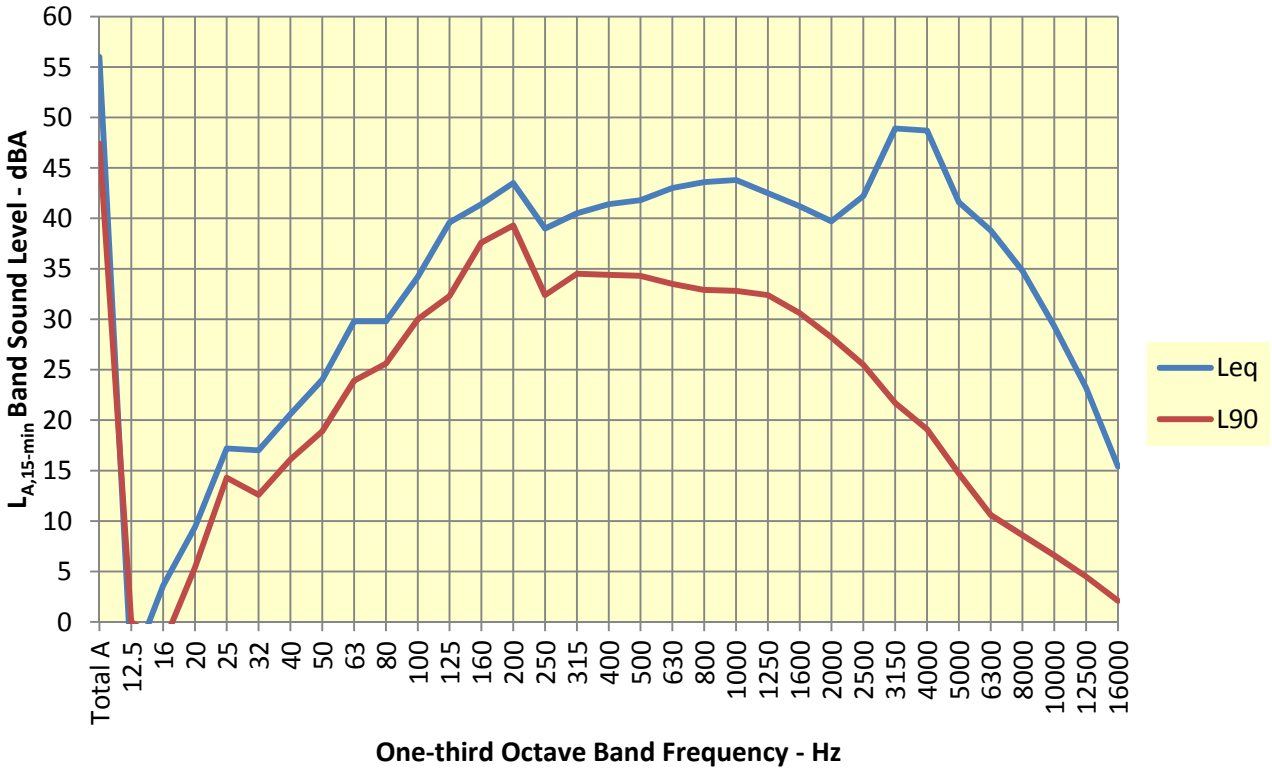


Figure F7: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 23/10 18:00pm

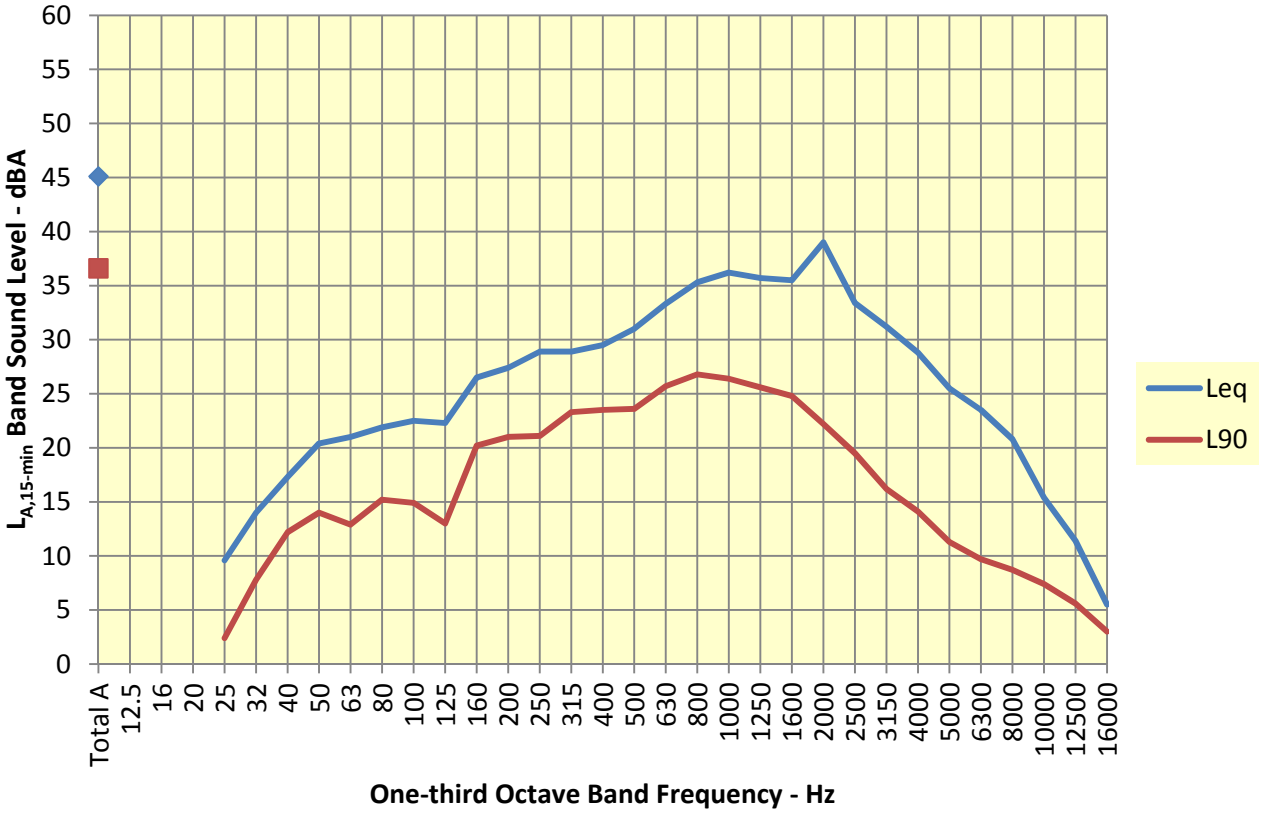


Figure F8: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 26/10 00:00am

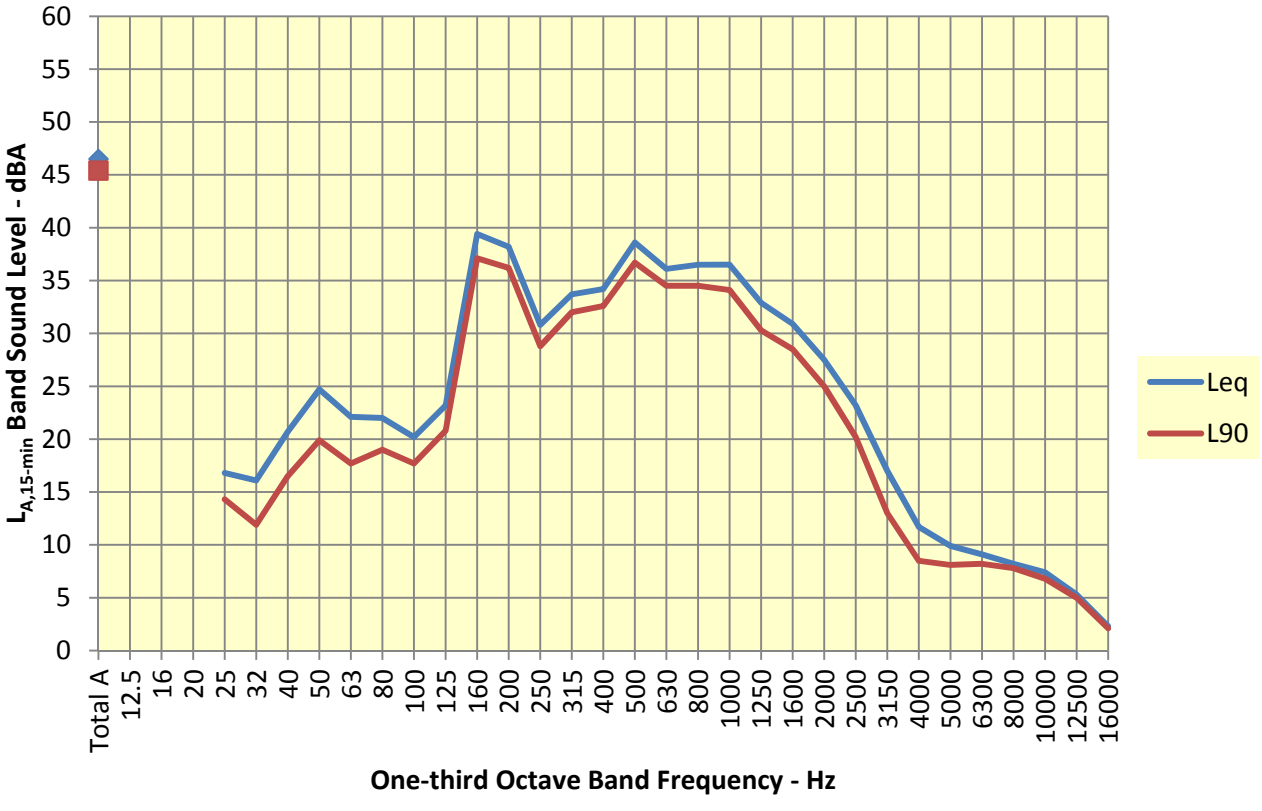


Figure F9: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 28/10 19:00pm

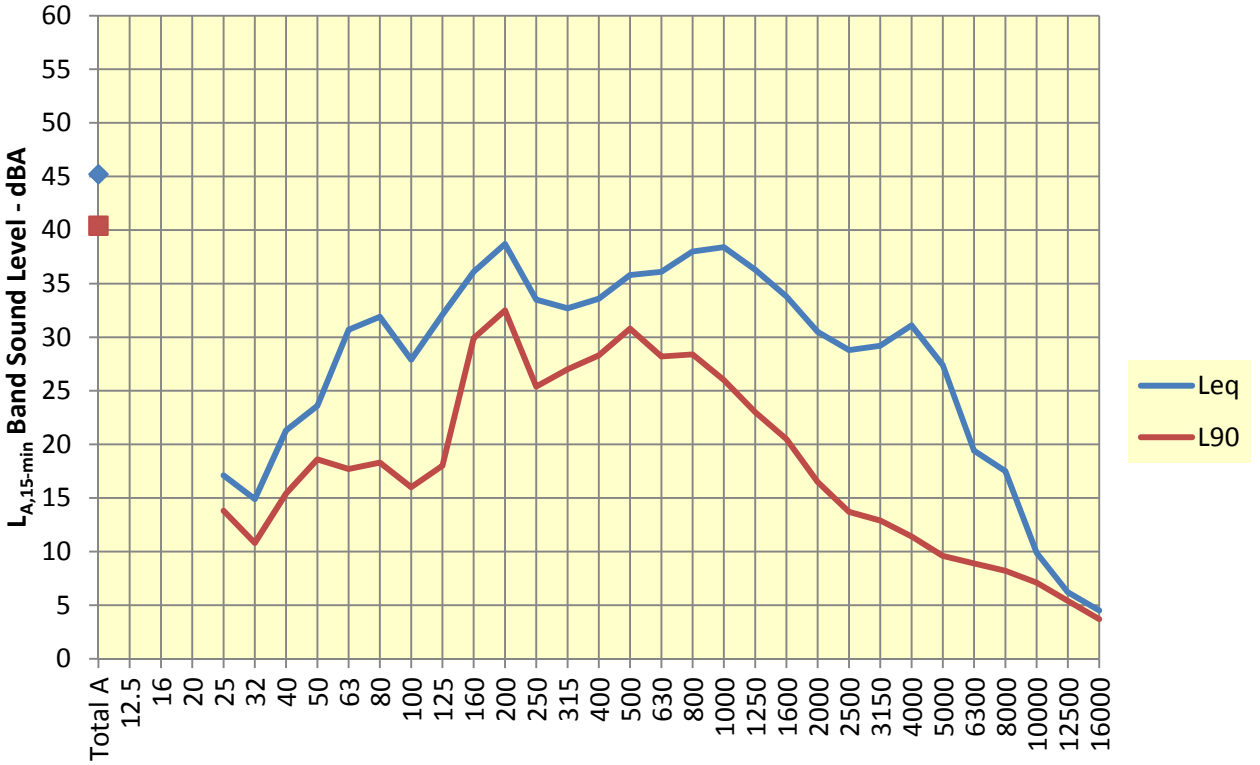


Figure F10: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 29/10 00:00am

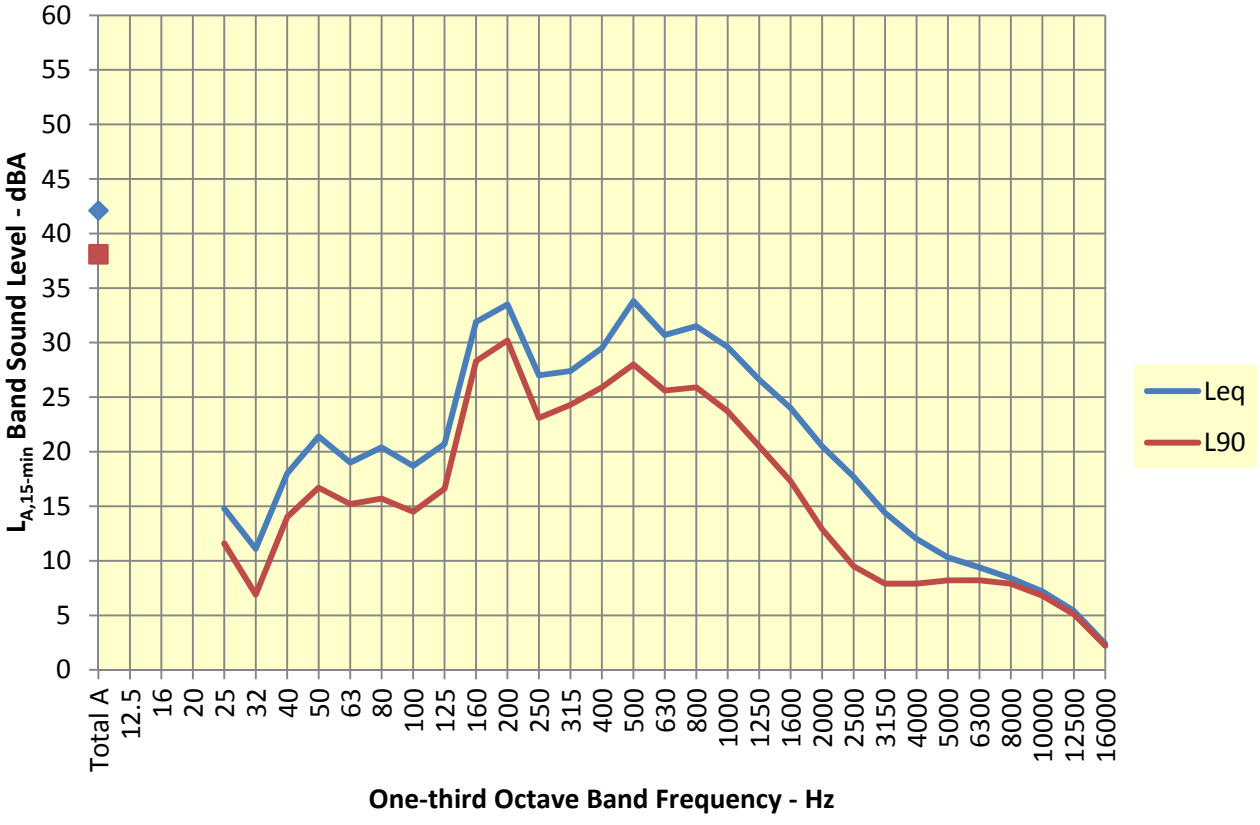


Figure F11: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 03/11 14:00pm

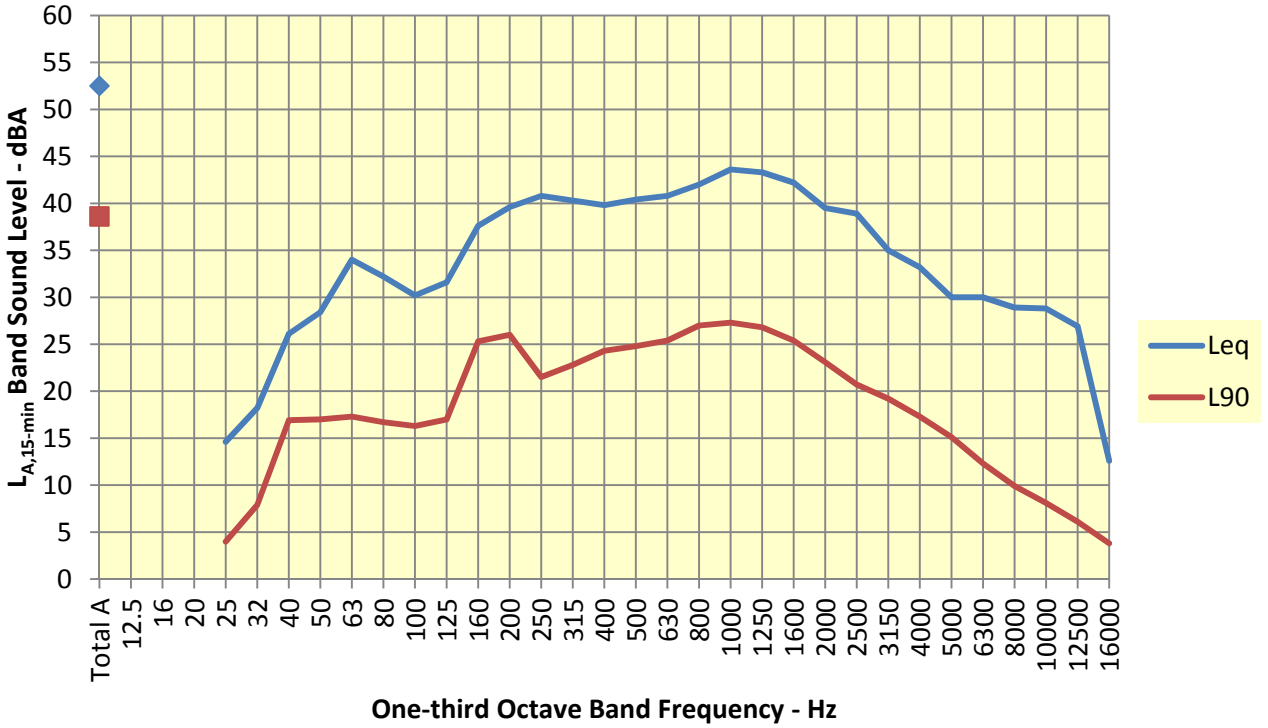


Figure F12: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 04/11 08:30am

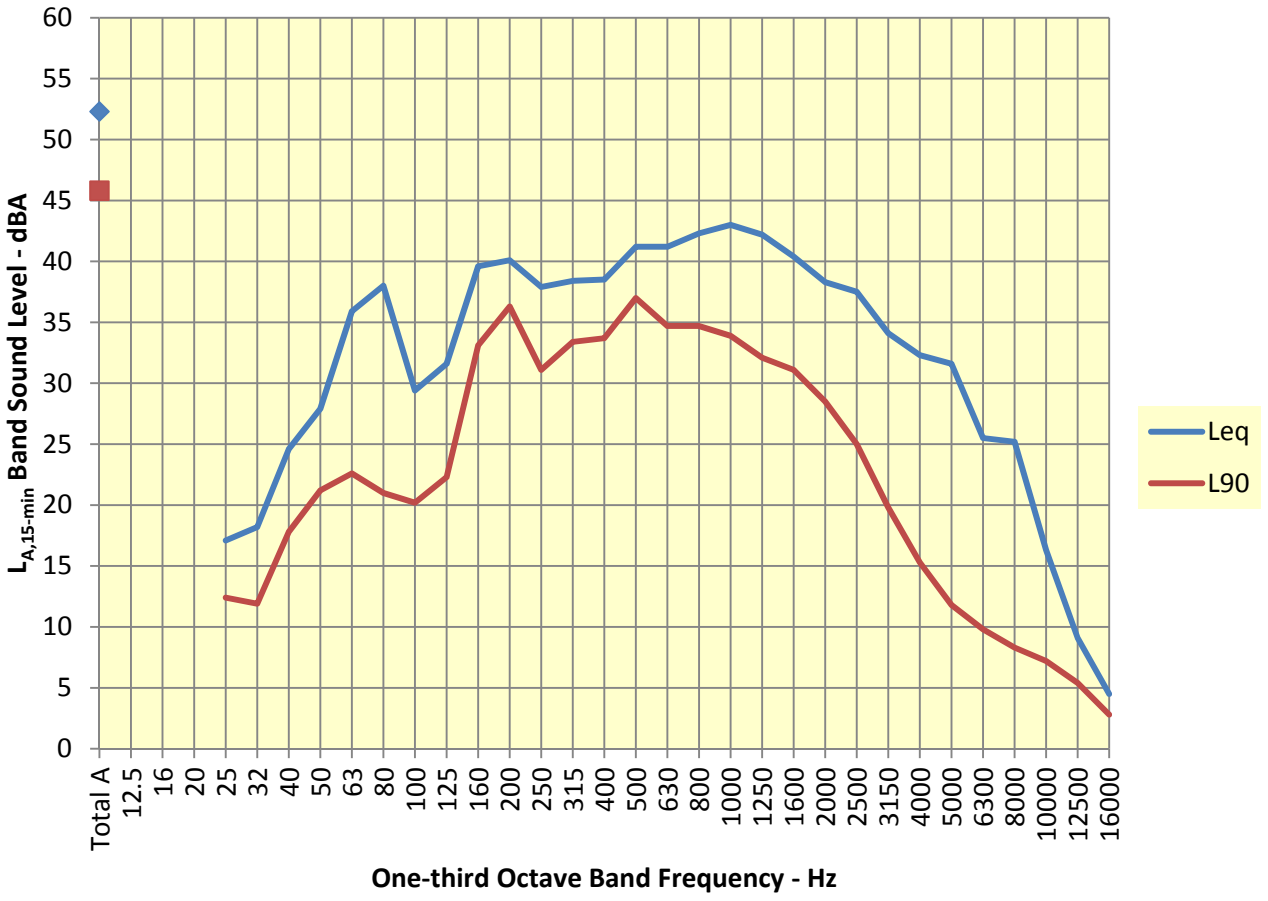


Figure F13: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 4 Melbourne St L_{Aeq} and L_{A90} 04/11 13:55am

