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Karuah East Quarry

Environmental Monitoring Report

June 2023



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1.0 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) and Project Approval MP09_0175 (the Consent) for the Karuah East Quarry (the Quarry) as summarised by **Table 1** and **Table 2** respectively.

Table 1 Summary of Environment Protection Licence, EPL 20611

EPL Number:	EPL 20611
Licensee’s Name:	Karuah East Quarry Pty Limited
Licensee’s Address:	Karuah East Quarry PO Box 3284, Thornton NSW 2322 Blue Rock Close, Karuah NSW 2324
Link to Full Licence on the EPA website:	EPL 20611

Table 2 Summary of Project Approval, MP09_0175

Project Approval:	MP09_0175
Applicant:	Karuah East Quarry Pty Limited
Consent Authority:	NSW Planning Assessment Commission
Link to Full Project Approval on the DPE website:	Project Approval MP09_0175

A summary of the environmental monitoring data for June 2023 is covered in this report. Tables throughout this report provide key monitoring information from the EPL and the Consent, including:

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

Monitoring locations are illustrated by the site plan provided by **Appendix 1**.

2.0 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 and summarised by **Table 3**, **Table 4** and **Table 5**.

Deposited dust and TSP/PM10 monitoring is undertaken at the locations listed in **Table 6**, in accordance with the Approved Methods of Sampling and Analysis of Air Pollutants in NSW (EPA, 2022).

Table 3 Long-term Assessment Criteria for Deposited Dust (MP09-0175).

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

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

Table 4 Long-term Assessment Criteria for Particulate Matter (MP09-0175).

Pollutant	Averaging Period	Criterion
Total Suspended Particulates	Annual	90 µg/m ³
Particulate Matter < 10 µm (PM10)	Annual	30 µg/m ³

Table 5 Short-term Assessment Criteria for Particulate Matter (MP09-0175).

Pollutant	Averaging Period	Criterion
Particulate Matter < 10 µm (PM10)	24-hour	50 µg/m ³

Table 6 Air Quality Monitoring Locations (EPL 20611).

Site Monitoring Point ID	EPL Monitoring Point ID	Location	Address	Coordinates
DDG 1	4	South-West of Karuah East Quarry	54 Mill Hill Close, Karuah NSW 2324	32°38'04"S 151°59'58"E
DDG 2	5	South-West of Karuah East Quarry	64 Mill Hill Close, Karuah NSW 2324	32°38'02"S 152°00'09"E
DDG 3	6	South-West of Karuah East Quarry	Lot 251 DP1092111, Karuah NSW 2324	32°37'57"S 151°59'41"E
DDG 4	7	East of Karuah East Quarry	21 Halloran Road, North Arm Cove NSW 2324	32° 37' 30.87"S 152°01'10.18"E
DDG 5	8	South-West of Karuah East Quarry	Lot 21 DP1024341, Karuah NSW 2324	32° 37' 55.33"S 152°00'2.74"E
HVAS	9	South-West of Karuah East Quarry	64 Mill Hill Close, Karuah NSW 2324	32°38'03"S 152°00'09"E

2.1 Deposited Dust Monitoring

Deposited dust results for the 12-months prior-to and including June 2023 are summarised by **Table 7**.

Table 7 *Deposited dust monitoring results.*

Reporting Period	Start Date	End Date	Days	DDG 1 EPL ID 4	DDG 2 EPL ID 5	DDG 3 EPL ID 6	DDG 4 EPL ID 7	DDG 5 EPL ID 8
Jul-22	5/07/2022	3/08/2022	29	0.3	0.3	0.4	0.7	0.4
Aug-22	3/08/2022	2/09/2022	30	0.9	0.9	0.6	1.0	0.9
Sep-22	2/09/2022	4/10/2022	32	0.5	0.2	0.6	0.3	0.8
Oct-22	4/10/2022	3/11/2022	30	0.2	0.5	0.5	0.3	0.3
Nov-22	3/11/2022	5/12/2022	32	0.8	0.8	0.7	1.2	2.0
Dec-22	5/12/2022	5/01/2023	31	0.7	0.7	0.3	0.6	0.1
Jan-23	5/01/2023	3/02/2023	29	0.2	0.4	0.8	0.1	0.4
Feb-23	3/02/2023	5/03/2023	31	0.9	0.7	0.2	0.3	0.8
Mar-23	5/03/2023	5/04/2023	30	1.1	1.5	1.1	1.1	1.1
Apr-23	5/04/2023	4/05/2023	29	0.3	0.5	0.3	0.2	1.2
May-23	4/05/2023	5/06/2023	32	0.2	0.3	0.3	0.4	0.4
Jun-23	6/06/2023	4/07/2023	28	0.6	2.5	1.8	–	–
Progressive Annual Average				0.6	0.8	0.6	0.6	0.8

