



Karuah East Quarry
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Karuah East Quarry

Environmental Monitoring Report

July 2023



Contents

| | | |
|-----|---|----|
| 1.0 | Introduction | 3 |
| 2.0 | Air Quality Monitoring..... | 4 |
| 2.1 | Deposited Dust Monitoring..... | 5 |
| 2.2 | High Volume Air Sampling | 5 |
| 3.0 | Blast Monitoring..... | 7 |
| 4.0 | Noise Monitoring..... | 7 |
| 5.0 | Surface Water Monitoring | 8 |
| 6.0 | Weather Station Monitoring..... | 10 |
| 7.0 | Production Data | 11 |
| 8.0 | Reporting | 11 |
| 8.1 | Reportable Environmental Incidents | 11 |
| 8.2 | Reportable Non-Compliances | 11 |
| 8.3 | Community Complaints | 11 |
| | Appendix 1 – EPL 20611 Monitoring Locations | 12 |

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 July 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 July 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 |
|-----------------------------------|------------|-----------|------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 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 | – | – |
| Jul-23 | 4/07/2023 | 3/08/2023 | 30 | 0.4 | 0.9 | 1.2 | 1.1 | 0.3 |
| Progressive Annual Average | | | | 0.6 | 0.8 | 0.7 | 0.6 | 0.8 |

Monitoring results for the July 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 July 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 July 2023 reporting period.*

| Run Date | Total Suspended Particulates, TSP (µg/m ³) | Particulate Matter < 10 µm, PM10 (µg/m ³) |
|-----------------------------------|---|--|
| 4/07/2023 | 5 | 2 |
| 10/07/2023 | 10 | 6 |
| 16/07/2023 | 13 | 8 |
| 22/07/2023 | 12 | 6 |
| 28/07/2023 | 20 | 13 |
| Progressive Annual Average | 22.2 | 12.2 |

