



Karuah Hard Rock Quarry
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Karuah Hard Rock Quarry

Annual Review 2023

16 January 2023 to 15 January 2024



Annual Review Title Block

Table 1 Karuah Hard Rock Quarry Annual Review 2023 Title Block.


Name of Operation:	Karuah Hard Rock Quarry
Name of Operator:	Hunter Quarries Pty Ltd
Development Consent:	DA 265-10-2004
Name of holder of Development Consent:	Hunter Quarries Pty Ltd
Mining Lease:	N/A
Water Licences:	None
MOP / RMP:	N/A
Annual Review Start Date:	16 January 2023
Annual Review End Date:	15 January 2024

I, **Shane Burton**, certify that this audit report is a true and accurate record of the compliance status of **Karuah Hard Rock Quarry** for the period **16 January 2023** to **15 January 2024** and that I am authorised to make this statement on behalf of **Hunter Quarries Pty Ltd**.

Note.

A. The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.

B. The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications / information / documents — maximum penalty 2 years imprisonment or \$22,000, or both).

Name of Authorised Reporting Officer:	Shane Burton
Title of Authorised Reporting Officer:	Quarry Manager
Signature of Authorised Reporting Officer:	
Date:	08/03/2024

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Glossary

Abbreviation / Term	Meaning
AR / AEMR	Annual Review / Annual Environmental Management Report
AQMP	Air Quality Monitoring Program
BCD	Biodiversity Conservation Division
CCC	Community Consultative Committee
DA	Development Application
DDG	Dust Deposition Gauge
DPE	Former NSW Department of Planning and Environment
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Program
EMS	Environmental Management Strategy
EPL	NSW Environment Protection Licence
Ha	Hectare
HVAS	High Volume Air Sampler
HQPL	Hunter Quarries Pty Ltd
KEQPL	Karuah East Quarry Pty Limited
Km	Kilometre
L	Litre
LDP	Licensed Discharge Point
MCC	MidCoast Council
NSW Planning	NSW Department of Planning, Housing and Infrastructure
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RAR	Response to Audit Recommendations
RCP	Rehabilitation and Closure Plan
RFS	NSW Rural Fire Service
SWMP	Site Water Management Plan
Tpa	tonnes per annum

1.0 Statement of Compliance

The compliance status of the Karuah Hard Rock Quarry (KHRQ) site at the end of the 2023 Annual Review reporting period is summarised by **Table 2**, **Table 3**, and **Table 4** below, in reference to the site's Development Consent and Environment Protection Licence (EPL).

Table 2 *Statement of Compliance.*

Were all conditions of the relevant approval(s) complied with?	
Development Consent (DA 265-10-2004)	No
Environment Protection Licence (EPL 11569)	Yes

Table 3 *Compliance Status Key (NSW Planning Annual Review Guideline, October 2015).*

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur.
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur.
Administrative	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

Table 4 *Summary of Non-Compliances.*

Relevant Approval	Condition	Condition Aspect	Compliance Status	Description	Section
Development Consent	Schedule 3, Condition 13	Air Quality	Non-compliant	Contamination of one Depositional Dust Gauge with organic material in the June 2023 reporting period.	Section 6.2 and Section 11.0
			Non-compliant	Contamination of one Depositional Dust Gauge with organic material in the November 2023 reporting period.	Section 6.2 and Section 11.0
			Non-compliant	Minor PM10 exceedance of short-term criteria on 16/06/2023.	Section 6.2 and Section 11.0

2.0 Introduction

This Annual Review covers the reporting period from the **16 January 2023** to **15 January 2024** for the Karuah Hard Rock Quarry site.

Mountain Industries obtained approval to operate the Karuah Hard Rock Quarry in 1997, with the site subsequently purchased by Hunter Quarries Pty Ltd (HQPL) in 2002. In October 2004, HQPL applied to the then Department of Infrastructure, Planning and Natural Resources (now known as the Department of Planning, Housing and Infrastructure – NSW Planning) for approval to expand the quarry into adjoining lands (the Stage 2 area) to allow the extraction of further hard rock resources.

Development Consent was granted by the Minister for Infrastructure, Planning and Natural Resources on 03 June 2005 (DA 265-10-2004), with the approved development including:

- Implementing the remainder of the approved Stage 1 Quarry Operation Area;
- Extending the quarry operations into the Stage 2 Extraction Area;
- Upgrading and using existing infrastructure on site;
- Rehabilitating the site by re-contouring and revegetating exposed surfaces; and
- Producing up to 500,000 tonnes of andesite product a year over the next 22 years.

The HQPL contributes materials to the construction industries in the Hunter, New England, and Sydney Regions. The site is located approximately five kilometres north-east of the village of Karuah, NSW. The overall site covers an area of approximately 78.5 Ha across the following properties as outlined by **Figure 1**:

- Lot 21 DP 1024564 consisting of material processing and product stockpiling;
- Lot 11 DP 1024564 consisting of the Stage 2 extraction area; and
- Part Lot 12 DP 1024564 consisting of the Conservation Offset Area.

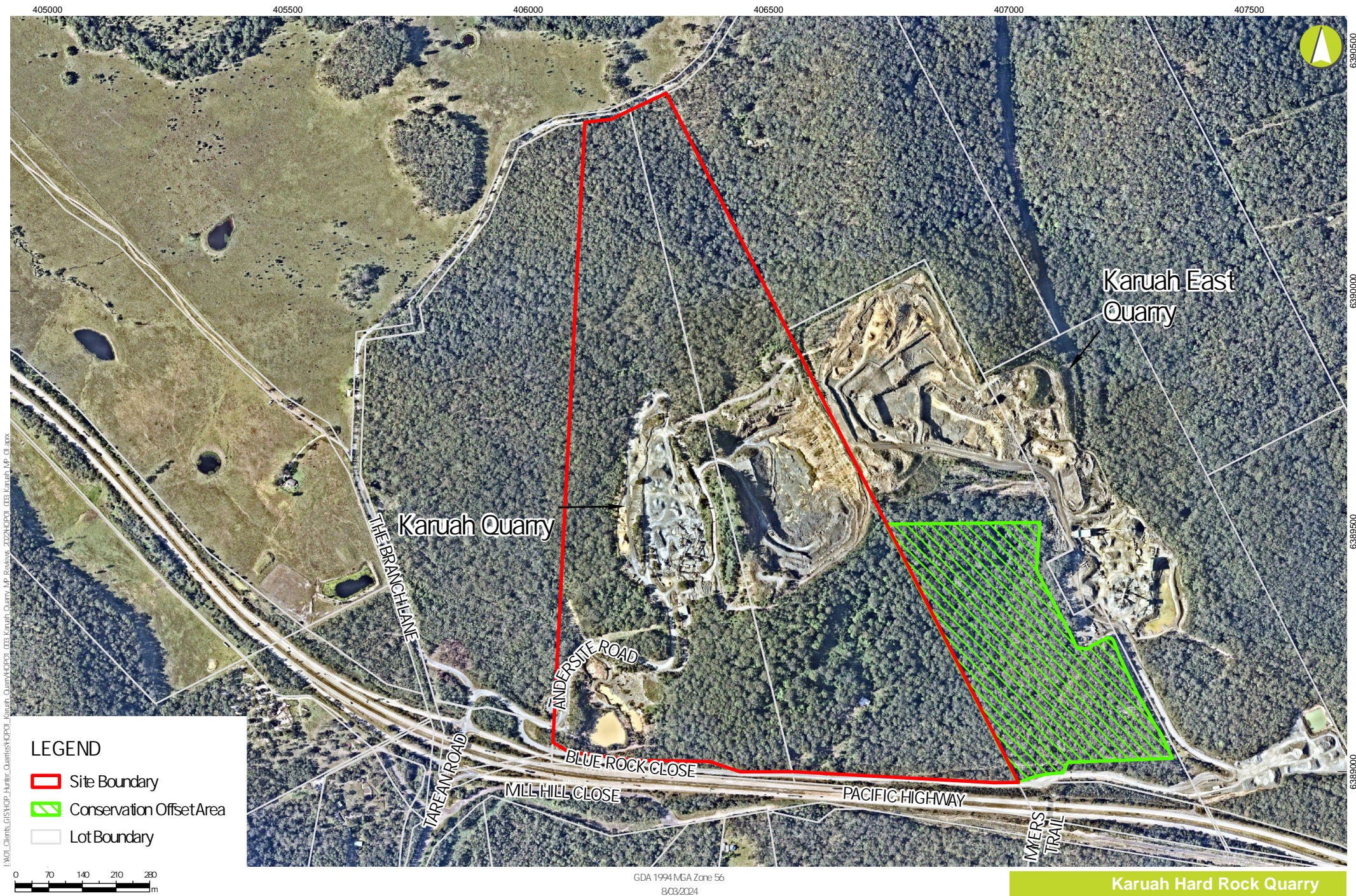
Figure 1 and **Figure 2** illustrate the site within its broader regional context and site layouts respectively.

2.1 Quarry Contacts

Key personnel who are responsible for environmental management of the operation are provided by **Table 5**.

Table 5 *Key Quarry Contacts.*

Position	Name	Contact	Contact Priority
Environment & Development Manager	Scott Ellerton	0447 044 646	Primary Contact
Quarry Manager	Shane Burton	0490 405 375	Secondary Contact
General Manager	Dylan Nagle	0438 380 701	–



3.0 Approvals

3.1 State Approvals

A summary of the approvals benefiting the Karuah Hard Rock Quarry are provided in **Table 6**. The Development Consent was granted in 2005 for 22-years allowing the extraction of a total of 11.2 Mt of andesite. No modifications have been approved to the Development Consent.

Since the granting of the Development Consent on 03 June 2005, the Environment Protection Licence (EPL) has been subject to seven variations as summarised by **Table 7**. No variation applications were submitted in the 2023 reporting period.

In 2024, HQPL will apply to vary the licence for the proposed changes to the DDG locations.

Table 6 Approvals associated with the Karuah Hard Rock Quarry.

Instrument	Grant Date	Expiry Date	Comments
Development Consent (DA 265-10-2004)	03/06/2005	03/06/2027	Primary statutory approval for the site under NSW <i>Environmental Planning and Assessment Act 1979</i> .
Environment Protection Licence (EPL 11569)	16/01/2015	-	Primary statutory licence for the site under NSW <i>Protection of the Environment Operations Act 1997</i> .

Table 7 Variations to the Environment Protection Licence for the Karuah Hard Rock Quarry.

No.	Variation Date	Description
1	30/06/2005	Increase in fee-based activity classifications.
2	14/09/2006	Licence review to remove completed Pollution Reduction Programs.
3	16/04/2007	Variation of Condition L6.3 to be consistent with the KHRQ Development Consent.
4	04/05/2010	Licence review and subsequent administrative changes.
5	29/12/2011	EPA software upgrade.
6	26/08/2016	Licence review and subsequent modernisation of licence conditions.
7	20/07/2020	Licence review and subsequent administrative changes.

3.2 Statutory Requirements of this Annual Review

Requirements of the Annual Review are summarised in **Table 9**.

Table 8 Summary of Statutory Requirements of the Annual Review.

No.	Aspect	Requirement	Section
Schedule 3 – Specific Environmental Conditions			
Condition 23	FLORA AND FAUNA	<u>Reporting</u> The Applicant shall include a progress report on the implementation and performance of the Flora and Fauna Management Plan and the Conservation Offset Strategy in the AEMR.	Section 6.6
Condition 29	VISUAL IMPACT	The Applicant shall: a) implement all practicable measures to minimise the visual impacts of the development; b) retain, re-vegetate and subsequently maintain a visual bund within the Stage 1 works area (in accordance with Figures 13 and 14 of the EIS) to minimise the visual impacts of development; c) include a progress report on the re-vegetation and maintenance of the visual bund in the AEMR, to the satisfaction of the Director General.	Section 8.0
Condition 34	WASTE MANAGEMENT	The Applicant shall: a) monitor the amount of waste generated by the development; b) investigate ways to minimise waste generated by the development; c) implement reasonable and feasible measures to minimise waste generated by the development; and d) report on waste management and minimisation in the AEMR. to the satisfaction of the Director-General.	Section 6.7
Condition 37	PRODUCTION DATA	The Applicant shall: a) provide annual production data to the DPI (Minerals) using the standard form for that purpose; and b) include a copy of this data in the AEMR.	Section 4.1
Condition 39	REHABILITATION	<u>Reporting</u> The Applicant shall include a progress report on the Rehabilitation Management Plan in the AEMR.	Section 8.0
Schedule 4 – Environmental Management, Monitoring, Auditing and Reporting			
Condition 5	ANNUAL REPORTING	The Applicant shall prepare and submit an AEMR to the Director-General and the relevant agencies. This report must address: a) identify the standards and performance measures that apply to the development;	Section 6.0, Section 7.0 and Section 8.0
		b) describe the works carried out in the last 12 months;	Section 4.0 and Section 5.0

No.	Aspect	Requirement	Section
Condition 5 cont.	ANNUAL REPORTING	c) describe the works that will be carried out in the next 12 months;	Section 4.6 and Section 12.0
		d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;	Section 9.0
		e) include a summary of the monitoring results for the development during the past year;	Section 6.0 and Section 7.0
		f) include an analysis of these monitoring results against the relevant: <ul style="list-style-type: none"> • impact assessment criteria; • monitoring results from previous years; and • predictions in the EIS; 	Section 6.0 and Section 7.0
		g) identify any trends in the monitoring results over the life of the development;	Section 6.0 and Section 7.0
		h) identify any non-compliance during the previous year; and	Section 11.0
		i) describe what actions were, or are being taken to ensure compliance.	Section 11.0 and Section 12.0

3.3 Summary of Environmental Management Plans

A summary of the site's Environmental Management Plans is provided in **Table 9**.

Table 9 Summary of Statutory Environmental Management Plans.

Environmental Management Plan	Status	2024 Action
Environmental Management Strategy	Comprehensive review last completed in August 2020 by SLR Consulting Australia.	Complete the statutory 5-yearly comprehensive review.
Environmental Monitoring Program	Comprehensive review completed in 2023 and update approved by NSW Planning on 22 September 2023.	–
Bushfire Management Plan	Comprehensive review completed in 2023 and copy distributed to NSW Planning 31 May 2023.	–
Flora and Fauna Management Plan	Comprehensive review last completed in September 2020 by SLR Consulting Australia.	Complete the statutory 5-yearly comprehensive review.
Site Water Management Plan	Comprehensive review completed in 2023 and update approved by NSW Planning on 03 October 2023.	–
Rehabilitation and Closure Plan	Comprehensive review completed in 2023 with update submitted to MidCoast Council for consultation on 27 February 2024.	Finalise submission to NSW Planning for approval. Target submission due date of 31 March 2024.

4.0 Operations Summary

The KHRQ site operated during the 2023 Annual Review reporting period as outlined below.

4.1 Quarry Production Summary

The monthly production summary during the reporting period is included in **Table 10**; and a long-term production summary is provided in **Table 11** since 2005.

In 2023, production increased from the site (compared to 2021 and 2022) due to on-going supply contracts for state significant infrastructure projects including the Newcastle Inner City Bypass (SSI-6888) and the M1 Pacific Motorway Extension to Raymond Terrace (SSI-7319).

Schedule 2, Condition 7 outlines a life of quarry production limit of 11.2 Mt of andesite and forecast production for 2024 will remain within this limit.

Table 10 **Monthly Quarry Production Data.**

Month	Production (t)	Truck Loads (#)
16 to 31 Jan-23	8,774	300
Feb-23	24,606	842
Mar-23	18,737	668
Apr-23	18,013	616
May-23	21,807	776
Jun-23	27,048	903
Jul-23	24,880	769
Aug-23	18,090	563
Sep-23	18,790	599
Oct-23	19,527	606
Nov-23	23,165	821
Dec-23	33,316	1,129
01 to 15 Jan-24	19,852	609
2023 TOTAL:	276,605	9,201
2024 FORECAST:	450,000	15,000

Table 11 **Production Data Summary since 2005.**

Annual Review Reporting Period	Production (t)	Notes
01/01/2005 – 31/07/2006	595,898	19-month period
01/08/2006 – 31/07/2007	338,528	
01/08/2007 – 31/07/2008	494,117	
01/08/2008 – 31/07/2009	779,006	
01/08/2008 – 31/07/2009	460,294	
01/08/2010 – 15/01/2012	637,234	16-month period
16/01/2012 – 15/01/2013	460,148	
16/01/2013 – 15/01/2014	458,040	
16/01/2014 – 15/01/2015	442,831	
16/01/2015 – 15/01/2016	412,779	
16/01/2016 – 15/01/2017	497,077	
16/01/2017 – 15/01/2018	498,752	
16/01/2018 – 15/01/2019	459,059	
16/01/2019 – 15/01/2020	456,990	
16/01/2020 – 15/01/2021	95,648	
16/01/2021 – 15/01/2022	119,833	
16/01/2022 – 15/01/2023	148,515	
16/01/2023 – 15/01/2024	276,605	
TOTAL:	7,631,354	

4.2 Land Preparation

No land clearing was completed during the 2023 reporting period.

4.3 Construction Activities

No construction activities were completed during the 2023 reporting period.

4.4 Operating Hours

For the 2023 reporting period the KHRQ site was operated within the operating hours provided by Schedule 3, Condition 2 of the Development Consent as outlined by **Figure 3**.

No temporary extensions to operating hours were sought from the Planning Secretary and no directions from statutory authorities were received during the 2023 reporting period.