Monitoring results for the June 2023 reporting period at all five DDG monitoring sites are within the long-term annual deposited dust limit of 4 g/m²/month.

It should be noted that DDG 4 and DDG 5 samples in the June 2023 reporting period become contaminated with vegetation matter and are therefore discounted from averaging. This failure to monitor event was reported to the NSW Department of Planning & Environment (DPE), the NSW EPA and surrounding landholders in accordance with the relevant conditions of the Consent and EPL.

2.2 High Volume Air Sampling

TSP and PM10 results for the June 2023 reporting period are summarised by **Table 8** and illustrated respectively by **Figure 1** and **Figure 2**.

Table 8 *HVAS TSP and PM10 monitoring results for the June 2023 reporting period.*

Run Date	Total Suspended Particulates, TSP (µg/m ³)	Particulate Matter < 10 µm, PM10 (µg/m ³)
4/06/2023	25	15
10/06/2023	13	10
16/06/2023	81	51
22/06/2023	57	26
28/06/2023	12	6
Progressive Annual Average	22.0	12.1

Monitoring results for the five HVAS run days within the June 2023 reporting period were generally compliant with the long-term limits for TSP and PM10 and short-term limits for PM10.

On 16/06/2023, one minor exceedance of PM10 was recorded at 51 µg/m³ against a limit of 50 µg/m³. This anomalous result was reported to the NSW Department of Planning & Environment (DPE), the NSW EPA and surrounding landholders in accordance with the relevant conditions of the Consent and EPL.