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

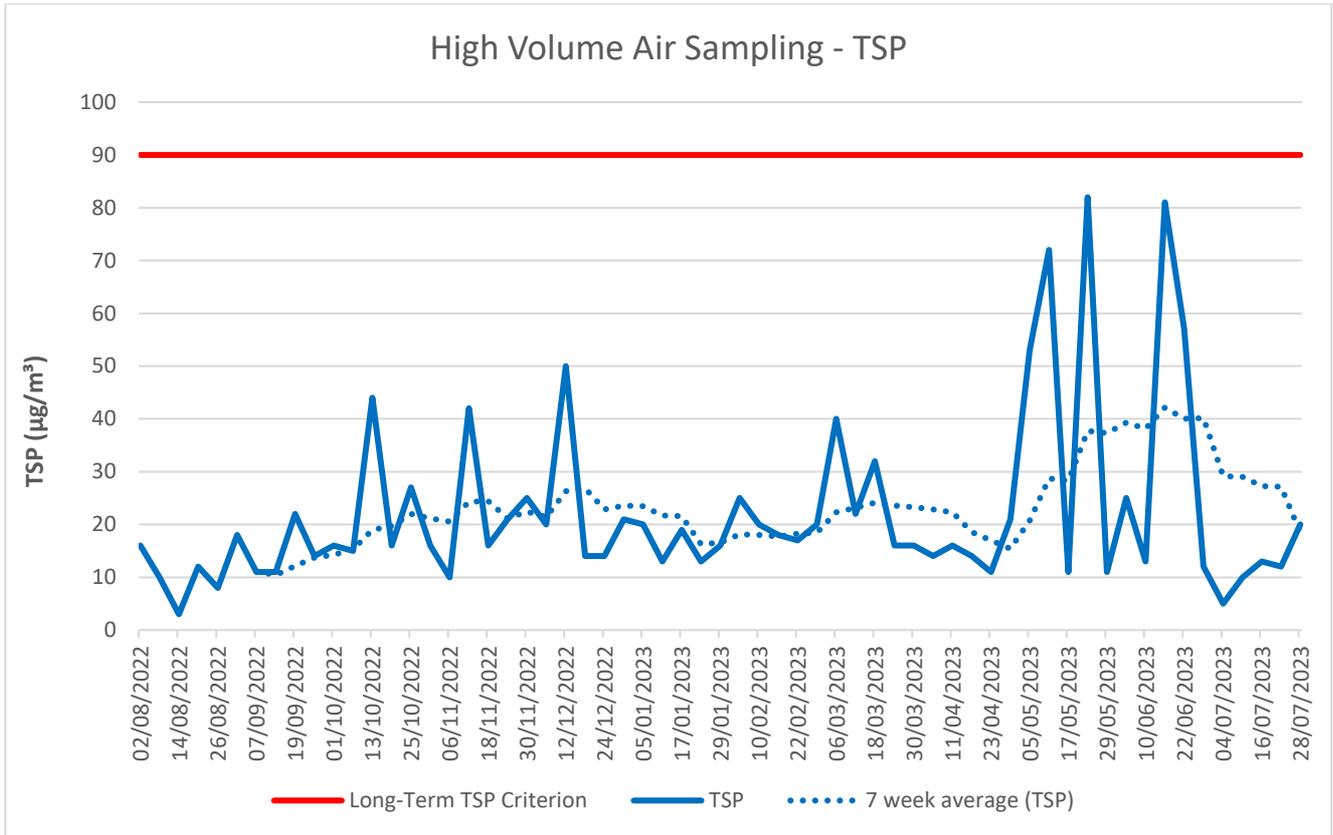


Figure 1 Long-term TSP monitoring trends.