Operating Hours		
2. The Applicant shall comply with the operating hours in Table 1:		
Activity	Days of the Week	Time
• Construction	Monday – Friday	7am to 6pm
• Extraction and processing	Saturday	7am to 1pm
• Internal and off-site transportation of product	Sunday and public holidays	No work at any time
Minor maintenance works on plant and machinery	7 days a week and public holidays	7am to 6pm

Table 1: Operating Hours for the Development

Note: Delivery of material outside of the hours of operation permitted by condition 2 is only allowed, where that delivery is required by the police or other authorities for safety reasons; and/or where the operation or personnel or equipment are endangered. In such circumstances, prior notification should be provided to the DEC and affected residents as soon as possible, or within a reasonable period in the case of emergency.

Figure 3 Operating Hours as specified in the Development Consent.

4.5 Operating Equipment

During the 2023 reporting period the following equipment was available for use during operational periods:

- 2x Excavators;
- 1x Mobile jaw crusher;
- 1x Mobile screen;
- 1x Mobile stacker;
- 3x Front end loaders;
- 1x 25,000 L water tanker; and
- 2x Onsite haul trucks.

4.6 Next Reporting Period

Forecast operations for the next 2024 reporting period are summarised by **Table 12**.

Table 12 Forecast Operations for the Next 2024 Reporting Period.

Aspect	Forecast Operations for the Next 2024 Reporting Period
Quarrying Operations	Continuation of quarrying activities within the approved extraction pit.
Infrastructure Upgrades	No major infrastructure upgrades are planned; however, routine maintenance to structural assets will continue to be completed subject to economic business cases and in accordance with operational requirements and the expected life of fixed plant.
Equipment Upgrades	No major equipment upgrades are planned; however, routine replacement of equipment will continue to be completed subject to economic business cases and in accordance with operational requirements and the expected life of mobile plant and equipment.
Rehabilitation	Rehabilitation is proposed to continue in accordance with the proposed rehabilitation schedule as outlined by the draft Rehabilitation and Closure Plan, subject to approval by NSW Planning (target submission due date of 31 March 2024).

5.0 Actions Required from Previous Annual Reviews

HQPL received correspondence from NSW Planning on 15 March 2023 regarding the 2022 Annual Review; and requested a revision to the submitted document to include:

- Reference to correspondence dated 15 February 2022 directing HQPL to revise and submit the Site Water Management Plan, Bushfire Management Plan and Environmental Monitoring Program; and
- Review and revise a typographical error in relation reported production data.

These actions requested by NSW Planning and the actions required as an outcome of the previous 2022 Annual Review are summarised in **Table 13**.

Table 13 Summary of Previous Actions.

ID	Action Required	Status	Section
NSW Planning Directions – 2022 Annual Review			
1	<p>The Department has reviewed the AEMR and requests that you provide a revised report that addresses the following:</p> <ul style="list-style-type: none"> Section 5 Actions Required from Previous AEMR – update this section of the report to reference the direction given by a nominee of the Planning Secretary to Hunter Quarries Pty Ltd in correspondence dated 15 February 2022 to revise and submit to the department by 30 June 2022 the Site Water Management Plan, Bushfire management Plan and Environmental Monitoring Program, to be determined by the Secretary. 	<p>Complete</p> <p>HQPL updated the Annual Review document on 31 May 2023 along with submitting a revised Bushfire Management Plan and Environmental Monitoring Plan. A revised Site Water Management Plan was submitted on 02 June 2023.</p>	Section 3.2 and Appendix 1
2	<p>The Department has reviewed the AEMR and requests that you provide a revised report that addresses the following:</p> <ul style="list-style-type: none"> Section 4 Operations Summary – review and revise the production data for 2021 provided in Tables 8 (i.e., 156,020 tonnes), which are inconsistent with the data provided in Table 9 and the AEMR for the 2021 reporting period (i.e., 119,833 tonnes). 	<p>Complete</p> <p>HQPL updated the Annual Review document on 31 May 2023 correcting these details.</p>	Section 4.1 and Appendix 1
KHRQ Findings – 2022 Annual Review			
3	Continue to update the website with monitoring data and key environment and community information.	<p>Complete</p> <p>Monthly monitoring data uploaded to the restructured Hunter Quarries website during 2023.</p>	–
4	Continue weed reduction program (target rehabilitation and conservation areas).	<p>Complete</p> <p>Pest and weed monitoring and management continued during 2023.</p>	Section 6.6
5	Remain within licensing and production limits.	<p>Complete</p> <p>KHRQ remains within approved production limits.</p>	Section 4.1
6	Continuation of community support program.	<p>Complete</p> <p>HQPL continued to facilitate community sponsorship program in 2023.</p>	Section 9.0
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ID	Action Required	Status	Section
7	Letter dated 15 February 2022 by a nominee of the Planning Secretary, HQPL is to revise and submit to the Department by 30 June 2022 the following: <ul style="list-style-type: none"> • Site Water Management Plan; • Bushfire Management Plan; and • Environmental Monitoring Program. 	<u>Complete</u> Management Plans were submitted as outlined by Action ID 1.	Section 3.2
8	Seek approval from DPE for several updated Management Plans, including the: <ul style="list-style-type: none"> • Site Water Management Plan, • Bushfire Management Plan, • Environmental Monitoring Program, • Surface Water Monitoring Plan, • Rehabilitation and Closure Plan, • Environmental Management Strategy, and • Flora and Fauna Management Plan. 	<u>Complete</u> Management Plans were submitted as outlined by Action ID 1. <u>Underway</u> Rehabilitation and Closure Plan submitted to MidCoast Council for consultation on 27 February 2024. Target submission to NSW Planning for approval by 31 March 2024. <u>On-going – DUE 30/12/2024</u> The Environmental Management Strategy and Flora and Fauna Management Plans remain within the 5-year statutory review period. However, HQPL will commit to completion of comprehensive reviews by 30 December 2024.	Section 3.2

6.0 Environmental Performance

HQPL undertakes environmental monitoring in accordance with the Development Consent and Environment Protection Licence. Key monitoring locations are illustrated by **Figure 4**.

Table 14 provides a summary of the environmental performance at the site for the 2023 reporting period.

Table 14 *Summary of Environmental Performance During the 2023 Reporting Period.*

Aspect	Approval Criteria OR EIS Prediction	Performance During the Operating Period	Trend OR Key Management Implications	Implemented OR Proposed Management Actions
Air Quality	Development Consent – Schedule 3, Condition 13	2x Depositional Dust exceedances	Exceedances due to contamination of DDG's with organic (not quarry-related) material.	Minor relocation of 2x DDG's to minimise contamination risk as far as reasonably practicable.
		1x PM10 exceedance	Exceedance for short term criteria considered to be an anomalous result.	Additional dust topics were included in toolbox talks to works on-site and a review of dust suppression equipment was conducted. HVAS monitoring at for the neighbouring Karuah East Quarry will continue in 2024. Any community complaints or further exceedances will be reviewed as required.
Blasting	Development Consent – Schedule 3, Conditions 4 & 5	Compliant	Within criteria	Improved administrative measures to better manage community complaints were implemented in 2023, as consistent with practices for the Karuah East Quarry.
Noise	Development Consent – Schedule 3, Condition 1	Compliant	Within criteria	Continued monitoring
Heritage	–	Not triggered	No specific criteria	No additional management proposed.
Biodiversity	Development Consent – Schedule 3, Condition 17 to 23	Compliant	Within criteria for F&MP	Continued management
Waste	Development Consent – Schedule 3, Conditions 34 & 35	Complaint	Increased waste associated with improved housekeeping processes.	Continued monitoring

Aspect	Approval Criteria OR EIS Prediction	Performance During the Operating Period	Trend OR Key Management Implications	Implemented OR Proposed Management Actions
Water	Development Consent – Schedule 3, Condition 19	Compliant	Within discharge criteria	Continued monitoring



Annual Review 2023

FIGURE 4 - Environmental Monitoring Locations

6.1 Meteorological Monitoring

For the 2023 reporting period the KHRQ site operated a meteorological monitoring station in accordance with Schedule 3, Condition 16 of the Development Consent as illustrated by **Figure 5**.

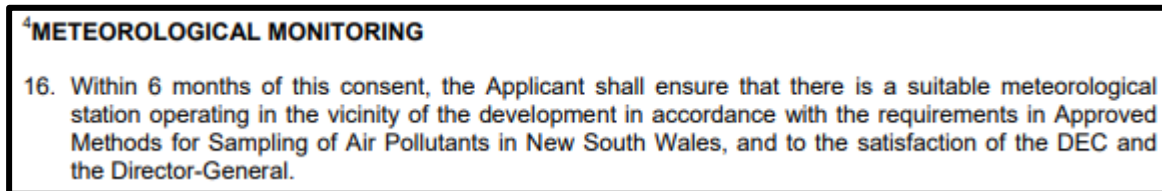


Figure 5 *Meteorological Monitoring Requirements from the Development Consent.*

The meteorological monitoring station was installed in August 2016 adjacent to the site's weighbridge as illustrated by **Figure 4** and currently services both quarries at the Karuah Quarry Complex. On 08 March 2023 the station was serviced and subject to the required annual field calibration.

Table 15 summarises the meteorological data collected by the meteorological station during 2023.

Table 15 *Recorded 2023 Meteorological Data.*

Month	Temperature (°C)			Rainfall (mm)		Wet Days (No. >1 mm.)	Wind [Max Gust] (km/h)
	Min	Ave	Max	Total	Max Daily		
Jan-23	12.3	22.3	36.2	174.8	41.0	11	40.2
Feb-23	11.2	23.1	37.2	38.8	25.0	6	45.0
Mar-23	1.9	22.3	40.3	92.6	22.2	9	48.0
Apr-23	6.3	16.9	27.4	153.4	40.0	13	59.2
May-23	1.7	12.5	24.8	100.4	36.8	5	27.6
Jun-23	0.1	11.5	23.1	4.2	2.4	2	28.8
Jul-23	1.8	11.7	25.1	58.2	27.8	6	29.6
Aug-23	3.6	12.8	27.3	58.4	24.8	8	31.1
Sep-23	2.7	15.7	34.3	13.0	4.6	3	28.6
Oct-23	5.5	18.7	36.6	81.4	46.4	5	33.4
Nov-23	10.9	20.3	33.7	99.2	45.0	7	50.9
Dec-23	13.1	23.9	42.6	56.80	22.4	6	45.0

Average monthly temperatures during 2023 ranged from 11.5 to 23.9 °C, with a maximum temperature of 42.6 °C recorded in December 2023. Total monthly rainfall ranged from 4.2 mm (June) to 174.8 mm (Jan), with the maximum daily rainfall recorded at 46.4 mm on 27 October 2023. The maximum wind gust was recorded in April 2023 with a result of 59.2 km/h.

The total rainfall for 2023 was 931.2 mm which can be compared to 1,666.8 mm in 2022.

6.2 Air Quality

EIS Predictions

The 2004 EIS for the then 'Proposed Hard Rock Quarry Extension' predicted that dust levels from the operation would be within the criteria of 4 g/m²/month. The obtained depositional dust monitoring data since this time demonstrates that the operation is meeting these predicted dust levels.

Approval Criteria

Air quality criteria is provided in Schedule 3, Condition 13 of the Development Consent as outlined by **Figure 6**. However, no specific limits are specified for air quality emissions by the EPL, however, the EPA does mandate the use of Approved Methods as outlined by their guidance document – *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2022).

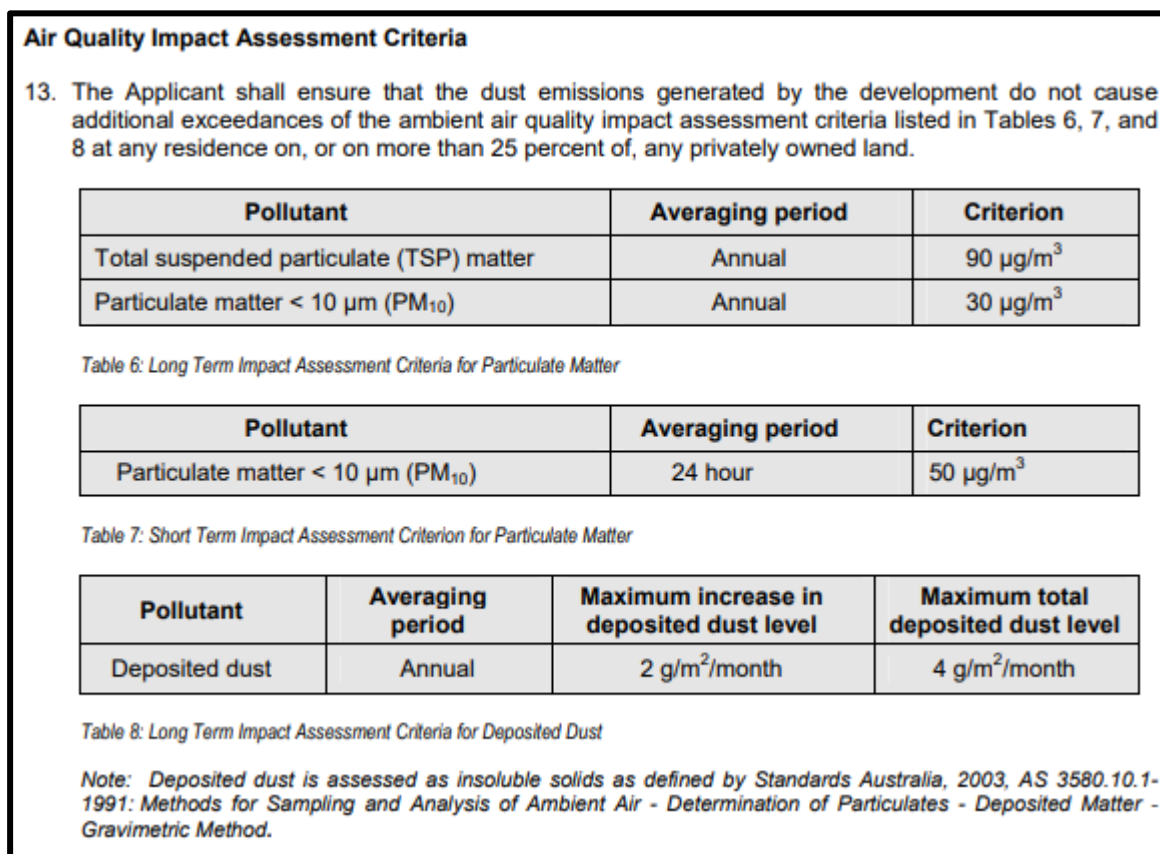


Figure 6 Air Quality Criteria provided by the Development Consent.

The main source of air pollution at the quarry is in the form of airborne dust, which arises from activities such as construction, quarrying, vehicle movements and crushing. Air quality monitoring has been performed to meet the EPA's Approved Methods (EPA, 2022) using four (4x) Depositional Dust Gauges. The location of these monitoring locations are illustrated by **Figure 4**.

Environmental Performance Results

Depositional dust results are outlined within **Table 16**. The 2023 monitoring results indicated that the maximum deposited dust levels measured at DDG 1 to DDG 4 were generally all less than the long-term impact assessment criteria for depositional dust (maximum deposited dust level of 4 g/m²/month) over the reporting period.

Table 16 Summary of Depositional Dust Gauge Results During 2023.

Monitoring Details				Deposited Dust (g/m ² /month)			
Reporting Period	Start Date	End Date	Days	DDG 1 EPL ID 2	DDG 2 EPL ID 3	DDG 3 EPL ID 4	DDG 4 EPL ID 5
Jan-23	05/01/2023	03/02/2023	29	0.2	0.4	0.8	0.1
Feb-23	03/02/2023	06/03/2023	31	0.9	0.7	0.2	0.3
Mar-23	06/03/2023	05/04/2023	30	1.1	1.5	1.1	1.1
Apr-23	05/04/2023	04/05/2023	29	0.3	0.5	0.3	0.2
May-23	04/05/2023	05/06/2023	32	0.2	0.3	0.3	0.4
Jun-23	05/06/2023	04/07/2023	28	0.6	2.5	1.8	—*
Jul-23	04/07/2023	03/08/2023	30	0.4	0.9	1.2	1.1
Aug-23	03/08/2023	04/09/2023	32	0.7	0.3	0.5	0.5
Sep-23	04/09/2023	04/10/2023	29	1.5	2.6	1.4	1.4
Oct-23	04/10/2023	02/11/2023	28	1.4	2.4	2.2	1.6
Nov-23	02/11/2023	30/11/2023	28	1.6	—*	1.4	1.0
Dec-23	30/11/2023	28/12/2023	28	1.1	1.0	1.3	1.3
2023 AR Average:				0.8	1.2	1.0	0.8
2023 Minimum:				0.2	0.3	0.2	0.1
2023 Maximum:				1.6	2.5	2.2	1.6

*Contaminated samples discounted from reporting data set.

However, it should be noted that DDG 4 in the June 2023 reporting period, and DDG 2 sample in the November 2023 reporting period become contaminated with organic vegetation matter and are therefore discounted from averaging. These ‘failure to monitor’ events were reported to NSW Planning and the NSW EPA in accordance with the relevant conditions of the Development Consent and EPL. Both agencies subsequently acknowledged the events and have confirmed no regulatory action will be taken.

Long-term dust results are summarised by **Table 17**, with consistent results from 2014 to 2023.

Table 17 Long-term summary of Depositional Dust Gauge Results.