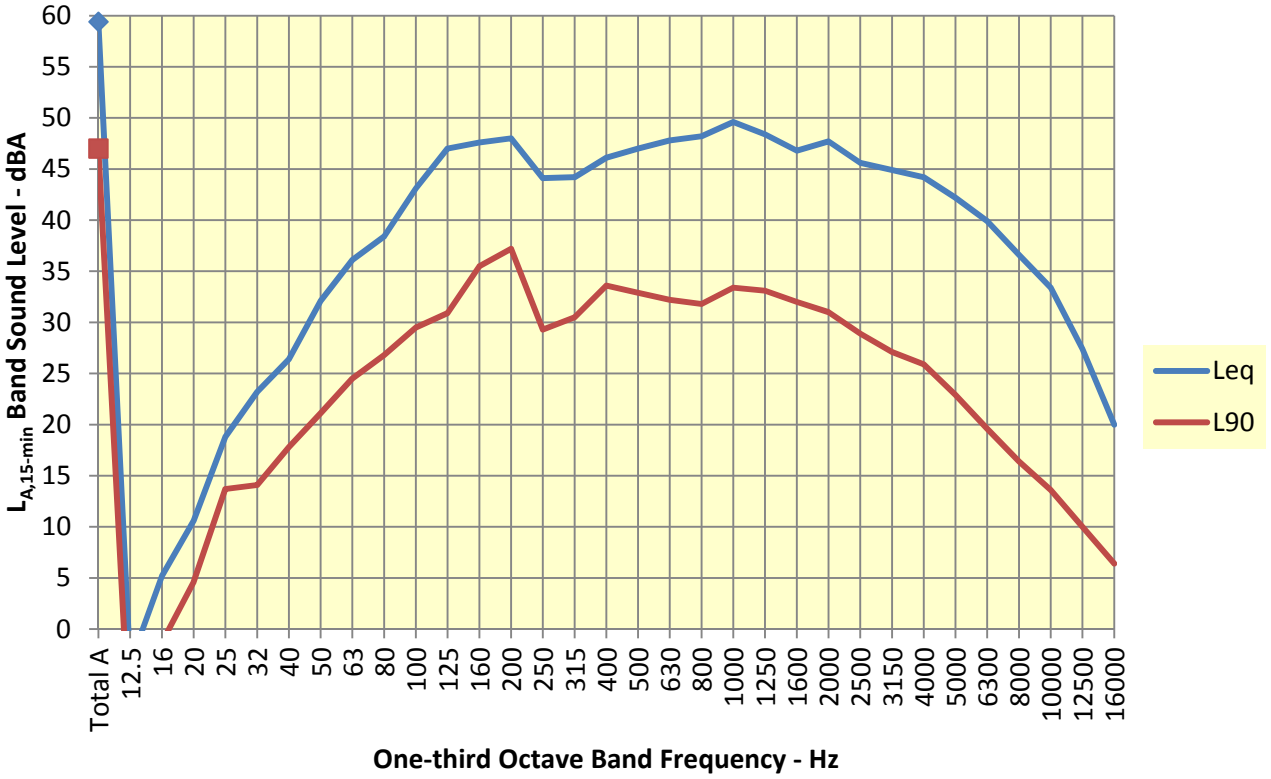


Figure F14: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Adelaide St near Taylor L_{Aeq}

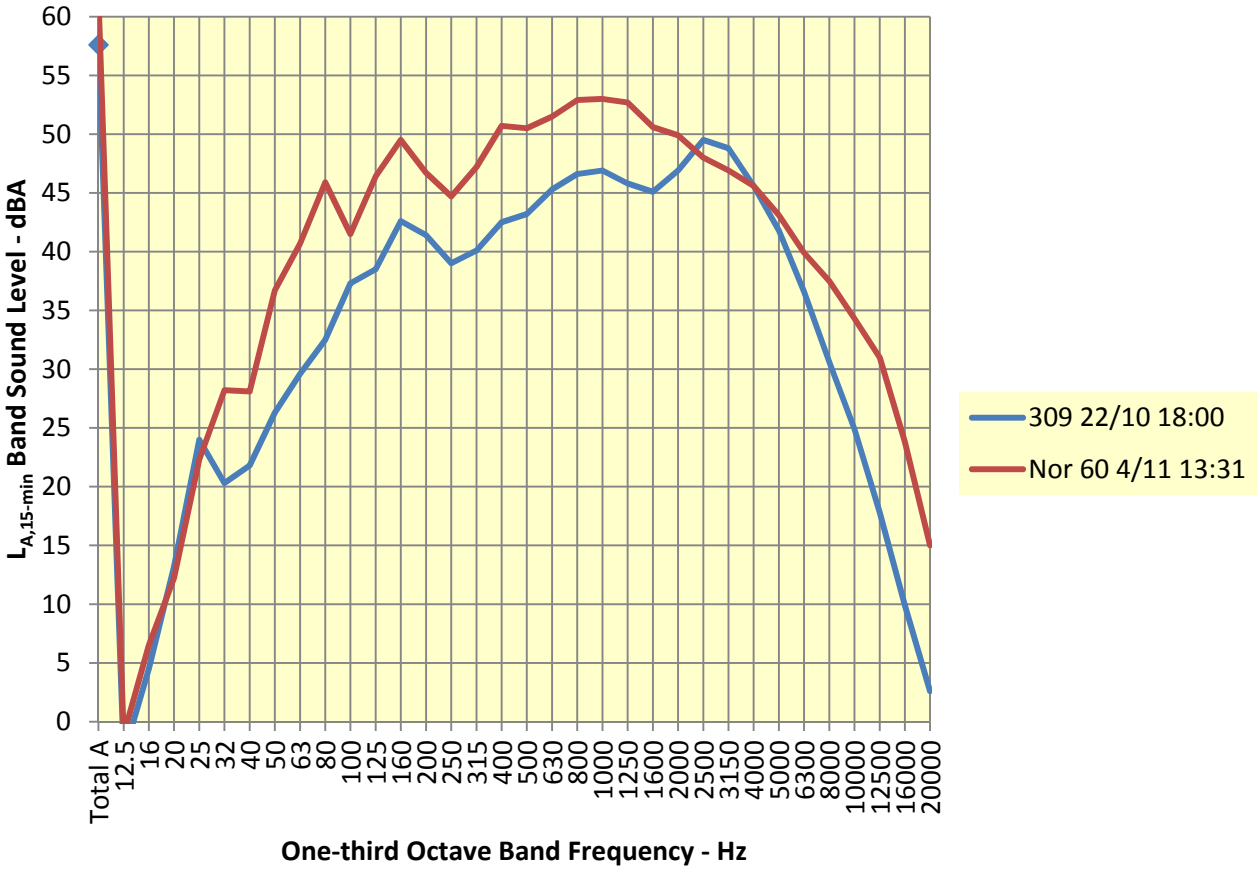


Figure F15: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Adelaide St near Taylor L_{A90}

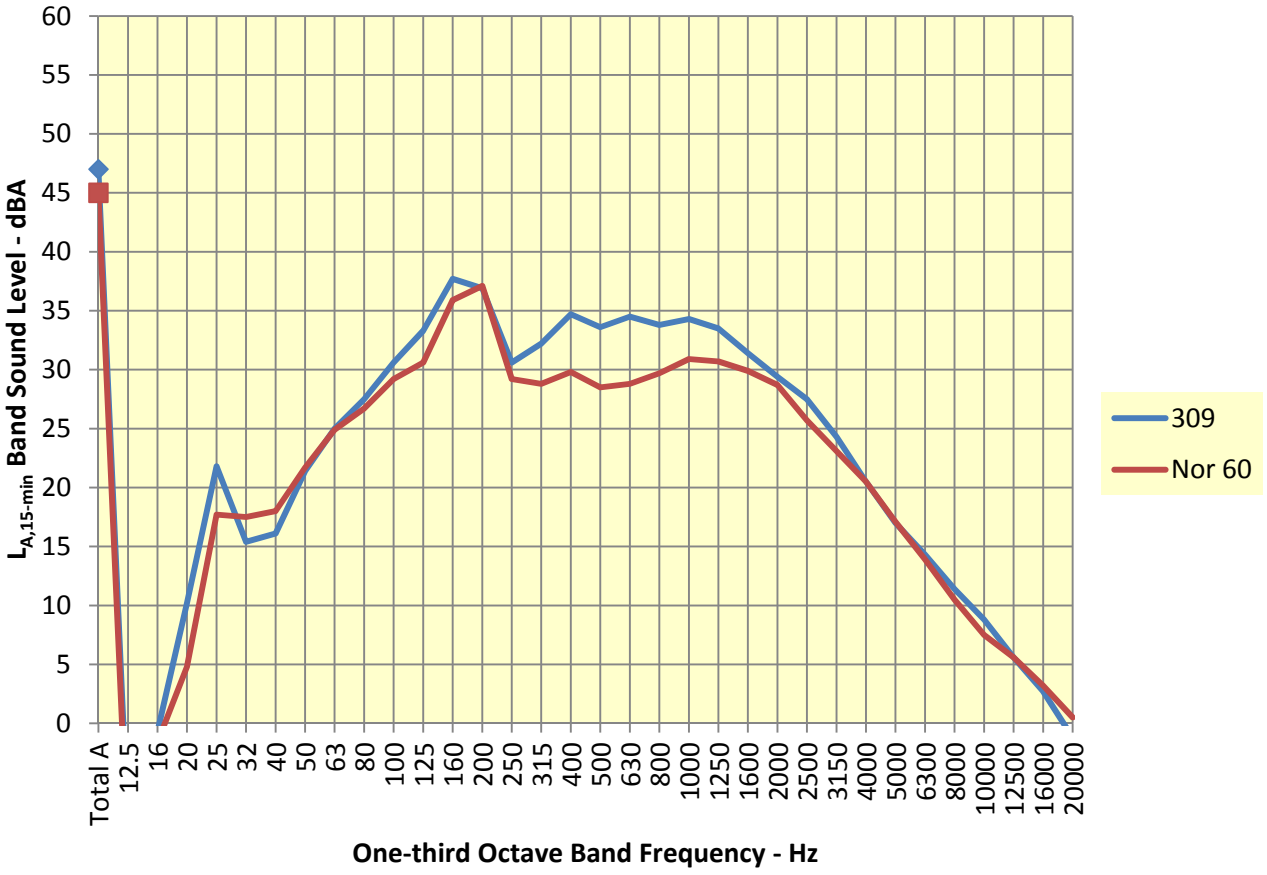


Figure F16: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra: Adelaide St near Taylor L_{Aeq} & L_{A90}

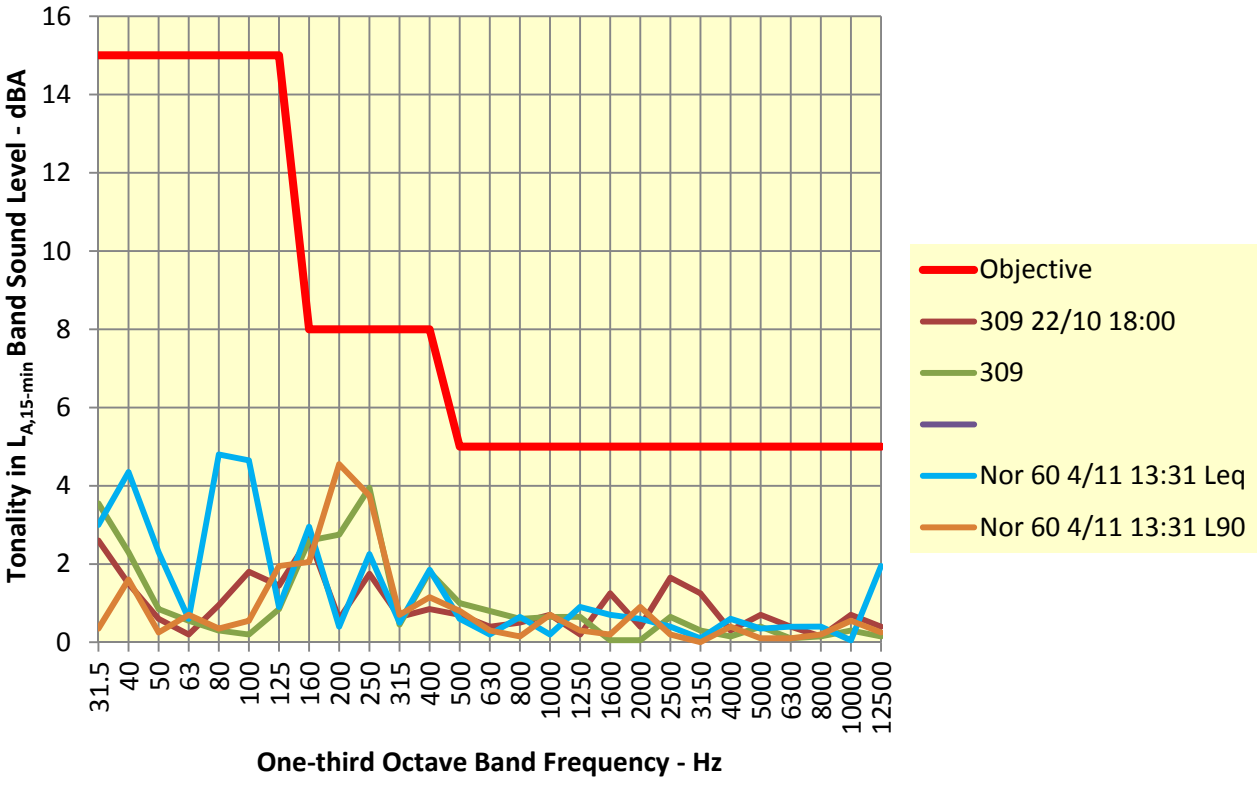


Figure F17: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 12 Brisbane St L_{Aeq}

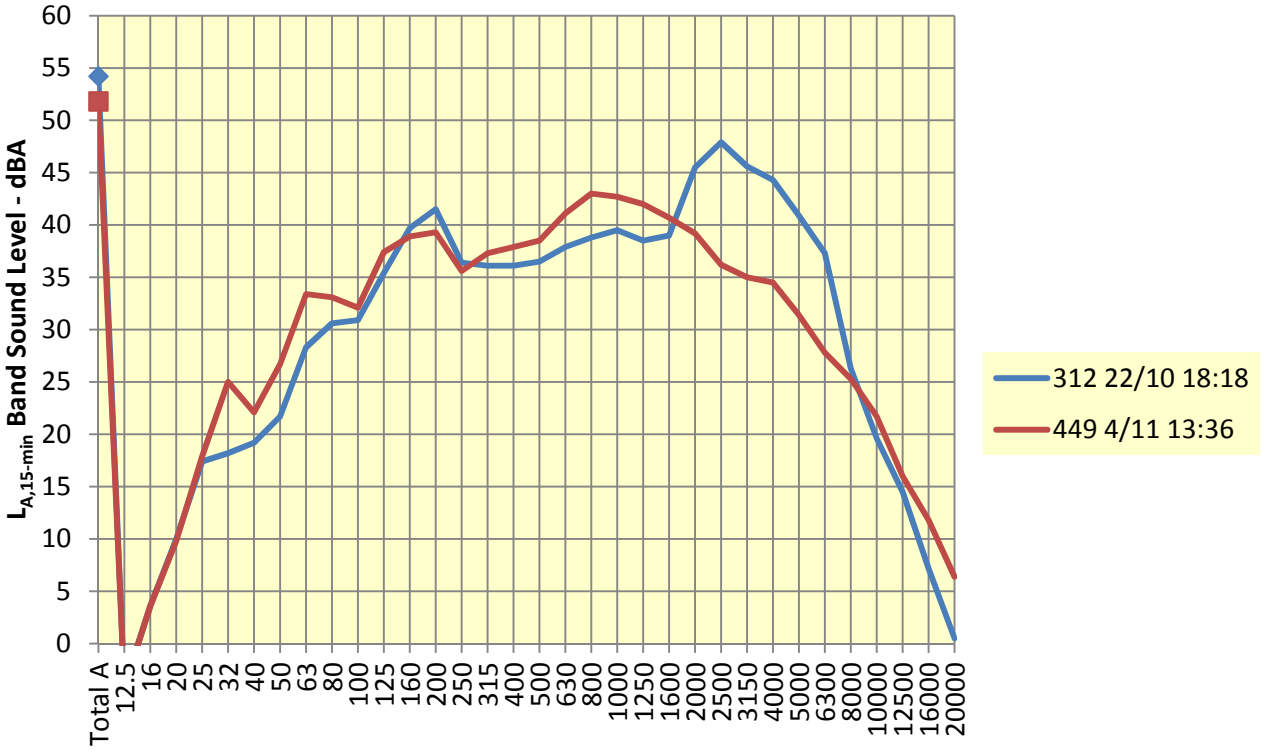


Figure F18: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 12 Brisbane St L_{A90}

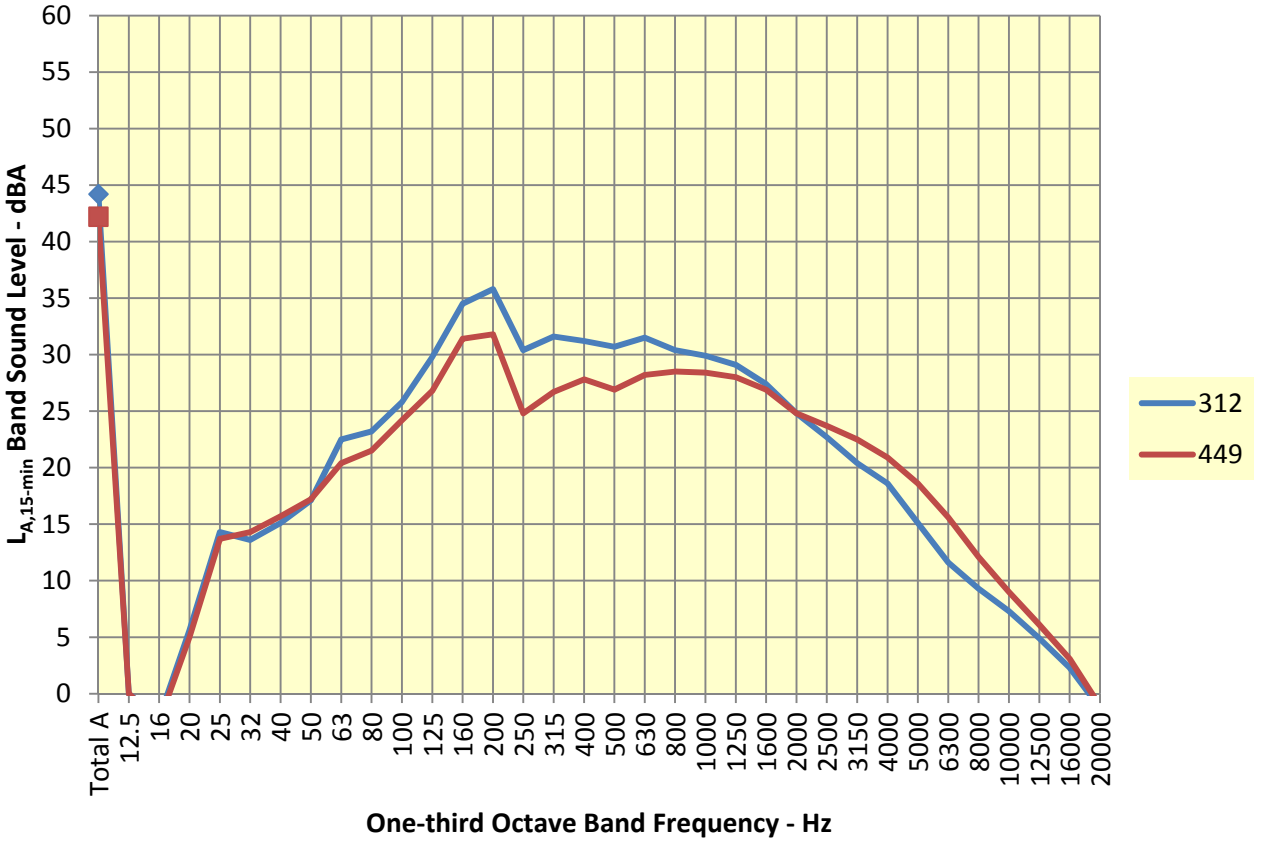


Figure F19: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 12 Brisbane St L_{Aeq} and L_{A90} 22/10 18:18pm

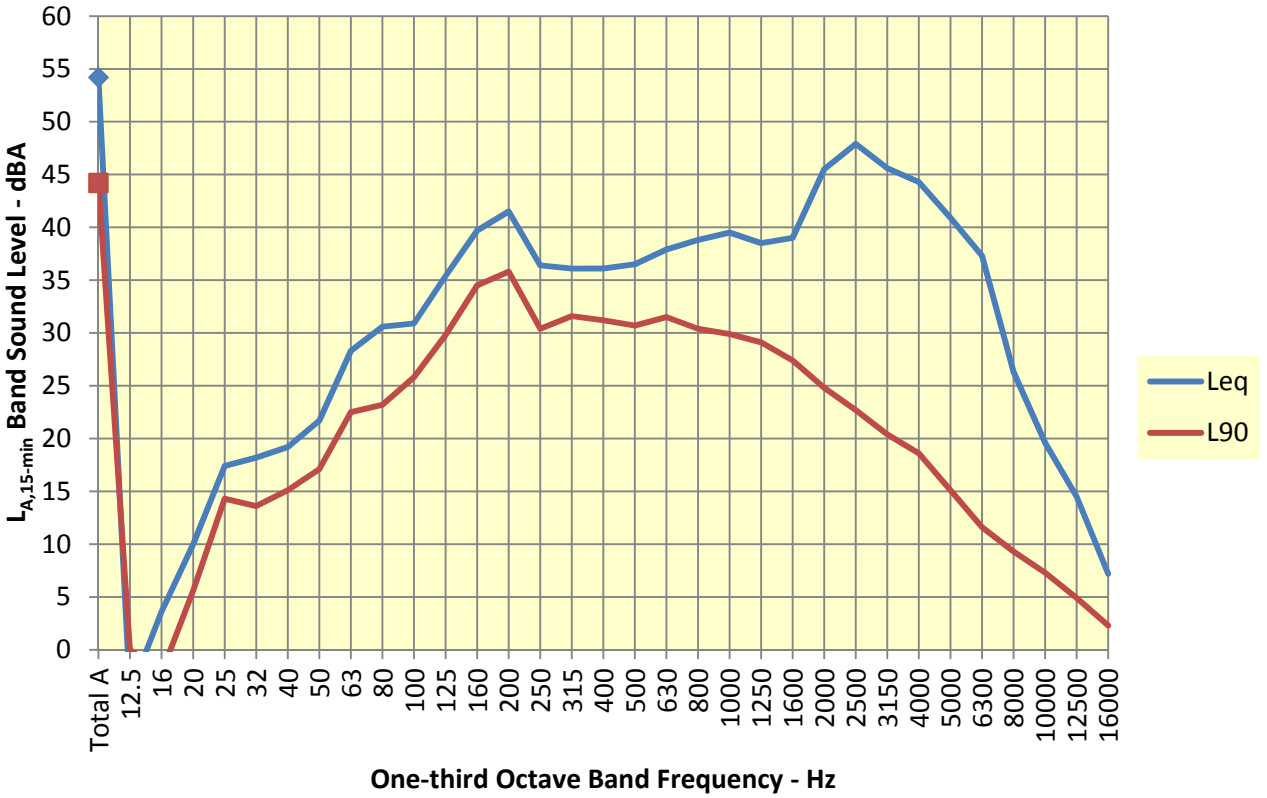


Figure F20: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: 12 Brisbane St L_{Aeq} and L_{A90} 14/11 13:36pm