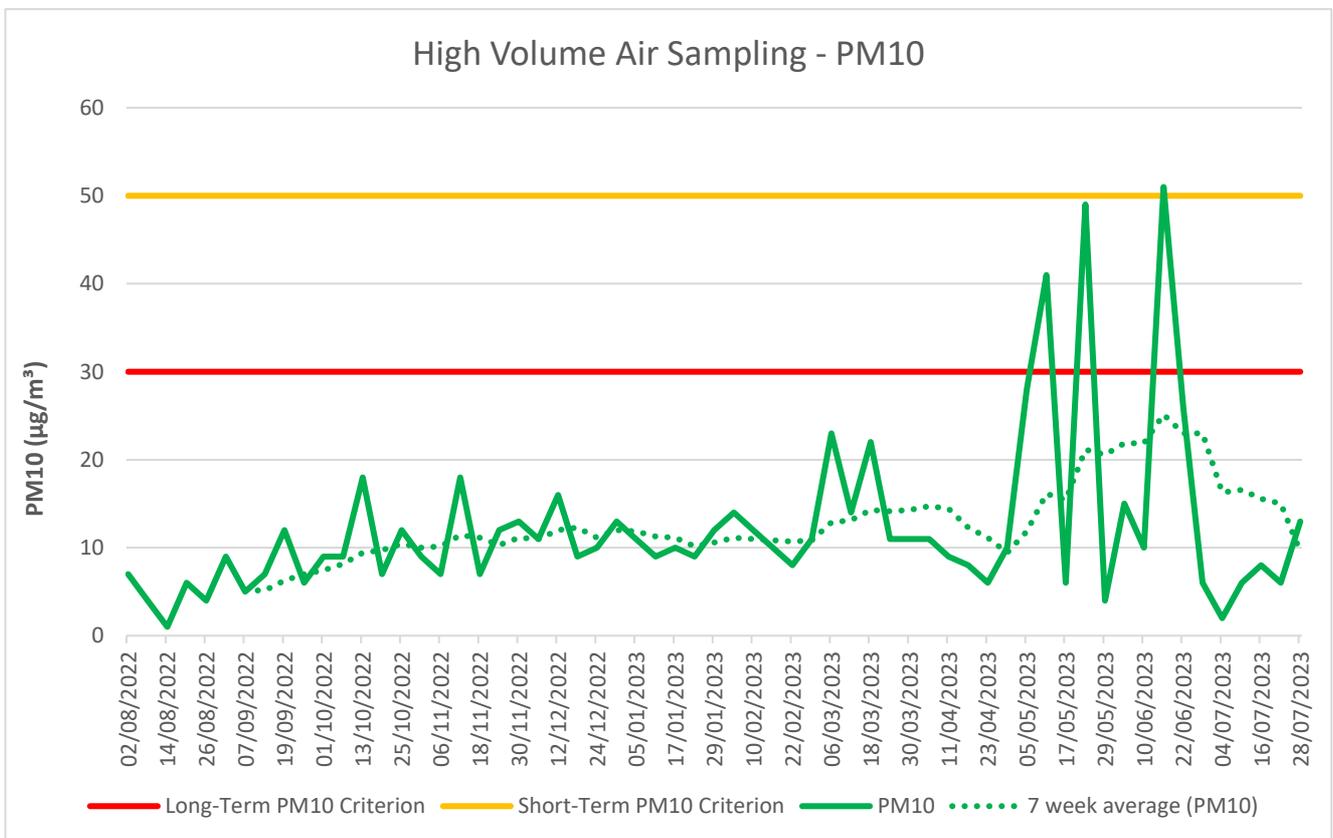


Figure 2 Long-term PM10 monitoring trends.

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 were two blasts within the July 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) |
|---------------------|---------|----------|-------------------------------|-------------------------|
| Tuesday, 04/07/2023 | 2:13 pm | RL 135 | n/t | n/t |
| Monday, 31/07/2023 | 2:59 pm | RL 135 | 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 July 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 4 July 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 | 7.00 | 6.43 | 7.46 | 7.2 | 6.11 |
| Total Suspended Solids | mg/L | 40 | 1530 | 82 | 23 | 104 | 28 |
| Parameter | Units | ANZECC Guidelines ¹ | Dam 1 | Dam 2 | Dam 3 | SW 2 | SW 3 |
| Conductivity | µS/cm | 125 – 2200 | 430 | 3280 | 446 | 434 | 480 |
| Total Dissolved Solids | mg/L | -- | 770 | 2420 | 272 | 269 | 252 |
| Total Phosphorus | mg/L | 0.025 | 0.97 | 0.02 | 0.05 | 0.13 | 0.02 |
| Ammonia | mg/L | 0.2 | 0.17 | 0.7 | 0.02 | 0.01 | <0.01 |
| Nitrogen (Nitrate) | mg/L | 0.350 | 5.4 | 0.19 | 0.26 | <0.01 | <0.01 |
| Total Hardness (as CaCO ₃) | mg/L | -- | 17 | 1390 | 75 | 48 | 79 |
| Arsenic | mg/L | 0.024 | 0.005 | <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 | 532 | 20 | 6 | 12 |
| Chromium | mg/L | 0.001 | 0.04 | <0.001 | <0.001 | 0.006 | <0.001 |
| Copper | mg/L | 0.0014 | 0.061 | <0.001 | 0.002 | 0.008 | 0.001 |
| Lead | mg/L | 0.0034 | 0.03 | <0.001 | <0.001 | 0.003 | <0.001 |
| Magnesium | mg/L | -- | 3 | 14 | 6 | 8 | 12 |
| Manganese | mg/L | 1.9 | 0.02 | 2.11 | 0.022 | 0.193 | 0.09 |
| Nickel | mg/L | 0.011 | 0.035 | 0.002 | <0.001 | 0.004 | 0.001 |
| Potassium | mg/L | -- | 1 | 2 | 1 | 2 | 2 |
| Sodium | mg/L | -- | 78 | 53 | 57 | 67 | 57 |
| Vanadium | mg/L | -- | 0.15 | <0.01 | <0.01 | 0.02 | <0.01 |
| Zinc | mg/L | 0.0312 | 0.283 | 0.007 | <0.005 | 0.031 | 0.009 |

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 | | | | |
| - | - | - | - | - |
| LDP 3 – Dam 3 | | | | |
| - | - | - | - | - |

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 July 2023 reporting period.