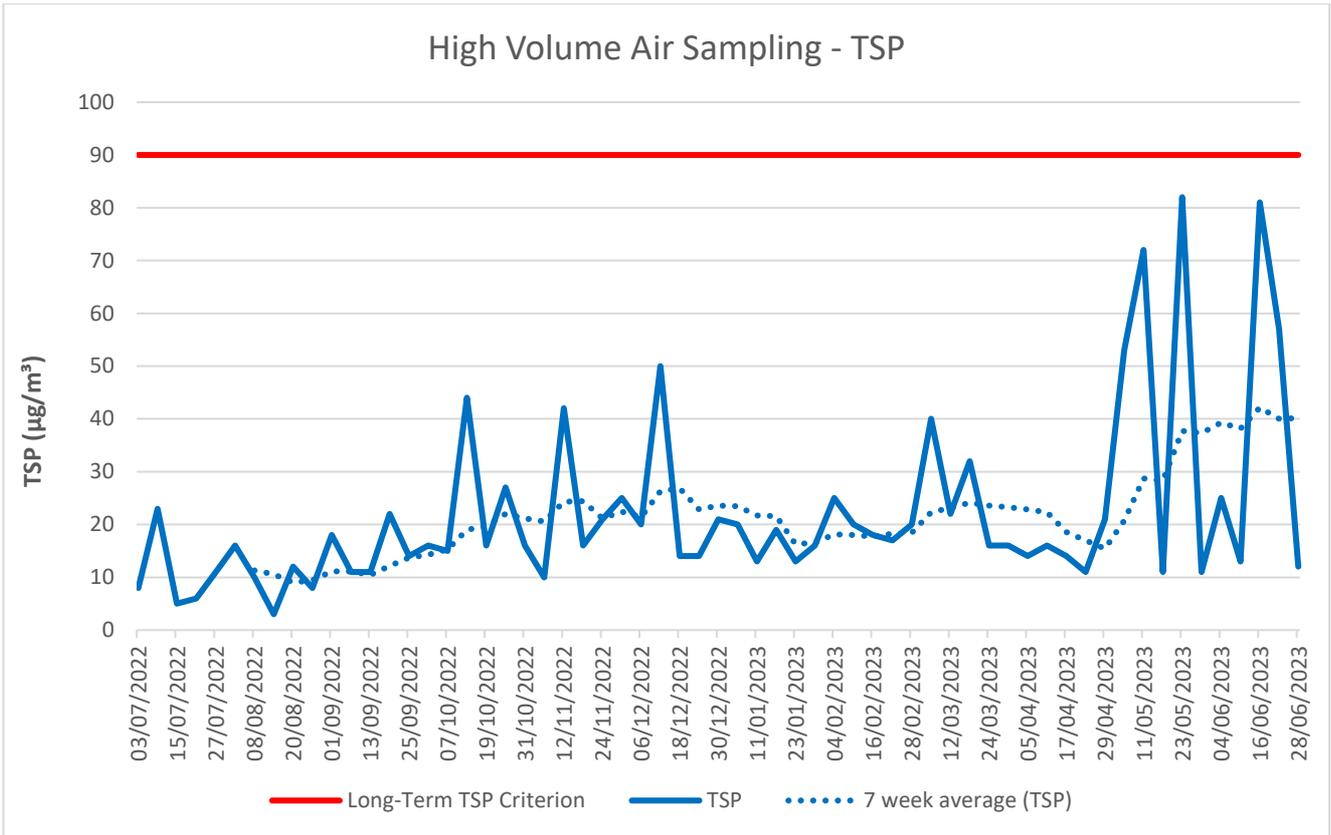


Figure 1 Long-term TSP monitoring trends.

