



Environmental Monitoring Report

April 2021

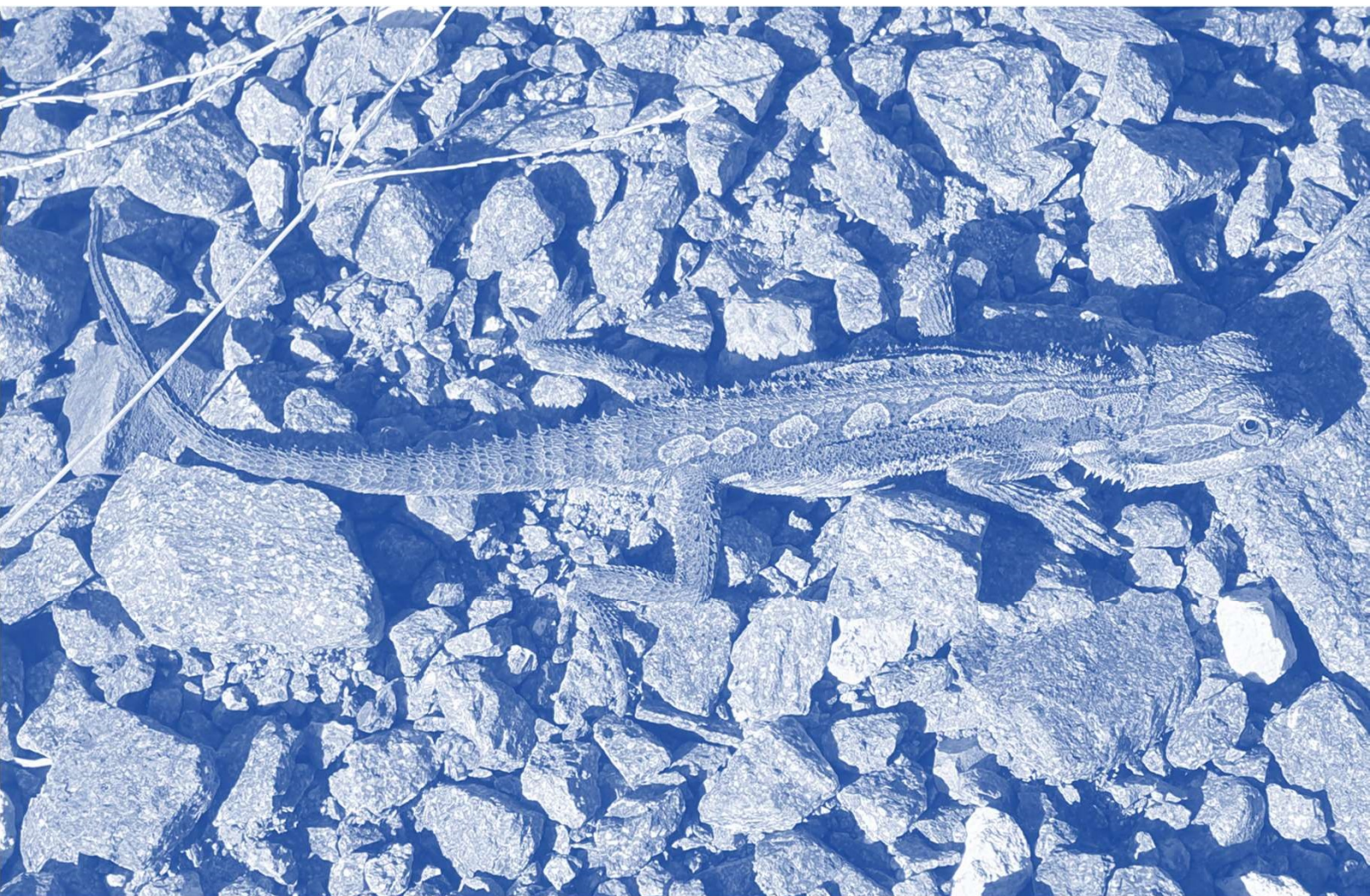


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1 INTRODUCTION

This report has been completed to meet the requirements of Section 66(6) of the *Protection of the Environment Operations Act 1997* and the NSW Environmental Protection Authority's (EPA) *Requirements for Publishing Pollution Monitoring Data* (EPA, 2013). This report summarises the required monitoring data under *Environmental Protection Licence 20611* (the EPL) (see Table 1) and *Project Approval 09_0175* (the Consent) (see Table 2) for Karuah East Quarry (the Quarry).