Reporting Period	Deposited Dust Gauge											
	DDG 1 (EPL ID 2)			DDG 2 (EPL ID 3)			DDG 3 (EPL ID 4)			DDG 4 (EPL ID 5)		
	min	ave	max	min	ave	max	min	ave	max	min	ave	max
2014	0.5	1.2	2.2	0.4	0.9	2.2	0.3	0.8	1.4	0.3	1.6	7.1
2015	0.3	1.5	6.4	0.3	0.9	3.7	0.1	0.6	2.8	0.3	1.2	4.1
2016	0.4	1.9	4.0	0.3	1.0	3.0	0.1	0.7	1.3	0.3	1.3	3.2
2017	0.4	0.9	1.7	0.1	0.7	1.8	0.5	0.9	1.4	0.5	1.5	3.8
2018	0.6	1.1	1.6	0.4	0.9	3.4	0.4	0.9	3.4	0.2	1.3	3.0
2019	0.3	1.5	3.8	0.5	1.8	4.0	0.2	1.3	3.5	0.1	1.6	4.8
2020	0.1	1.5	3.4	0.1	0.8	2.3	0.1	0.7	2.3	0.1	0.9	3.5
2021	0.2	1.5	3.6	0.1	0.6	1.4	0.2	0.7	2.2	0.1	0.8	3.7
2022	0.1	0.6	1.4	0.2	0.8	3.6	0.1	0.5	1.2	0.1	0.5	1.2
2023	0.2	0.8	1.6	0.3	1.2	2.5	0.2	1.0	2.2	0.1	0.8	1.6

A High-Volume Air Sampler (HVAS) operated at the site from October 2006 until December 2008. It was demonstrated that measured particulate matter was at a sufficiently low level to not require on-going monitoring and its removal was approved by NSW Planning and the EPA.

In accordance with the approved Environmental Monitoring Program (EMP), in 2023, no air quality complaints or directions from NSW Planning were received requiring a review of the neighbouring Karuah East Quarry's particulate matter results.

However, on 16/06/2023, an exceedance of PM10 short-term criteria at Karuah East Quarry's HVAS monitoring station was recorded at 51 $\mu\text{g}/\text{m}^3$ compared to the performance measure of 50 $\mu\text{g}/\text{m}^3$. This anomalous result was reported to NSW Planning, the NSW EPA and surrounding landholders in accordance with the relevant conditions of the Development Consent and EPL. NSW Planning reviewed the notification and determined to record a breach under the NSW EP&A Act 1979 on 19 January 2024. However, no response from the EPA was received.

Management Measures

The following best practice air quality control measures continued to be implemented in 2023:

- Air quality monitoring;
- Minimising disturbance of land to only what is required by quarry activities;
- Minimising distance travelled by hauling rock the shortest distance possible;
- Utilising quarry runoff water for dust suppression on roads, stockpiles, production plant and work areas. A 25,000 litre (L) water cart is used at the site to assist with firefighting capabilities and dust management. Water is regularly collected from Sediment Dam 2 and sprayed on roads throughout the quarry to minimise dust generated from vehicle movements;
- Engaging the services of a contract road sweeper to regularly clean roadways around the entrance to the quarry; and
- Ensuring loads are covered when leaving the site.

Improvements

HQPL will continue to monitor air quality in accordance with the conditions of the Development Consent Approval and EPL.

In response to the DDG contamination events, HQPL proposes to undertake a minor relocation of two stations to minimise the risk as far as reasonably practicable, subject to approval by NSW Planning and the EPA.

6.3 Blasting

EIS Predictions

The 2004 EIS predicted that air blast and ground vibration levels will meet the EPA Guidelines at all residential locations surrounding the development with appropriate maximum instantaneous charge (MIC) limits in place.

Approval Criteria

Blasting criteria for the site are provided in Schedule 3, Condition 4 (airblast overpressure) and Schedule 3, Condition 5 (ground vibration) of the Development Consent as outlined by **Figure 7**. Additionally, Conditions L4.1 to 4.7 of the EPL detail consistent blast limits for the project.

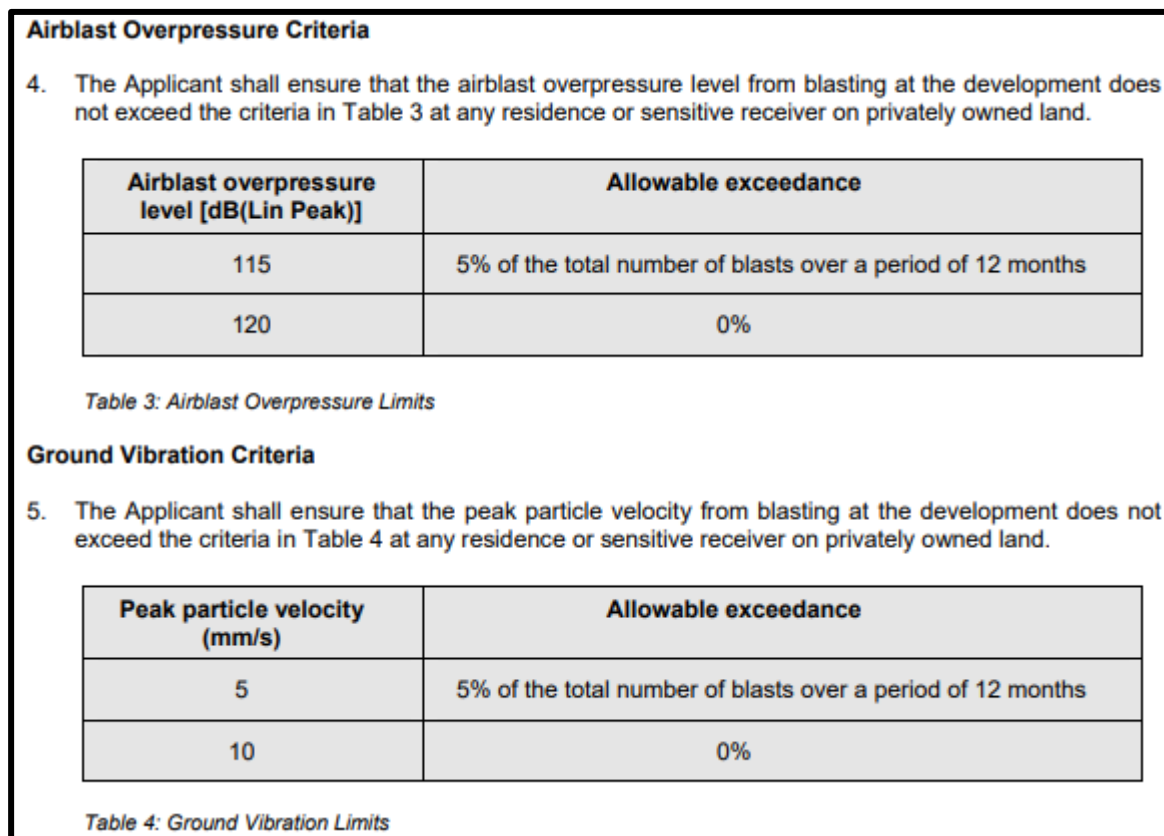


Figure 7 Blasting Criteria provided by the Development Consent.

Environmental Performance Results

In the 2023 reporting period, eight (8x) blast events were completed at the site as summarised by **Table 18**. All blasts were within the limits provided by the Development and EPL.

Table 18 Blast Monitoring Results for the 2023 Reporting Period.

Date	Time	Location	Airblast Overpressure* (dB [Lin Peak])	Ground Vibration* PPV (mm/s)
10/02/2023	12:41	RL 67 & 86	108.3	1.60
28/02/2023	14:02	RL 77	110.5	1.13
26/03/2023	11:27	RL 77	110.4	1.93
15/06/2023	12:02	RL 77	111.7	2.10
14/07/2023	11:52	RL 76 & 87	110.7	1.60
15/09/2023	12:21	RL 76	112.5	2.20
21/12/2023	14:24	West Highwall	N.T	N.T
12/01/2024	12:38	RL 76 & 115	108.9	1.18
2023 AR Average:			110.1 dBL	1.53 mm/s
2023 Minimum:			< 108 dBL	< 0.5 mm/s
2023 Maximum:			112.5 dBL	2.20 mm/s

*n/t = Not triggered

Ground Vibration < 0.5 mm/s

Overpressure < 108 dB(L)

Management Measures and Improvements

No exceedances were identified and therefore no further controls are considered necessary.

However, in response to three (3x) blast-related community complaints at the neighbouring Karuah East Quarry, a minor administrative improvement has been implemented to assist with greater management of blast-related impacts, by updating our Blast Notification Messaging System to provide text message notifications from a single mobile phone number (**0439 580 440**) to allow residents to maintain a single point of contact, allowing greater ability to remain up to date with planned blasting activities.

6.4 Noise

EIS Predictions

The 2004 EIS noted that operational noise levels are predicted to meet project specific noise goals at all nearest, potentially affected non-project related residential locations surrounding the site. The 2004 EIS predicted that there would be no increase in road traffic noise levels due to quarry contributed traffic discernible at any residential location adjacent to the Highway.

Approval Criteria

Noise criteria for the site are provided in Schedule 3, Condition 1 of the Development Consent as outlined by **Figure 8**.

Environmental Performance Results

Attended and unattended noise monitoring was conducted at the two nearest residential receivers (NM1 and NM2) on a six-monthly basis by EMM Consulting in accordance with the Development Consent and EPL. The two monitoring reports for the 2023 reporting period are provided by **Appendix 3**.

Noise results, attributable to quarry-operations, for both residential receptors were assessed as being within compliance limits for both monitoring rounds.

Management Measures and Improvements

No exceedances were identified and therefore no further controls are considered necessary.

Noise Impact Assessment Criteria	
1. The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2 at any residence or noise sensitive receptor on privately owned land.	
Time Period	Noise Limits dB(A)
	L_{Aeq} (15minute)
Day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

Table 2: Noise Impact Assessment Criteria for the Development

Notes:

- Noise from the site is to be measured within thirty meters of any residence or other noise sensitive areas to determine compliance with the noise criteria set out in Table 2.
- L_{Aeq}(15 minute) is the equivalent continuous noise level - the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
- For the purpose of noise measures required for this condition, the L_{Aeq} noise level must be measured or computed at the point defined in this condition over a period of 15 minutes using "FAST" response on the sound level meter.
- For the purpose of the noise criteria for this condition, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. The location or point of impact can be different for each development, for example, at the closest residential receiver or at the closest boundary of the development. Measurement locations can be:
 - 1 meter from the facade of the residence for night time assessment;
 - at the residential boundary;
 - 30 meters from the residence (rural situations) where boundary is more than 30 meters from residence.
- The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:
 - documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions;
 - where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversions conditions should be developed and implemented.

Figure 8 Noise Criteria provided by the Development Consent.

6.5 Heritage (Aboriginal Cultural Heritage & Historic Heritage)

EIS Predictions

The archaeological survey conducted for the EIS (ADW, 2004) process did not find any heritage items onsite. There were no predicted impacts to heritage from the Karuah Hard Rock Quarry.

Approval Criteria

There are no specific criteria associated with heritage relating to the project. The process for managing any unexpected heritage items is outlined below under Management Measures and Improvements.

Environmental Performance Results

There were no issues relating to Aboriginal and Cultural heritage during the reporting period. There was no clearing in the period.

Management Measures and Improvements

Should unexpected Aboriginal objects/features be encountered, work must stop immediately, and the area cordoned off with a high visibility barrier. The Quarry Manager is to then contact a heritage consultant and Registered Aboriginal Parties (RAPs). The heritage consultant, in consultation with the RAPs, is to conduct a field survey to assess the Aboriginal objects/features identified. The heritage consultant, in consultation with the RAPs, will then recommend appropriate mitigation measures.

The Quarry Manager is to implement the mitigation measures that are recommended by the heritage consultant and agreed to by the RAPs and in accordance with Heritage NSW regulations. If additional visual inspection and salvage is recommended, the Quarry Manager is to arrange for the heritage consultant and RAPs to undertake those works.

Provided that these heritage contingency protocols have been followed, works within the project area may proceed.

As there have been no heritage items located to date, no improvements to management measures are proposed.

6.6 Biodiversity

EIS Predictions

The 2004 Stage 2 EIS stated:

"The proposed extension will impact on four endangered species, one directly and the others indirectly. The impacts can be adequately mitigated to allow these species to continue to function unimpeded by the proposed extension. A conservation off-set of 16 hectares will be provided on adjacent land. The off-set will comprise similar habitat to that which will be disturbed by quarrying. The off-set will ensure an appropriate level of formal protection for threatened flora and fauna species in the long-term."

Approval Criteria

There are no specific criteria associated with biodiversity management for the site. Activities need to be completed in accordance with the EIS.

Environmental Performance Results

HQPL implement a Flora and Fauna Management Plan. The key components and management measures of the Flora and Fauna Management Plan include:

- A vegetation clearing protocol;
- Flora and fauna monitoring;
- Topsoil management;
- Conservation Offset Management Plan; and
- Remnant Vegetation Conservation Plan.

Ecological monitoring is undertaken on a two-yearly basis with the next monitoring round to be undertaken in 2024.

Management Measures and Improvements

HQPL will continue to undertake weed control measures particularly around haul roads and within rehabilitation areas in 2023. Site inspections for the identification of noxious weeds will continue to be undertaken.

6.7 Waste Management

Approval Criteria

Waste management requirements for the site are provided in Schedule 3, Condition 34 and 35 of the Development Consent as outlined by **Figure 9**.

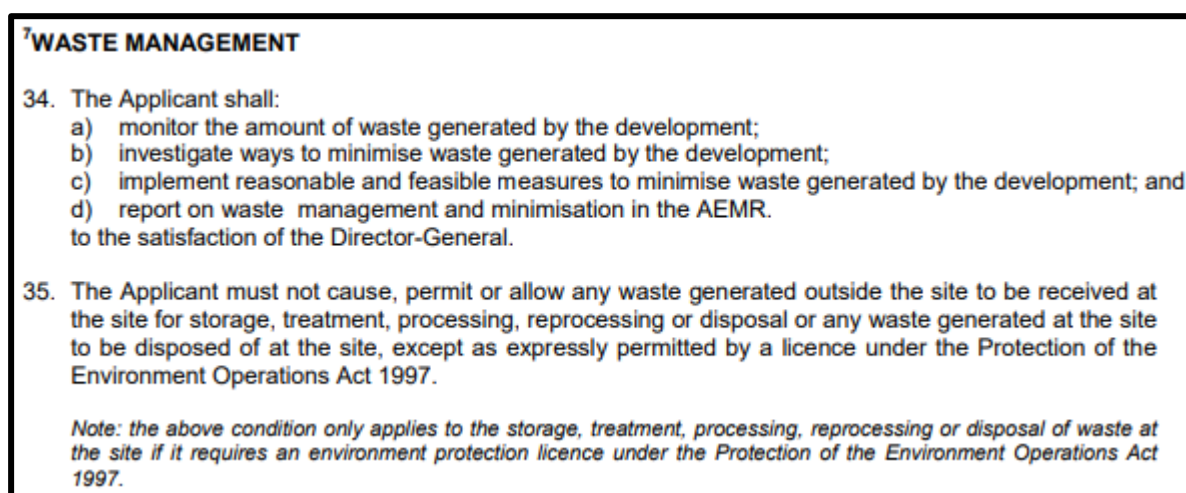


Figure 9 Waste Management Requirements provided by the Development Consent.

Environmental Performance Results

A licenced waste contractor removes waste from a 3 m³ waste bin at the site. There were 44 collections during the reporting period, with capacity of the bin ranging from 30% to 100%, or a total of approximately 87 m³ of waste being removed from site. This represents an increase compared to 68 m³ in 2022 which can be attributed to greater housekeeping processes being implemented in the reporting period.

No waste material was imported onto the site during the reporting period as per Schedule 3, Condition 35.

Management Measures and Improvement

HQPL use a licensed contractor for waste removal at the site. Typical waste at the quarry generally consists of non-hazardous and general wastes, as well as oily wastes. The general and non-hazardous wastes are placed in a skip bin and removed from site.

Oily water accumulates in the workshop sump within a bunded area and is removed by a licenced contractor when the sump is full. Additionally, scrap steel and tyres are separated and stockpiled until there is enough quantity for removal by a licensed contractor for recycling.

HQPL will continue to effectively manage their waste on site, including continuing to reuse and recycle where possible.

7.0 Water Management

Overview

Surface water at Karuah Hard Rock Quarry is managed in accordance with the Site Water Management Plan (SWMP). The primary objective of water management at the site is to remain compliant with the Development Consent and EPL. As such, water contained within the footprint of the development is directed to Sediment Dam 2; or where this is not possible, water is directed through sediment control structures such as silt fences and retention sumps in accordance with the provisions of the Blue Book.

The capacity of Sediment Dam 2 is approximately 18 ML and primarily used for dirty water management, including the storage and re-use for:

- Dust suppression on internal access and haul roads; and
- Process water/dust suppression for the crusher, conveyors and stockpiles.

EIS Predictions

The 2004 EIS noted:

“No ground water or creeks will be affected by the proposed quarry extension. Water will be retained on site for reuse on site for quarry operations and for environmental mitigation. No run-off is expected from the site. Water quality management facilities are already in place as part of the existing quarry to ensure the quality of the water should any run-off occur. These existing measures will be upgraded.”

Approval Criteria

Discharge criteria is provided in Condition L2.4 of the EPL and summarised in **Table 19**. These pollutants will be tested during discharge events from LDP 1.

Table 19 EPL Discharge Monitoring Criteria for LDP 1.

Parameter	Units of Measure	EPL Discharge Limits (100 Percentile Concentration Limit)
Oil and Grease	mg/L and/or Visibility	5 and/or non-visible
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50
Total Nitrogen	mg/L	–
Total Phosphorus	mg/L	–

Environmental Performance Results (Discharge)

No discharges occurred in the 2023 reporting period.

Environmental Performance Results (Monitoring)

Six-monthly surface water monitoring results for Sediment Dam 2 site are provided by **Table 20**. The monitoring results indicate the dam was compliant for pH and oil and grease; however, TSS was above the discharge limit. Prior to any potential discharges the dams are treated through flocculation with Calcium Chloride to reduce the TSS to below 50 mg/L to comply with the Development Consent and EPL.