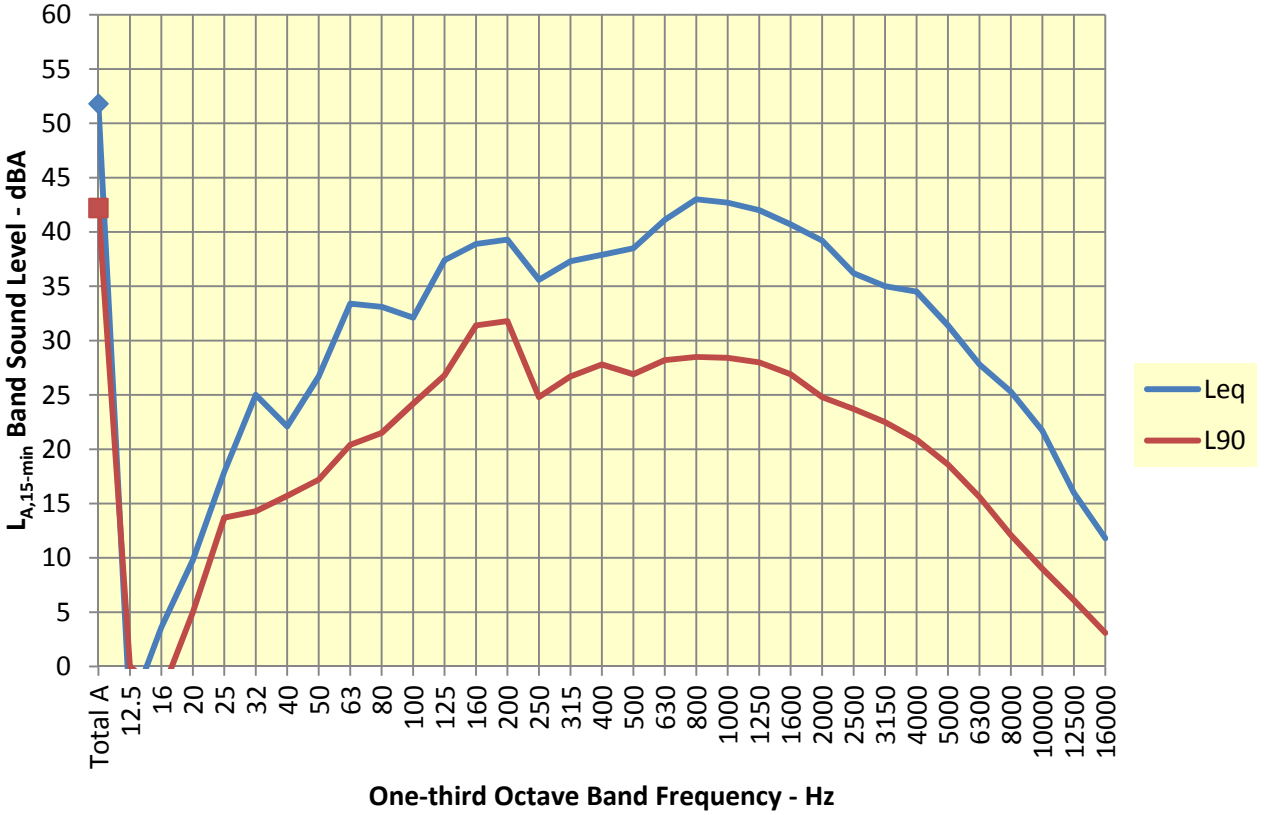


Figure F21: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra: Brisbane St L_{Aeq} & L_{A90}

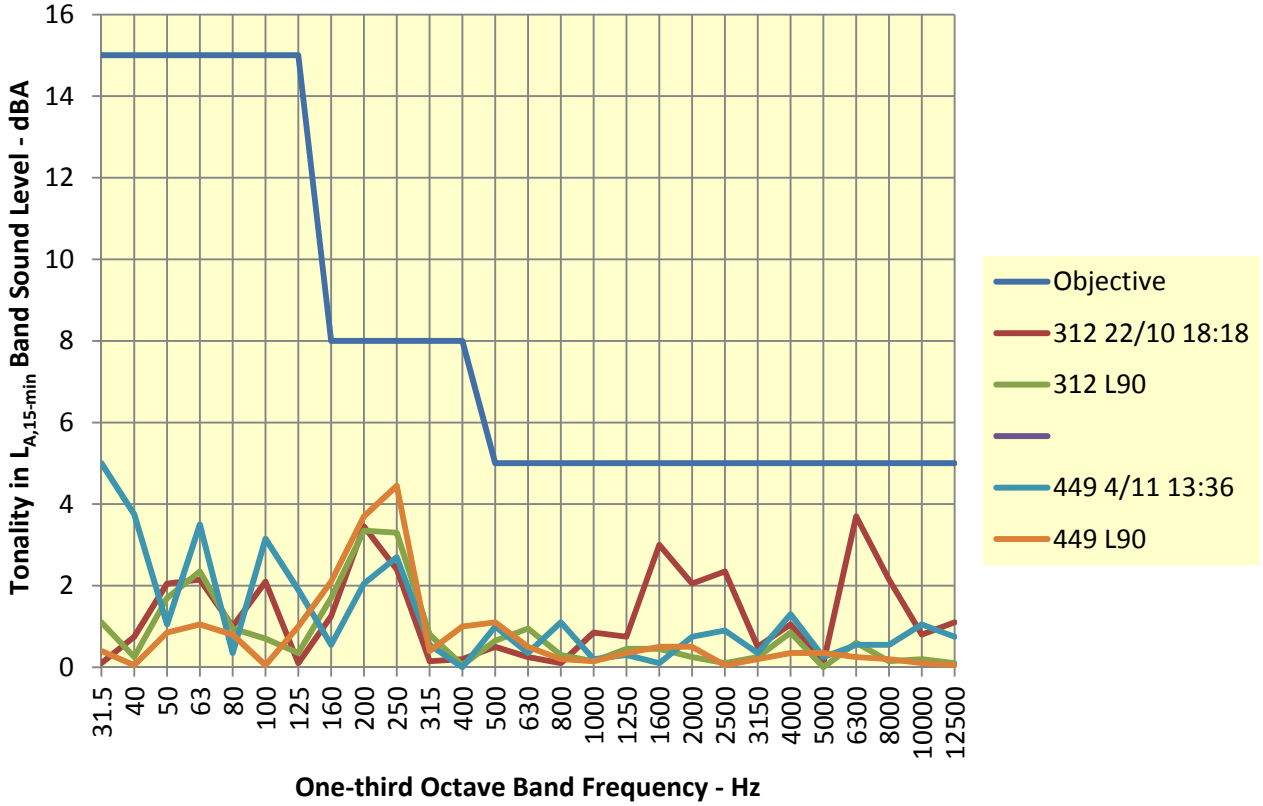


Figure F22: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq}

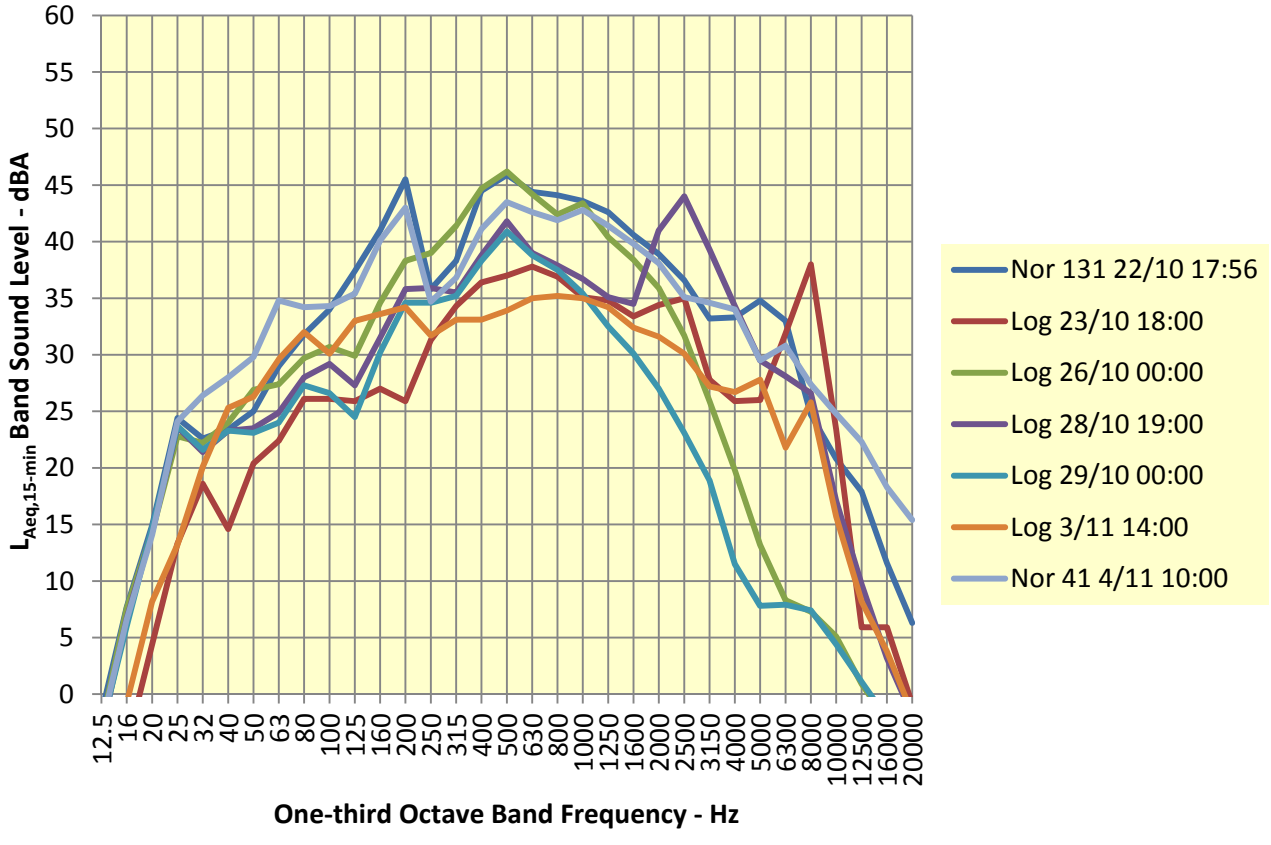


Figure F23: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{A90}

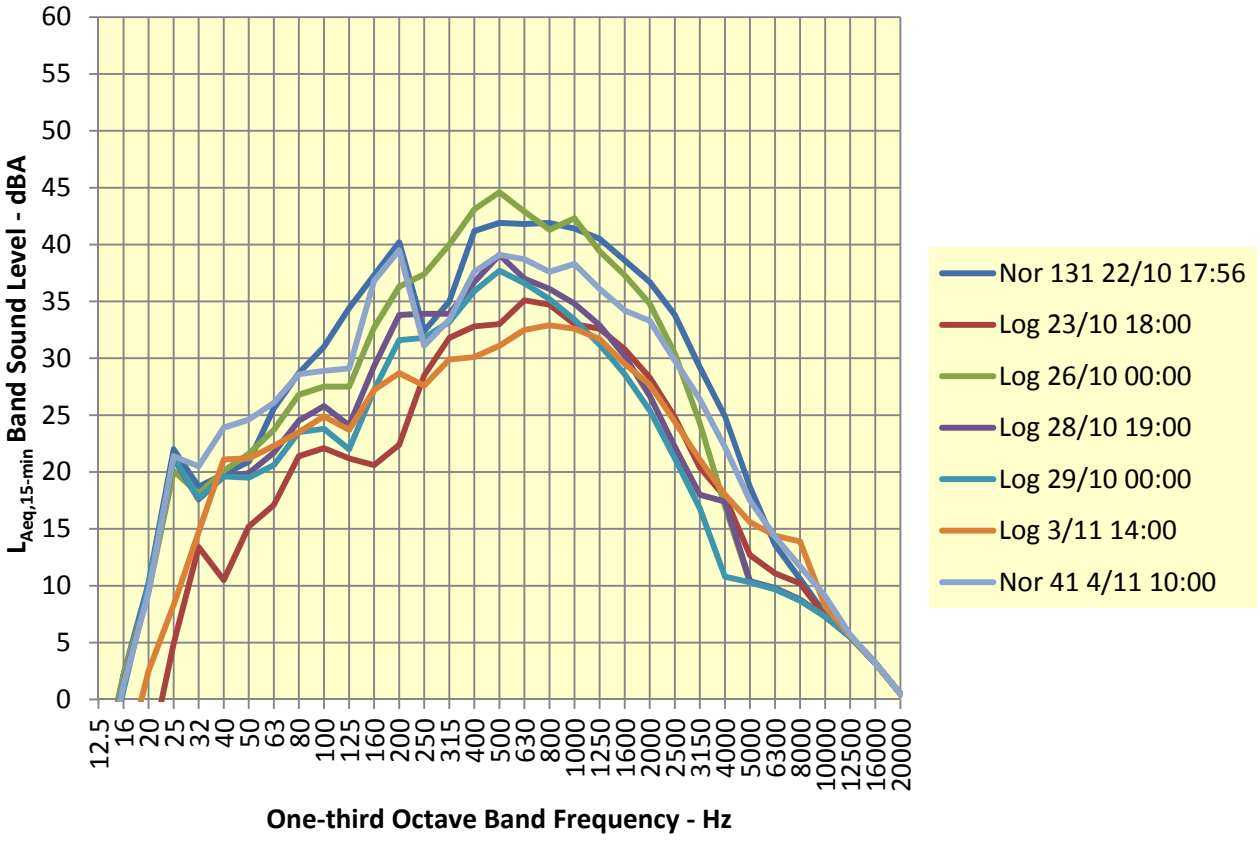


Figure F24: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra North Fence L_{Aeq}

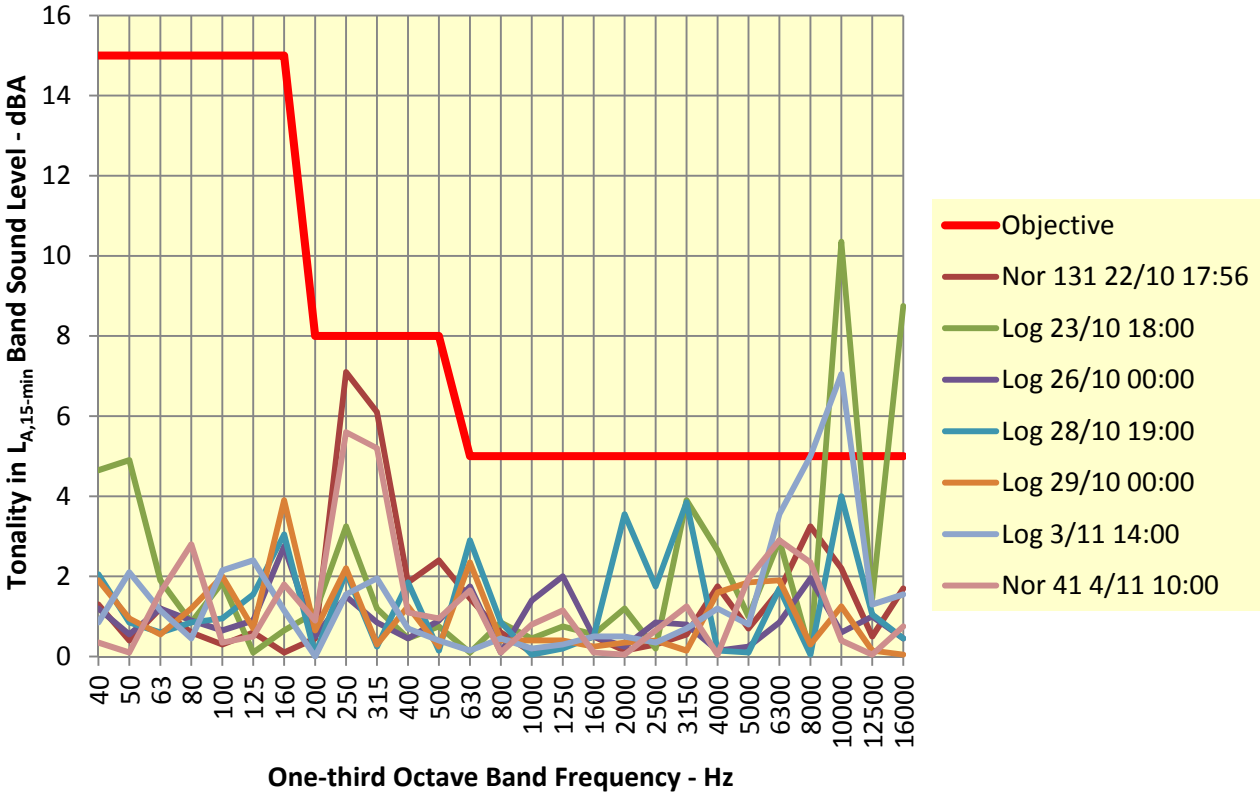


Figure F25: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra North Fence L_{A90}