Table 1 Environmental Protection Licence 20611 information

Environmental Protection Licence Number	20611
Licensee's Name	Karuah East Quarry Pty Limited
Licensee's Address	Licensee Postal Address: PO Box 3284 Thornton NSW 2322. Premises Address: Karuah East Quarry, Blue Rock Close, Karuah NSW 2324.
Link to Full Licence on the EPA Website	EPL 20611

Table 2 Project Approval 09_0175 information

Development Application	PA 09_0175
Applicant	Karuah East Quarry Pty Limited
Approval Authority	Minister for Planning
Land	Lot 12 DP 1024564; Lot 13 DP 1024564; Lot 202 DP 1042537; Lot 26 DP1024341; Lot 27 DP 1024341; Lot 16 DP 1024564; Lot 17 DP 1024564

A summary of the environmental monitoring data for April 2021 is covered in this report.

Tables throughout this report provide key monitoring information from the EPL and the Consent, such as:

- location of monitoring;
- pollutant;
- unit of measurement; and
- monitoring frequency required.

Monitoring locations are identified in Appendix 1.

2 AIR QUALITY MONITORING

Dust emissions generated by the Quarry operation must not cause additional exceedances of ambient air quality criterion outlined in *Schedule 3, Condition 13* of the Consent (see Table 3, Table 4 and Table 5). Deposited dust and TSP/PM₁₀ monitoring is undertaken at the locations listed in Table 6.

Table 3 PA 09_0175 Long Term Assessment Criteria for Deposited Dust

Pollutant	Averaging Period	Maximum Increase in Deposited Dust Level ¹	Maximum Total Deposited Dust Level ¹
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Note 1: Deposited dust is assessed as insoluble solids as defined by AS 3580.10.1-2003.

Table 4 PA 09_0175 Long Term Impact Assessment Criteria for Particulate Matter

Pollutant	Average period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter <10 µm (PM ₁₀)	Annual	30 µg/m ³

Table 5 PA 09_0175 Short Term impact Assessment Criterion for Particulate Matter

Pollutant	Averaging period	Criterion
Particulate matter <10 µm (PM ₁₀)	24 hour	50 µg/m ³

Table 6 Air quality monitoring locations

Site ID	EPL ID	Location	Address	GPS Coordinates
DDG 1	MP 4	South-West of Karuah East Quarry	5760 Pacific Hwy, Karuah NSW 2324	32°38'04"S 151°59'58"E
DDG 2	MP 5	South-West of Karuah East Quarry	5770 Pacific Hwy, Karuah NSW 2324	32°38'02"S 152°00'09"E
DDG 3	MP 6	South-West of Karuah East Quarry	DP 1024341, Karuah	32°37'57"S 151°59'41"E
DDG 4	MP 7	East of Karuah East Quarry	21 Halloran Rd North Arm Cove NSW 2324	32° 37' 30.87"S 152°01'10.18"E
DDG 5	MP 8	South-West of Karuah East Quarry	Lot 21 DP 1024341 Karuah NSW 2324	32° 37' 55.33"S 152°00'2.74"E
HVAS (TSP/PM ₁₀)	MP 9	South-West of Karuah East Quarry	5770 Pacific Hwy, Karuah NSW 2324	32°38'03"S 152°00'09"E

All dust monitoring is undertaken in accordance with the *Approved Methods of Sampling and Analysis of Air Pollutants in NSW* (EPA, 2007).

2.1 DEPOSITED DUST MONITORING

Deposited dust results for the twelve months prior to and including April 2021 are shown in Table 7.