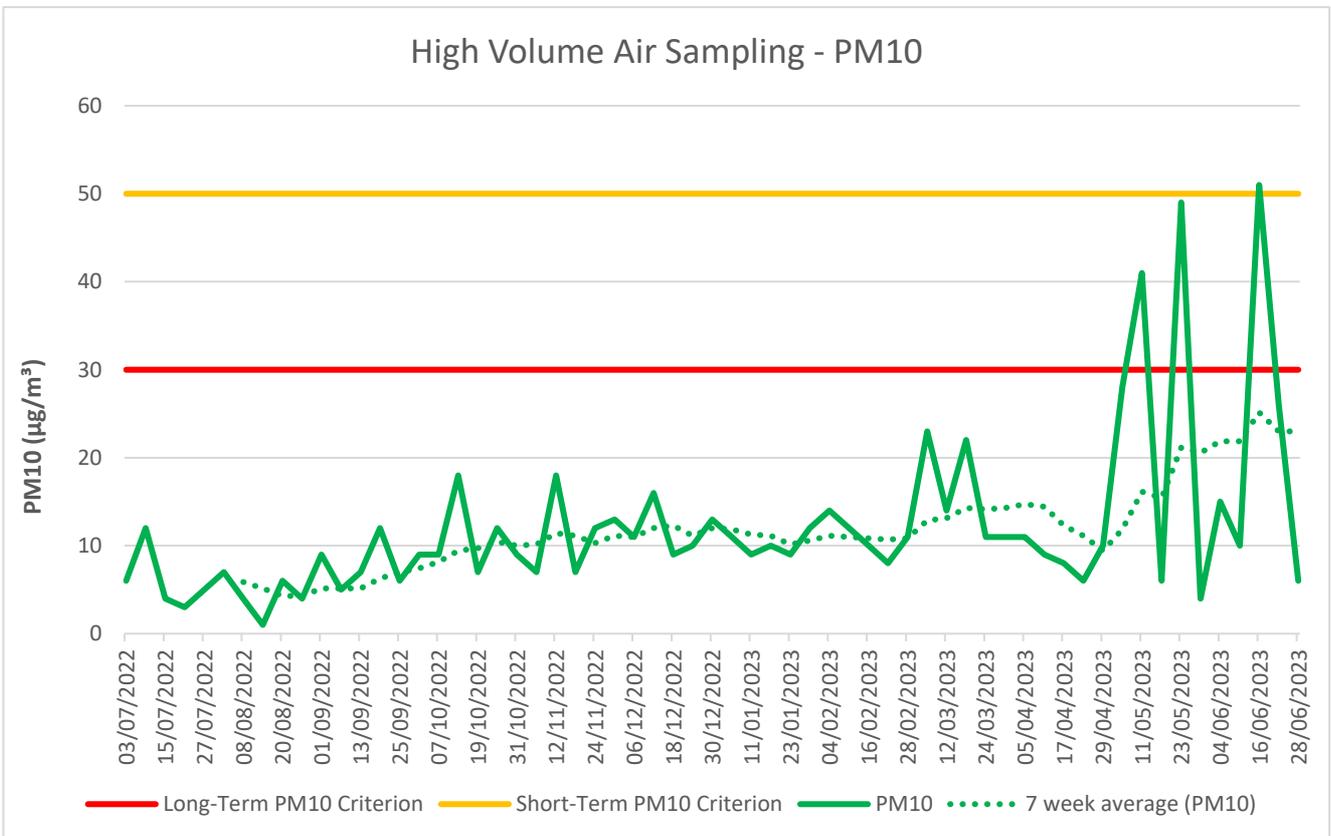


Figure 2 Long-term PM10 monitoring trends.

3.0 Blast Monitoring

Blast monitoring is undertaken for all blasts at the Quarry at the nearest residential location (EPL Monitoring Point 11) to ensure that air blast overpressure and ground vibration remain within the compliance limits, as summarised by **Table 9**.

There was two blasts within the June 2023 reporting period, as summarised by **Table 10**, and were observed to be within compliance limits.

Table 9 *Blasting Airblast Overpressure and Ground Vibration Criteria (MP09-0175 & EPL 20611).*

Location	Airblast Overpressure (dB(L))	Ground Vibration (mm/s)	Allowable Exceedance
Private Residence B	120	10	0%
EPL Monitoring Point ID 11	115	5	5% over 12-month reporting period.

Table 10 *Blasting Monitoring Results.*

Date	Time	Location	Airblast Overpressure (dB(L))	Ground Vibration (mm/s)
Friday, 09/06/2023	12:46 pm	RL 105	112.4	0.85
Friday, 26/06/2023	12:19 pm	RL 128	n/t	n/t

*Not triggered = n/t

Ground Vibration < 0.5 mm/s

Overpressure < 108 dB(L)

4.0 Noise Monitoring

Noise monitoring is undertaken in accordance with the EPL and DPE approved Noise Management Plan, which requires attended noise monitoring to be conducted on a quarterly basis.

No noise monitoring was conducted during the June 2023 reporting period.

5.0 Surface Water Monitoring

Water monitoring is undertaken in accordance with the EPL and DPE approved Water Management Plan, which includes monthly surveillance sampling and daily sampling during discharge events.

Monthly surveillance monitoring was undertaken on 7 June 2023 with the results summarised by **Table 11**.

Table 11 Surface Water Monitoring Results.