Monthly Weather Summary



Site: Karuah Quarry
 Month: July 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 | Sat | 17.4 | 5.3 | 10.6 | 16.7 | 8.3 | 11.7 | 19.7 | 5.8 | 290 | 407.5 | 97.3 | 0.0 |
| 2 | Sun | 17.6 | 7.4 | 11.4 | 16.5 | 8.5 | 12.1 | 19.8 | 4.4 | 260 | 462.5 | 91.1 | 0.0 |
| 3 | Mon | 18.5 | 7.2 | 12.0 | 16.8 | 8.1 | 12.1 | 12.3 | 3.3 | 224 | 597.5 | 68.0 | 0.2 |
| 4 | Tue | 14.6 | 10.1 | 11.8 | 14.2 | 10.6 | 12.0 | 8.7 | 2.1 | 220 | 272.4 | 41.5 | 2.6 |
| 5 | Wed | 16.0 | 8.4 | 12.2 | 15.9 | 9.8 | 12.8 | 10.2 | 1.8 | 180 | 402.4 | 36.3 | 3.6 |
| 6 | Thu | 20.9 | 9.1 | 13.8 | 19.9 | 9.8 | 14.7 | 18.8 | 4.6 | 282 | 417.4 | 98.2 | 0.0 |
| 7 | Fri | 18.1 | 5.1 | 12.0 | 17.1 | 6.6 | 12.7 | 21.2 | 5.0 | 250 | 554.2 | 70.7 | 0.0 |
| 8 | Sat | 17.6 | 8.5 | 13.3 | 16.7 | 10.6 | 13.7 | 25.9 | 10.7 | 286 | 459.1 | 101.3 | 0.0 |
| 9 | Sun | 18.9 | 11.8 | 15.0 | 18.1 | 12.8 | 15.3 | 29.6 | 11.9 | 285 | 433.3 | 103.6 | 0.0 |
| 10 | Mon | 18.4 | 4.4 | 12.1 | 17.4 | 6.0 | 13.3 | 26.2 | 6.9 | 280 | 422.5 | 101.0 | 0.0 |
| 11 | Tue | 19.4 | 2.4 | 9.1 | 18.5 | 3.7 | 10.4 | 12.5 | 2.9 | 224 | 434.2 | 104.8 | 0.0 |
| 12 | Wed | 17.5 | 2.8 | 8.1 | 16.8 | 4.0 | 8.9 | 11.4 | 2.3 | 257 | 438.3 | 105.4 | 0.0 |
| 13 | Thu | 19.4 | 3.9 | 10.6 | 18.0 | 5.5 | 11.5 | 10.5 | 2.4 | 183 | 559.1 | 93.2 | 0.0 |
| 14 | Fri | 21.1 | 4.6 | 10.7 | 20.7 | 5.7 | 11.7 | 13.3 | 2.4 | 207 | 442.5 | 106.3 | 0.0 |
| 15 | Sat | 22.4 | 4.1 | 10.8 | 21.8 | 5.2 | 12.0 | 9.6 | 2.5 | 230 | 455.8 | 109.5 | 0.0 |
| 16 | Sun | 23.0 | 7.0 | 12.5 | 21.9 | 9.3 | 14.0 | 20.1 | 3.2 | 199 | 466.7 | 104.2 | 0.0 |
| 17 | Mon | 20.8 | 9.6 | 13.0 | 18.8 | 9.9 | 13.1 | 16.9 | 2.4 | 214 | 618.3 | 54.9 | 17.4 |