Table 7 Deposited dust monitoring results

Date On	Date Off	DDG 1	DDG 2	DDG 3	DDG 4	DDG 5
7/05/2020	4/06/2020	0.2	0.3	0.3	0.7	0.1
4/06/2020	2/07/2020	0.1	0.2	0.3	0.3	0.3
2/07/2020	31/07/2020	0.2	<0.1	0.2	0.6	<0.1
31/07/2020	1/09/2020	0.4	0.2	0.4	1.0	<0.1
1/09/2020	1/10/2020	0.6	0.5	0.4	1.0	1.0
1/10/2020	2/11/2020	0.2	<0.1	1.3	0.7	0.6
2/11/2020	3/12/2020	3.2	2.3	0.8	0.7	4.7
3/12/2020	4/01/2021	0.3	0.5	<0.1	0.4	1.5
4/01/2021	4/02/2021	1.5	0.9	0.7	0.3	1.2
4/02/2021	5/03/2021	0.4	0.4	0.7	0.2	1.6
5/03/2021	6/04/2021	0.8	1.3	0.5	0.7	0.7
6/04/2021	6/05/2021	0.7	1.4	2.2	3.7	1.9
YTD average		0.7	0.7	0.7	0.9	1.2

Monitoring results indicate that for the period 6 April 2021 to 6 May 2021 the insoluble solid levels recorded at DDG 1 to DDG 5 monitoring locations were below the project criterion of 4 g/m²/month over an annual averaging period.

2.2 HIGH VOLUME AIR SAMPLING

The TSP and PM₁₀ results for April 2021, the report average and a rolling annual average are shown in are shown in Table 8. Figure 1 illustrates the year-to-date results for HVAS monitoring.

Table 8 High Volume Air Sampling (µg/m³) results

Run Date	HVAS TSP (µg/m ³)	HVAS PM ₁₀ (µg/m ³)
3/04/2021	13	4 ¹
9/04/2021	20	12
15/04/2021	28	16
21/04/2021	16	8
27/04/2021	19	12
24hr Average Criteria²	N/A	50
Annual Average Criteria²	90	30
Progressive Annual Average³	17.9	11.9

Note: ¹ Sampling for HVAS TSP was not possible on 3/04/2021 due to mechanical issues, this run was made up on 12/04/2021.

²Criteria as specified in PA 09_0175.

³ The progressive annual average is from 1/01/2020 to 27/04/2021, this is not a measure of compliance.

Due to mechanical issues with the HVAS TSP sampling instrument, the sampling run scheduled for 4 April 2021 had to be done on 12 April 2021 (refer to Section 6.2 for further information).

All HVAS monitoring results, to the end of April 2021 were compliant with the long term and short term impact assessment criteria outlined in *Schedule 3 Condition 13* of the Consent (see Table 3, Table 4 and Table 5).