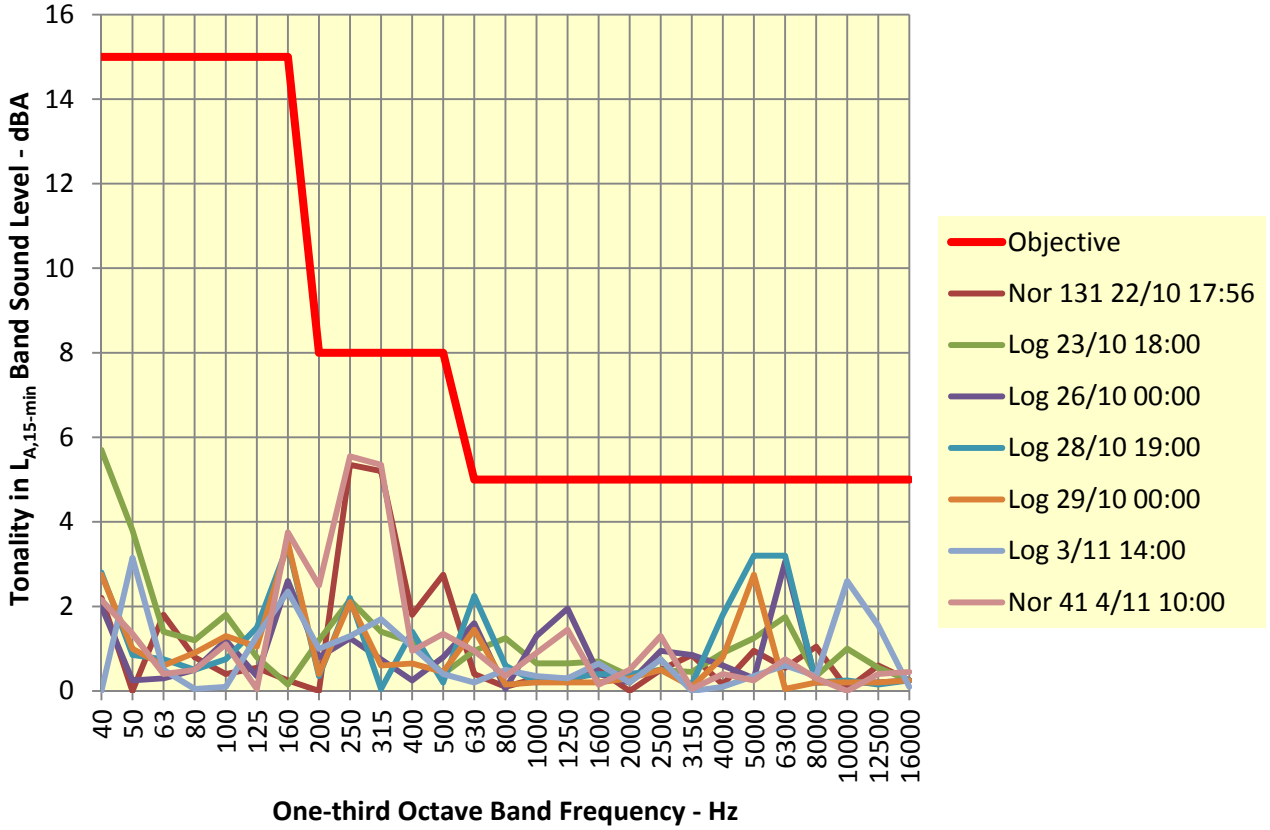


Figure F26: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

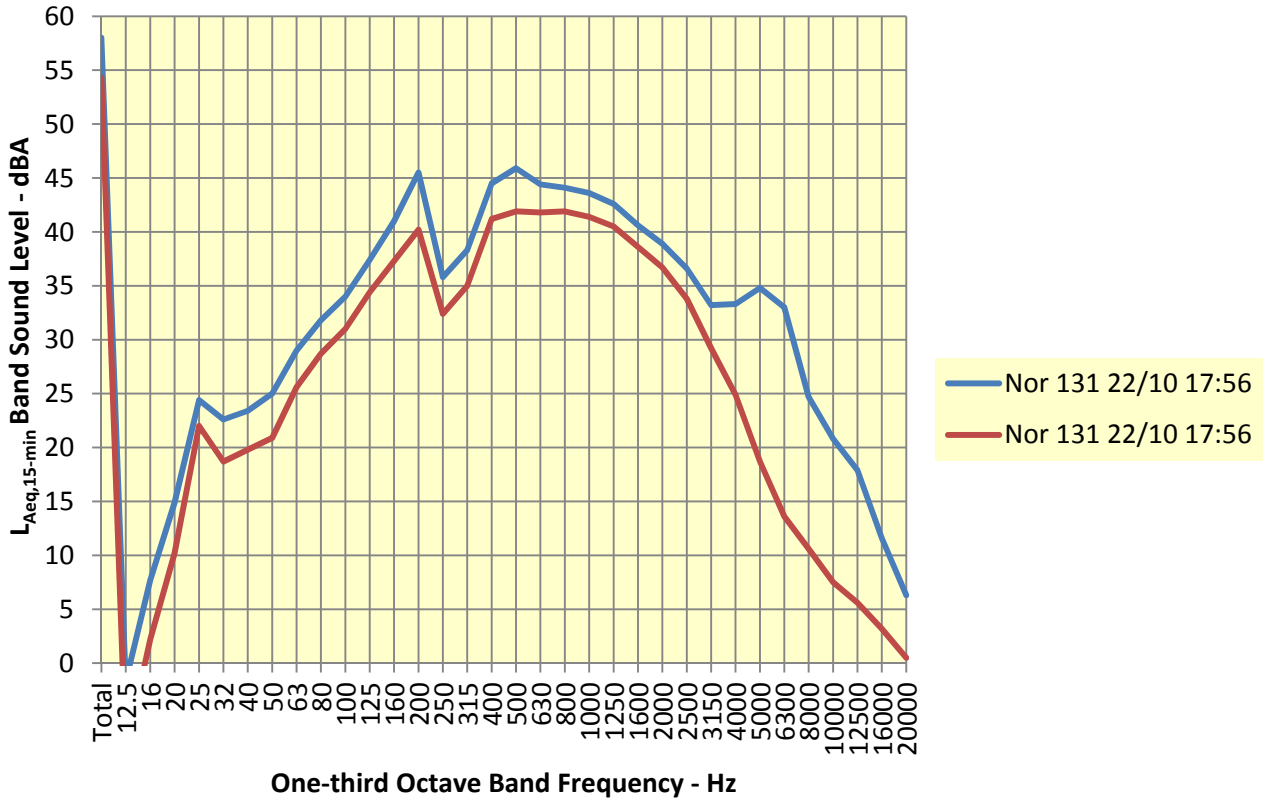


Figure F27: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

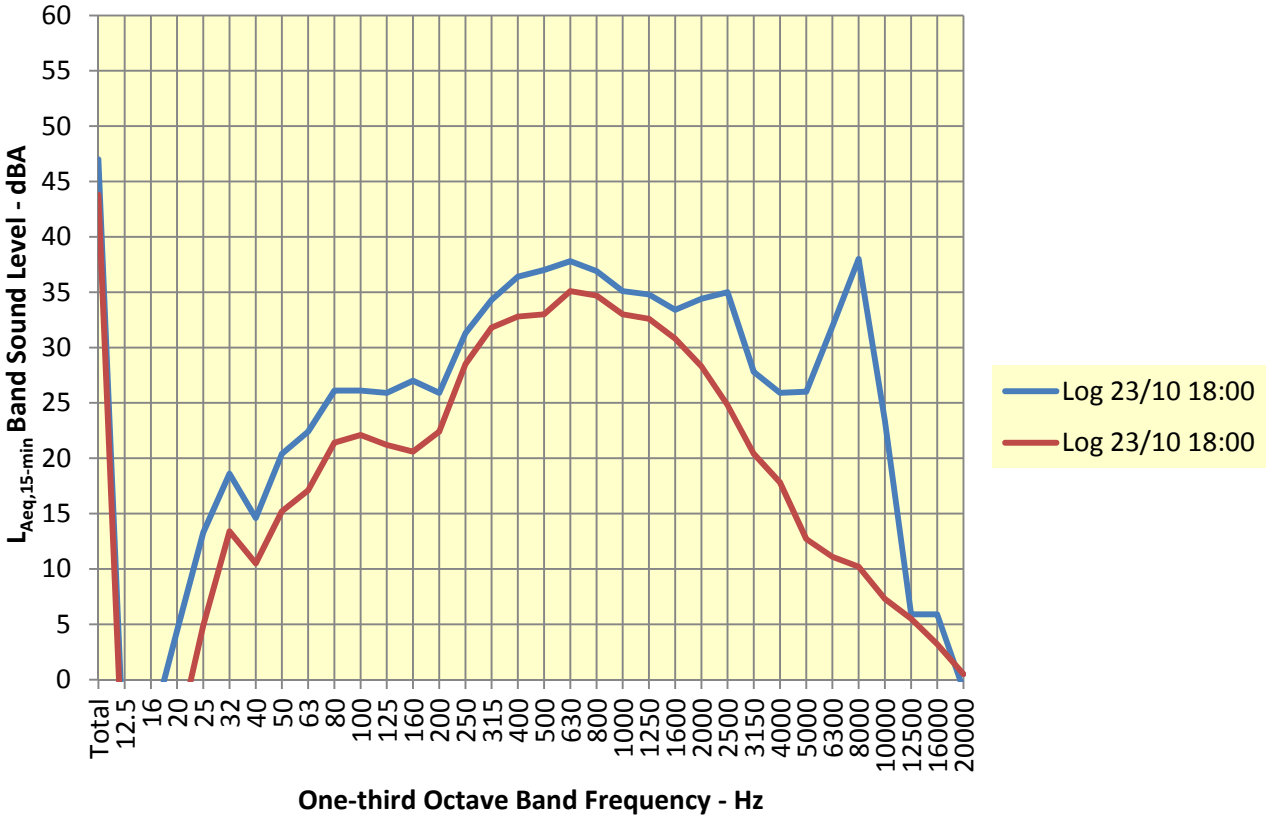


Figure F28: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

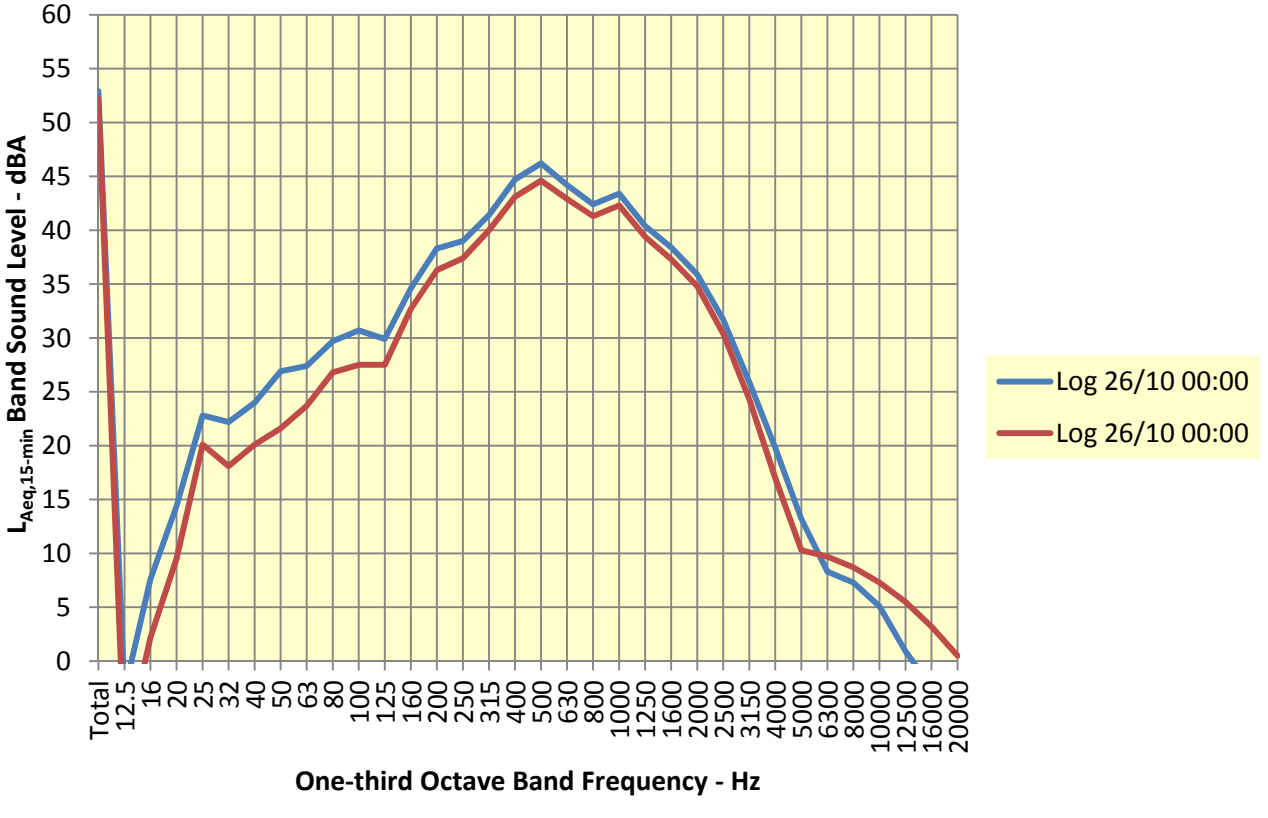


Figure F29: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

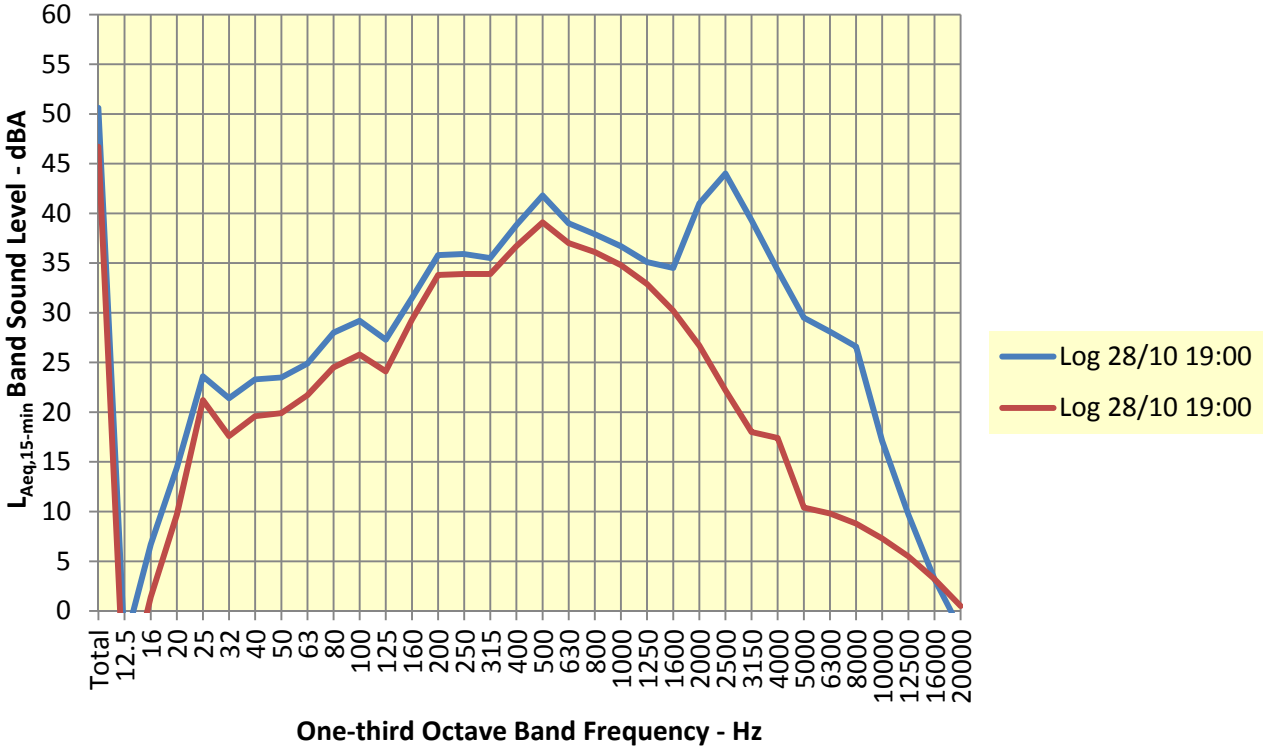


Figure F30: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

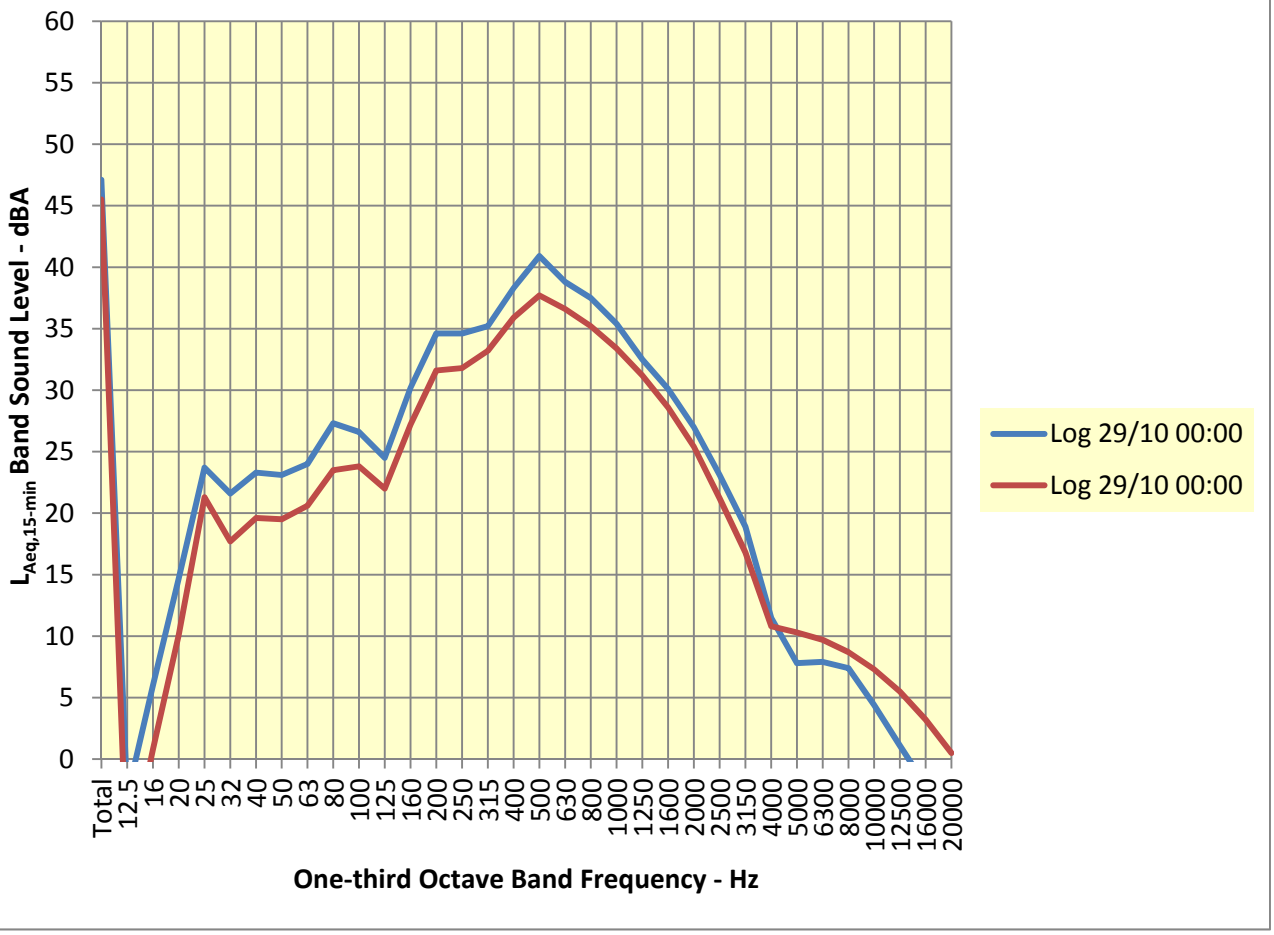


Figure F31: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

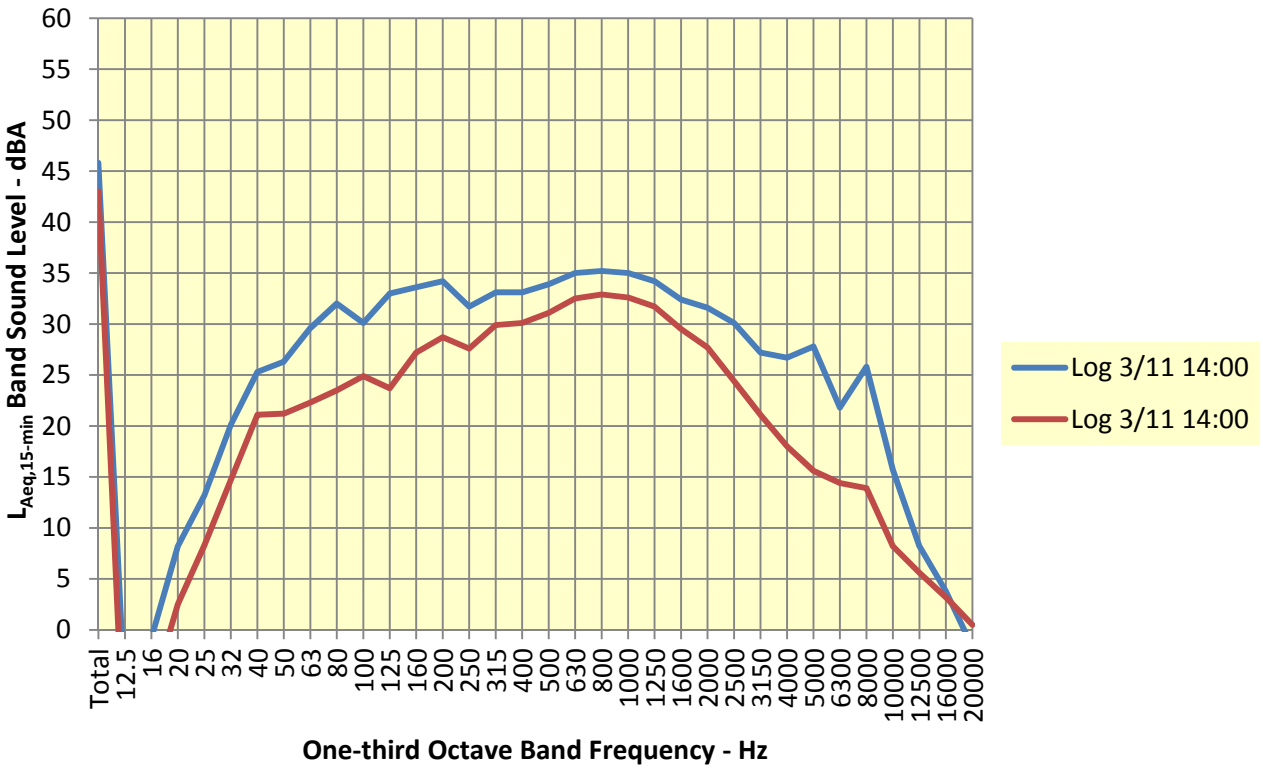


Figure F32: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: North Fence L_{Aeq} & L_{A90}