Table 20 **Six-Monthly Surface Water Monitoring Results for Sediment Dam 2.**

Parameter	Units	EPL Discharge Limits	H1 2023 (08/06/2023)	H2 2023 (06/10/2023)
Oil and Grease	mg/L	5 and/or non-visible	Non-visible	< 5
pH	pH	6.5 – 8.5	7.7	7.7
Total Suspended Solids, TSS	mg/L	50	180	120
Turbidity	NTU	–	230	260
Electrical Conductivity, EC	µS/cm	–	361	412
Total Nitrogen	mg/L	–	0.2	0.2
Total Phosphorus	mg/L	–	0.10	0.09

Management Measures and Improvements

During the reporting period, HQPL completed a comprehensive review of the Site Water Management Plan which was approved by NSW Planning on 03 October 2023. Further management measures included desilting of Sediment Dam 2 from late October to early November 2023.

No off-site discharges occurred during the reporting period, and therefore no improvements are considered necessary.

Other Water Management Matters

- Water Licencing: HQPL holds no surface water or groundwater extraction licences.
- Salinity Trading: HQPL does not participate in any salinity trading schemes.
- Compensatory Water Supply: HQPL has not impacted any neighbouring landholders' water supply schemes requiring the provision of compensatory water supply.

8.0 Rehabilitation

The KHRQ Rehabilitation and Closure Plan (RCP) has been prepared to meet the requirements of Schedule 3, Condition 39 (Rehabilitation Management Plan) and Schedule 3, Condition 44 (Quarry Closure Plan) of the Development Consent. The current RCP (SLR, May 2021) was approved by NSW Planning on 08 July 2021.

In 2023, HQPL commissioned Integrated Environmental Management Australia (IEMA) to complete a comprehensive review of the RCP to account for extended quarry life and updated quantities of available material for further side casting activities. A draft revision of the RCP was provided to MidCoast Council for consultation on 27 February 2024 and a final revision will be targeted for submission to NSW Planning by 31 March 2024.

Side-casting of the eastern quarry face was undertaken in 2020 and 2021; and in 2023 side-casting commenced along the northern quarry face. There have been limited further opportunities to establish rehabilitation at the quarry site to-date, due to the configuration of the quarry and the progressive nature of the working operational areas, particularly in light of increased production associated with state significant infrastructure projects, including the Newcastle Inner City Bypass (SSI-6888) and the M1 Pacific Motorway Extension to Raymond Terrace (SSI-7319).

A summary of rehabilitation works completed in 2023 is provided by **Table 21**; and a status update of total rehabilitation is provided by **Table 22**. Planned rehabilitation actions for 2024 are summarised by **Table 23**.

Table 21 Summary of Rehabilitation Performance During the 2023 Reporting Period.

Rehabilitation Performance Details	KHRQ Site Comments
Extent of the operations and rehabilitation at completion of the reporting period.	Side-casting commenced along the northern quarry face.
Agreed post-rehabilitation land-use.	Final land-use is outlined within the RCP. The vegetation at closure will be native woodland consistent with the surrounding bushland; with the quarry void remaining as a water storage.
Key rehabilitation performance indicators.	—
Renovation or removal of buildings.	—
Any other Rehabilitation undertaken including: <ul style="list-style-type: none"> ■ Exploration activities; ■ Infrastructure; ■ Dams; and ■ The installation or maintenance of fences, bunds and any other works. 	Side-casting commenced along the northern quarry face.
Rehabilitation sign-off status of completed areas against the land-use objectives and completion criteria.	—
Variations to activities undertaken to those proposed (including why there were variations and whether the Resources Regulator was notified)	—
Outcomes of trials, research projects and other initiatives.	—
Key issues that may affect successful rehabilitation.	—

Table 22 **Disturbance and Rehabilitation Status.**

ID	Quarry Area Type	Previous 2022 Reporting Period [actual] (Ha)	Current 2023 Reporting Period [actual] (Ha)	Next 2024 Reporting Period [forecast] (Ha)
A	Total Quarry Footprint	28.8	28.8	28.8
B	Total Active Disturbance	28.8	28.8	28.8
C	Land Being Prepared for Rehabilitation	1.57	0	1.57
D	Land Under Active Rehabilitation	1.8	0	1.8
E	Completed Rehabilitation	11.2	11.2	11.2

Table 23 **Actions for the Next 2024 Reporting Period.**

Action	KHRQ Site Comments
Describe the steps to be undertaken to progress agreement during next reporting period, where final rehabilitation outcomes have not yet been agreed between stakeholders.	A comprehensive revision to the RCP will be targeted for submission to NSW Planning by 31 March 2024.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period.	There are no additional rehabilitation trials during the next Annual Review period.
Summary of rehabilitation activities proposed for next report period.	<ul style="list-style-type: none"> Side-casting of the northern quarry face with any available material will continue in 2024. Detailed civil design of the final landform, including water management infrastructure, such as the final void spillway, will commence. Geotechnical stability assessments will commence as final bench positions are reached. Seed collection will continue in 2024.

9.0 Community

9.1 Community Engagement

In both 2007 and 2011, HQPL sent flyers to nearby neighbours and advertised for expressions of interest for a Community Consultative Committee (CCC). There was no interest received and therefore a CCC was not formed. In the neighbouring Karuah East Quarry, during six-monthly annual CCC meetings, community members are able to discuss Karuah Hard Rock Quarry if required.

HQPL have committed to sending out a six-monthly report to nearby residents and MidCoast Council updating these stakeholders on the environmental performance of the quarry from January to June and July to December of each year. Therefore, information can be accessed by the community twice a year through this report, as well as this Annual Review. The Community Consultation Reports can be found on the HQPL website at <https://hunterquarries.com.au/>.

More detail on this Community Communication Strategy is available in Section 4.14.2 of the EMS (SLR, 2020).

9.2 Community Contributions

In 2023 HQPL supported the following organisations:

- Karuah Pearls Netball Club;
- Karuah Public School P&C;
- Karuah Roos Rugby League Football Club;
- Karuah & District Tennis Club;
- North Arm Cove Community Association;
- Bulahdelah Golf Club;
- Glen William Public School;
- Victoria Hotel Hinton;
- Bulahdelah Men's Shed;
- Rotary Clubs of Maitland;
- Wildlife in Need of Care;
- Karuah Oyster & Timber Festival;
- Karuah Golf Club; and
- Karuah RSL.

9.3 Community Complaints

Members of the community are encouraged to report any issues that are identified associated with our operations via the dedicated **Community Call Line** on **1800 329 161**. The Environment & Development Manager reviews, investigates, and reports all complaints received in accordance with the Development Consent, EPL, and the site's Environmental Management Strategy.

In 2023, the Community Call Line was advertised by:

- Updated signage at the entrance to the quarry premises;
- Inclusion of the Community Call Line in prominent locations on the Hunter Quarries website;
- Inclusion of the Community Call Line in communications with the CCC; and
- Letter drop to nearby residents of the Karuah Quarry Complex.

In 2023, no complaints were received by HQPL, which is below the typical result of one to two complaints per year as summarised by the complaints history provided in **Table 24**.

Table 24 **Community Complaints 2012-2023.**

Year	Number of Complaints Received
2012	0
2013	0
2014	0
2015	0
2016	0
2017	1
2018	1
2019	1
2020	2
2021	2
2022	1
2023	0

10.0 Independent Environment Audit

In accordance with Schedule 4, Condition 6 of the Development Consent, HQPL has commissioned an Independent Environment Audit (IEA) every five years as summarised by **Figure 10**.

INDEPENDENT ENVIRONMENTAL AUDIT	
6.	<p>Within 2 years of the date of this consent, and every 5 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:</p> <ul style="list-style-type: none"> a) be conducted by a suitably qualified, experienced, and independent person whose appointment has been endorsed by the Director-General; b) be consistent with <i>ISO 19011:2002 - Guidelines for Quality and/ or Environmental Systems Auditing</i>, or updated versions of this guideline; c) assess the environmental performance of the development, and its effects on the surrounding environment; d) assess whether the development is complying with the relevant standards, performance measures, and statutory requirements; e) review the adequacy of the Applicant's Environmental Management Strategy and Environmental Monitoring Program; and f) if necessary, recommend measures or actions to improve the environmental performance of the development, and/or the environmental management and monitoring systems.
7.	<p>Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, with a response to the recommendations contained in the audit report.</p>

Figure 10 Independent Environmental Audit (IEA) requirements from the Development Consent.

The previous audit was undertaken in July 2019. HQPL prepared a Response to Audit Recommendations (RAR) which was submitted to DPE 19 February 2020. This was accepted by NSW Planning 28 February 2020; and all actions have since been closed out.

The next 5-yearly IEA will be conducted in 2024.

11.0 Incidents & Non-Compliances During the Reporting Period

During the 2023 reporting period, three exceedances of performance criteria occurred, all of which related to air quality.

- **16/06/2023 – PM10 Exceedance of Short-term criteria;**

Minor exceedance of PM10 was recorded at 51 µg/m³ compared to the short-term criteria of 50 µg/m³ on 16 June 2023 at the HVAS monitoring station. This anomalous result was reported to NSW Planning, the NSW EPA and surrounding landholders in accordance with the relevant conditions of the Development Consent and EPL.

In response, additional dust topics were included in toolbox talks to works on-site and a review of dust suppression equipment was conducted.

NSW Planning reviewed the notification and determined to record a breach under the NSW EP&A Act 1979 on 01 February 2024. However, no response from the EPA was received.

- **June 2023 – Contamination of DDG 4 and DDG 5 with organic material;**

- **November 2023 – Contamination of DDG 2 with organic material.**

During these reporting periods, dust gauges become contaminated with organic vegetation matter and are therefore discounted from averaging. Ash content of the samples, which quarry-related dust may contribute, remained well within compliance limits.

These 'failure to monitor' events were reported to NSW Planning, the EPA and surrounding landholders in accordance with the relevant conditions of the Project Approval and EPL. Both agencies subsequently acknowledged the events and have confirmed no regulatory action will be taken.

In response to the DDG contamination events, HQPL proposes to undertake a minor relocation of two stations to minimise the risk as far as reasonably practicable, subject to approval by NSW Planning and the EPA.

12.0 Activities to be Completed in the Next Reporting Period

Table 25 outlines the actions to be completed within the 2024 reporting period.

Table 25 *Proposed Actions for the Next 2024 Reporting Period.*

ID	Action	Timeline
1	Submit final revision of the Rehabilitation and Closure Plan to NSW Planning for approval, following consultation with MidCoast Council.	A comprehensive revision to the RCP will be targeted for submission to NSW Planning by 31 March 2024.
2	Complete the statutory 5-year comprehensive review of the Environmental Management Strategy.	Submit to NSW Planning by 31 December 2024.
3	Complete the statutory 5-year comprehensive review of the Flora and Fauna Management Plan.	Submit to NSW Planning by 31 December 2024.
4	Undertake the statutory 5-year Independent Environmental Audit.	Submit IEA and PAR to NSW Planning by 31 December 2024.
5	Submit EPL Variation (in conjunction with KEQPL) to undertake minor relocation of two depositional dust gauges.	Complete relocation by 31 December 2024.
6	Complete (or continue) rehabilitation activities:	On-going actions to be progressed in 2024 in accordance with the draft RCP, subject to approval by NSW Planning.
	A. Side-casting of the northern quarry face with any available material will continue in 2024.	
	B. Detailed civil design of the final landform, including water management infrastructure, such as the final void spillway, will commence.	
	C. Geotechnical stability assessments will commence as final bench positions are reached.	
	D. Seed collection will continue in 2024.	

Appendix 1 – NSW Planning Correspondence

NSW Planning Response to KHRQ Annual Review 2022

Department of Planning and Environment

Shane Burton
Quarry Manager
Karuah Quarry
Worimi Country
PO Box 23
KARUAH NSW 2324

15/05/2023

Dear Mr Burton

Karuah Hard Rock Quarry (DA 265-10-2004)
2022 Annual Environmental Management Report - Request for Additional Information

I refer to the 2022 Annual Environmental Management Report (AEMR) submitted to the Department of Planning and Environment (the department) as required by Schedule 4 Condition 5 of development consent DA 265-10-2004 as modified (the consent) for Karuah Hard Rock Quarry.

The department has reviewed the AEMR and requests that you provide a revised report that addresses the following:

- Section 5 Actions Required from Previous AEMR – update this section of the report to reference the direction given by a nominee of the Planning Secretary to Hunter Quarries Pty Ltd in correspondence dated 15 February 2022 to revise and submit to the department by 30 June 2022 the Water Management Plan, Bushfire management Plan and Environmental Monitoring Program, to be determined by the Secretary.
- Section 4 Operations Summary – review and revise the production data for 2021 provided in Tables 8 (i.e., 156,020 tonnes), which are inconsistent with the data provided in Table 9 and the AEMR for the 2021 reporting period (i.e., 119,833 tonnes).

You are requested to provide the information, or notification that the information will not be provided, to the Department by close of business Wednesday 31 May 2023. If you are unable to provide the requested information within this timeframe you are required to provide, and commit to, a timeframe detailing the provision of this information.

If you have any questions, please contact Jennifer Sage, Senior Compliance Officer on 0400 245 170 or compliance@planning.nsw.gov.au.

Yours sincerely



Heidi Watters
Team Leader Northern
Compliance

Appendix 2 – Noise Monitoring Reports

Noise Monitoring Report – H1 2023

Noise Monitoring Report – H2 2023

Karuah Quarry

Biannual Attended Noise Monitoring - S1 2023

Prepared for Hunter Quarries Pty Limited

May 2023

Karuah Quarry

Biannual Attended Noise Monitoring - S1 2023

Hunter Quarries Pty Limited

E230083 RP5

May 2023

Version	Date	Prepared by	Reviewed by	Comments
1	2 May 2023	Lucas Adamson	Najah Ishac	Draft
2	3 May 2023	Lucas Adamson	Najah Ishac	Final

Approved by



Najah Ishac

Director

3 May 2023

Level 3 175 Scott Street
Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Hunter Quarries Pty Limited and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. The contents of this report are private and confidential. This report is only for Hunter Quarries Pty Limited's use in accordance with its agreement with EMM and is not to be relied on by or made available to any other party without EMM's prior written consent. Except as permitted by the *Copyright Act 1968* (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Hunter Quarries Pty Limited (and subject to the terms of EMM's agreement with Hunter Quarries Pty Limited).

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1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at Karuah Quarry (KQ, the site) located at Blue Rock Close, Karuah NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day period of 19 April 2023 at two monitoring locations.

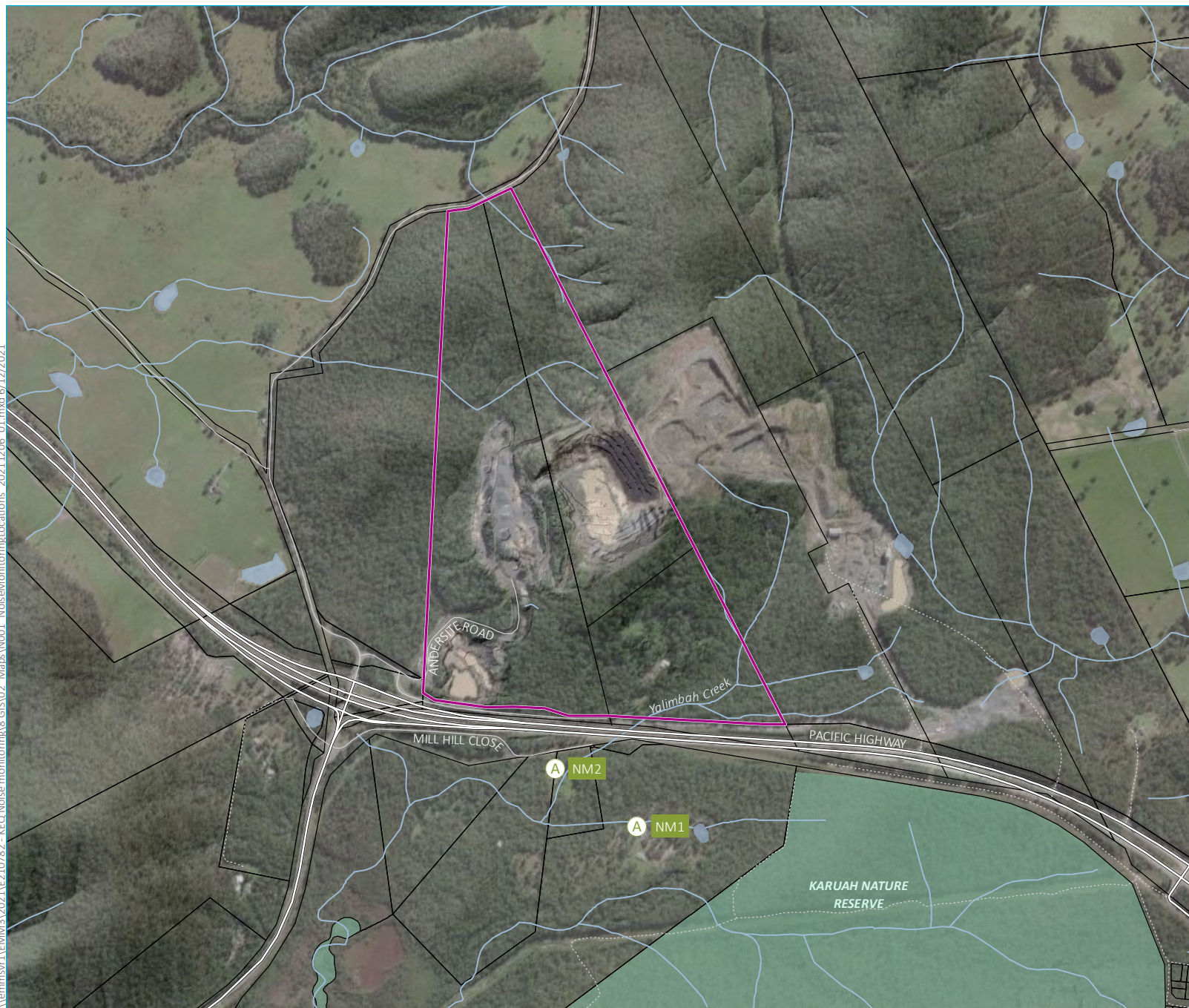
1.2 Attended monitoring locations

Site monitoring locations are detailed in Table 1.1 and shown on Figure 1.1. It should be noted that Figure 1.1 shows actual monitoring positions, not necessarily the location of residences.