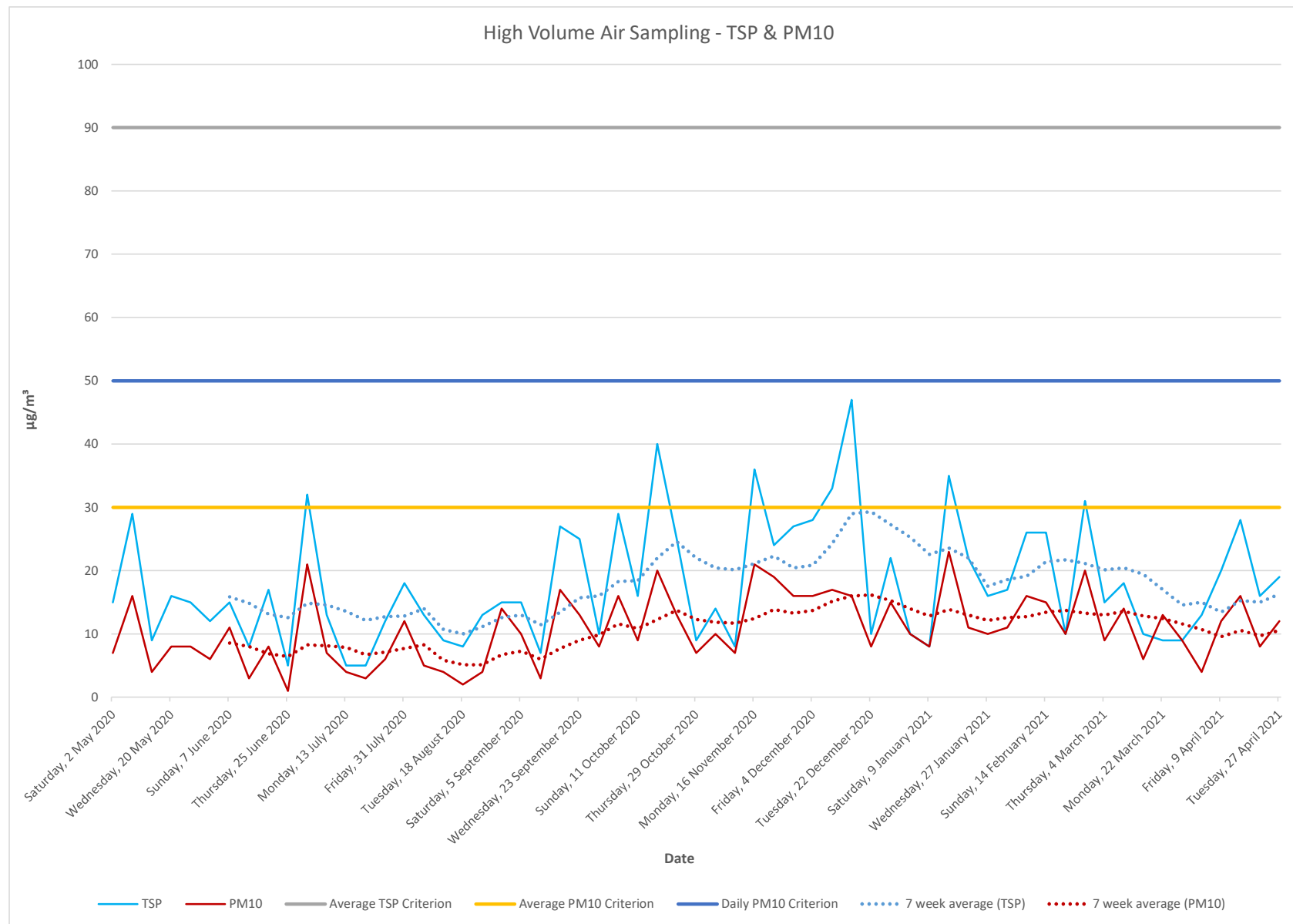


Figure 1 High Volume Air Sampling: Year-to-date results

3 BLAST MONITORING

The following conditions from the EPL refer to blast management:

L5.1 Blasting in or on the premises must only be carried out between the hours of 9:00 am and 4:00 pm Monday to Friday. No blasting is permitted on Saturdays, Sundays or public holidays. Blasting outside of the hours specified in this condition can only take place with the written approval of the EPA.

L5.2 Blasting is not permitted simultaneously with adjacent quarry(s).

*L5.3 The airblast overpressure level from blasting operations in or on the premises must not exceed:
 a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and
 b) 120 dB (Lin Peak) at any time,
 at monitoring point 11 detailed in Condition P1.4.*

*L5.4 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:
 a) 5 mm/second for more than 5% of the total number of blasts during each reporting period; and
 b) 10 mm/second at any time,
 at monitoring point 11 detailed in Condition P1.4.*

L5.5 Error margins associated with any monitoring equipment used to measure airblast overpressure or peak particle velocity are not to be taken into account in determining whether or not the limit has been exceeded.

L5.6 The airblast overpressure and ground vibration levels in the conditions above do not apply at noise sensitive locations that are owned by the licensee or subject to a private agreement, relating to airblast overpressure and ground vibration levels, between the licensee and land owner.

L5.7 Offensive blast fume must not be emitted from the premises.