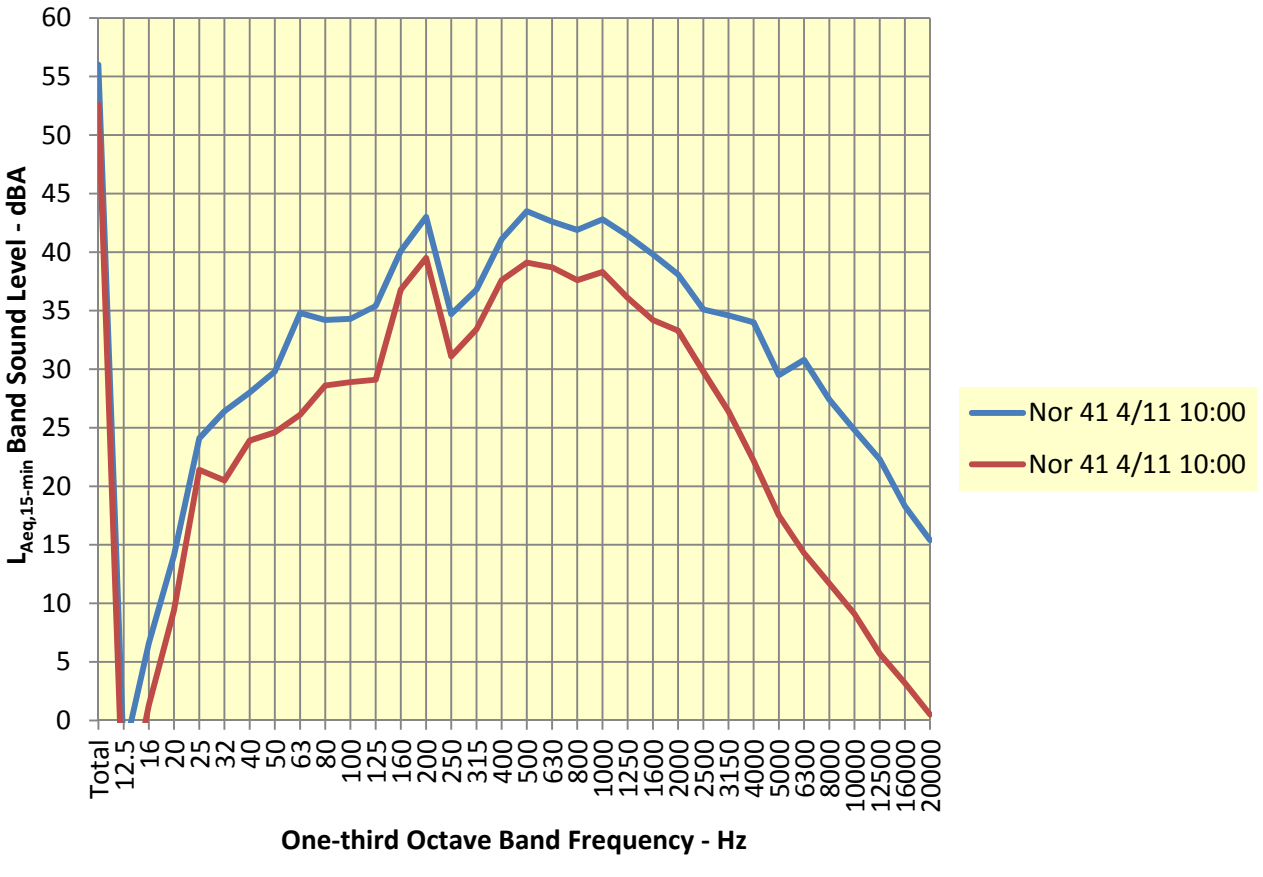


Figure F33: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq}

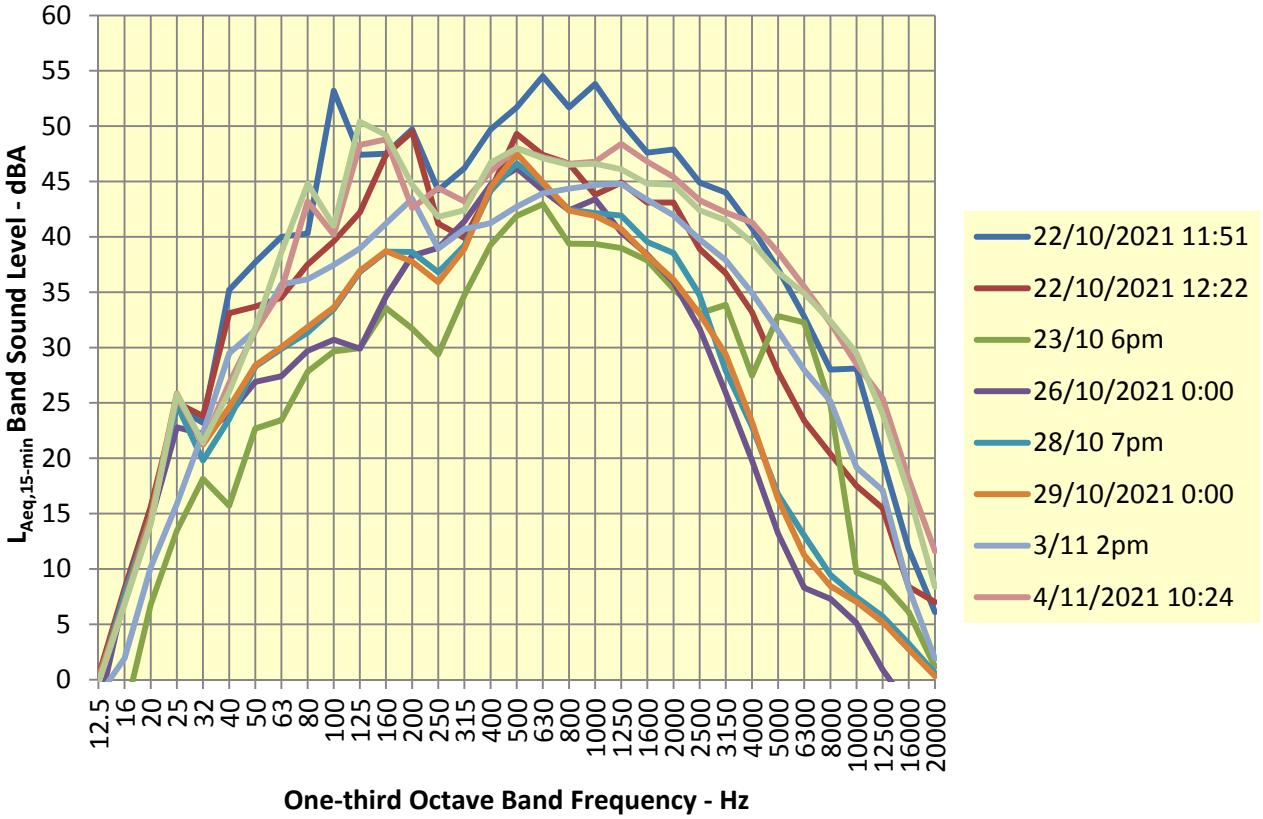


Figure F34: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{A90}

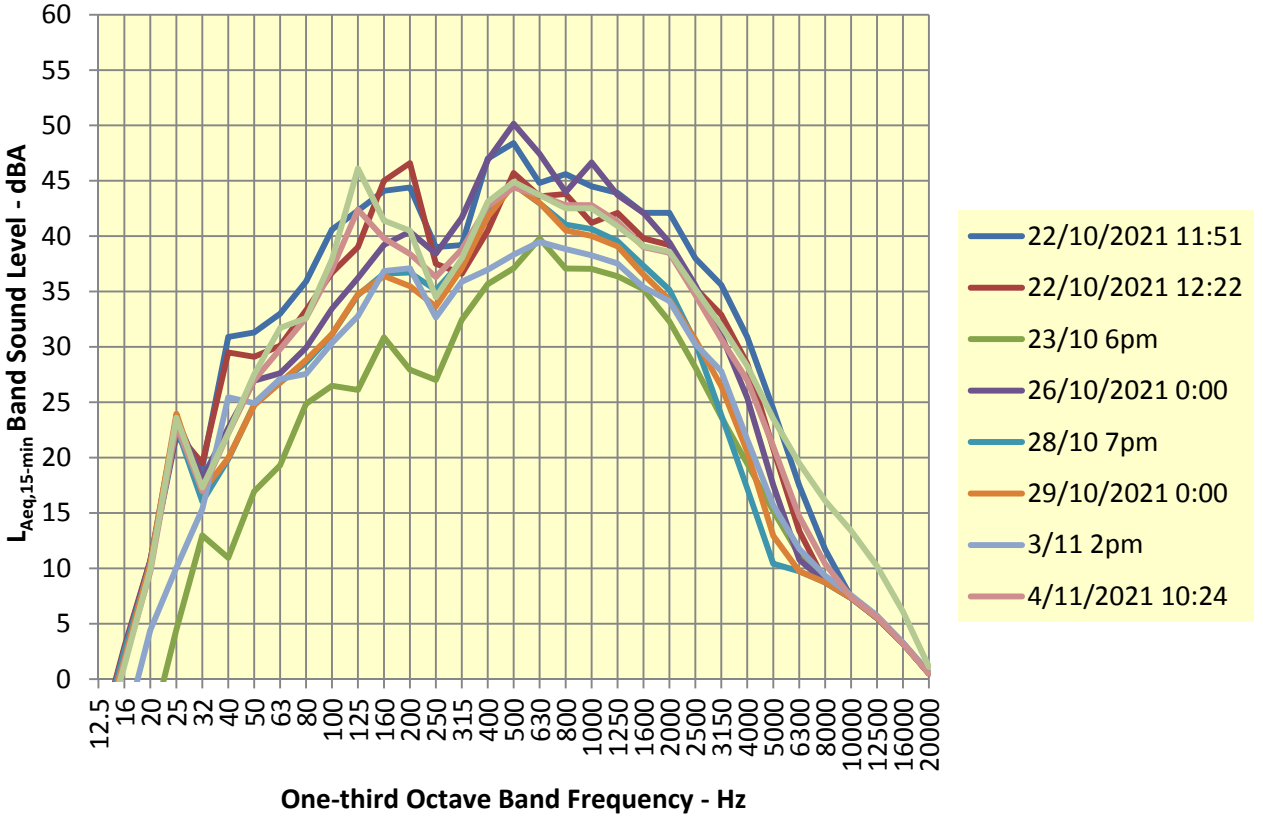


Figure F35: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra Location 20 L_{Aeq}

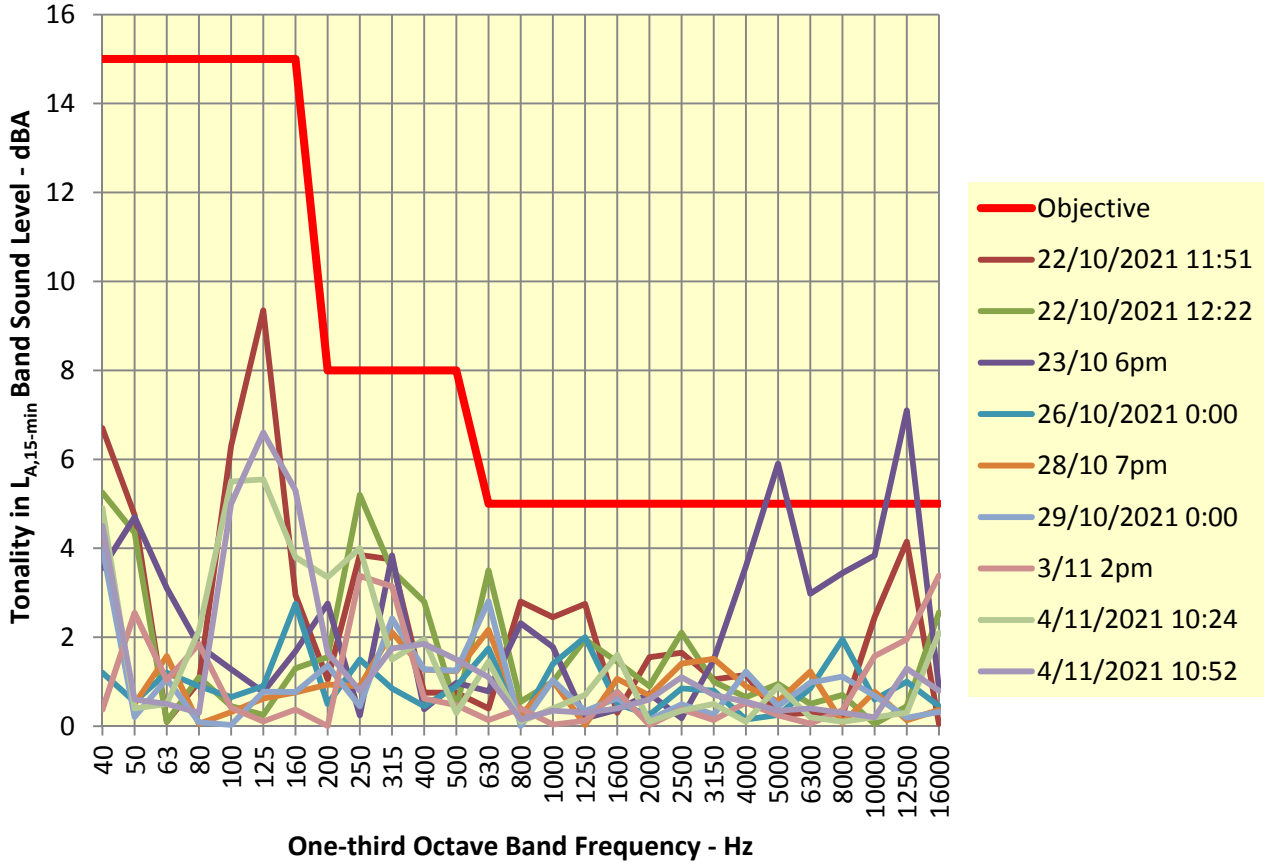


Figure F36: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Tonality Spectra Location 20 L_{A90}