| 18 | Tue | 19.5 | 7.9 | 12.1 | 18.5 | 8.3 | 12.6 | 15.1 | 2.3 | 182 | 616.6 | 77.5 | 0.0 |
| 19 | Wed | 20.1 | 7.9 | 12.5 | 19.8 | 9.6 | 13.3 | 10.8 | 3.1 | 216 | 597.4 | 69.3 | 0.2 |
| 20 | Thu | 17.2 | 1.8 | 7.8 | 15.2 | 2.7 | 8.2 | 17.9 | 3.7 | 224 | 462.5 | 113.3 | 0.0 |
| 21 | Fri | 18.2 | 2.9 | 8.1 | 17.6 | 4.6 | 9.6 | 11.4 | 2.5 | 234 | 480.8 | 108.6 | 0.4 |
| 22 | Sat | 17.2 | 6.5 | 10.7 | 16.8 | 7.0 | 11.4 | 15.4 | 4.1 | 253 | 550.8 | 62.9 | 1.2 |
| 23 | Sun | 17.5 | 4.3 | 10.4 | 15.9 | 4.8 | 10.7 | 15.3 | 3.2 | 218 | 585.0 | 101.3 | 0.0 |
| 24 | Mon | 18.3 | 8.5 | 12.2 | 16.2 | 8.8 | 12.0 | 11.9 | 3.3 | 217 | 661.6 | 72.8 | 27.8 |
| 25 | Tue | 15.9 | 6.6 | 10.7 | 16.0 | 6.9 | 11.0 | 10.9 | 2.2 | 245 | 635.8 | 61.3 | 4.6 |
| 26 | Wed | 18.5 | 6.0 | 11.4 | 17.1 | 6.1 | 11.7 | 11.6 | 2.1 | 233 | 680.0 | 72.2 | 0.0 |
| 27 | Thu | 20.1 | 5.2 | 10.9 | 19.4 | 6.1 | 11.6 | 9.9 | 2.3 | 226 | 478.3 | 116.6 | 0.2 |
| 28 | Fri | 21.0 | 5.1 | 11.5 | 20.1 | 6.2 | 12.2 | 9.7 | 2.7 | 190 | 477.5 | 118.4 | 0.0 |
| 29 | Sat | 23.3 | 8.5 | 13.2 | 22.1 | 9.9 | 14.3 | 16.9 | 2.6 | 203 | 605.0 | 108.3 | 0.0 |
| 30 | Sun | 23.8 | 9.8 | 14.9 | 23.3 | 11.4 | 15.7 | 12.5 | 2.6 | 194 | 611.6 | 112.2 | 0.0 |
| 31 | Mon | 25.1 | 8.5 | 16.2 | 24.3 | 10.1 | 17.6 | 18.8 | 3.7 | 257 | 609.2 | 108.4 | 0.0 |
| Ave or Total | | 19.3 | 6.5 | 11.7 | 18.3 | 7.6 | 12.4 | 15.3 | 3.7 | 231.0 | 512.8 | 90.0 | 58.2 |
| High | | 25.1 | 11.8 | 16.2 | 24.3 | 12.8 | 17.6 | 29.6 | 11.9 | | 680.0 | 118.4 | 27.8 |
| Low | | 14.6 | 1.8 | 7.8 | 14.2 | 2.7 | 8.2 | 8.7 | 1.8 | | 272.4 | 36.3 | |
| Notes: 1. Values are for the 24 hour period from 9am to 9am next day. | | | | | | | | | | | | No. rain days >1mm: | 6 |
| 2. Values are for the 24 hours to 9am. | | | | | | | | | | | | | |