Table 1.1 **Attended noise monitoring locations**

Location descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
NM1	Private Residence - 74 Mill Hill Close, Karuah	406623	6388704
NM2	Private Residence - 64 Mill Hill Close, Karuah	406405	6388859

\\lemmsvr1\EMM3\2021\0210782 - KEQ Noise monitoring\8 GIS\02 Maps\N001 NoiseMonitoringLocations 20211206 01.mxd 6/12/2021



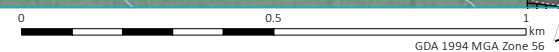
- KEY**
- Site boundary
 - A Noise monitoring location
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Cadastral boundary
 - Waterbody
 - NPWS reserve
 - State forest

Noise monitoring locations

Karuah Quarry
Bi-annual noise monitoring
Figure 3.1



Source: EMM (2021); ADW Johnson (2020); DFSI (2017); ICSM (2012); GA (2011); ASGC (2006)



1.3 Terminology and abbreviations

Some definitions of terms and abbreviations which may be used in this report are provided in Table 1.2.

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L_{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L_{A1}	The A-weighted noise level which is exceeded for 1 per cent of the time.
$L_{A1,1minute}$	The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
L_{A10}	The A-weighted noise level which is exceeded for 10 percent of the time.
L_{Aeq}	The energy average A-weighted noise level.
L_{A50}	The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period.
L_{A90}	The A-weighted noise level exceeded for 90 percent of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L_{Amin}	The minimum A-weighted noise level over a time period.
L_{Ceq}	The energy average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

2.1 Development consent

Karuah Quarry noise limits are detailed in Condition 1 of Schedule 3 of Development Consent (DC) DA 265-10-2004. Relevant sections of DA 265-10-2004 are reproduced in Appendix B.1.

2.2 Environment protection licence

There are no noise limits detailed in the site's Environment Protection Licence (EPL) 11569.

2.3 Environmental monitoring program

The approved environmental monitoring program (EMP) adopts two attended noise monitoring locations that are representative of residences outlined in DA 265-10-2004. Relevant sections of the EMP are reproduced in Appendix B.2.

2.4 Noise limits

Noise impact limits based on the development consent are provided in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day L _{Aeq,15minute}	Evening L _{Aeq,15minute}	All other times L _{Aeq,15minute}
NM1	48	47	46
NM2	48	47	46

2.5 Meteorological conditions

The table notes for Table 2, Condition 1 of Schedule 3 of DA 265-10-2004 also state that noise generated by the project is to be measured in accordance with the following meteorological conditions:

The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions.

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfi) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022.

As outlined in Section 5.4.1 of the EMP, unattended noise monitoring is to be conducted at two locations (NM1 and NM2) on a bi-annual basis under the following conditions:

In order to measure the possible impact of noise resulting from quarry operations, the following monitoring will be undertaken at the two (2) nearest residences downwind and/or in line-of sight from the quarry and not owned or under agreement with HQPL:

- a) An unattended (continuous 24hr) noise monitor will be placed in the field to measure noise for at least four (4) full days of monitoring each six months;
- b) An attended survey (15-minutes meeting EPA standards) will be undertaken at the two nearest residences on a six monthly basis. This survey will be undertaken in conjunction with the unattended survey described above;
- c) A suitably qualified noise consultant will be engaged to undertake 15-minute attended noise surveys to investigate any complaints received by HQPL; and
- d) Onsite logged climatic data (particularly winds) will be utilised to assist with a timely management response to any noise issue that may arise. This is further discussed in Section 5.5.

3 Methodology

3.1 Overview

Attended environmental noise monitoring was done in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant EPA requirements.

Meteorological data was obtained from the site automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the day period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site only $L_{Aeq,15\text{minute}}$ were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range, but site noise was determined to be at least 5 dB lower than relevant limits, then a maximum estimate of it may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- Site noise levels were extremely low and unlikely, in many cases, to be noticed
- Site noise levels were masked by other more dominant noise sources that are characteristic of the environment, such as breeze in foliage or continuous road traffic noise, that cannot be eliminated by monitoring at an alternate or intermediate location
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Unattended noise monitoring

The unattended noise monitoring was carried out using Acoustic Research Labs (ARL) Ngara environmental noise loggers that were in place from Wednesday 19 April to Monday 24 April 2023.

Calibration of instrumentation was checked prior to and following measurements. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates (refer Appendix C).

Data affected by adverse meteorological conditions and by spurious or uncharacteristic events has been excluded from the results in accordance with methodologies provided in the NPfI.

3.4 Meteorological data

Meteorological data for the monitoring period was sourced from the Karuah Quarry on-site meteorological station to determine applicability of criteria in accordance with the DC.

3.5 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site only L_{Aeq} noise levels.

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

3.6 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix C.

Table 3.1 Noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
B&K 2250 sound level meter	3029363	3/11/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	86311	17/10/2024	IEC 60942:2003
ARL Ngara unattended noise logger	878127	2/2/2024	IEC 61672-3:2013
ARL Ngara unattended noise logger	878017	8/11/2024	IEC 61672-3:2013

4 Results

4.1 Attended noise monitoring

4.1.1 Total measured noise levels and atmospheric conditions

Overall noise levels measured at each location during attended measurements are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.1 of this report.

Table 4.1 Total measured noise levels (attended) – Semester 1 2023¹

Location	Start date and time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
NM2	19/04/2023 16:54	79	74	69	66	64	59	53
NM1	19/04/2023 17:15	67	61	57	54	53	50	47

Notes: 1. Levels in this table are not necessarily the result of activity at site.

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – Semester 1 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
NM2	19/04/2023 16:54	21.4	0.7	70	0
NM1	19/04/2023 17:15	20.1	<0.5	-	0

Notes: 1. "-" indicates calm conditions at monitoring location.

4.1.2 Site only noise levels

i Modifying factors

There were no modifying factors, as defined in the NPfI, applicable during the survey.

ii Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data from the site AWS. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – Semester 1 2023

Location	Start Date and Time	Wind		Stability Class	Limits apply? ¹	Limits, dB	Site levels, dB	Exceedances, dB ¹
		Speed m/s	Direction ³			L _{Aeq,15minute}	L _{Aeq,15minute} ²	L _{Aeq,15minute}
NM1	19/04/2023 16:54	0.9	137	A	Y	48	IA	Nil
NM2	19/04/2023 17:15	1.2	128	A	Y	48	IA	Nil

Notes:

1. Noise emission limits are applicable if weather conditions were within parameters specified in Section 2.5. NA in exceedance column indicates that limits were not applicable due to weather conditions.
2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
3. Degrees magnetic north, “-” indicates calm conditions.

4.2 Unattended noise monitoring

Overall noise levels measured at each location during attended measurements are provided in Table 4.4. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.2 of this report.

Table 4.4 Total measured noise levels (unattended) – Semester 1 2023¹

Location	Period	Measured noise levels, dB	
		RBL	L _{Aeq,period}
NM1 19-24 April 2023	Day	48	55
	Evening	45	54
	Night	38	50
NM2 19-24 April 2023	Day	57	65
	Evening	51	64
	Night	38	61

Notes: 1. Levels in this table are not necessarily the result of activity at site.

5 Discussion

5.1 Attended noise monitoring

5.1.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations, summaries have been derived for the location and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs and insects are seen to be generating noise at frequencies above 1000 Hz, while industrial noise is observed at frequencies less than 1000 Hz.

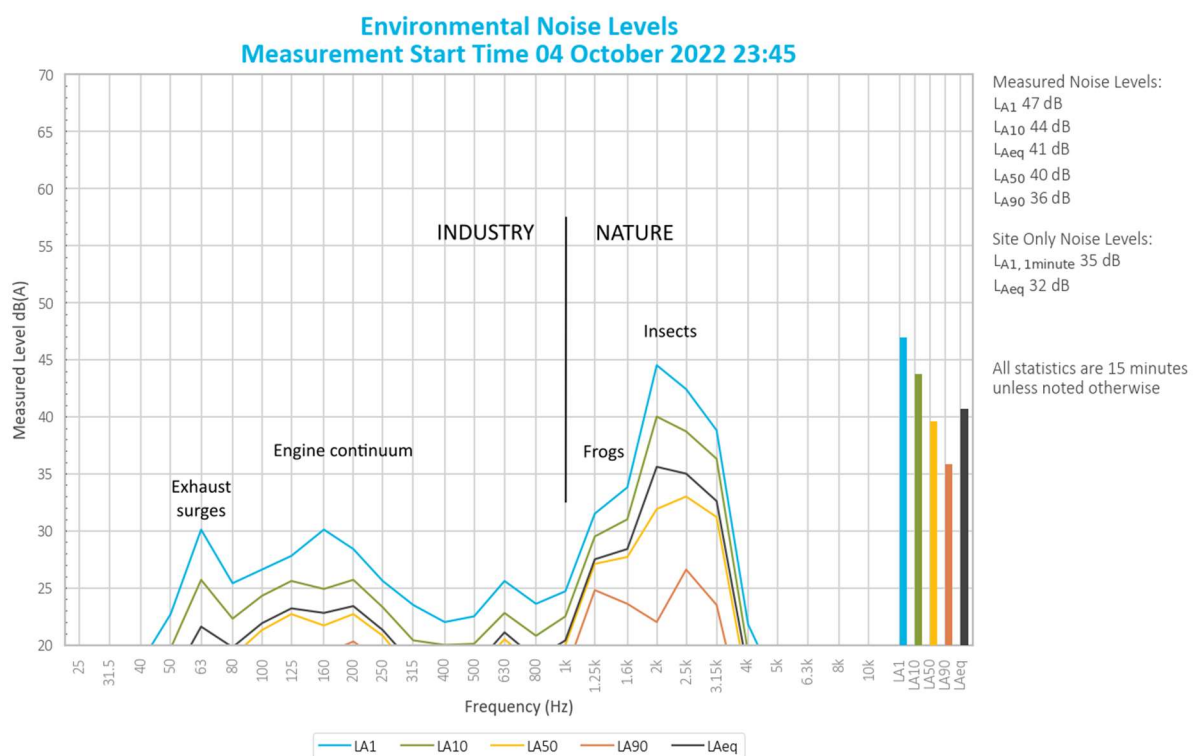


Figure 5.1 Example graph

5.1.2 NM1

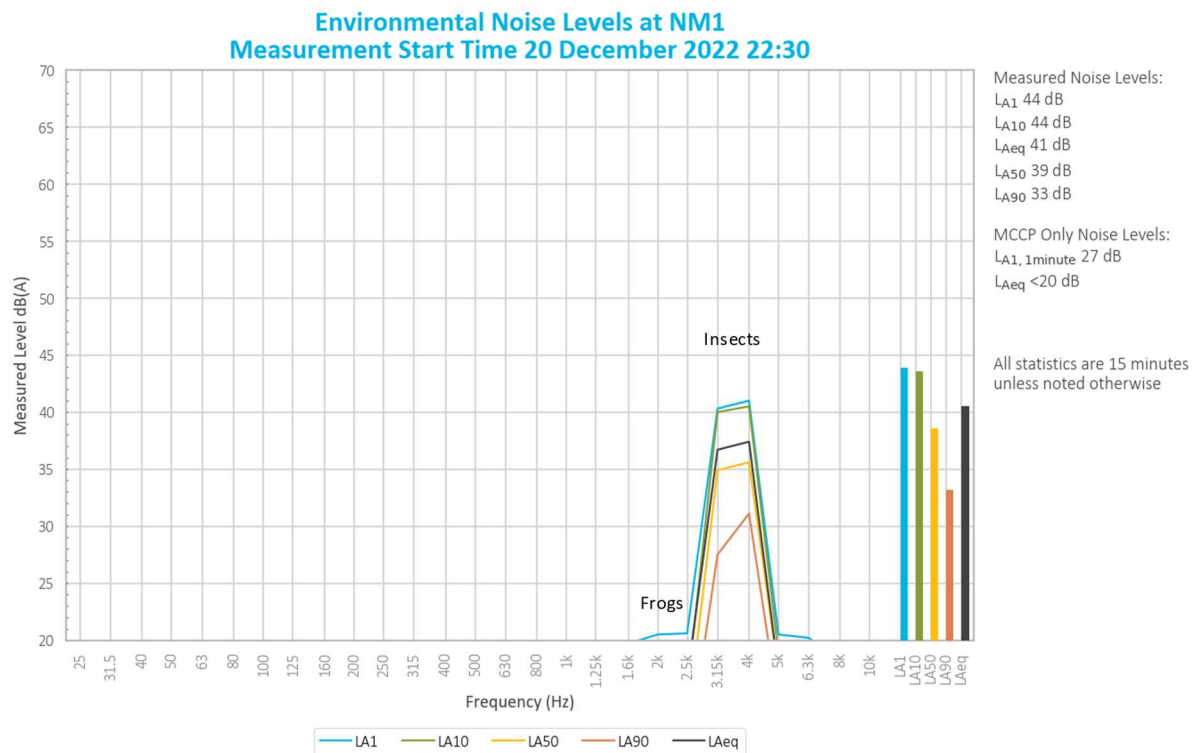


Figure 5.2 Environmental Noise Levels – NM1

Karuah Quarry operations were inaudible during the entire measurement. Typically, when this type of noise source is not audible above ambient (not withstanding insect noise and other sources of varied character), the likely level of that source is at least 10 dB below the measured background (L_{A90}) level. Given this, and the measured background noise level of 59 dB L_{A90} , the Karuah Quarry $L_{Aeq,15\text{ minute}}$ was estimated to be <49 dB $L_{Aeq,15\text{ minute}}$ and therefore did not exceed the 48dB noise limit.

Road traffic noise dominated the measured L_{A1} and L_{A10} . Insects and road traffic noise were primarily responsible for the measured L_{A50} , L_{Aeq} and L_{A90} .

Noise from birds and dogs barking were also noted.

5.1.3 NM2

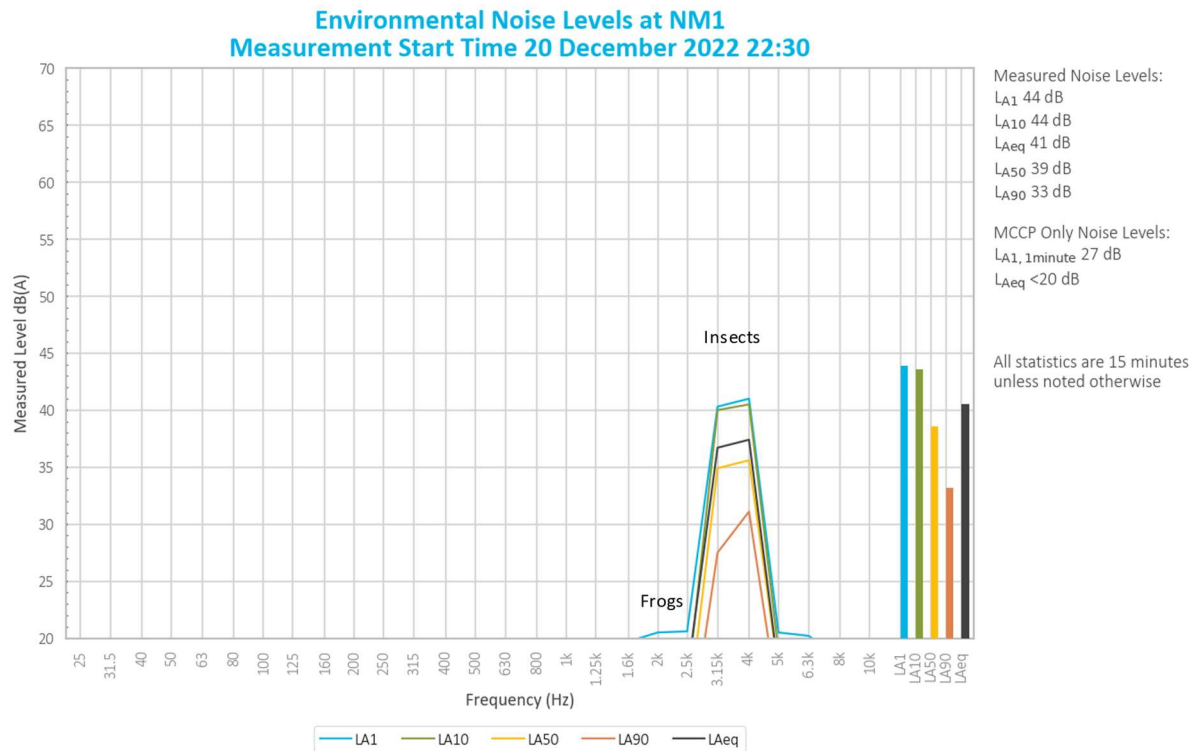


Figure 5.3 Environmental Noise Levels – NM2

Karuah Quarry operations were inaudible during the entire measurement. Typically, when this type of noise source is not audible above ambient (not withstanding insect noise and other sources of varied character), the likely level of that source is at least 10 dB below the measured background (L_{A90}) level. Given this, and the measured background noise level of 50 dB L_{A90} , the Karuah Quarry $L_{Aeq, 15\text{ minute}}$ was estimated to be <40 dB $L_{Aeq, 15\text{ minute}}$ and therefore below the relevant noise limit. Karuah Quarry noise contributions complied with the relevant DC noise limits.