M7.1 To determine compliance with Blast Limit conditions of this licence:

- a) Airblast overpressure and ground vibration levels must be measured and electronically recorded for monitoring point 11 for the parameters specified in Column 1 of the table below; and*
- b) The licensee must use the units of measure, sampling method, and sample at the frequency specified opposite in the other columns.*

Table 9 EPL 20611 Condition M7.1 Blasting

Parameter	Units of Measure	Frequency	Sampling Method
Airblast Overpressure	Decibels (Linear Peak)	All blasts	Australian Standard AS 2187.2-2006
Ground Vibration Peak Particle Velocity	Millimetres/second	All blasts	Australian Standard AS 2187.2-2006

There was one blast conducted in April 2021, see Table 10 for monitoring results.

Table 10 Blast monitoring results

Date	Time	Overpressure (dB(L))	Vibration (mm/s)
Monday, 12 April 2021	12:28 PM	Nil Trigger	Nil Trigger

The monitoring results for April 2021 demonstrate compliance with blasting criteria of the Consent and the EPL.

4 NOISE MONITORING

Noise monitoring is undertaken in accordance with the approved *Noise Management Plan*, the Consent (*Schedule 3, condition 3 to 7*) and the EPL (*conditions L4 and M8*).

As the Quarry is operational with no construction activities being completed, construction noise is not being considered. Table 11 summarises the operational noise criteria.

Noise generated by the Quarry operation must not exceed the criteria specified in *Schedule 3, Condition 14* of the Consent (see Table 11) at the locations identified in Table 12.

Table 11 Operational Noise Criteria (dB(A) LA_{eq}(15min))

Location	Criteria (day ¹)
Residence on Lot 11 DP10244564	43
A	40
B	37
G	38
All other residence	35

Note 1: A day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.

In accordance with the Consent, a noise monitoring program has been implemented. A summary of this monitoring program is outlined in Table 12

Table 12 Noise monitoring locations

Monitoring Method	Location	Frequency	Criteria
Attended noise monitoring	A, B, F, G	Quarterly	Refer to Table 11
Unattended noise monitoring	G	Quarterly	Refer to Table 11

4.1 ATTENDED MONITORING

Table 13 contains the results for attended noise monitoring undertaken in April 2021.

Table 13 Attended noise monitoring results

Location	Date/Start Time/ Weather	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		LA _{max}	LA1	LA10	LA90	LA _{eq}	
A	6/05/2021 2:00 PM SE 9.6 km/h	85	60	59	56	58	Wind noise 50-60 Motorbike 50-50 Pacific Highway 45-55 Karuah East Quarry inaudible
B	6/05/2021 3:05 PM SE 8.3 km/h	87	71	67	60	64	Pacific Highway 55-65 Birds 40-45 Karuah East Quarry inaudible
F	6/05/2021 1:20 PM SE 8.9 km/h	85	59	57	54	56	Wind noise 50-55 Insects 40-45 Karuah East Quarry inaudible

G	6/05/2021 9:50 AM SSE 1.6 km/h	68	49	47	46	47	Wind noise 40-45 Insects 40-45 Birds 35-40 Karuah East Quarry inaudible
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The results of the attended monitoring (Table 13) show ambient noise levels include noise sources such as wind noise, traffic from the nearby Pacific Highway and wildlife such as insects and birds. The Quarry operation was inaudible at all locations.

4.2 UNATTENDED NOISE MONITORING

Table 14 contains the results for unattended noise monitoring undertaken in April 2021.

Table 14 Unattended noise monitoring results

INP Period	L _{A1}	L _{A10}	L _{A90}	L _{AEQ}
Day	63	57	52	58
Evening	65	63	55	57
Night	57	55	51	50

4.3 NOISE MONITORING SUMMARY

The attended noise monitoring conducted during April 2021 identified that the Quarry was not audible at Location A, B, F and G. Therefore, the Quarry is determined to be complaint for the monitoring completed in April 2021.