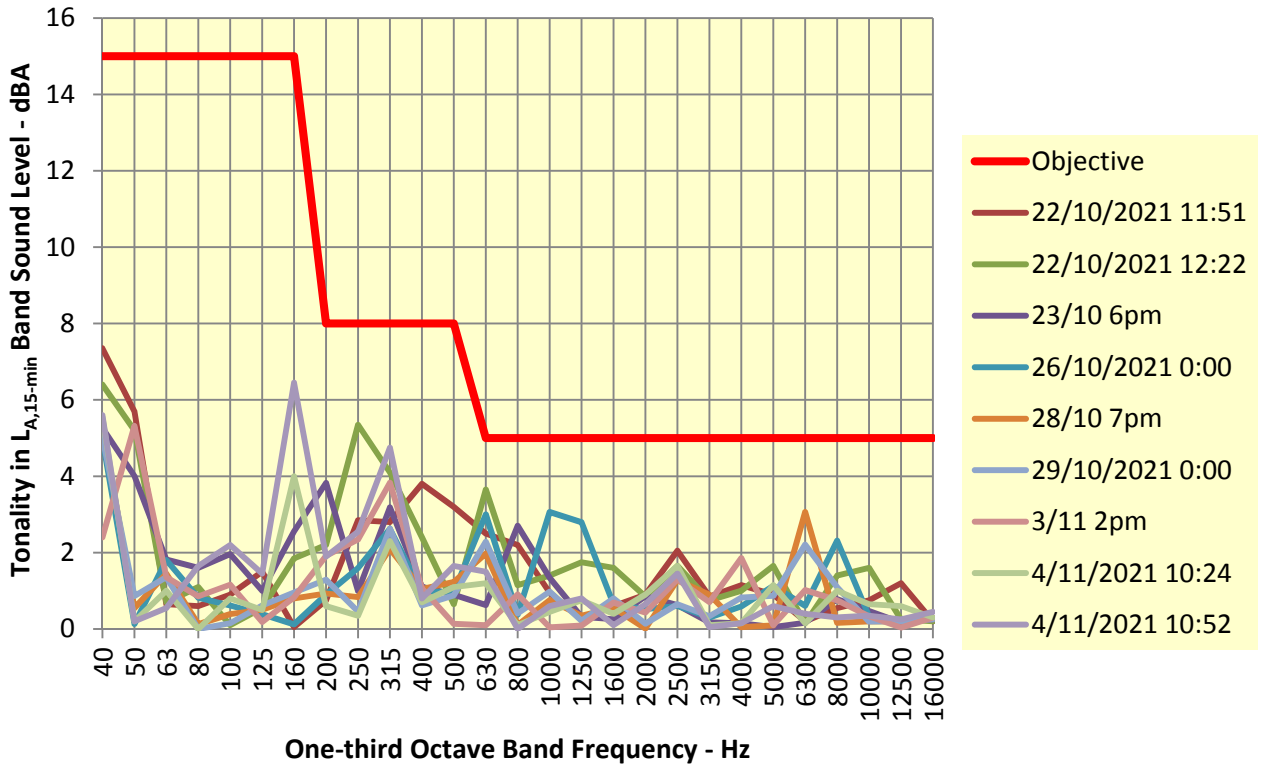


Figure F37: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

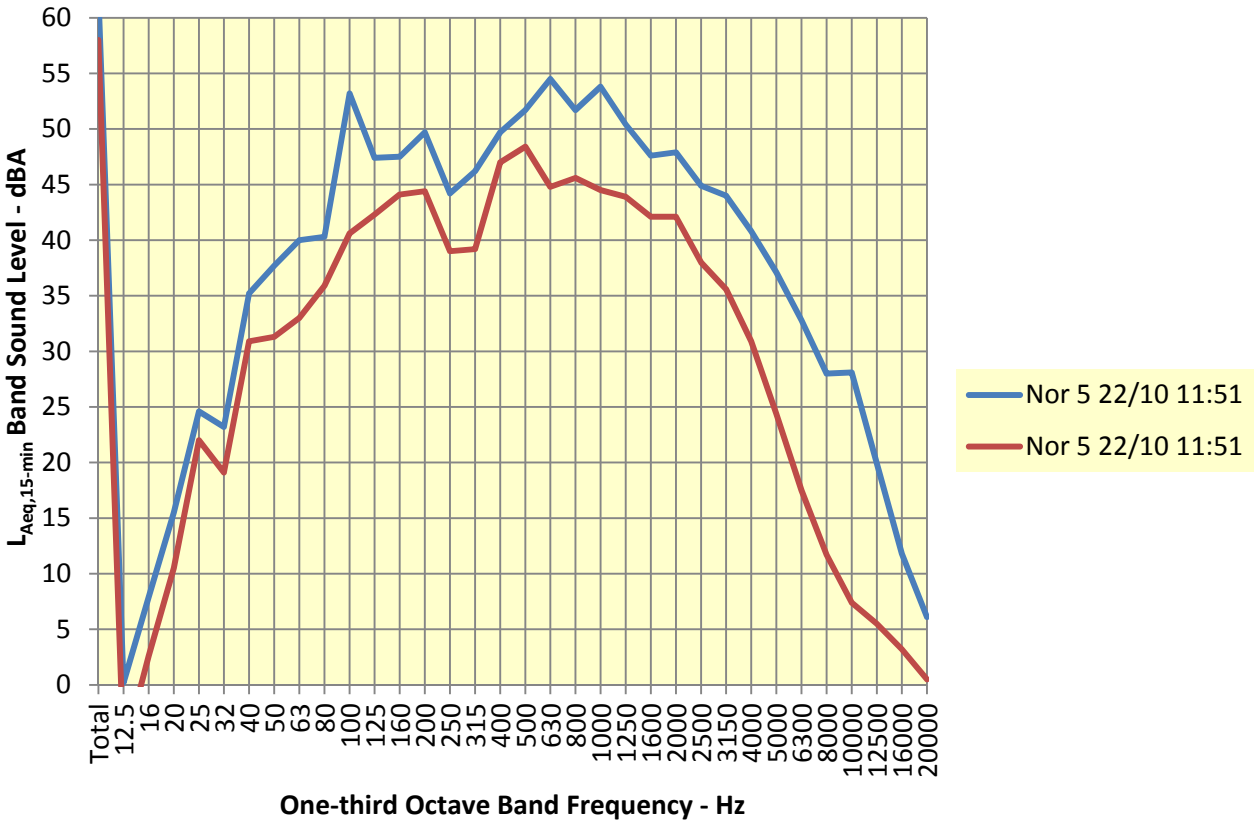


Figure F38: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

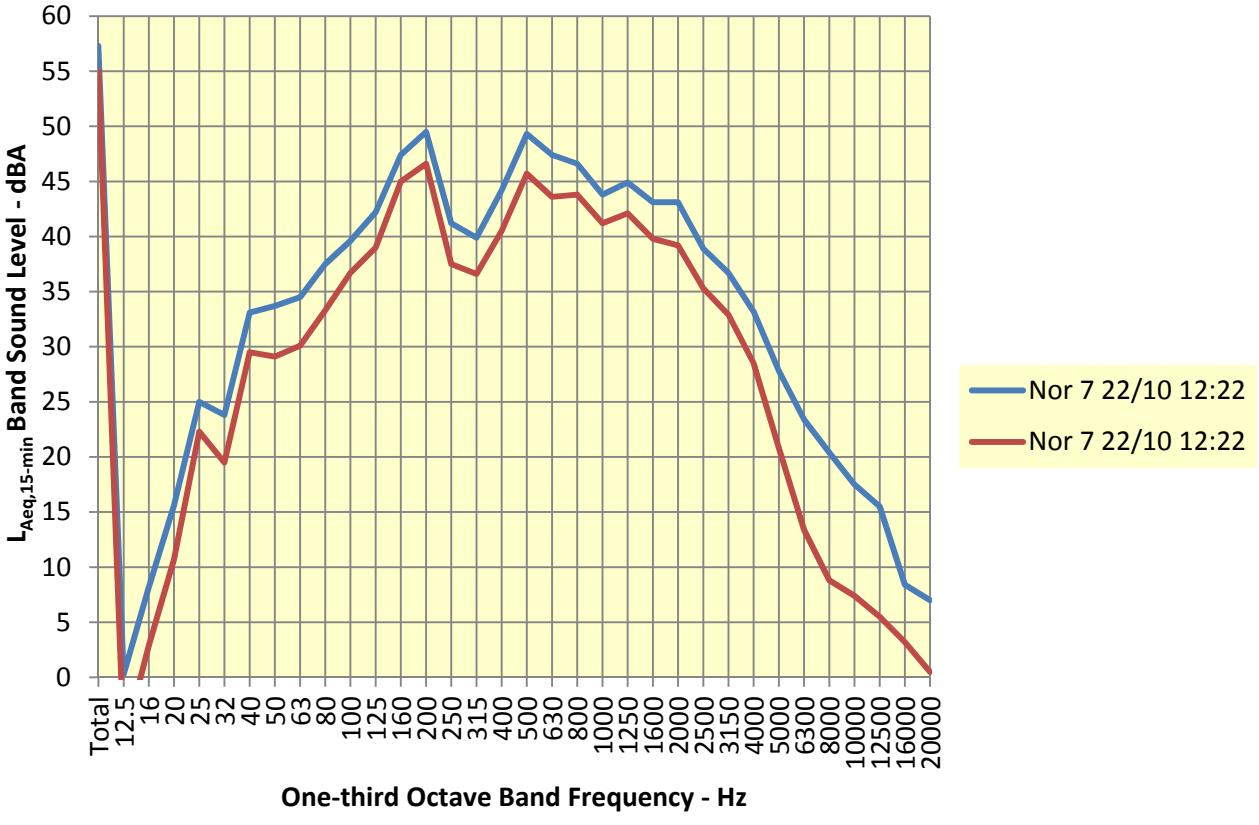


Figure F39: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

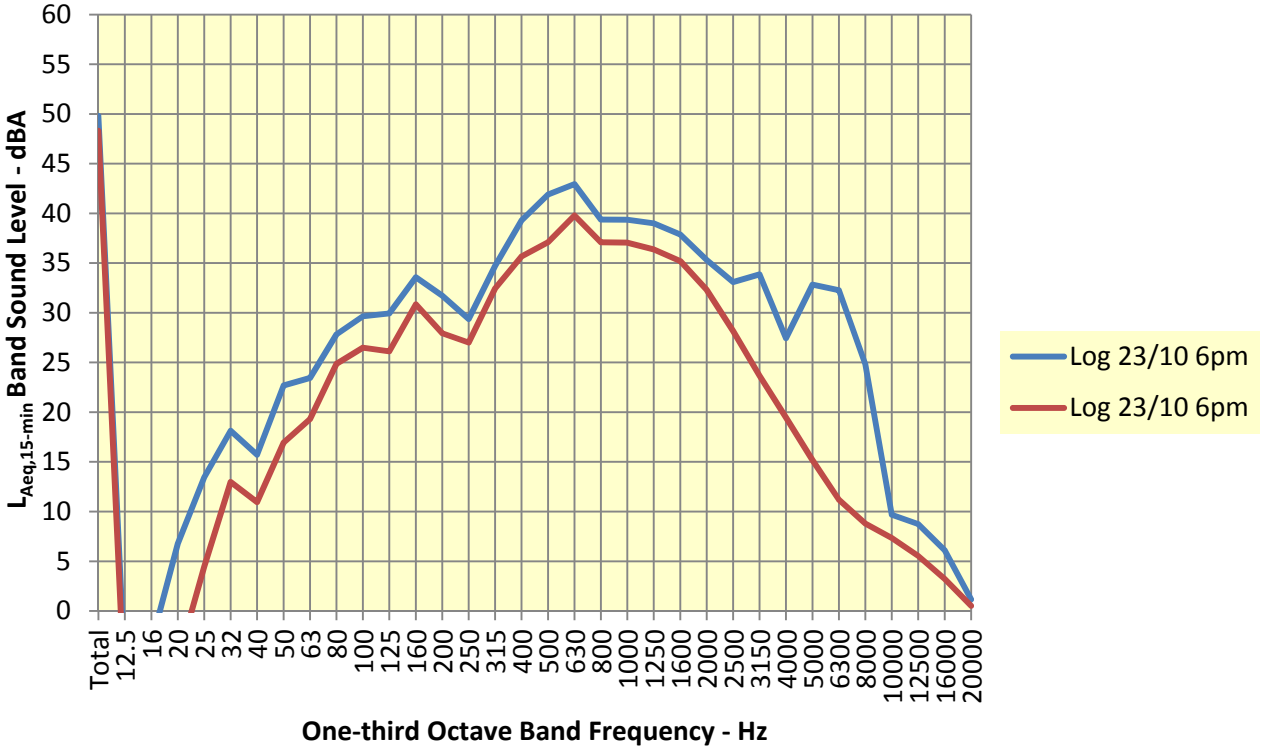


Figure F40: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

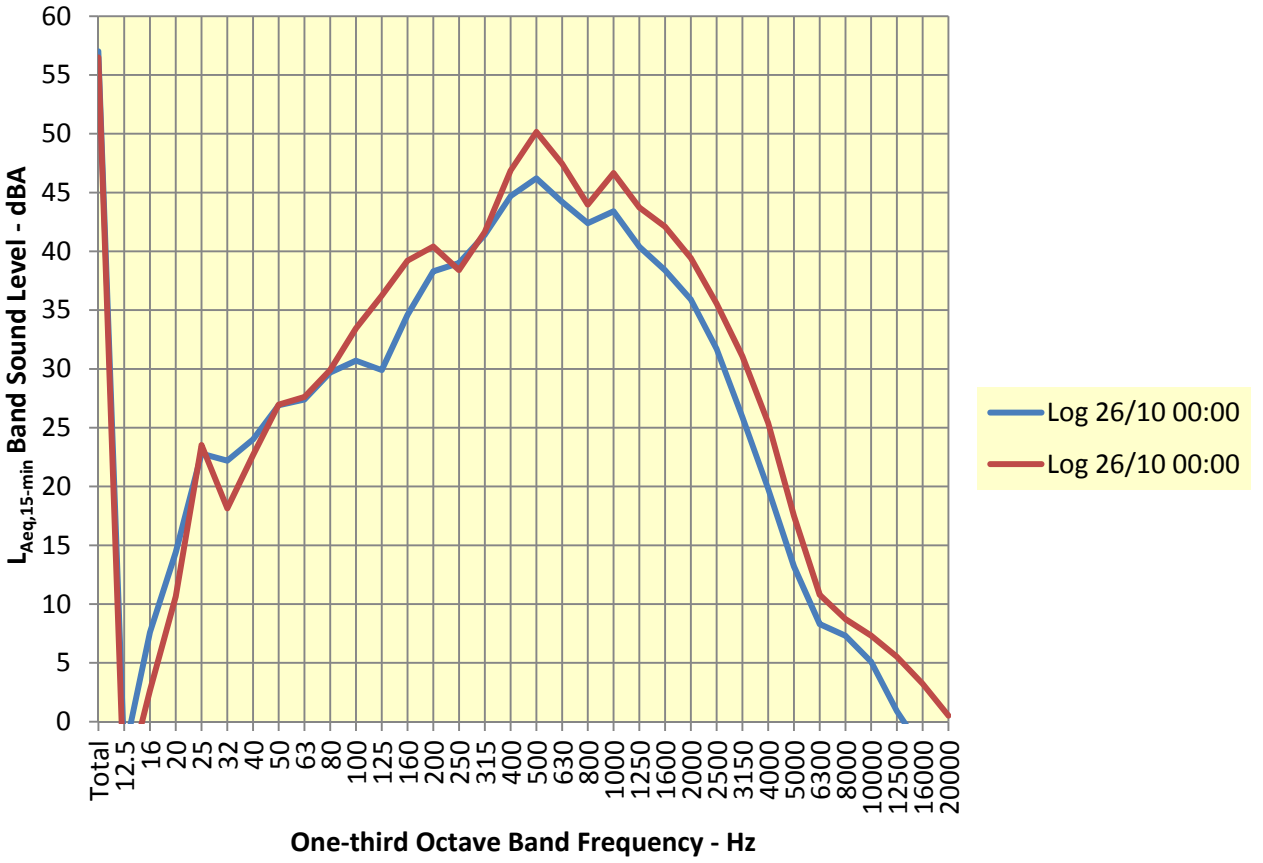


Figure F41: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

Figure F42: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

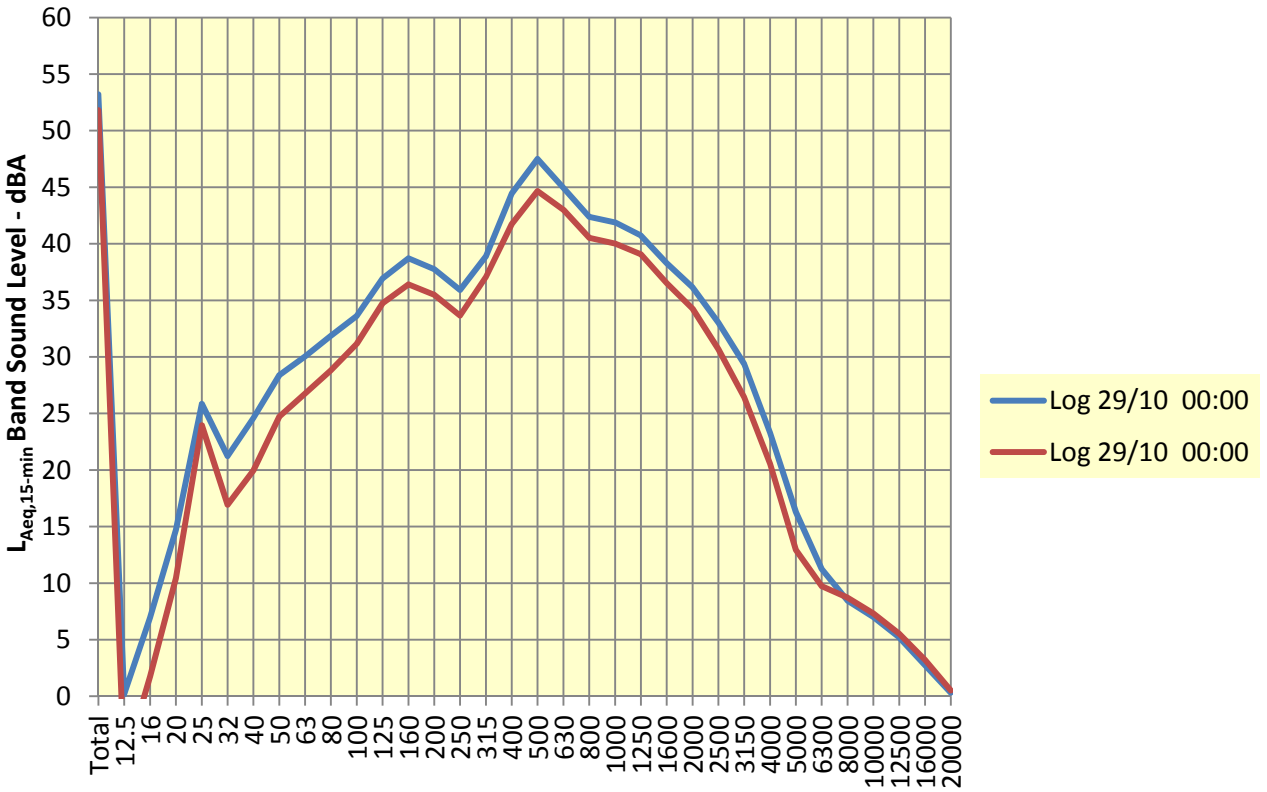


Figure F43: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

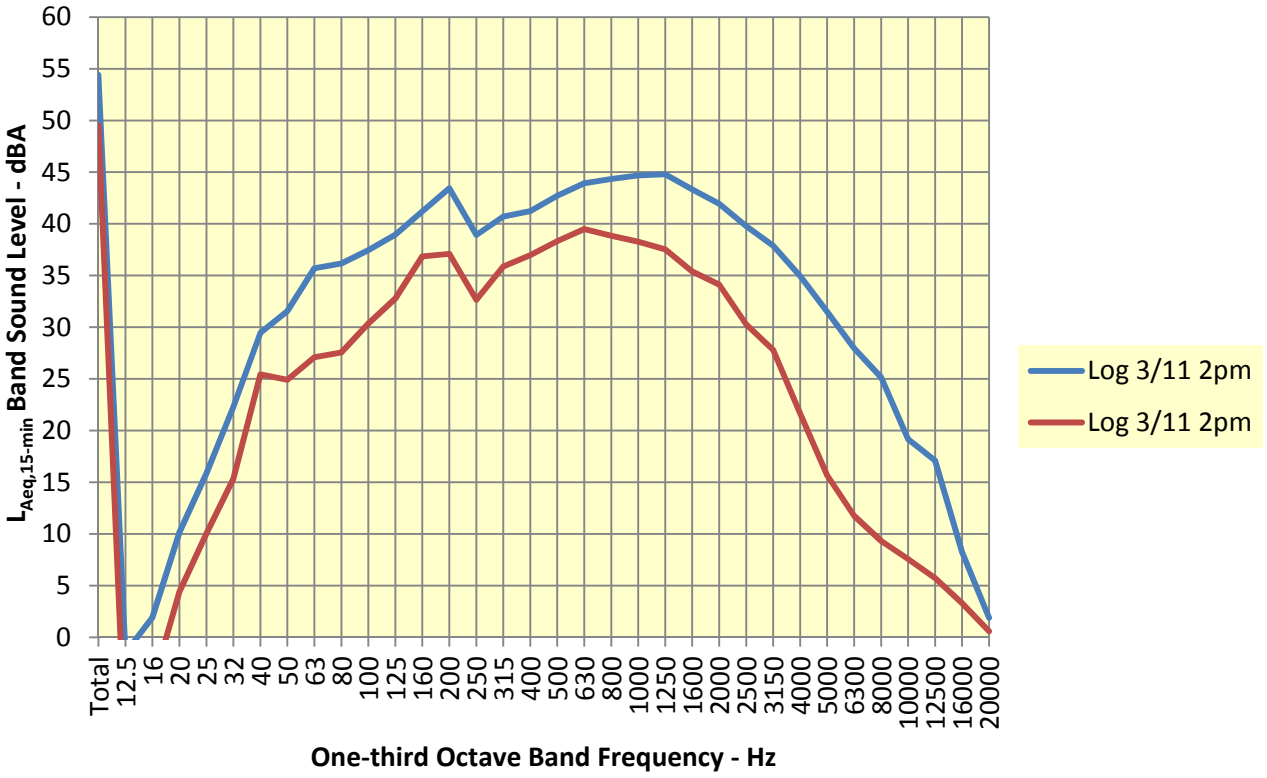


Figure F44: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

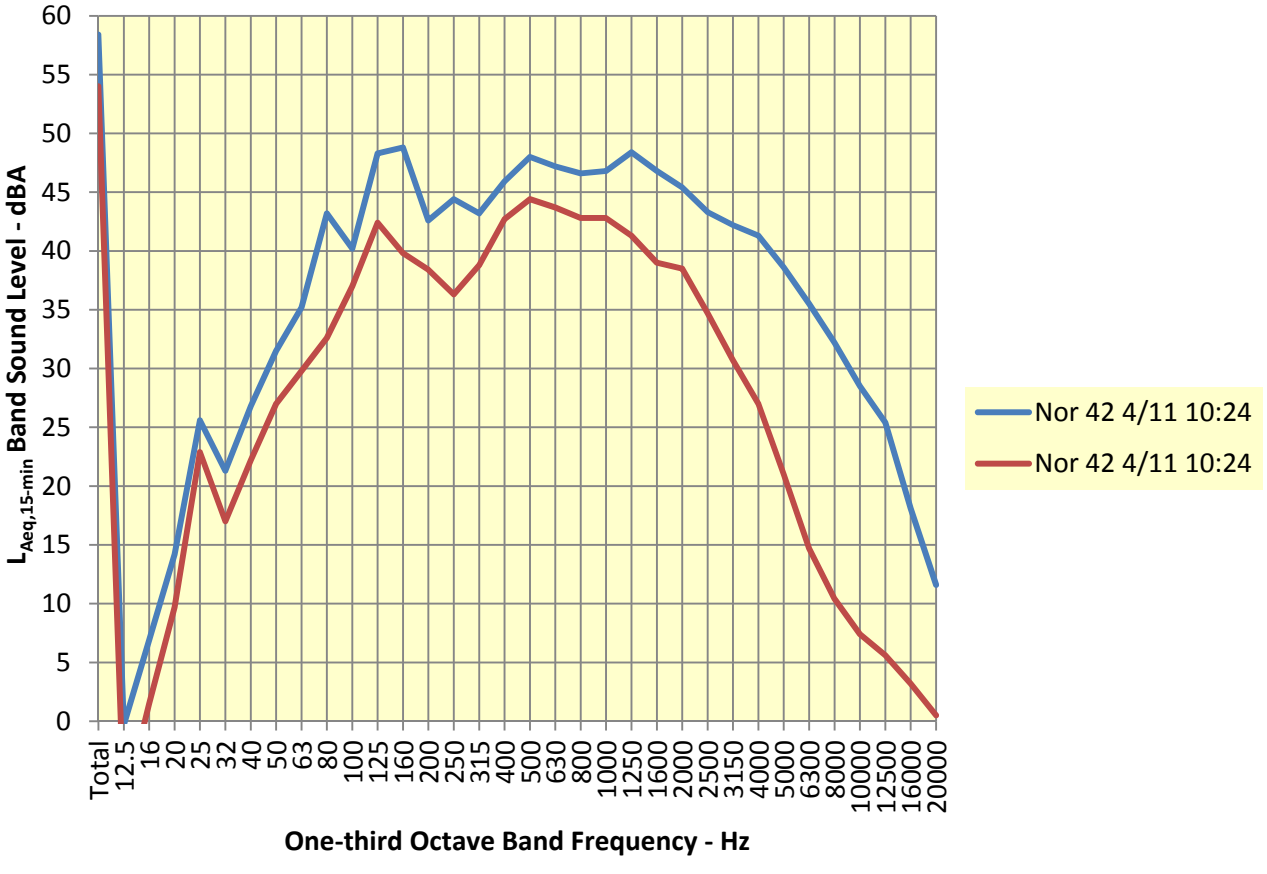


Figure F45: Boral Cement Berrima Annual Environmental Noise 2021 - Attended Monitoring Spectra: Location 20 L_{Aeq} & L_{A90}

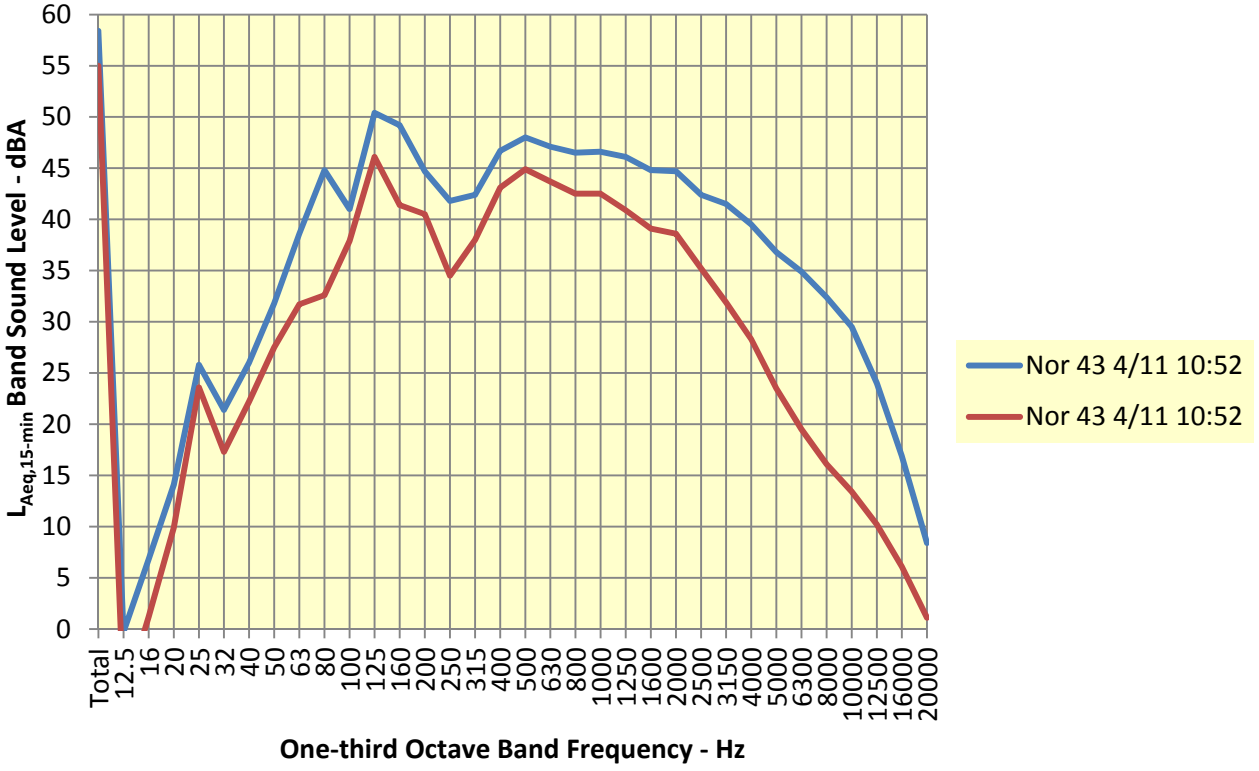


Figure F46: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Sound Level variation at 4 Melbourne St, 0.1s intervals 23 October 6:00 to 6:15pm

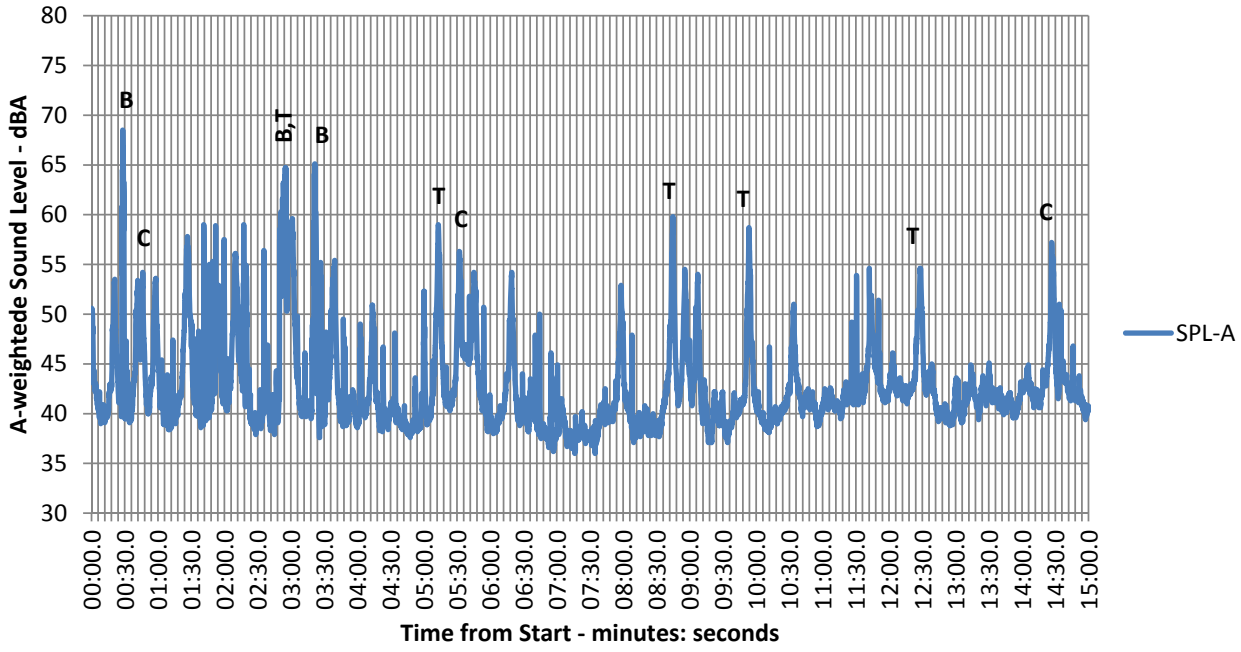
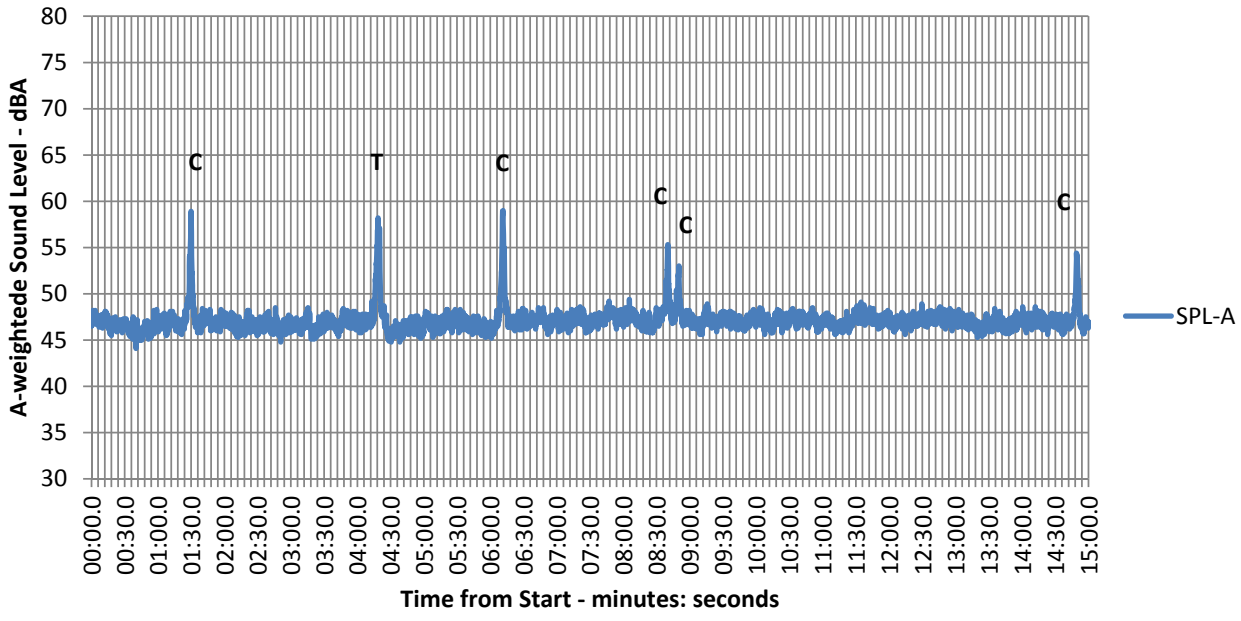


Figure F47: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Sound Level variation at 4 Melbourne St, 0.1s intervals 26 October Midnight 12:00 to 12:15am



B= Bird; C = car on Taylor Ave; T = Truck on Taylor Ave;

15 minute ngara time histories selected

Figure F48: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Sound Level variation at 4 Melbourne St, 0.1s intervals 28 October 7:00 to 7:15pm

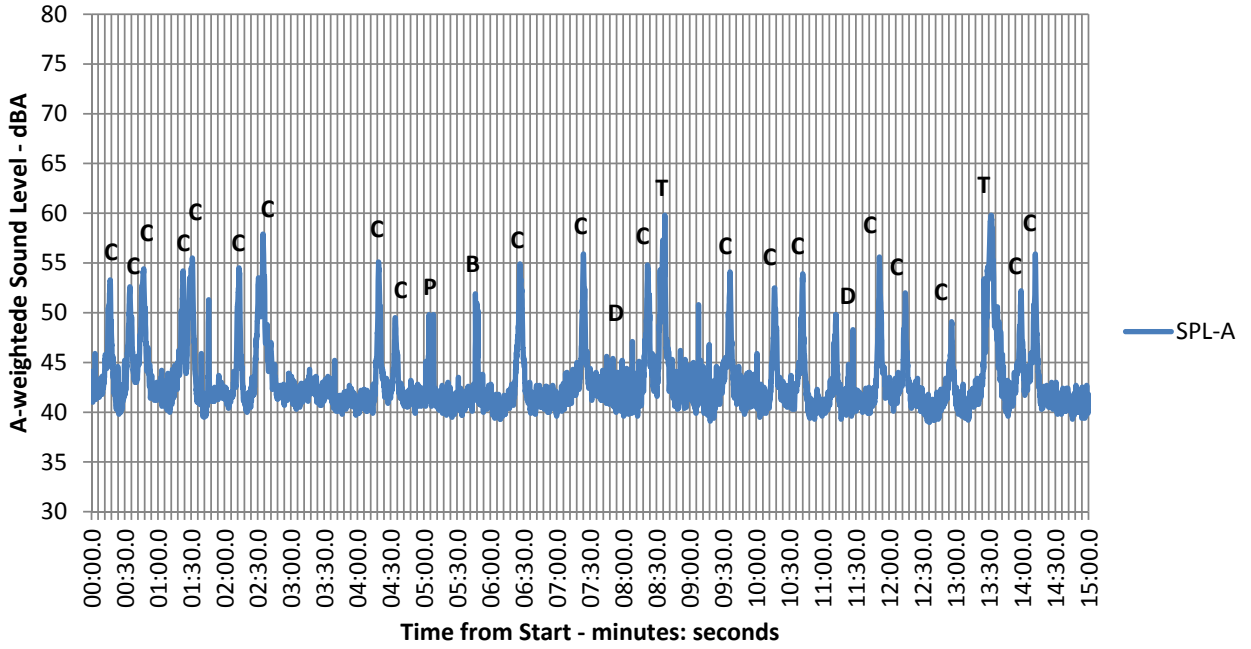
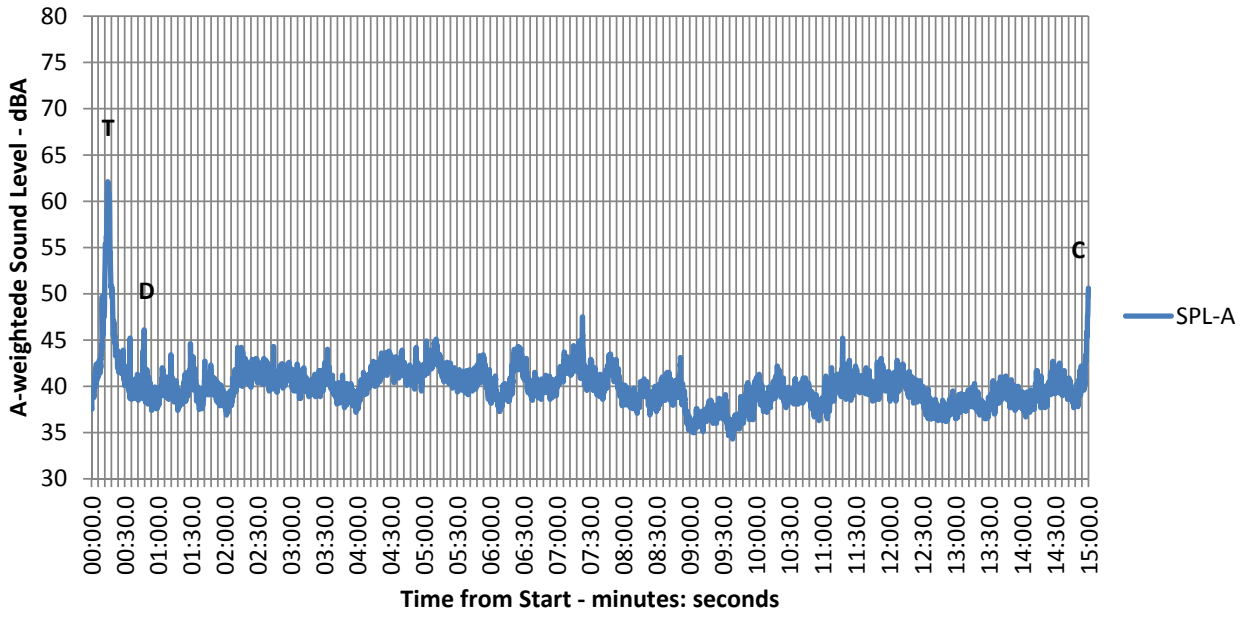