Road traffic noise dominated the measured L_{A1} and L_{A10} . Insects and road traffic noise were primarily responsible for the measured L_{A50} , L_{Aeq} and L_{A90} .

Noise from birds and dogs barking were also noted.

5.2 Unattended noise monitoring

Observations during the operator attended measurements indicate that the dominant source of noise at both unattended noise monitoring locations is road traffic noise from the Pacific Highway (particularly during peak traffic periods), with insects, birds and dogs barking also noted to be audible.

Notwithstanding, a review of the unattended noise monitoring data has found no correlation between recorded noise levels and events associated with Karuah Quarry operations. Without an operator present to discern the noise sources contributing to the measured noise levels, it is difficult to establish any meaningful conclusions or trends from the unattended noise monitoring data.

6 Summary

EMM was engaged by Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at the site. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day period of 19 April 2023 at two monitoring locations.

Karuah Quarry was confirmed inaudible at both NM1 and NM2. Typically, when this type of noise source is not audible above ambient (not withstanding insect noise and other sources of varied character), the likely level of that source is at least 10 dB below the measured background (L_{A90}) level. However, given the locality of these locations (directly adjacent to the Pacific Highway), the L_{A90} is controlled by road traffic noise. Karuah Quarry was also confirmed to be inaudible during lulls in road traffic noise which, for these measurements, would correlate with the L_{Amin} measured during the surveys. Given this and the L_{Amin} measured during the surveys, Karuah Quarry was estimated to be below the relevant noise limits.

A review of the unattended noise monitoring data found that no meaningful conclusions, events or trends could be associated with Karuah Quarry operations.

Noise levels from site complied with relevant limits at all monitoring locations during the Semester 1 2023 survey.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

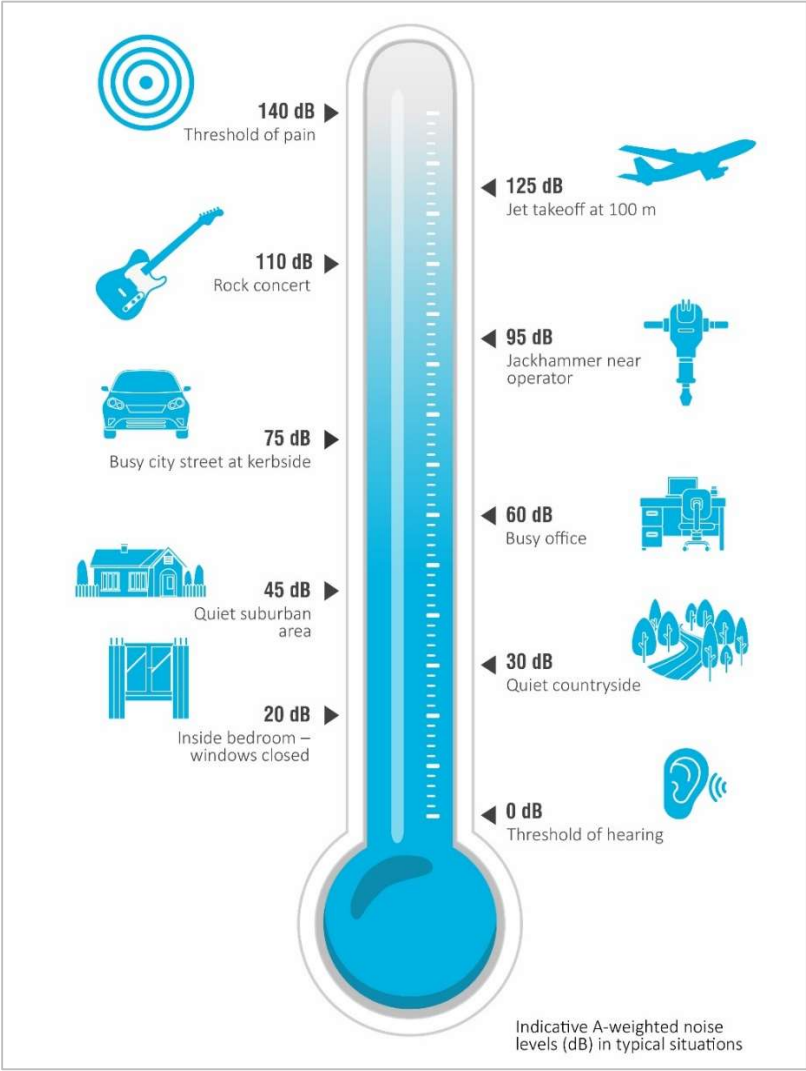


Figure A.1 Common noise levels

Appendix B

Regulator documents

B.1 Project approval

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

¹NOISE

Noise Impact Assessment Criteria

- The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2 at any residence or noise sensitive receptor on privately owned land.

Time Period	Noise Limits dB(A)
	L_{Aeq} (15minute)
Day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

Table 2: Noise Impact Assessment Criteria for the Development

Notes:

- Noise from the site is to be measured within thirty meters of any residence or other noise sensitive areas to determine compliance with the noise criteria set out in Table 2.
- $LA_{eq(15\text{ minute})}$ is the equivalent continuous noise level - the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
- For the purpose of noise measures required for this condition, the LA_{eq} noise level must be measured or computed at the point defined in this condition over a period of 15 minutes using "FAST" response on the sound level meter.
- For the purpose of the noise criteria for this condition, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. The location or point of impact can be different for each development, for example, at the closest residential receiver or at the closest boundary of the development. Measurement locations can be:
 - 1 meter from the facade of the residence for night time assessment;
 - at the residential boundary;
 - 30 meters from the residence (rural situations) where boundary is more than 30 meters from residence.
- The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:
 - documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions;
 - where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversions conditions should be developed and implemented.

Operating Hours

- The Applicant shall comply with the operating hours in Table 1:

Activity	Days of the Week	Time
<ul style="list-style-type: none"> Construction Extraction and processing Internal and off-site transportation of product 	Monday – Friday	7am to 6pm
	Saturday	7am to 1pm
	Sunday and public holidays	No work at any time
Minor maintenance works on plant and machinery	7 days a week and public holidays	7am to 6pm

Table 1: Operating Hours for the Development

Note: Delivery of material outside of the hours of operation permitted by condition 2 is only allowed, where that delivery is required by the police or other authorities for safety reasons; and/or where the operation or personnel or equipment are endangered. In such circumstances, prior notification should be provided to the DEC and affected residents as soon as possible, or within a reasonable period in the case of emergency.

Noise Monitoring

- Within 6 months of the date of this consent, the Applicant shall prepare and implement a Noise Monitoring Program for the development to evaluate compliance with the noise impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.

¹ Incorporates DEC GTAs

B.2 Environmental monitoring program

area will be used to calculate the volume of water discharged. Samples will be taken during the discharge of water from the site.

The results of the water quality monitoring program for the quarry shall be reported as per **Section 6.0** of this *Environmental Monitoring Program*.

5.4 Noise and Blast Monitoring

5.4.1 Operational Noise

Schedule 2 Condition 1 of the Development Consent requires HQPL to ensure noise generated by the development does not exceed the criteria specified in **Table 6** below at any residence, or any noise sensitive receptor on privately owned land.

Table 6: Noise Impact Assessment Criteria for the Development

Time Period	Noise Limits dB(A)
	L _{Aeq} (15 min)
Day (7am to 6pm) Mon to Fri and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

In order to measure the possible impact of noise resulting from quarry operations, the following monitoring will be undertaken at the two (2) nearest residences downwind and/or in line-of sight from the quarry and not owned or under agreement with HQPL:

- An unattended (continuous 24hr) noise monitor will be placed in the field to measure noise for at least four (4) full days of monitoring each six months;
- An attended survey (15-minutes meeting EPA standards) will be undertaken at the two nearest residences on a six monthly basis. This survey will be undertaken in conjunction with the unattended survey described above;
- A suitably qualified noise consultant will be engaged to undertake 15-minute attended noise surveys to investigate any complaints received by HQPL; and
- Onsite logged climatic data (particularly winds) will be utilised to assist with a timely management response to any noise issue that may arise. This is further discussed in Section 5.5.

During attended surveys, where the noise from operations is measured to be greater than approved criteria, a review of operational activities causing exceedances shall be undertaken and, where considered appropriate, the offending activity will cease until such times as the meteorological conditions improve (i.e. inversion lift) or other appropriate controls can be employed. In addition, the frequency of noise monitoring may be increased as appropriate, or until such time that it can be demonstrated that noise levels are well below required limits. Noise monitoring is completed by a trained external environmental consultancy.

5.4.2 Monitoring of Operational Blasting (Vibration and Overpressure)

In accordance with the Development Consent, blasts will only occur between 9am and 3pm Monday to Friday inclusive, once a week or at other times as approved by the OEH. In addition, blasting will only be undertaken in favourable weather conditions and by accredited specialist blasting contractors. Data from the site weather station will be checked prior to blasting. HQPL usually schedules blasts at 12:00pm on the day of blasting.

Appendix C

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No: C34022

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Svantek

Type No: SV-36

Serial No: 86311

Owner: EMM Consulting

Suite 01, 20 Chandos St

St Leonards NSW 2065

Tests Performed: Measured Output Pressure level, Frequency & Distortion

Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 μ Pa)	Frequency (Hz)	THD&N (%)
Level1:	NA	N	94.01 dB	1000.00 Hz	2.00 %
Level2:	NA	N	113.92 dB	1000.00 Hz	0.35 %
Uncertainty			± 0.11 dB	$\pm 0.05\%$	± 0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure 1013 hPa ± 1 hPa

Temperature 22 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$

Relative Humidity 56 % $\pm 5\%$

Date of Receipt : 17/10/2022

Date of Calibration : 17/10/2022

Date of Issue : 17/10/2022

Acu-Vib Test AVP02 (Calibrators)

Procedure: Test Method: AS IEC 60942 - 2017

CHECKED BY:

AUTHORISED
SIGNATURE:

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

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(02) 9680 8133
www.acu-vib.com.au

CERTIFICATE OF CALIBRATION

CERTIFICATE No: **SLM34169**

EQUIPMENT TESTED: Sound Level Meter

Manufacturer: B & K

Type No: 2250

Mic. Type: 4189

Pre-Amp. Type: ZC0032

Serial No: 3029363

Serial No: 3260501

Serial No: 30109

Filter Type: 1/3 Octave

Test No: F034175

Owner: EMM Consulting
Suite 01, 20 Chandos St
St Leonards NSW 2065

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure 1002 hPa ± 1 hPa

Temperature 24 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$

Relative Humidity 35 % $\pm 5\%$

Date of Receipt: 02/11/2022

Date of Calibration: 03/11/2022

Date of Issue: 04/11/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *[Signature]*

AUTHORISED SIGNATURE: *[Signature]*

Jack Kielt

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Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C22695

Client Details		EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300
Equipment Tested/ Model Number :		ARL Ngara
Instrument Serial Number :		878017
Microphone Serial Number :		21991
Pre-amplifier Serial Number :		27806
Firmware Version :		12.6
Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions
Ambient Temperature : 22.4°C		Ambient Temperature : 22.8°C
Relative Humidity : 48.6%		Relative Humidity : 50.1%
Barometric Pressure : 100.91kPa		Barometric Pressure : 100.86kPa
Calibration Technician : Lucky Jaiswal		Secondary Check: Shaheen Boaz
Calibration Date : 8 Nov 2022		Report Issue Date : 9 Nov 2022
Approved Signatory : 		Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.13dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.


Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.



Sound Level Meter
IEC 61672-3:2013
Calibration Certificate
Calibration Number C22051

Client Details	EMM Consulting Ground Floor, Suite 01, 20 Chandos Street St Leonards NSW 2065
Equipment Tested/ Model Number :	ARL Ngara
Instrument Serial Number :	878127
Microphone Serial Number :	322707
Pre-amplifier Serial Number :	28565
Pre-Test Atmospheric Conditions	Post-Test Atmospheric Conditions
Ambient Temperature : 23.5°C	Ambient Temperature : 24°C
Relative Humidity : 49.3%	Relative Humidity : 48.3%
Barometric Pressure : 99.5kPa	Barometric Pressure : 99.51kPa
Calibration Technician : Lucky Jaiswal	Secondary Check: Max Moore
Calibration Date : 2 Feb 2022	Report Issue Date : 2 Feb 2022
Approved Signatory : 	Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.10dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Karuah Quarry

Biannual attended noise monitoring - Semester 2 2023

Prepared for Hunter Quarries Pty Limited

December 2023

Karuah Quarry

Biannual Attended Noise Monitoring - S2 2023

Hunter Quarries Pty Limited

E230083 RP6

December 2023

Version	Date	Prepared by	Reviewed by	Comments
1	12 December 2023	Lucas Adamson	Najah Ishac	Draft
1	12 December 2023	Lucas Adamson	Najah Ishac	Final

Approved by



Najah Ishac

Director

12 December 2023

Level 3 175 Scott Street
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This report has been prepared in accordance with the brief provided by Hunter Quarries Pty Limited and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. The contents of this report are private and confidential. This report is only for Hunter Quarries Pty Limited's use in accordance with its agreement with EMM and is not to be relied on by or made available to any other party without EMM's prior written consent. Except as permitted by the *Copyright Act 1968* (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Hunter Quarries Pty Limited (and subject to the terms of EMM's agreement with Hunter Quarries Pty Limited).

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1 Introduction

1.1 Background

EMM Consulting Pty Ltd (EMM) was engaged by Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at Karuah Quarry (KQ, the site) located at Blue Rock Close, Karuah NSW. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day period of Friday 24 November 2023 at two monitoring locations.

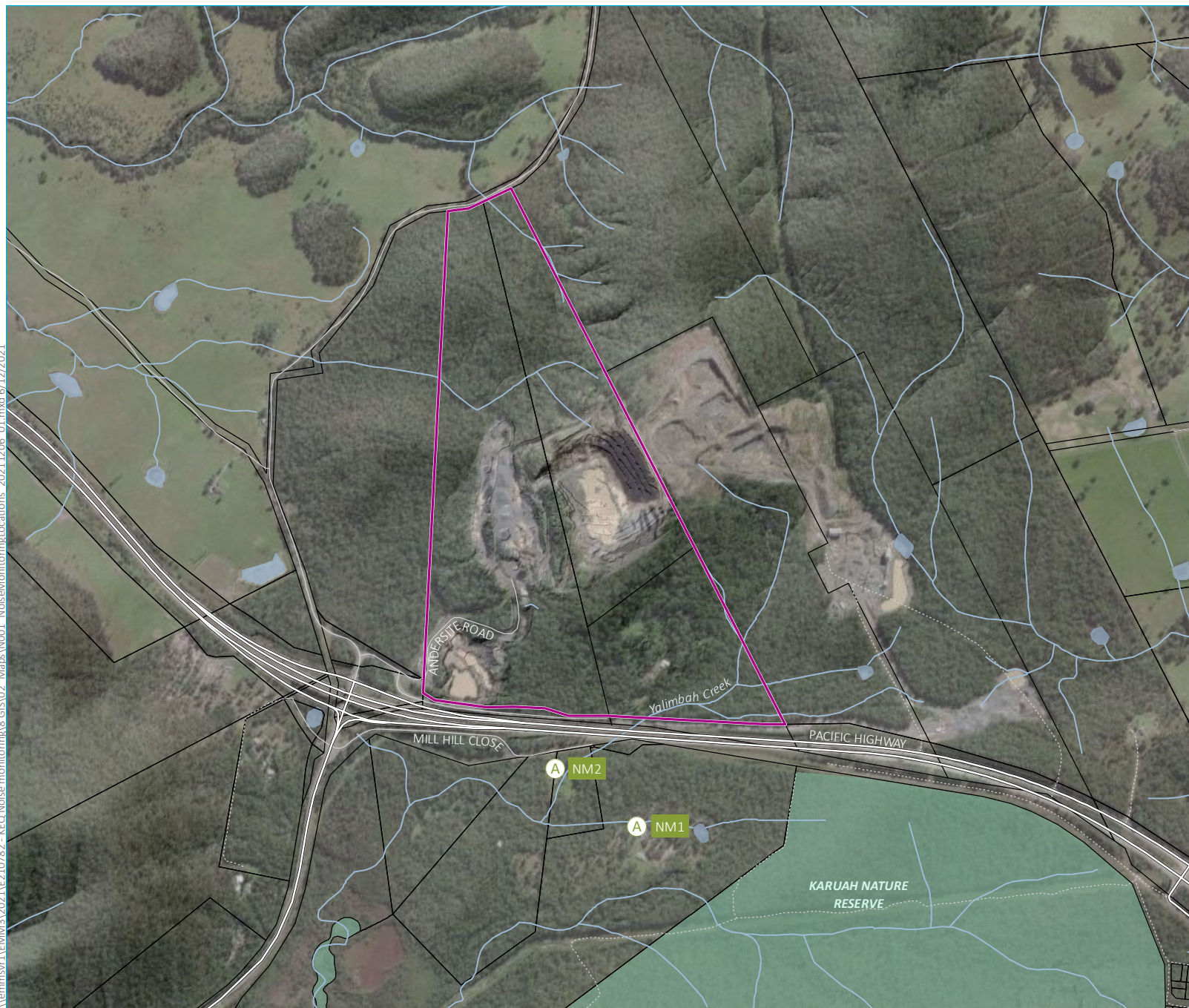
1.2 Attended monitoring locations

Site monitoring locations are detailed in Table 1.1 and shown on Figure 1.1. It should be noted that Figure 1.1 shows actual monitoring positions, not necessarily the location of residences.