5 SURFACE WATER MONITORING

5.1 MONTHLY MONITORING RESULTS

Monthly water monitoring was undertaken on 1 April 2021 in accordance with the *Surface Water Monitoring Program* outlined in the *KEQ Water Management Plan (2015)*. Results are displayed in Table 15 along with the EPL discharge criterion and ANZECC (2000) Guidelines. These results do not determine compliance, they are used to analyse trends and assist with water management.

Table 15 Water monitoring results

Parameter	Units of measure	EPL 20611 concentration limit	Dam 1	Dam 2	Dam 3	SW 2	SW 3
Oil and grease	Milligrams per litre	5 and/or non-visible	<5	<5	<5	<5	<5
pH	pH	6.5 – 8.5	7.46	6.81	7.04	6.84	6.45
Total suspended solids	Milligrams per litre	40	1585	44	417	865	370
		ANZECC Guidelines¹					
Conductivity	µS/cm	125 – 2200	537	338	307	294	125
Total dissolved solids	mg/L	--	965	262	278	558	366
Total phosphorus	mg/L	0.025	0.47	0.01	<0.1	0.3	0.17
Ammonia	mg/L	0.2	0.06	0.02	0.04	0.05	<0.01
Nitrogen (Nitrate)	mg/L	0.350	16.4	0.44	1.38	6.19	0.08
Total hardness (as CaCO ₃)	mg/L	--	21	81	39	11	13
Arsenic	mg/L	0.024	0.005	<0.001	0.002	0.003	0.001
Cadmium	mg/L	0.0002	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Calcium	mg/L	--	2	26	9	1	2
Chromium	mg/L	0.001	0.032	0.001	0.014	0.023	0.012
Copper	mg/L	0.0014	0.04	0.002	0.023	0.029	0.015
Lead	mg/L	0.0034	0.024	<0.001	0.013	0.019	0.009
Magnesium	mg/L	--	4	4	4	2	2
Manganese	mg/L	1.9	1.06	0.096	0.557	0.724	0.251

Nickel	mg/L	0.011	0.018	0.002	0.012	0.015	0.008
Potassium	mg/L	--	1	<1	1	1	<1
Sodium	mg/L	--	98	27	46	52	21
Vanadium	mg/L	--	0.12	<0.01	0.05	0.08	0.04
Zinc	mg/L	0.0312	0.158	0.013	0.087	0.116	0.055

Note 1 – Key default trigger values presented in ANZECC 2000 for slightly disturbed upland rivers in NSW. Heavy metals based on hard water (120-179 mg CaCO³/L).

5.2 DISCHARGE MONITORING

Condition L2 of the EPL outlines the requirement to monitor water discharges from the Quarry via the licensed discharge points (LDP1, LDP2 and LDP3), see Table 16.

Table 16 EPL20611 - Pollutant concentration limits

Pollutant	Units of Measure	Concentration Limit
Oil and Grease	Visible	5 &/or non-visible
pH	pH units	6.5 – 8.5
Total suspended solids	Milligrams per litre	40

There were no water discharges during April 2021

6 REPORTING

6.1 INCIDENT

There were nil environmental incidents during April 2021 to report.

6.2 NON-COMPLIANCE

There was one non-compliance during April 2021.

Air Quality Monitoring

On 23 March 2021, it was discovered that the High Volume Air Sampling unit (for TSP) was not working. This equipment failed during the period of extreme rainfall. The manufacturer of the equipment advised that mechanical issues may occur during periods of wet weather, as the units are sensitive recording devices and are exposed to the natural elements. Due to the equipment failure, there were three scheduled runs missed (22/03/2021; 28/03/2021 and 3/04/2021). These runs dates were made up on 6/04/2021; 7/04/2021 and 12/04/2021 respectively.

This non-compliance was reported to the appropriate regulatory authorities for investigation. At the time of publishing this report, KEQ had not received a response.

6.3 COMPLAINTS

There were nil complaints received during April 2021.