Parameter	Units	EPL Discharge Limits	Dam 1	Dam 2	Dam 3	SW 2	SW 3
Oil and Grease	mg/L	5 and/or non-visible	<5	<5	<5	<5	<5
pH	pH	6.5 – 8.5	7.21	7.84	7.83	6.77	6.54
Total Suspended Solids	mg/L	40	2040	8	18	957	114
Parameter	Units	ANZECC Guidelines ¹	Dam 1	Dam 2	Dam 3	SW 2	SW 3
Conductivity	µS/cm	125 – 2200	395	393	535	449	296
Total Dissolved Solids	mg/L	--	2050	552	314	430	1010
Total Phosphorus	mg/L	0.025	1.37	0.08	0.06	0.17	0.69
Ammonia	mg/L	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrogen (Nitrate)	mg/L	0.350	6.4	0.01	0.02	0.07	0.06
Total Hardness (as CaCO ₃)	mg/L	--	11	257	102	48	20
Arsenic	mg/L	0.024	0.002	<0.001	<0.001	<0.001	<0.001
Cadmium	mg/L	0.0002	0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Calcium	mg/L	--	2	88	31	6	3
Chromium	mg/L	0.001	0.008	<0.001	<0.001	0.001	0.004
Copper	mg/L	0.0014	0.041	<0.001	0.001	0.004	0.019
Lead	mg/L	0.0034	0.024	<0.001	<0.001	0.003	0.013
Magnesium	mg/L	--	2	9	6	8	3
Manganese	mg/L	1.9	0.641	0.103	0.039	0.087	0.251
Nickel	mg/L	0.011	0.011	<0.001	<0.001	0.001	0.006
Potassium	mg/L	--	1	1	<1	2	1
Sodium	mg/L	--	73	48	59	66	44
Vanadium	mg/L	--	0.05	<0.01	<0.01	<0.01	0.02
Zinc	mg/L	0.0312	0.139	<0.005	0.006	0.017	0.086

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).

Daily discharge monitoring was conducted when discharging surface water from the Quarry via the licenced discharge points in accordance with Condition L2 and M2 of the EPL, as summarised by **Table 12**

Table 12 Discharge Water Monitoring Results.

Date	pH	Total Suspended Solids, TSS (mg/L)	Oil and Grease	Discharge Type
LDP 1 – Dam 1				
-	-	-	-	-
LDP 2 – Dam 2				
Monday, 26/06/2023	7	29	Non-Visible	Controlled
LDP 3 – Dam 3				
Thursday, 08/06/2023	7.3	28	Non-Visible	Controlled
Friday, 09/06/2023	7.4	22	Non-Visible	Controlled
Saturday, 10/06/2023	7.3	31	Non-Visible	Controlled
Sunday, 11/06/2023	7.4	28	Non-Visible	Controlled

6.0 Weather Station Monitoring

The Quarry operates and maintains a permanent meteorological monitoring station to record weather parameters including temperature, wind speed and direction, solar radiation and rainfall. **Figure 3** below outlines the weather records for the June 2023 reporting period.