Table 1.1 **Attended noise monitoring locations**

Location descriptor/ID	Description/address	Coordinates (MGA56)	
		Easting	Northing
NM1	Private Residence - 74 Mill Hill Close, Karuah	406623	6388704
NM2	Private Residence - 64 Mill Hill Close, Karuah	406405	6388859

\\lemmsvr1\EMM3\2021\0210782 - KEQ Noise monitoring\8 GIS\02 Maps\N001 NoiseMonitoringLocations 20211206 01.mxd 6/12/2021



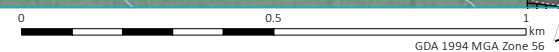
- KEY**
- Site boundary
 - A Noise monitoring location
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - Cadastral boundary
 - Waterbody
 - NPWS reserve
 - State forest

Noise monitoring locations

Karuah Quarry
Bi-annual noise monitoring
Figure 3.1



Source: EMM (2021); ADW Johnson (2020); DFSI (2017); ICSM (2012); GA (2011); ASGC (2006)



1.3 Terminology and abbreviations

Some definitions of terms and abbreviations which may be used in this report are provided in Table 1.2.

Table 1.2 Terminology and abbreviations

Term/descriptor	Definition
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to approximate how humans hear noise.
L _{Amax}	The maximum root mean squared A-weighted noise level over a time period.
L _{A1}	The A-weighted noise level which is exceeded for 1 per cent of the time.
LA1,1minute	The A-weighted noise level which is exceeded for 1 per cent of the specified time period of 1 minute.
LA10	The A-weighted noise level which is exceeded for 10 percent of the time.
LAeq	The energy average A-weighted noise level.
LA50	The A-weighted noise level which is exceeded for 50 per cent of the time, also the median noise level during a measurement period.
LA90	The A-weighted noise level exceeded for 90 percent of the time, also referred to as the “background” noise level and commonly used to derive noise limits.
L _{Amin}	The minimum A-weighted noise level over a time period.
LCeq	The energy average C-weighted noise energy during a measurement period. The “C” weighting scale is used to take into account low-frequency components of noise within the audibility range of humans.
SPL	Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals.
Hertz (Hz)	The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together.
AWS	Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude.
Sigma-theta	The standard deviation of the horizontal wind direction over a period of time.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location.
NM	Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified.
Day	Monday – Saturday: 7 am to 6 pm, on Sundays and Public Holidays: 8 am to 6 pm.
Evening	Monday – Saturday: 6 pm to 10 pm, on Sundays and Public Holidays: 6 pm to 10 pm.
Night	Monday – Saturday: 10 pm to 7 am, on Sundays and Public Holidays: 10 pm to 8 am.

Appendix A provides further information that gives an indication as to how an average person perceives changes in noise level, and examples of common noise levels.

2 Noise limits

2.1 Development consent

Karuah Quarry noise limits are detailed in Condition 1 of Schedule 3 of Development Consent (DC) DA 265-10-2004. Relevant sections of DA 265-10-2004 are reproduced in Appendix B.1.

2.2 Environment protection licence

There are no noise limits detailed in the site's Environment Protection Licence (EPL) 11569.

2.3 Environmental monitoring program

The approved environmental monitoring program (EMP) adopts two attended noise monitoring locations that are representative of residences outlined in DA 265-10-2004. Relevant sections of the EMP are reproduced in Appendix B.2.

2.4 Noise limits

Noise impact limits based on the development consent are provided in Table 2.1.

Table 2.1 Noise impact limits, dB

Location	Day L _{Aeq,15minute}	Evening L _{Aeq,15minute}	All other times L _{Aeq,15minute}
NM1	48	47	46
NM2	48	47	46

Notes: 1. Day: 7:00 am–6:00 pm Monday to Saturday; 8:00 am–6:00 pm Sundays and public holidays; Evening: 6:00 pm–10:00 pm; All other times: 10:00 pm–7:00 am Monday to Saturday; 10:00 pm–8:00 am Sundays and public holidays.

2.5 Meteorological conditions

The table notes for Table 2, Condition 1 of Schedule 3 of DA 265-10-2004 also state that noise generated by the project is to be measured in accordance with the following meteorological conditions:

The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions.

2.6 Additional requirements

Monitoring and reporting have been done in accordance with the NSW EPA 'Noise Policy for Industry' (NPfI) issued in October 2017 and the 'Approved methods for the measurement and analysis of environmental noise in NSW' (Approved Methods) issued in January 2022.

As outlined in Section 5.4.1 of the EMP, unattended noise monitoring is to be conducted at two locations (NM1 and NM2) on a bi-annual basis under the following conditions:

In order to measure the possible impact of noise resulting from quarry operations, the following monitoring will be undertaken at the two (2) nearest residences downwind and/or in line-of sight from the quarry and not owned or under agreement with HQPL:

- a) An unattended (continuous 24hr) noise monitor will be placed in the field to measure noise for at least four (4) full days of monitoring each six months;
- b) An attended survey (15-minutes meeting EPA standards) will be undertaken at the two nearest residences on a six monthly basis. This survey will be undertaken in conjunction with the unattended survey described above;
- c) A suitably qualified noise consultant will be engaged to undertake 15-minute attended noise surveys to investigate any complaints received by HQPL; and
- d) Onsite logged climatic data (particularly winds) will be utilised to assist with a timely management response to any noise issue that may arise. This is further discussed in Section 5.5.

3 Methodology

3.1 Overview

Attended environmental noise monitoring was done as guided by Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant EPA requirements. Meteorological data was obtained from the site automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured site noise levels.

3.2 Attended noise monitoring

During this survey, attended noise monitoring was conducted during the day period at each location. The duration of each measurement was 15 minutes. Atmospheric conditions were measured at each monitoring location.

Measured sound levels from various sources were noted during each measurement, and particular attention was paid to the extent of site's contribution (if any) to measured levels. At each monitoring location, the site only $L_{Aeq,15\text{minute}}$ were measured directly or determined by other methods detailed in Section 7.1 of the NPfI.

If exact noise levels from site could not be established due to masking by other noise sources in a similar frequency range, but site noise was determined to be at least 5 dB lower than relevant limits, then a maximum estimate of it may be provided. This is expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may be used in this report. When site noise is noted as IA, it was inaudible at the monitoring location. When site noise is noted as NM, this means it was audible but could not be quantified. All results noted as NM in this report were due to one or more of the following:

- Site noise levels were extremely low and unlikely, in many cases, to be noticed
- Site noise levels were masked by other more dominant noise sources that are characteristic of the environment, such as breeze in foliage or continuous road traffic noise, that cannot be eliminated by monitoring at an alternate or intermediate location
- It was not feasible or reasonable to employ methods such as to move closer and back calculate. Cases may include rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

3.3 Unattended noise monitoring

The unattended noise monitoring was carried out using Svantek 977 and Acoustic Research Labs (ARL) Ngara and environmental noise loggers that were in place from Friday 24 to Wednesday 29 November 2023 (Svantek 977) and Wednesday 29 November to Thursday 7 December 2023 (ARL Ngara).

Calibration of instrumentation was checked prior to and following measurements. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates (refer Appendix C).

Data affected by adverse meteorological conditions and by spurious or uncharacteristic events has been excluded from the results in accordance with methodologies provided in the NPfI.

3.4 Meteorological data

Meteorological data for the monitoring period was sourced from the Karuah Quarry on-site meteorological station to determine applicability of criteria in accordance with the DC.

3.5 Modifying factors

All measurements were evaluated for potential modifying factors in accordance with the NPfl. Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable. If applicable, modifying factor penalties have been reported and added to measured site only L_{Aeq} noise levels.

Low-frequency modifying factor penalties have only been applied to site-only L_{Aeq} levels if the site was the only contributing low-frequency noise source. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfl.

3.6 Instrumentation

Equipment used to measure environmental noise levels is detailed in Table 3.1. Calibration certificates are provided in Appendix C.

Table 3.1 Noise monitoring equipment

Item	Serial number	Calibration due date	Relevant standard
B&K 2250 sound level meter	3029363	3/11/2024	IEC 61672-1:2002
Svantek SV-36 calibrator	79952	27/9/2025	IEC 60942:2003
ARL Ngara unattended noise logger	878113	30/8/2024	IEC 61672-3:2013
Svantek 977 unattended noise logger	59682	29/11/2023	IEC 61672-3:2013

4 Results

4.1 Attended noise monitoring

4.1.1 Total measured noise levels and atmospheric conditions

Overall noise levels measured at each location during attended measurements are provided in Table 4.1. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.1 of this report.

Table 4.1 Total measured 15-minute noise levels (attended) – Semester 2 2023¹

Location	Start date and time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A50} dB	L _{A90} dB	L _{Amin} dB
NM1	24/11/2023 8:33	60	55	53	51	51	48	44
NM2	24/11/2023 8:14	74	69	65	62	61	57	50

Notes: 1. Levels in this table are not necessarily the result of activity at site.

Atmospheric condition data measured by the operator during each measurement using a hand-held weather meter is shown in Table 4.2. The wind speed, direction and temperature were measured at approximately 1.5 metres above ground. Attended noise monitoring is not done during rain, hail, or wind speeds above 5 m/s at microphone height.

Table 4.2 Measured atmospheric conditions – Semester 2 2023

Location	Start date and time	Temperature °C	Wind speed m/s	Wind direction ° Magnetic north ¹	Cloud cover 1/8s
NM1	24/11/2023 8:33	22.2	<0.5	-	7
NM2	24/11/2023 8:14	22.1	<0.5	-	7

Notes: 1. "-" indicates calm conditions at monitoring location.

4.1.2 Site only noise levels

i Modifying factors

There were no modifying factors, as defined in the NPfI, applicable during the survey.

ii Monitoring results

Table 4.3 provides site noise levels in the absence of other sources, where possible, and includes weather data from the site AWS. Limits are applicable if weather conditions were within specified parameters during each measurement.

Table 4.3 Site noise levels and limits – Semester 2 2023

Location	Start Date and Time	Wind		Stability Class	Limits apply? ¹	Limits, dB	Site levels, dB	Exceedances, dB ¹
		Speed m/s	Direction ³			L _{Aeq,15minute}	L _{Aeq,15minute} ²	L _{Aeq,15minute}
NM1	24/11/2023 8:33	0.9	208	A	Y	48	IA	Nil
NM2	24/11/2023 8:14	0.5	283	A	Y	48	IA	Nil

Notes:

1. Noise emission limits are applicable if weather conditions were within parameters specified in Section 2.5. NA in exceedance column indicates that limits were not applicable due to weather conditions.
2. Site-only L_{Aeq,15minute}, includes modifying factor penalties if applicable.
3. Degrees magnetic north, “-” indicates calm conditions.

4.2 Unattended noise monitoring

Overall noise levels measured at each location during attended measurements are provided in Table 4.4. Discussion as to the noise sources responsible for these measured levels is provided in Section 5.2 of this report.

Table 4.4 Total measured noise levels (unattended) – Semester 2 2023¹

Location	Period	Measured noise levels, dB	
		RBL	L _{Aeq,period}
NM1 29 November- 7 December 2023	Day	46	53
	Evening	45	55
	Night	45	52
NM2 24-29 November 2023	Day	57	65
	Evening	49	65
	Night	40	62

Notes: 1. Levels in this table are not necessarily the result of activity at site.

5 Discussion

5.1 Attended noise monitoring

5.1.1 Noted noise sources

During attended monitoring, the time variations (temporal characteristics) of noise sources are considered in each measurement via statistical descriptors. From these observations, summaries have been derived for each location and provided in this section. Statistical 1/3 octave-band analysis of environmental noise was undertaken and the following figures display frequency ranges of various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} descriptors. These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 5.1, where frogs, insects and birds are seen to be generating noise at frequencies above 1000 Hz, while industrial noise is observed at frequencies less than 1000 Hz.

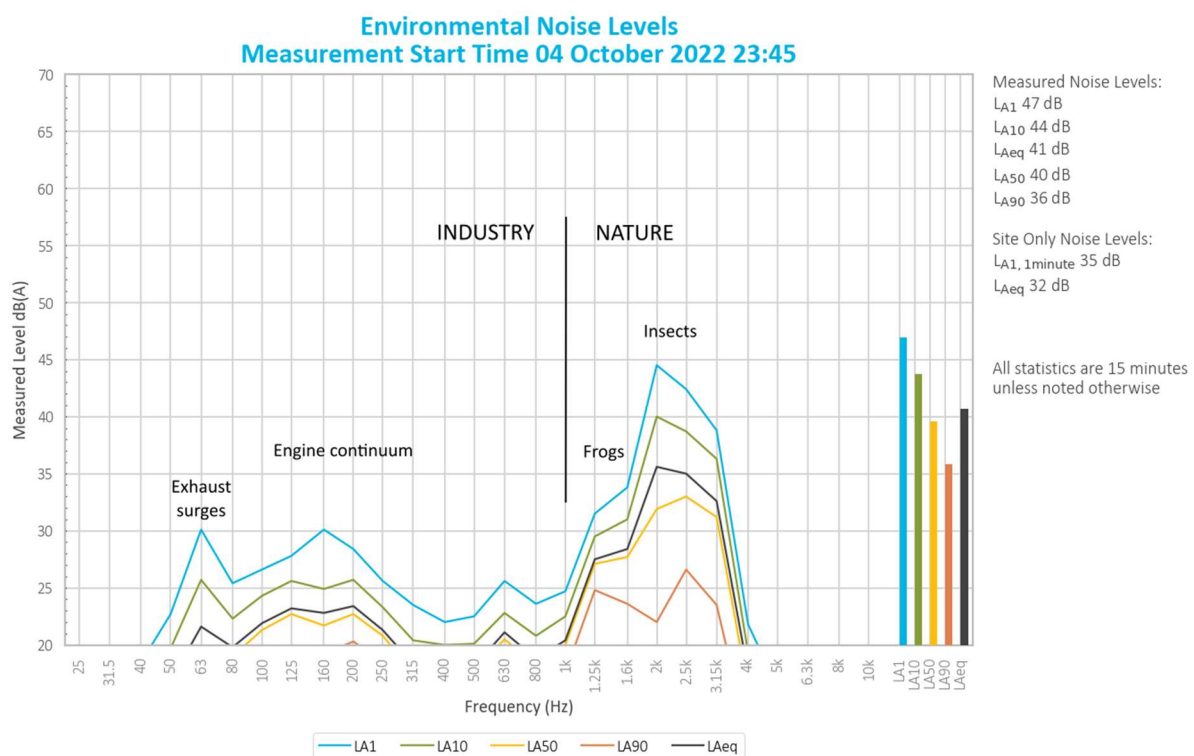


Figure 5.1 Example graph

5.1.2 NM1

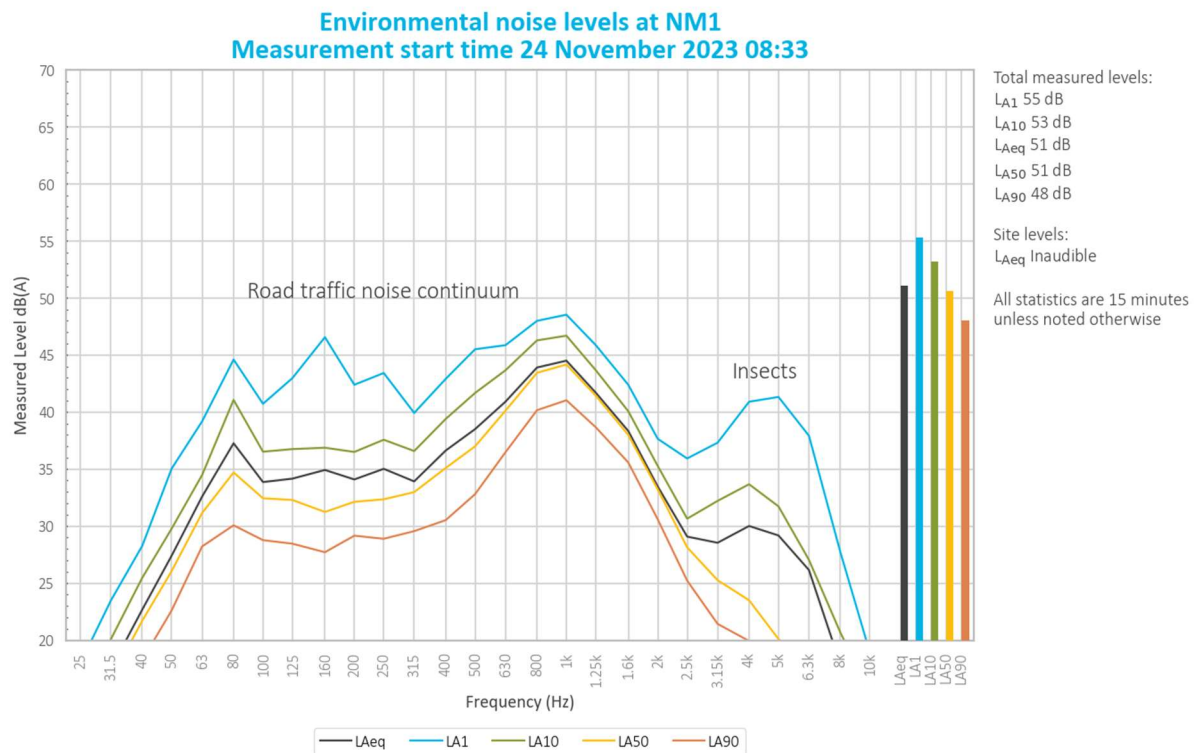


Figure 5.2 Environmental Noise Levels – NM1

Karuah Quarry operations were inaudible during the entire measurement. Typically, when this type of noise source is not audible above ambient (not withstanding insect noise and other sources of varied character), the likely level of that source is at least 10 dB below the measured background (L_{A90}) level. Given this, and the measured background noise level of 48 dB L_{A90} , the Karuah Quarry $L_{Aeq,15 \text{ minute}}$ was estimated to be <38 dB $L_{Aeq,15 \text{ minute}}$ and therefore did not exceed the 48 dB $L_{Aeq,15 \text{ minute}}$ noise limit.