Figure F49: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Sound Level variation at 4 Melbourne St, 0.1s intervals 29 October Midnight 12:00 to 12:15am



B= Bird; C = car on Taylor Ave; T = Truck on Taylor Ave; D = Dog barking

15 minute ngara time histories selected

Figure F50: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Sound Level variation at 4 Melbourne St, 0.1s intervals 3 November 2:00 to 2:15pm

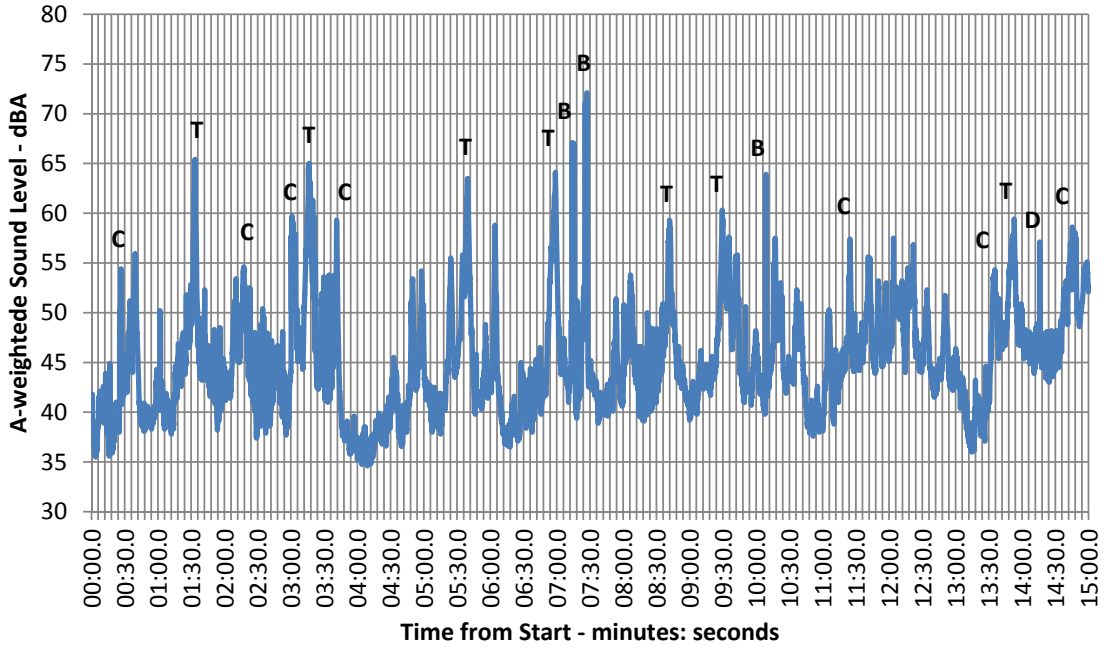
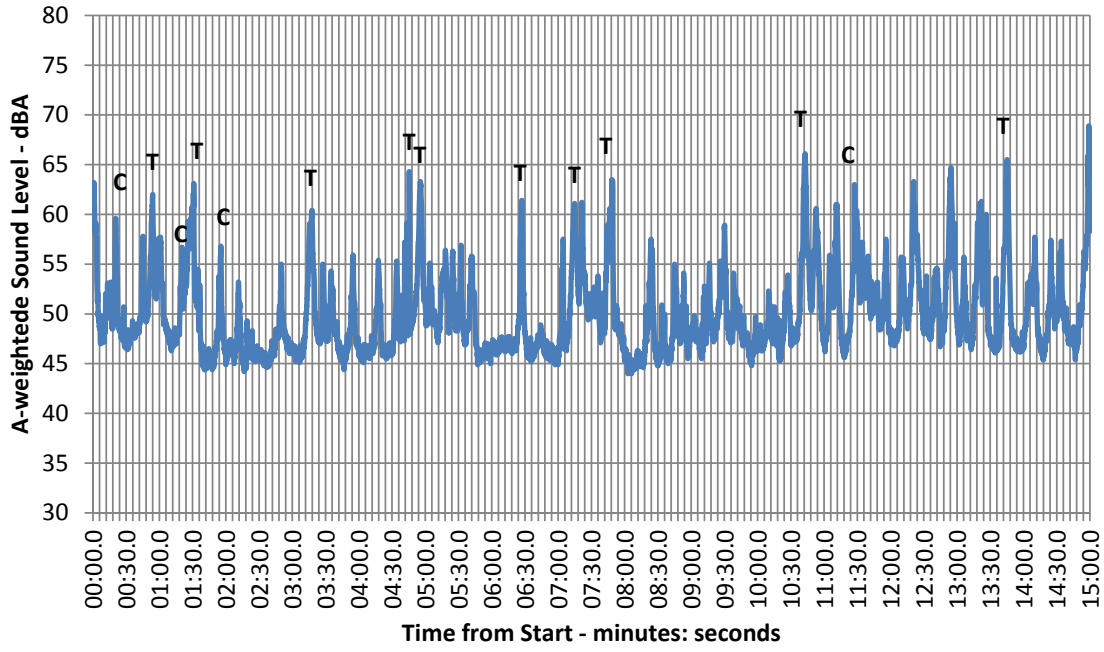


Figure F51: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Sound Level variation at 4 Melbourne St, 0.1s intervals 4 November 8:30 to 8:45am



B= Bird; C = car on Taylor Ave; T = Truck on Taylor Ave; D = Dog barking

15 minute ngara time histories selected

Figure F52: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 23/10 18:00 L_{Aeq}

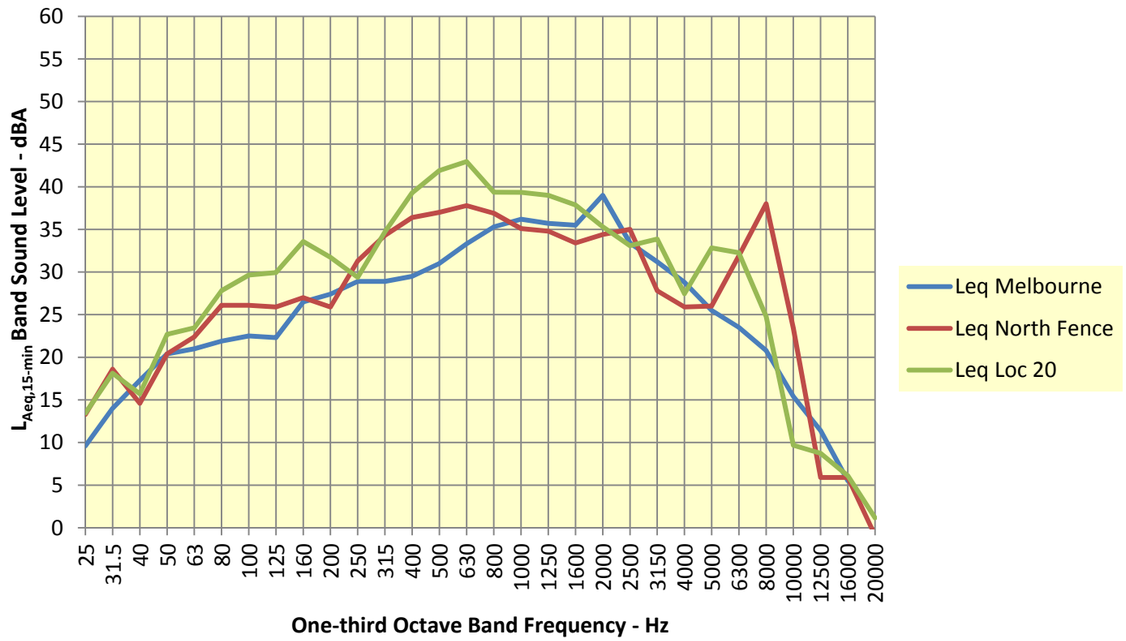


Figure F53: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 23/10 18:00 L_{A90}

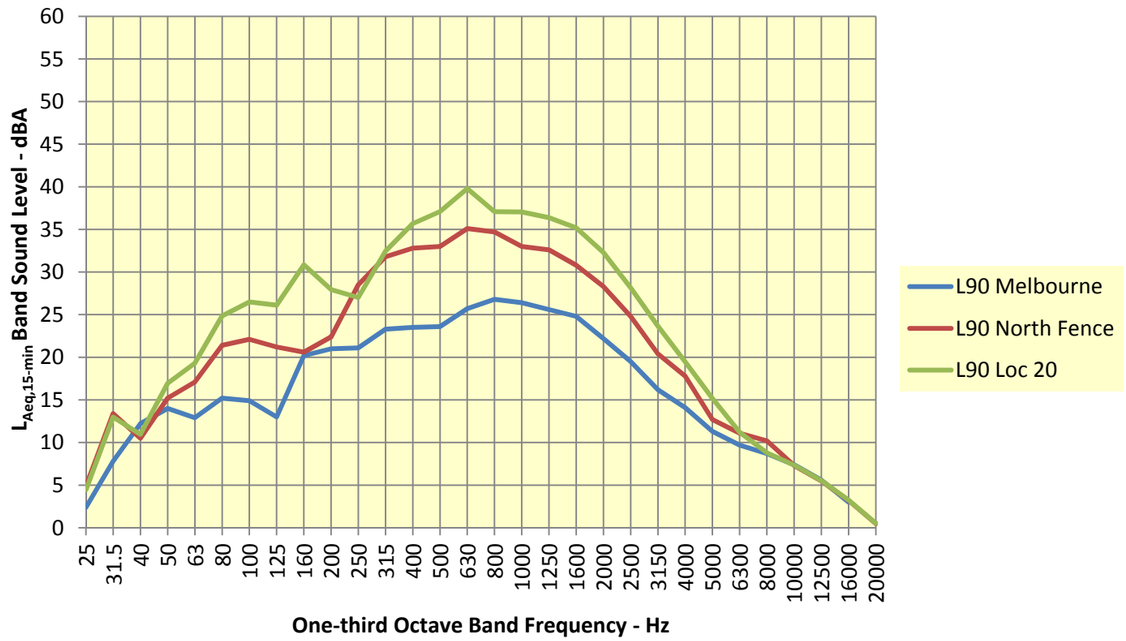


Figure F54: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 26/10 00:00 L_{Aeq}

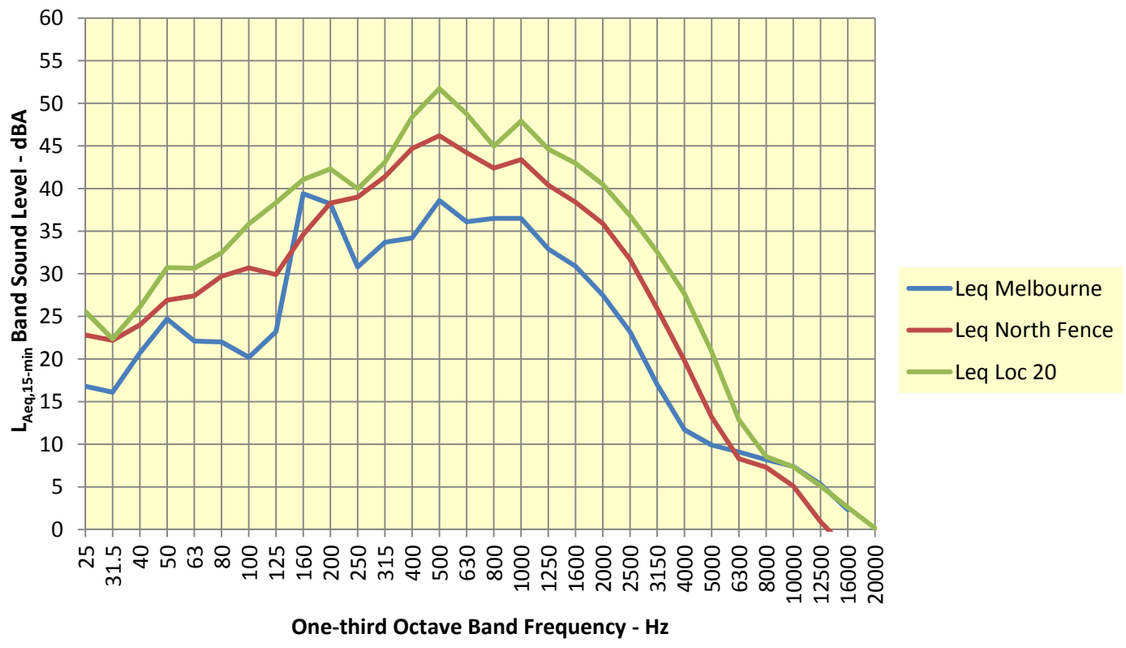
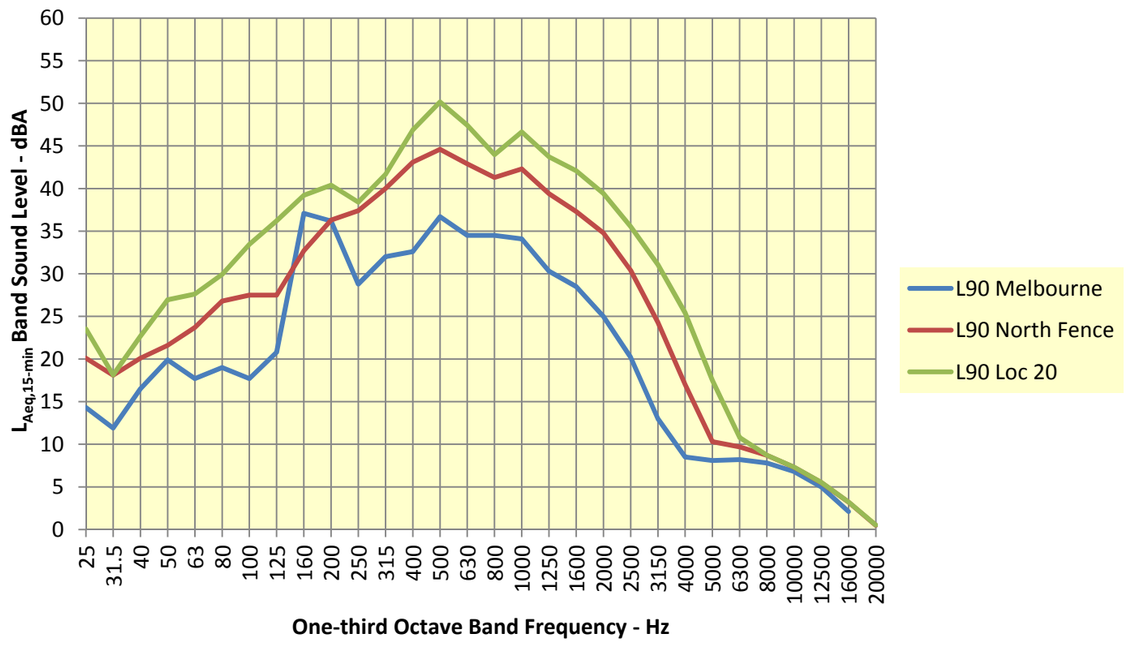


Figure F55: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 26/10 00:00 L_{A90}



attended results

Figure F56: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 28/10 19:00 L_{Aeq}

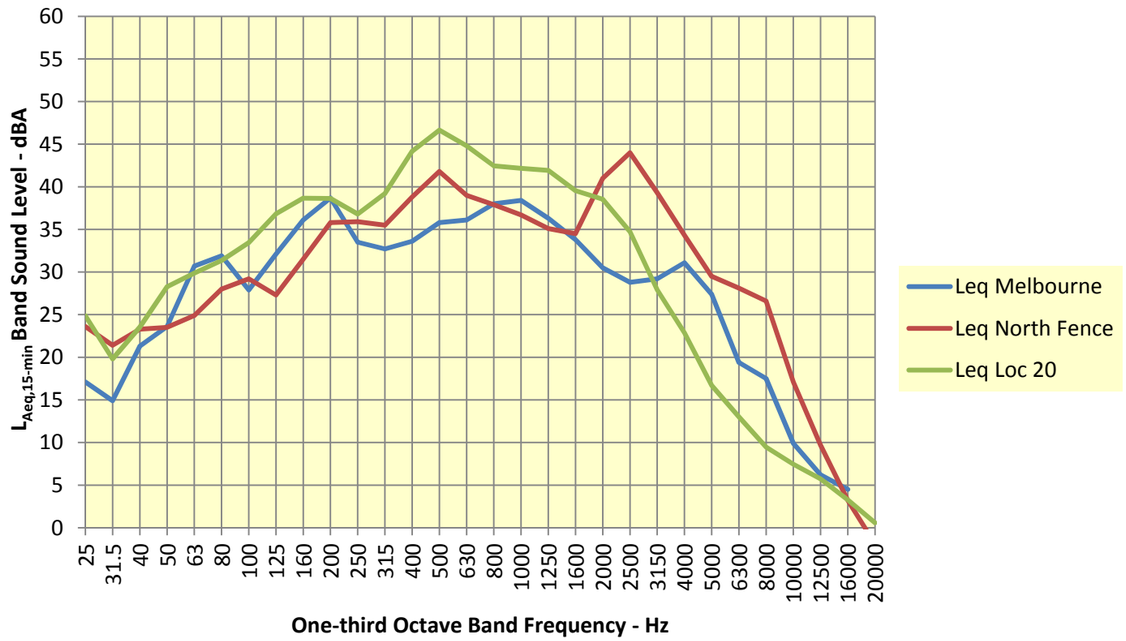


Figure F57: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 28/10 19:00 L_{A90}

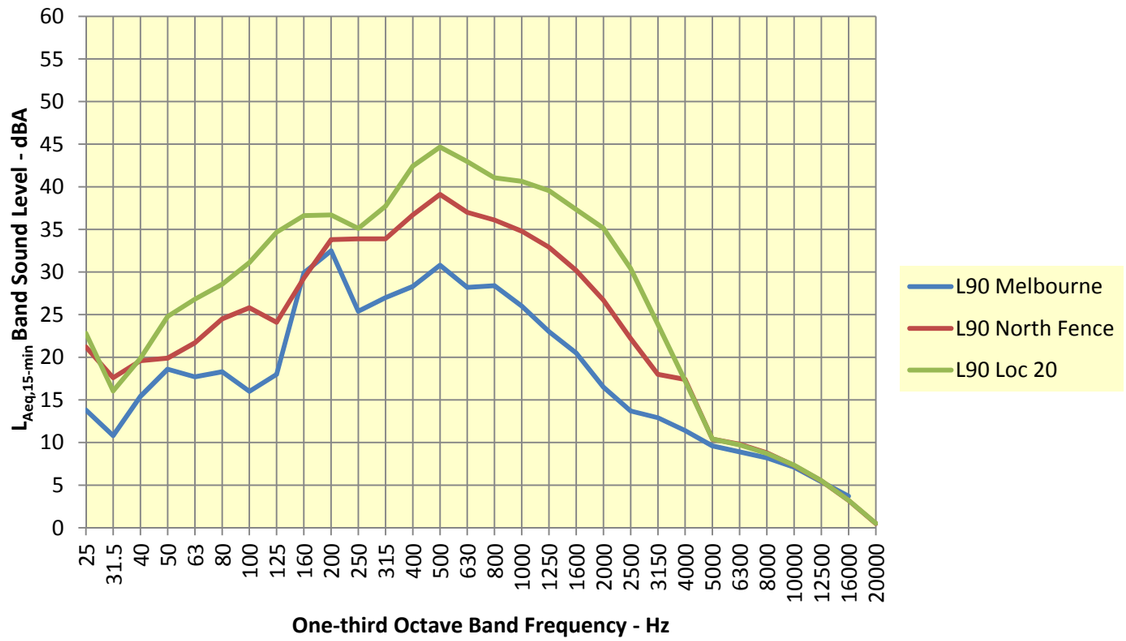


Figure F58: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 29/10 00:00 L_{Aeq}

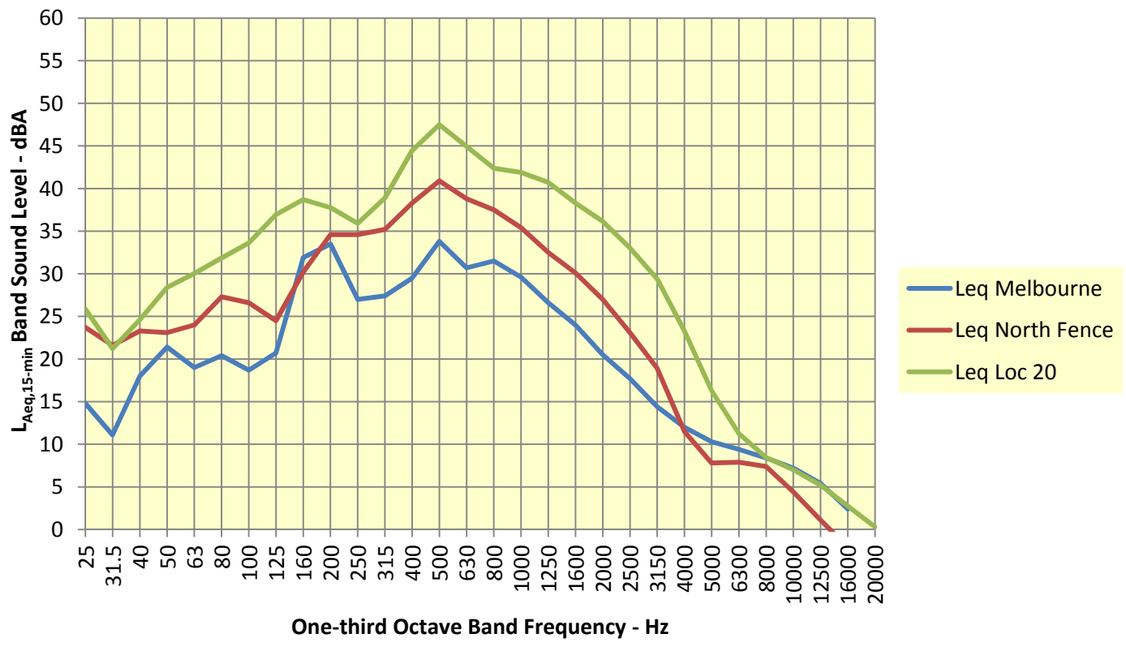
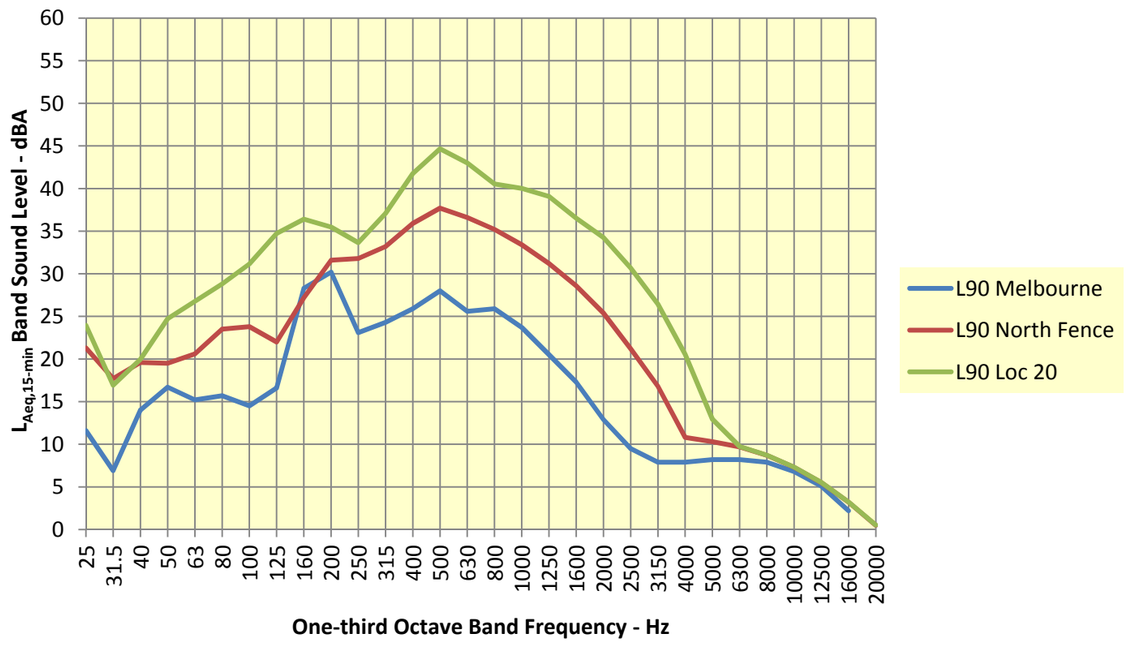