Monthly Weather Summary



Site: Karuah Quarry
 Month: June 2023

Date	Day	Temperature @ 2m			Temperature @ 10m			Winds			Solar Radiation		Rain ² mm
		Max ¹ °C	Min ² °C	Ave ¹ °C	Max ¹ °C	Min ² °C	Ave ¹ °C	Max Gust ¹ km/h	Ave Speed ¹ km/h	Dir Ave ¹ deg	Max ¹ W/m ²	Ave ¹ W/m ²	
1	Thu	22.0	8.4	13.5	20.7	10.4	14.9	16.0	2.9	220	466.6	88.9	0.0
2	Fri	23.1	8.6	13.5	21.8	9.3	14.4	16.9	2.7	248	675.8	71.3	0.0
3	Sat	22.3	9.9	15.1	20.9	10.8	15.8	11.2	2.5	163	556.7	84.7	0.0
4	Sun	23.1	13.6	17.4	22.9	13.6	18.0	18.7	4.3	173	624.9	88.9	0.0
5	Mon	19.7	10.1	14.0	18.7	11.0	14.6	19.8	3.4	155	445.0	49.0	0.2
6	Tue	19.9	9.6	13.7	18.6	10.4	14.1	18.5	2.7	172	643.3	79.3	0.0
7	Wed	21.3	7.8	13.3	19.8	8.3	14.0	14.3	2.7	171	534.2	86.6	0.0
8	Thu	21.9	8.4	13.9	20.1	9.6	14.8	12.6	3.3	150	475.8	98.5	0.0
9	Fri	19.9	8.8	13.4	19.3	10.9	14.7	10.6	3.0	248	639.9	59.1	0.4
10	Sat	19.4	4.4	10.7	18.6	5.6	11.6	22.1	4.2	220	425.0	102.2	0.0
11	Sun	18.8	3.2	9.1	17.9	4.5	10.0	14.5	2.6	240	417.5	99.2	0.0
12	Mon	19.6	5.4	10.3	18.0	6.4	11.0	9.2	2.0	189	415.8	99.1	0.0
13	Tue	22.0	9.0	13.7	21.3	10.2	14.9	8.6	2.5	218	428.3	95.4	0.0
14	Wed	17.2	7.1	11.6	17.2	8.9	12.8	13.2	3.7	257	390.8	49.2	0.0
15	Thu	18.5	3.4	10.7	17.4	5.6	12.4	20.5	5.7	261	422.4	99.5	0.0
16	Fri	17.8	2.7	8.3	16.6	4.0	9.5	15.6	3.2	224	415.8	97.7	0.0
17	Sat	18.4	2.7	8.6	17.6	3.9	9.5	10.8	2.2	242	411.7	97.5	0.0
18	Sun	19.5	2.9	9.2	18.8	4.2	10.0	9.1	2.3	205	418.3	99.5	0.0
19	Mon	19.7	0.1	7.6	19.0	1.4	9.2	19.6	2.9	225	415.8	97.5	0.0
20	Tue	17.6	5.6	11.1	16.9	7.0	12.0	17.0	6.0	280	425.8	100.6	0.0
21	Wed	16.1	0.2	6.5	14.7	1.3	7.2	16.7	3.2	216	421.7	99.5	0.0
22	Thu	17.3	3.9	8.1	15.7	4.9	8.6	10.7	2.5	228	410.8	97.9	0.0
23	Fri	16.9	8.1	11.8	15.9	9.3	11.9	16.9	2.3	190	523.3	62.8	1.2
24	Sat	18.8	7.1	13.1	18.4	10.3	14.0	23.7	7.4	292	547.5	87.5	0.0
25	Sun	19.1	1.4	8.4	18.7	2.5	9.5	22.4	4.6	236	438.3	99.4	0.0
26	Mon	21.6	6.3	13.6	19.5	7.9	14.5	23.7	6.7	238	426.7	99.8	0.0
27	Tue	19.5	3.6	12.5	18.7	5.5	13.8	28.8	7.2	285	421.7	99.0	0.0
28	Wed	18.5	5.4	11.1	17.3	6.9	11.7	14.6	2.9	236	510.0	89.0	0.0
29	Thu	14.2	5.5	9.8	13.5	7.1	10.2	16.3	4.1	269	225.8	26.7	2.4
30	Fri	16.0	6.0	9.9	15.1	7.4	10.5	18.8	6.6	274	467.4	89.6	0.0
Ave or Total		19.3	6.0	11.5	18.3	7.3	12.3	16.4	3.7	224.2	468.1	86.5	4.2
High		23.1	13.6	17.4	22.9	13.6	18.0	28.8	7.4		675.8	102.2	2.4
Low		14.2	0.1	6.5	13.5	1.3	7.2	8.6	2.0		225.8	26.7	
												No. rain days >1mm:	2

Notes: 1. Values are for the 24 hour period from 9am to 9am next day.
 2. Values are for the 24 hours to 9am.

Figure 3 Weather Records Summary – June 2023.

7.0 Production Data

Monthly monitoring of sales and truck movements are summarised by **Table 13**.

Table 13 Quarry Production Data.

Month	Truck Movements	Quarry Product Sales (t)
Jan-23	2,090	78,075
Feb-23	3,702	63,813
Mar-23	3,392	55,950
Apr-23	1,942	61,862
May-23	2,867	95,428
Jun-23	2,752	87,714

8.0 Reporting

8.1 Reportable Environmental Incidents

During the June 2023 reporting period, no reportable environmental incidents occurred at the Quarry.

8.2 Reportable Non-Compliances

During the June 2023 reporting period, the Quarry had two reportable non-compliances, both in relation to air quality, including:

- Failure to Monitor event associated with contamination of two Deposited Dust Gauges with organic matter; and
- PM10 Exceedance event on 16/06/2023 with a High Volume Air Sampler record of 51 µg/m³ against the Consent criteria of 50 µg/m³.

8.3 Community Complaints

During the June 2023 reporting period, the Quarry received one complaint in relation to blasting:

- On 09 June 2023 regarding the visibility of a dust plume from Halloran Road, North Arm Cove, associated with from blasting activities.