Road traffic noise dominated the noise environment. Insects and road traffic noise were primarily responsible for the measured L_{A50} , L_{Aeq} and L_{A90} .

Noise from birds was also noted.

5.1.3 NM2

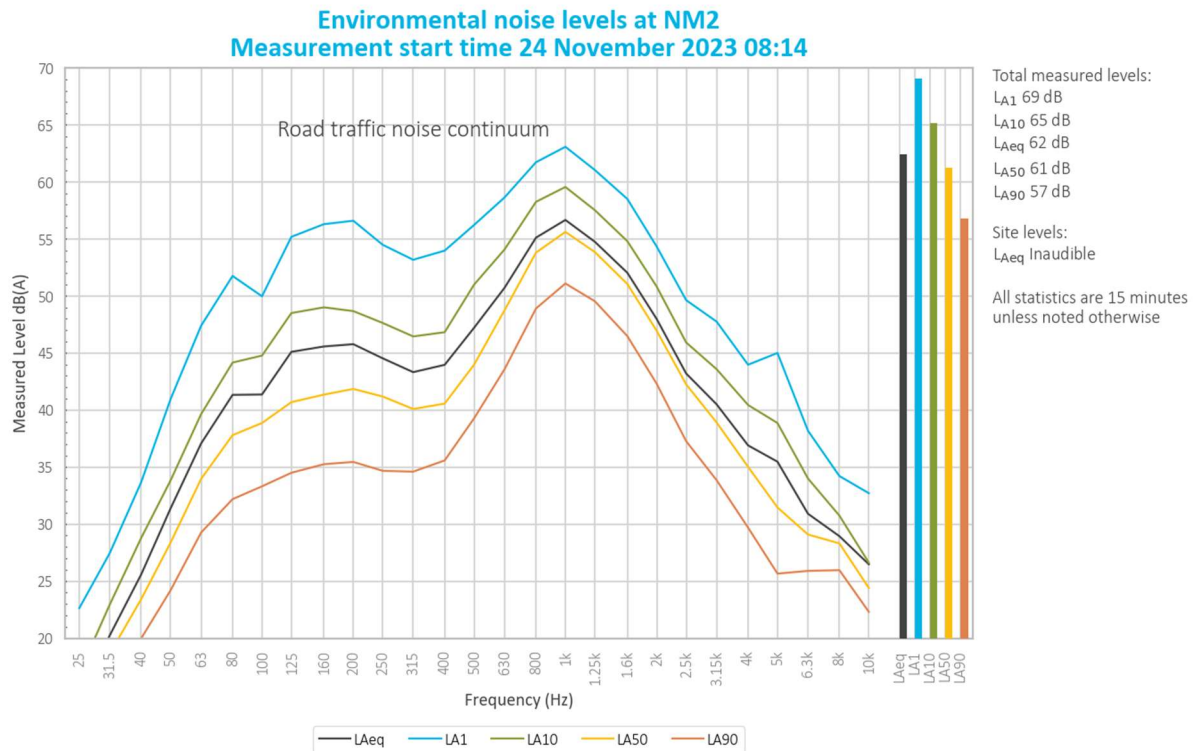


Figure 5.3 Environmental Noise Levels – NM2

Karuah Quarry operations were inaudible during the entire measurement. Typically, when this type of noise source is not audible above ambient (not withstanding insect noise and other sources of varied character), the likely level of that source is at least 10 dB below the measured background (L_{A90}) level. Given this, and the measured background noise level of 57 dB L_{A90} , the Karuah Quarry $L_{Aeq,15 \text{ minute}}$ was estimated to be <47 dB $L_{Aeq,15 \text{ minute}}$ and therefore below the relevant noise limit. Karuah Quarry noise contributions complied with the relevant DC noise limits.

Road traffic noise dominated the noise environment. Insects and road traffic noise were primarily responsible for the measured L_{A50} , L_{Aeq} and L_{A90} .

Noise from birds was also noted.

5.2 Unattended noise monitoring

Observations during the operator attended measurements indicate that the dominant source of noise at both unattended noise monitoring locations is road traffic noise from the Pacific Highway (particularly during peak traffic periods), with insects, birds and dogs barking also noted to be audible.

Notwithstanding, a review of the unattended noise monitoring data has found no correlation between recorded noise levels and events associated with Karuah Quarry operations. Without an operator present to discern the noise sources contributing to the measured noise levels, it is difficult to establish any meaningful conclusions or trends from the unattended noise monitoring data.

6 Summary

EMM was engaged by Hunter Quarries Pty Limited to conduct a bi-annual noise survey of operations at the site surrounds. The survey purpose was to quantify the acoustic environment and compare site noise levels against specified limits.

Attended environmental noise monitoring described in this report was done during the day period of 24 November 2023 at two monitoring locations as required by the approved EMP.

Noise levels from site complied with relevant limits at all monitoring locations during the Semester 2 2023 survey.

A review of the unattended noise monitoring data found that no meaningful conclusions, events or trends could be associated with Karuah Quarry operations.

Appendix A

Noise perception and examples

A.1 Noise levels

Table A.1 gives an indication as to how an average person perceives changes in noise level. Examples of common noise levels are provided in Figure A.1.

Table A.1 Perceived change in noise

Change in sound pressure level (dB)	Perceived change in noise
up to 2	Not perceptible
3	Just perceptible
5	Noticeable difference
10	Twice (or half) as loud
15	Large change
20	Four times (or quarter) as loud

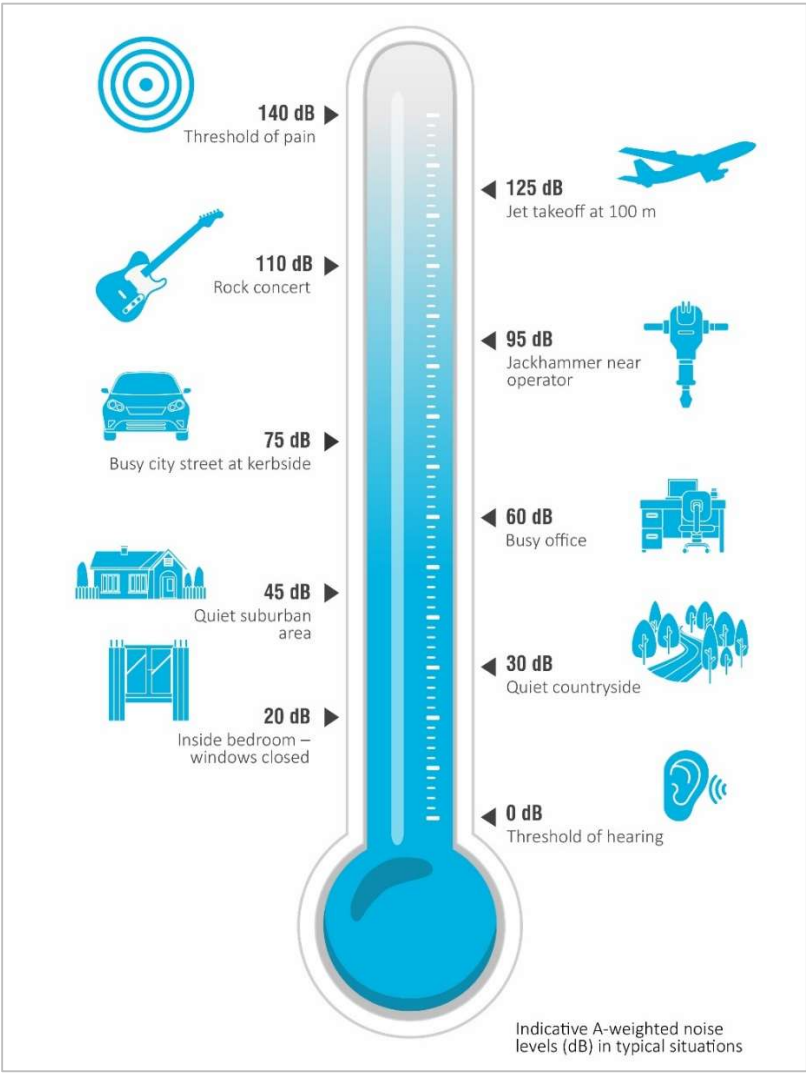


Figure A.1 Common noise levels

Appendix B

Regulator documents

SCHEDULE 3 SPECIFIC ENVIRONMENTAL CONDITIONS

¹NOISE

Noise Impact Assessment Criteria

- The Applicant shall ensure that the noise generated by the development does not exceed the criteria specified in Table 2 at any residence or noise sensitive receptor on privately owned land.

Time Period	Noise Limits dB(A)
	L_{Aeq} (15minute)
Day (7am to 6pm) Monday to Friday and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

Table 2: Noise Impact Assessment Criteria for the Development

Notes:

- Noise from the site is to be measured within thirty meters of any residence or other noise sensitive areas to determine compliance with the noise criteria set out in Table 2.
- $LA_{eq(15\text{ minute})}$ is the equivalent continuous noise level - the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
- For the purpose of noise measures required for this condition, the LA_{eq} noise level must be measured or computed at the point defined in this condition over a period of 15 minutes using "FAST" response on the sound level meter.
- For the purpose of the noise criteria for this condition, 5dBA must be added to the measured level if the noise is substantially tonal or impulsive in character. The location or point of impact can be different for each development, for example, at the closest residential receiver or at the closest boundary of the development. Measurement locations can be:
 - 1 meter from the facade of the residence for night time assessment;
 - at the residential boundary;
 - 30 meters from the residence (rural situations) where boundary is more than 30 meters from residence.
- The noise emission limits identified in this condition apply for prevailing meteorological conditions (winds up to 3m/s), except under conditions of temperature inversions. Noise impacts that may be enhanced by temperature inversions must be addressed by:
 - documenting noise complaints received to identify any higher level of impacts or patterns of temperature inversions;
 - where levels of noise complaints indicate a higher level of impact then actions to quantify and ameliorate any enhanced impacts under temperature inversions conditions should be developed and implemented.

Operating Hours

- The Applicant shall comply with the operating hours in Table 1:

Activity	Days of the Week	Time
<ul style="list-style-type: none"> Construction Extraction and processing Internal and off-site transportation of product 	Monday – Friday	7am to 6pm
	Saturday	7am to 1pm
	Sunday and public holidays	No work at any time
Minor maintenance works on plant and machinery	7 days a week and public holidays	7am to 6pm

Table 1: Operating Hours for the Development

Note: Delivery of material outside of the hours of operation permitted by condition 2 is only allowed, where that delivery is required by the police or other authorities for safety reasons; and/or where the operation or personnel or equipment are endangered. In such circumstances, prior notification should be provided to the DEC and affected residents as soon as possible, or within a reasonable period in the case of emergency.

Noise Monitoring

- Within 6 months of the date of this consent, the Applicant shall prepare and implement a Noise Monitoring Program for the development to evaluate compliance with the noise impact assessment criteria in this consent, in consultation with the DEC, and to the satisfaction of the Director-General.

¹ Incorporates DEC GTAs

B.2 Environmental monitoring program

area will be used to calculate the volume of water discharged. Samples will be taken during the discharge of water from the site.

The results of the water quality monitoring program for the quarry shall be reported as per **Section 6.0** of this *Environmental Monitoring Program*.

5.4 Noise and Blast Monitoring

5.4.1 Operational Noise

Schedule 2 Condition 1 of the Development Consent requires HQPL to ensure noise generated by the development does not exceed the criteria specified in **Table 6** below at any residence, or any noise sensitive receptor on privately owned land.

Table 6: Noise Impact Assessment Criteria for the Development

Time Period	Noise Limits dB(A)
	L _{Aeq} (15 min)
Day (7am to 6pm) Mon to Fri and 7am to 1pm Saturday	48
Evening (6pm to 10pm) Monday to Friday	47
At all other times	46

In order to measure the possible impact of noise resulting from quarry operations, the following monitoring will be undertaken at the two (2) nearest residences downwind and/or in line-of sight from the quarry and not owned or under agreement with HQPL:

- An unattended (continuous 24hr) noise monitor will be placed in the field to measure noise for at least four (4) full days of monitoring each six months;
- An attended survey (15-minutes meeting EPA standards) will be undertaken at the two nearest residences on a six monthly basis. This survey will be undertaken in conjunction with the unattended survey described above;
- A suitably qualified noise consultant will be engaged to undertake 15-minute attended noise surveys to investigate any complaints received by HQPL; and
- Onsite logged climatic data (particularly winds) will be utilised to assist with a timely management response to any noise issue that may arise. This is further discussed in Section 5.5.

During attended surveys, where the noise from operations is measured to be greater than approved criteria, a review of operational activities causing exceedances shall be undertaken and, where considered appropriate, the offending activity will cease until such times as the meteorological conditions improve (i.e. inversion lift) or other appropriate controls can be employed. In addition, the frequency of noise monitoring may be increased as appropriate, or until such time that it can be demonstrated that noise levels are well below required limits. Noise monitoring is completed by a trained external environmental consultancy.

5.4.2 Monitoring of Operational Blasting (Vibration and Overpressure)

In accordance with the Development Consent, blasts will only occur between 9am and 3pm Monday to Friday inclusive, once a week or at other times as approved by the OEH. In addition, blasting will only be undertaken in favourable weather conditions and by accredited specialist blasting contractors. Data from the site weather station will be checked prior to blasting. HQPL usually schedules blasts at 12:00pm on the day of blasting.

Appendix C

Calibration certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No: **SLM34169**

EQUIPMENT TESTED: Sound Level Meter

Manufacturer: B & K

Type No: 2250

Mic. Type: 4189

Pre-Amp. Type: ZC0032

Serial No: 3029363

Serial No: 3260501

Serial No: 30109

Filter Type: 1/3 Octave

Test No: F034175

Owner: EMM Consulting
Suite 01, 20 Chandos St
St Leonards NSW 2065

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure 1002 hPa ± 1 hPa

Temperature 24 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$

Relative Humidity 35 % $\pm 5\%$

Date of Receipt: 02/11/2022

Date of Calibration: 03/11/2022

Date of Issue: 04/11/2022

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *[Signature]*

AUTHORISED SIGNATURE: *[Signature]*

Jack Kielt

Accredited for compliance with ISO/IEC 17025 - Calibration

Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

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The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.



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Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

CERTIFICATE OF CALIBRATION

CERTIFICATE No: **C37508**

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Svantek

Type No: SV 36

Serial No: 79952

Class: 1

Owner: EMM Consulting Pty Ltd
L3, 175 Scott Street
Newcastle, NSW 2300

Tests Performed: Measured Output Pressure level, Frequency & Distortion

Comments: See Details and Class Tolerance overleaf.

CONDITION OF TEST:

Ambient Pressure 1005 hPa ± 1 hPa

Temperature 23 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$

Relative Humidity 47 % $\pm 5\%$

Date of Receipt : 26/09/2023

Date of Calibration : 27/09/2023

Date of Issue : 28/09/2023

Acu-Vib Test AVP02 (Calibrators)

Procedure: Test Method: AS IEC 60942 - 2017

CHECKED BY:

KB

AUTHORISED

SIGNATURE:

Hein Soe

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Page 1 of 2 Calibration Certificate
AVCERT02.1 Rev.2.0 14.04.2021

CERTIFICATE OF CALIBRATION

CERTIFICATE No: **SLM31260**

EQUIPMENT TESTED: Sound & Vibration Analyser

Manufacturer: Svantek
Type No: Svan-977A
Mic. Type: 7052E
Pre-Amp. Type: SV12L
Filter Type: 1/3 Octave
Serial No: 59682
Serial No: 79341
Serial No: 64882
Test No: F031264

Owner: EMM Consulting
Suite 01, 20 Chandos Street
St Leonards NSW 2065

Tests Performed: IEC 61672-3:2013 & IEC 61260-3:2016

Comments: All Test passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1006 hPa ± 1 hPa	Date of Receipt :	25/11/2021
Temperature	22 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$	Date of Calibration :	29/11/2021
Relative Humidity	55 % $\pm 5\%$	Date of Issue :	30/11/2021

Acu-Vib Test Procedure: AVP10 (SLM) & AVP06 (Filters)

CHECKED BY: *[Signature]* AUTHORISED SIGNATURE: *[Signature]*

Jack Kiedt

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Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C22561

Client Details		EMM Consulting Level 3/175 Scott Street Newcastle NSW 2300
Equipment Tested/ Model Number :		ARL Ngara
Instrument Serial Number :		878113
Microphone Serial Number :		322081
Pre-amplifier Serial Number :		28647
Firmware Version :		12.6
Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions
Ambient Temperature : 23.4°C		Ambient Temperature : 23.1°C
Relative Humidity : 39.8%		Relative Humidity : 39.8%
Barometric Pressure : 101.09kPa		Barometric Pressure : 101.09kPa
Calibration Technician : Lucky Jaiswal		Secondary Check: Shaheen Boaz
Calibration Date : 25 Aug 2022		Report Issue Date : 30 Aug 2022
Approved Signatory : 		Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	N/A
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	N/A
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
125Hz	±0.13dB	Temperature	±0.1°C
1kHz	±0.13dB	Relative Humidity	±1.9%
8kHz	±0.14dB	Barometric Pressure	±0.014kPa
Electrical Tests	±0.13dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Adelaide SA 5000
T 08 8232 2253

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454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH

Suite 9.02 Level 9
109 St Georges Terrace
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T 08 6430 4800

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emmconsulting.com.au