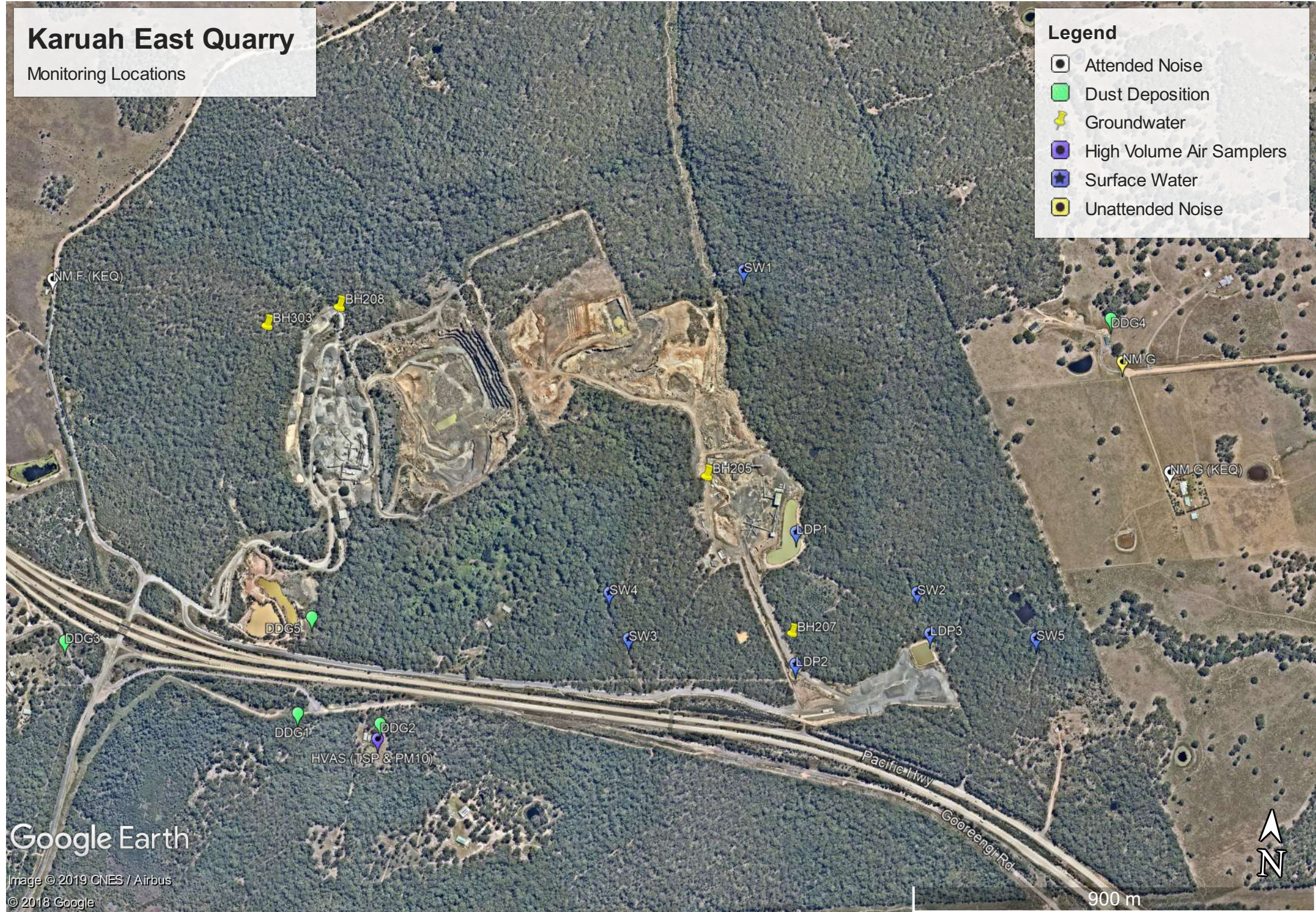
Appendix 1 – Monitoring Locations

Karuah East Quarry

Monitoring Locations

Legend

- Attended Noise
- Dust Deposition
- Groundwater
- High Volume Air Samplers
- Surface Water
- Unattended Noise



Google Earth

Image © 2019 CNES / Airbus
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900 m