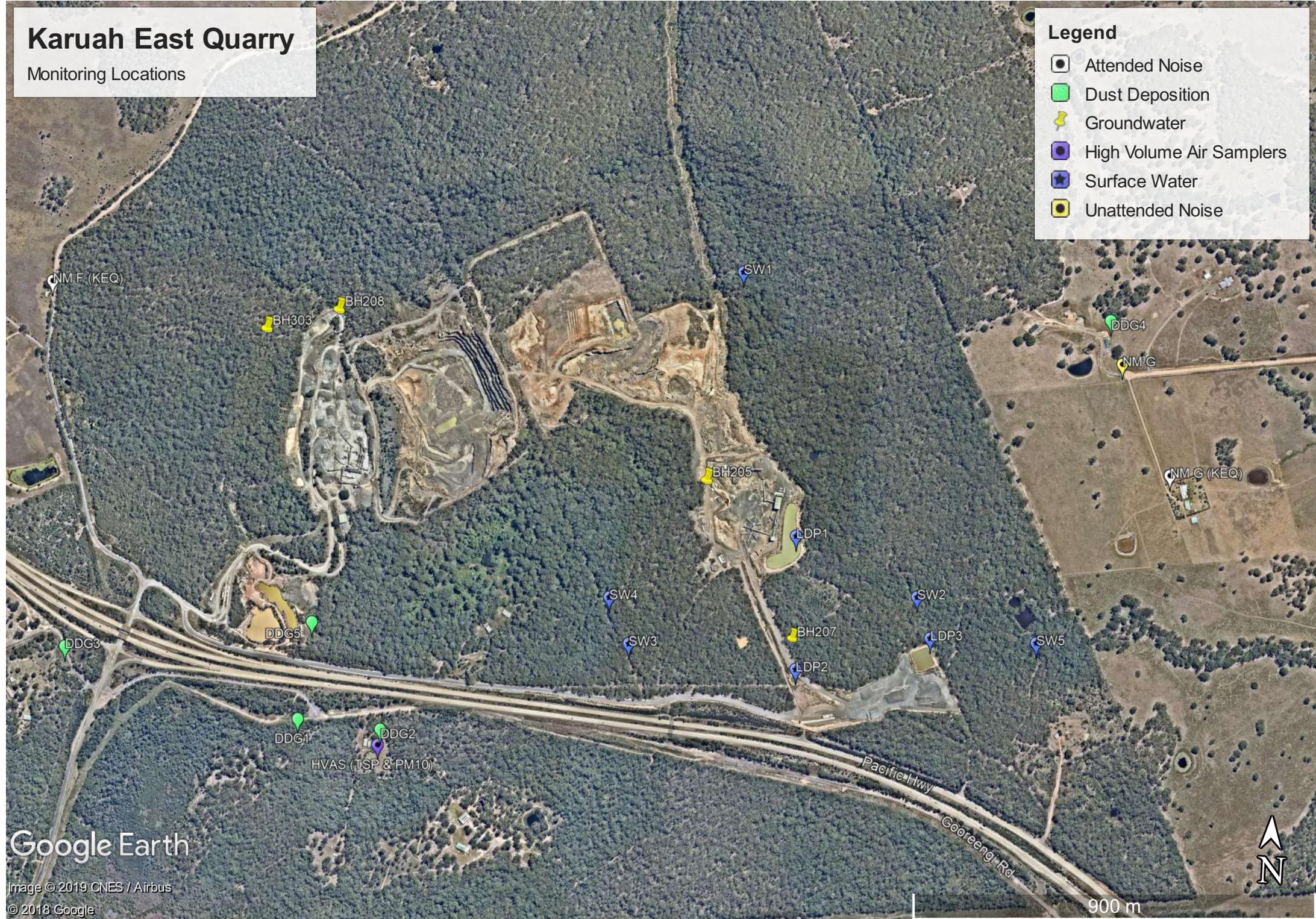
Appendix 1 – EPL 20611 Monitoring Locations

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