Figure 3 Weather Records Summary – July 2023.

7.0 Production Data

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

Table 13 Quarry Production Dat.

| 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 |
| Jul-23 | 2,534 | 56,165 |

8.0 Reporting

8.1 Reportable Environmental Incidents

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

8.2 Reportable Non-Compliances

During the July 2023 reporting period, no reportable non-compliances were identified at the Quarry.

8.3 Community Complaints

During the July 2023 reporting period, no community complaints were received by the Quarry.

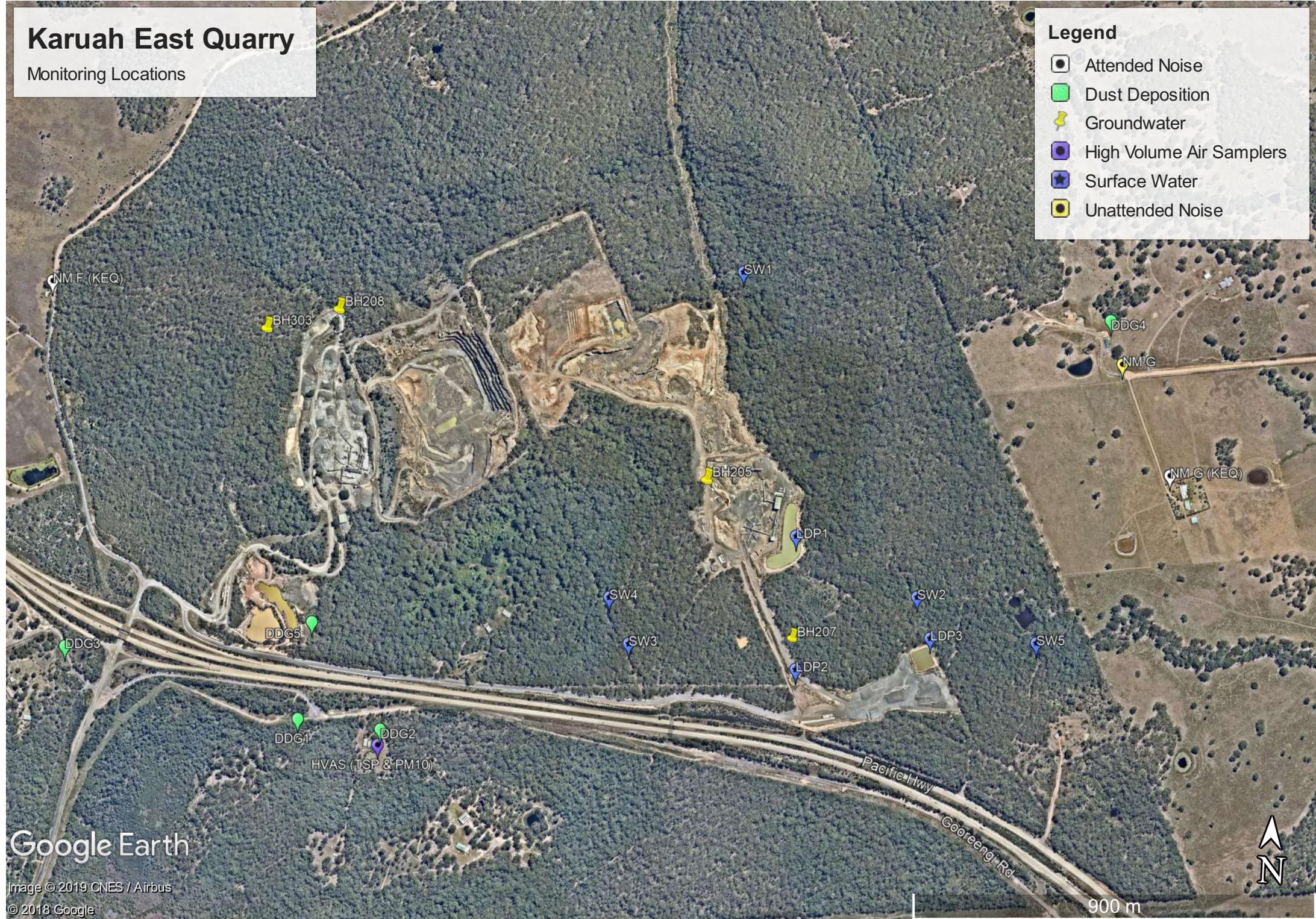
Appendix 1 – EPL 20611 Monitoring Locations

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