Figure F59: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 29/10 00:00 L_{A90}



attended results

Figure F60: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 3/11 14:00 L_{Aeq}

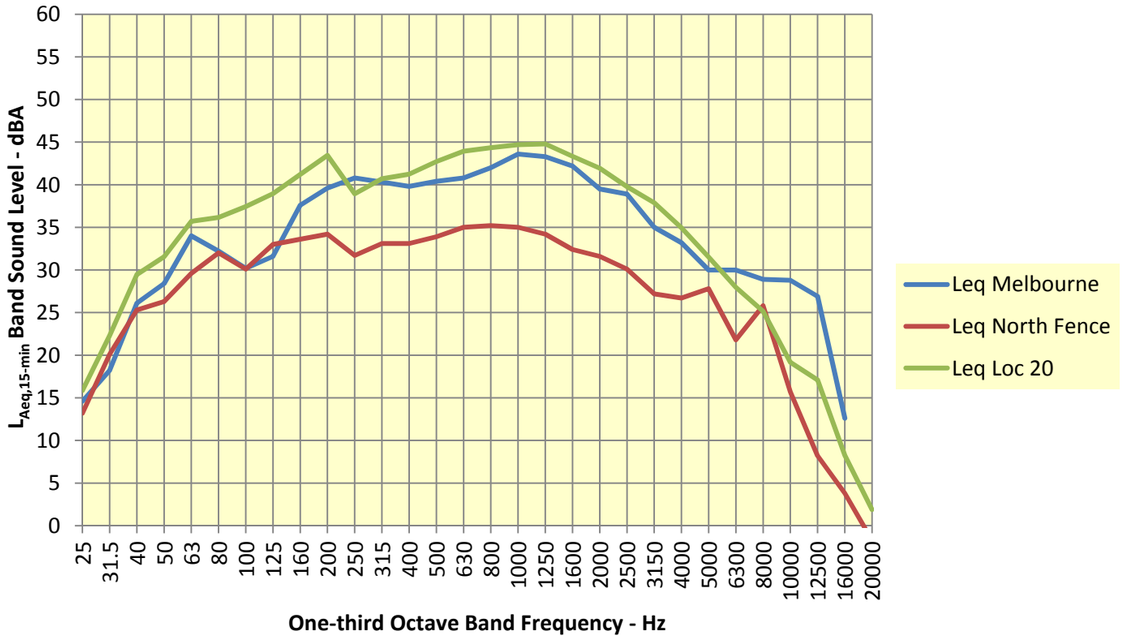
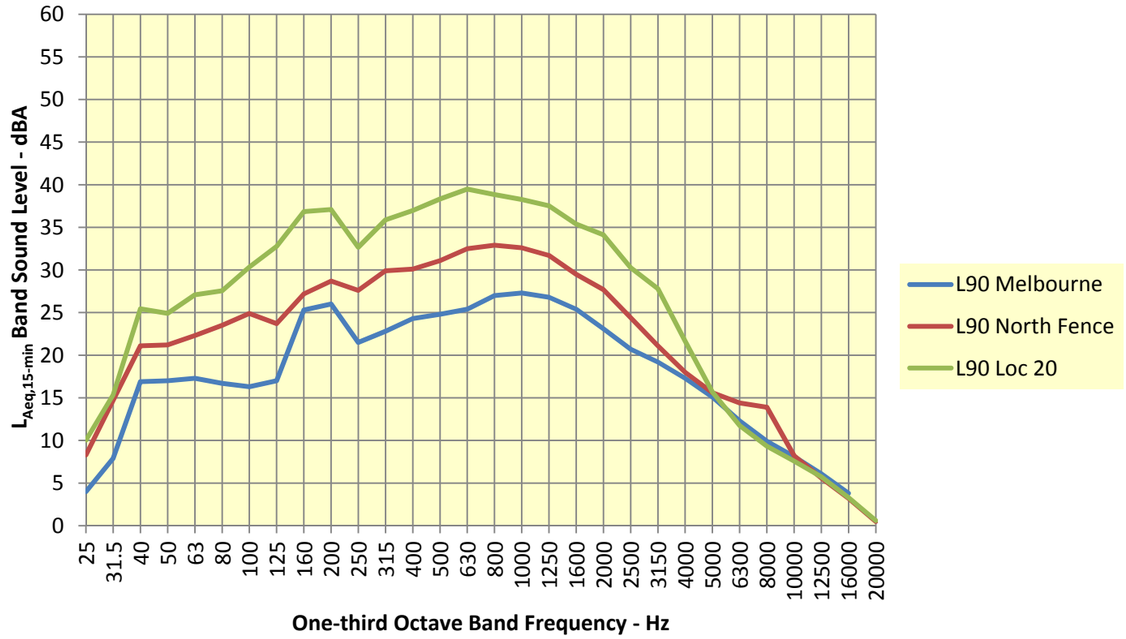


Figure F61: Boral Cement Berrima Annual Environmental Noise Assessment 2021 - Logger Monitoring Spectra same period: 3/11 14:00 L_{A90}



attended results

Figure F62: Boral Cement Berrima Annual Environmental Noise Assessment - Low Frequency Assessment 4 Melbourne St Leq

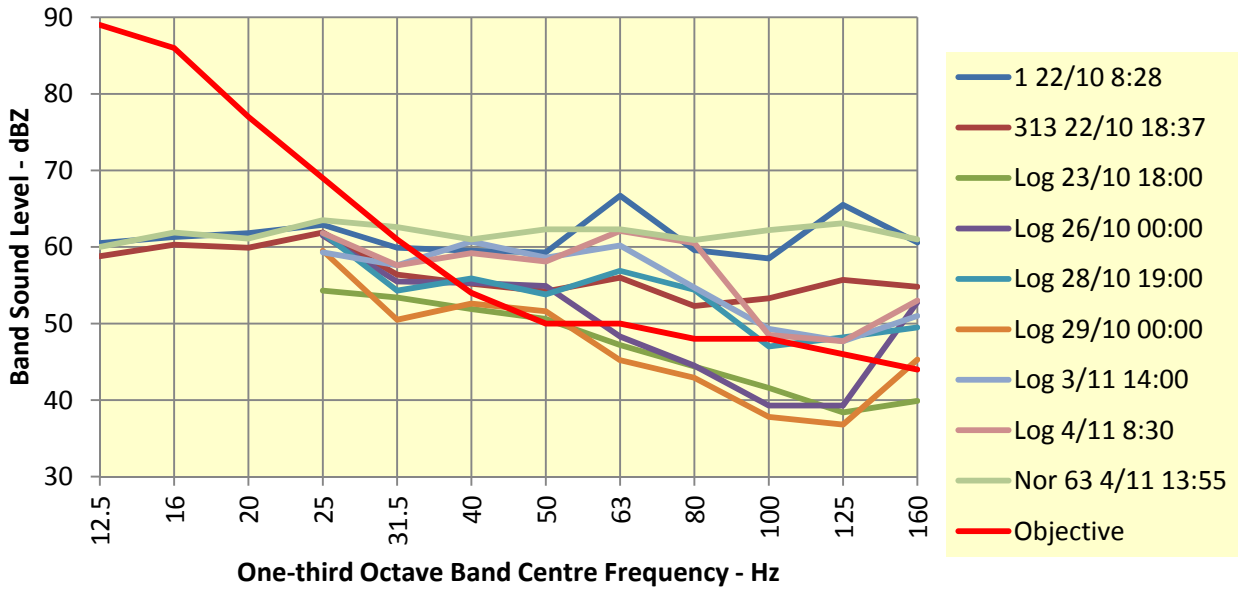
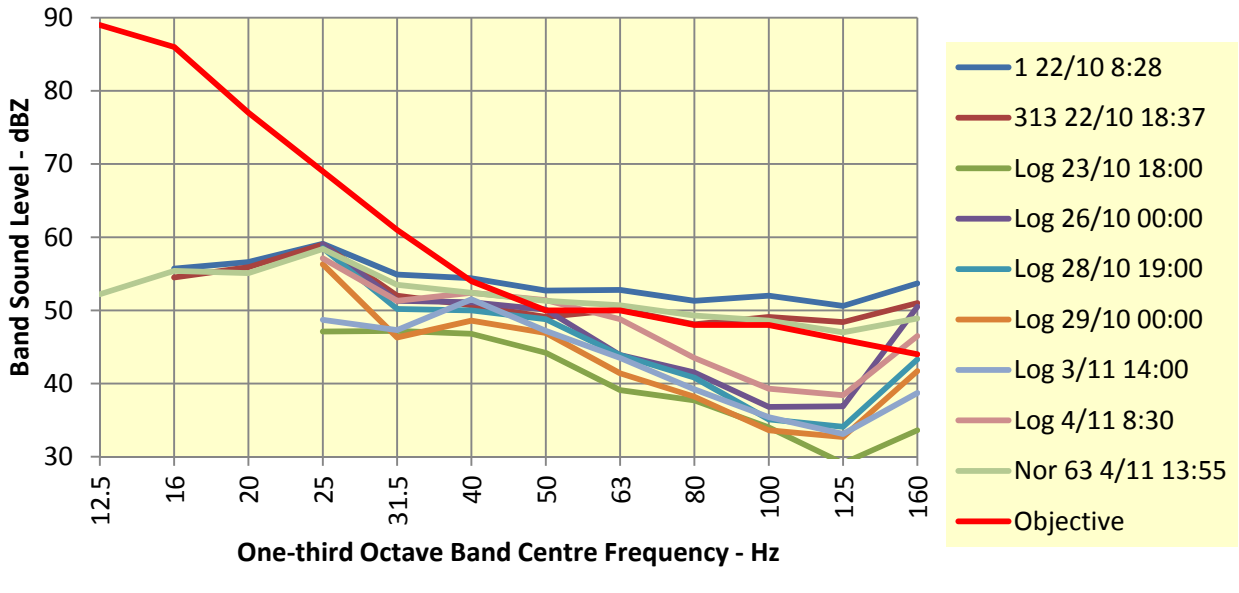


Figure F63: Boral Cement Berrima Annual Environmental Noise Assessment - Low Frequency Assessment 4 Melbourne St L90



attended results

Figure F64: Boral Cement Berrima Annual Environmental Noise Assessment - Low Frequency Assessment Adelaide St Leq & L90

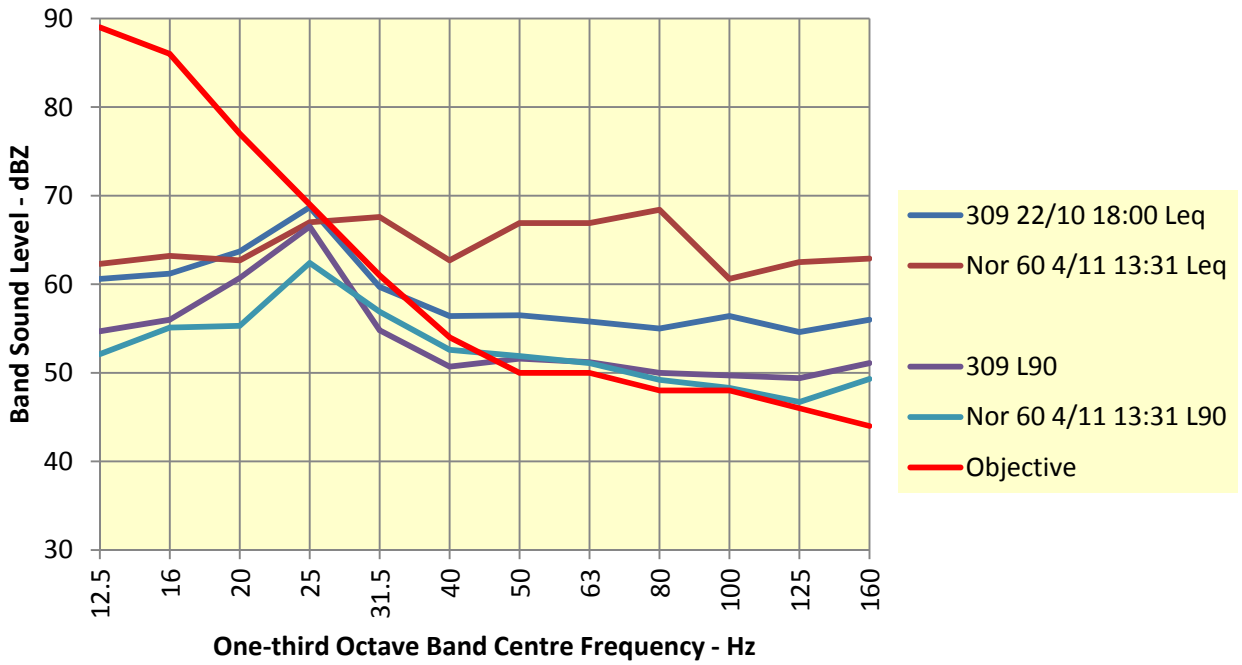
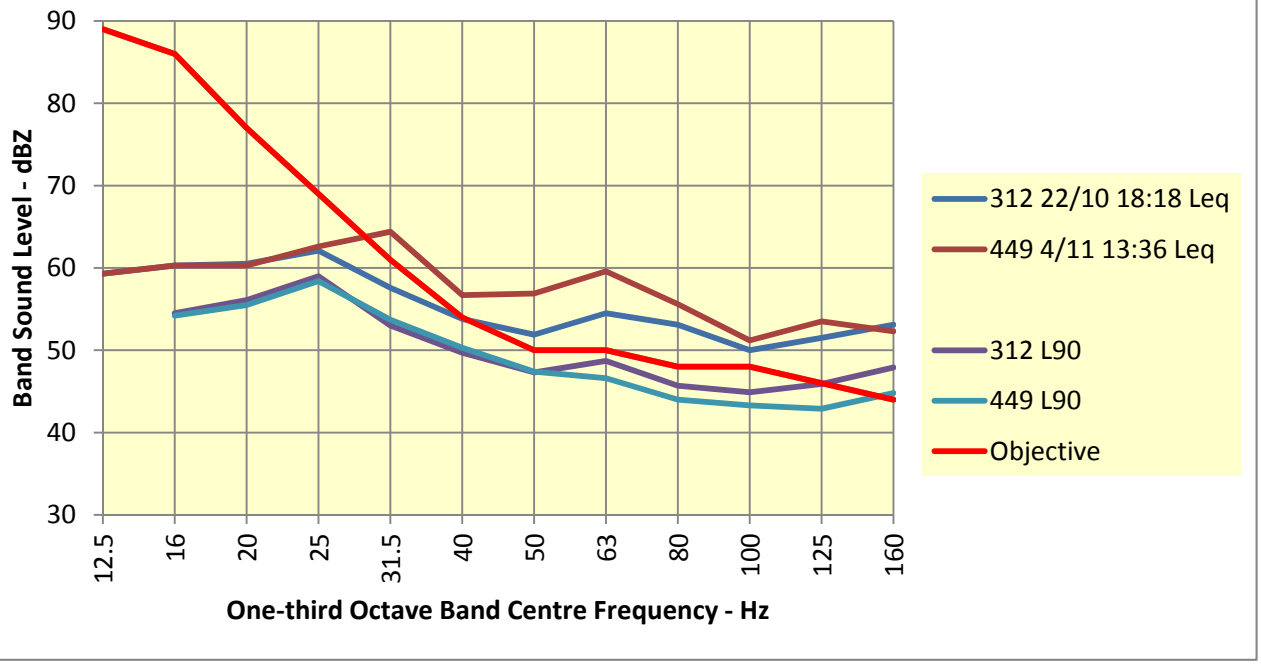


Figure F65: Boral Cement Berrima Annual Environmental Noise Assessment - Low Frequency Assessment Brisbane St Leq & L90



attended results

Figure F66: Boral Cement Berrima Annual Environmental Noise Assessment - Low Frequency Assessment North Fence Leq

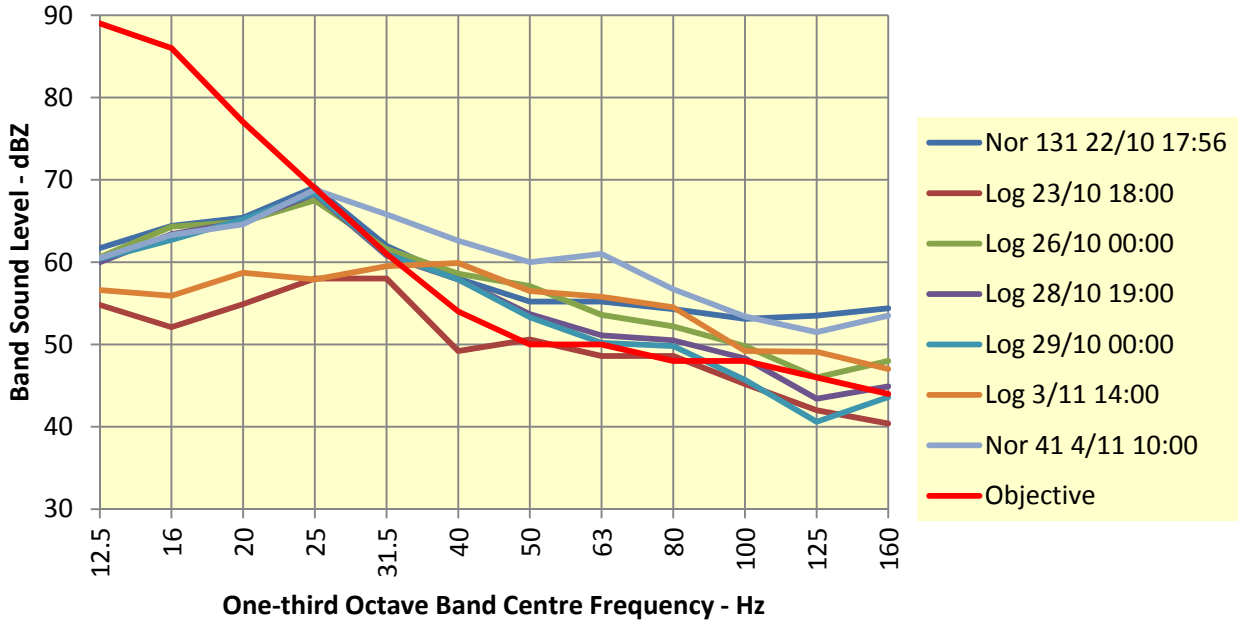
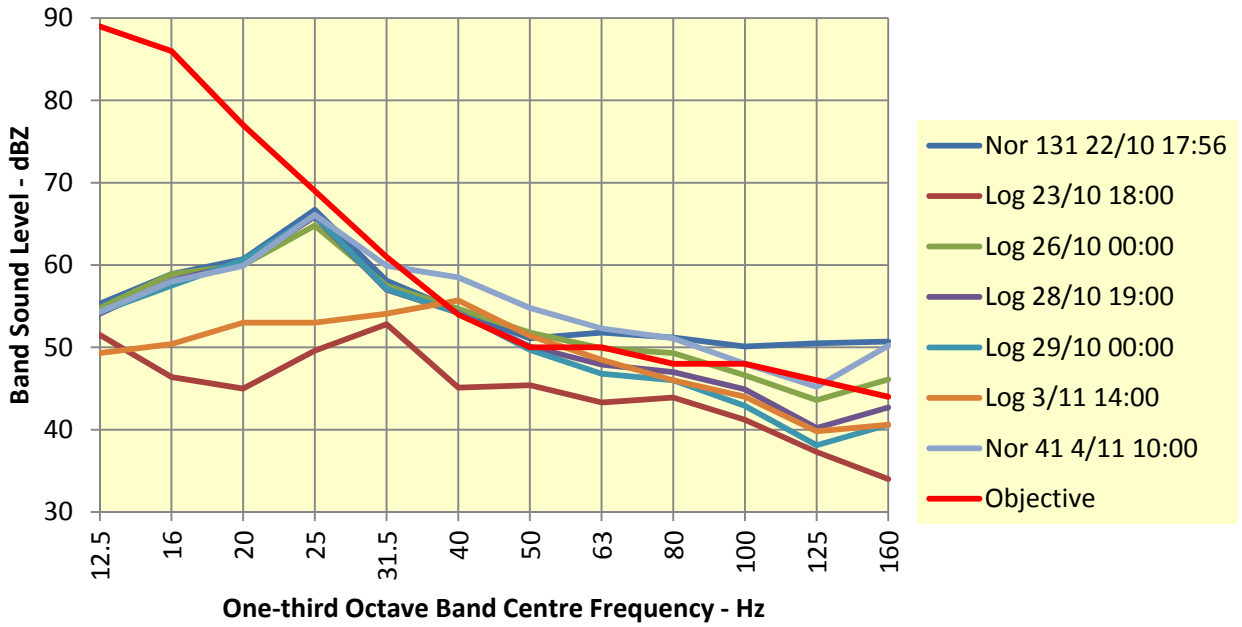


Figure F67: Boral Cement Berrima Annual Environmental Noise Assessment - Low Frequency Assessment North Fence L90



attended results

Unit 2 No 5 Thalassa Ave East Corrimal NSW 2518, Australia
Email: reception@recres.com.au ◆ Fax +61 2 4285 3635
ABN 25 153 946 064