

# Noise Monitoring Assessment

Tinda Creek Quarry,  
Tinda Creek, NSW

April 2018

# Document Information

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Tinda Creek Quarry, Tinda Creek, NSW

April 2018

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Limited (RWC) on behalf of Hy-Tec Industries Pty Ltd (Hy-Tec) to complete a Noise Monitoring Assessment (NMA) for the Tinda Creek Quarry, Tinda Creek, NSW (the 'project').

The monitoring has been conducted in accordance with the approved Tinda Creek Quarry Noise Management Plan and in general accordance with Conditions L3.1 and M5 of EPL#12007 (EPL).

The assessment was conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence EPL#12007;
- Umwelt Pty Ltd, Tinda Creek Quarry Noise Management Plan (NMP); and
- Australian Standard AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

This assessment was undertaken on Wednesday 18 April 2018 and forms part of the noise monitoring program to address conditions of EPL#12007, and the Noise Management Plan.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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## 2 Noise Criteria

### 2.1 Attended Noise Compliance

Section L3.1 of the Tinda Creek EPL, approved on 3 March 2017, outlines the applicable noise criteria for all privately owned residential receivers surrounding the project. The operating criteria specified in the EPL at all receivers is 35dBA LAeq(15min) for all periods and 45dBA LAmax during the night time period. **Table 1** presents the criteria for privately owned residential receivers surrounding the project, as outlined in the EPL.

| Table 1 Noise Criteria         |                   |                     |
|--------------------------------|-------------------|---------------------|
| Receiver                       | All Hours         | Night (10pm to 7am) |
|                                | dB(A) LAeq(15min) | dB(A) LAmax         |
| All privately owned residences | 35                | 45                  |

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### 3 Methodology

#### 3.1 Locality

The project is located on Putty Road, Tinda Creek, NSW approximately 67km north of Windsor, NSW. Receivers in the locality surrounding the project are primarily rural/residential. Putty Road is situated to the west of the site with the Yengo National park bordering the site in all other directions.

#### 3.2 Noise Monitoring Locations

Section M5.1 of the EPL specifies that noise monitoring is to be conducted for a minimum duration of 1 hour at the boundary of R1, (6255 Putty Road, Mellong) as detailed in Figure 6.1 of the Tinda Creek Noise Management Plan.

It should be noted that access to the property was not possible during the time of the noise measurements. Therefore, attended measurements were conducted at the boundary gate (NM1) of the property, as shown in **Figure 1**.

Following a request from the Department of Environment and Planning (DPE) on 20 January 2017, two additional near-field monitoring locations were selected to quantify project noise levels and limiting noise influence from Putty Road. The locations include a position adjacent to the dam and a second location adjacent to the main plant. The noise levels monitored at these locations were used to quantify the overall sound power of the onsite operations, which was then used to calculate the noise contribution at surrounding noise sensitive receivers.

The three monitoring locations, their MGA 56 coordinates and duration of measurement period are outlined in **Table 2** and are presented graphically in the locality plan shown in **Figure 1**.

| Table 2 Receiver Locations |                   |             |         |          |                       |
|----------------------------|-------------------|-------------|---------|----------|-----------------------|
| Receiver ID                | Receiver Location | Coordinates |         | Duration | Periods Monitored     |
| R1                         | 6255 Putty Road   | 284801      | 6329055 | 1 Hour   | Morning Shoulder, Day |
| Q1                         | Dam Plant         | 286026      | 6328048 | 15 mins  | Morning Shoulder, Day |
| Q2                         | Main Plant        | 285987      | 6327885 | 15 mins  | Morning Shoulder, Day |

### 3.3 Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 18 April 2018. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA.

Four noise measurements of 15 minutes in duration were conducted at the R1 monitoring location and where possible, throughout each survey, the operator quantified the contribution of each significant noise source. Additionally, one 15-minute measurement was conducted at each nearfield monitoring location during the day and morning shoulder monitoring periods to quantify the noise from the quarry. Nearfield measurements were supplemented with unattended monitoring during the morning shoulder period.

### 3.4 Operational Log




Transportation activities commenced at 5:30am and work shifts including operation of processing equipment commenced at 7:00am on the day of the survey. Morning shoulder measurements were conducted from 5:45am to 6:45am on 18 April 2018 to capture the onsite loading and transportation operations. Daytime operations commenced at approximately 8:40am following plant maintenance with the daytime monitoring being conducted from 8:45am to 11:00am.



**FIGURE 1**  
**LOCALITY PLAN**  
REF: MAC180647



**KEY**

-  **R1** RECEIVER LOCATION
-  **NM1** NOISE MONITORING LOCATION
-  PROJECT BOUNDARY





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## 4 Results

### 4.1 Morning Shoulder Results

Four attended noise measurements of 15-minutes in duration were completed during the morning shoulder assessment period at NM1 on Wednesday 18 April 2018. **Table 3** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

**Table 3 Operator-Attended Noise Survey Results – Morning Shoulder Period, Location NM1**

| Date   | Time (hrs) | Descriptor (dBA re 20 $\mu$ Pa) |                  |                  | Meteorology        | Description and SPL, dBA |
|--|------------|---------------------------------|------------------|------------------|--------------------|--------------------------|
|  |            | L <sub>Amax</sub>               | L <sub>Aeq</sub> | L <sub>A90</sub> |                    |                          |
| 18/4/18  | 05:43      | 65                              | 45               | 24               | Dir: E             | Traffic 38-65            |
|  |            |                                 |                  |                  | Wind Speed: 0.1m/s | Birds 26-28              |
|  |            |                                 |                  |                  | Rain: Nil          | Quarry Hum 18-21         |
| 18/4/18  | 05:58      | 63                              | 44               | 25               | Dir: E             | Traffic 34-63            |
|  |            |                                 |                  |                  | Wind Speed: 0.1m/s | Quarry Hum 20-22         |
|  |            |                                 |                  |                  | Rain: Nil          | Wildlife 40-46           |
| 18/4/18  | 06:13      | 63                              | 42               | 25               | Dir: E             | Traffic 32-63            |
|  |            |                                 |                  |                  | Wind Speed: 0.1m/s | Quarry Hum 19-21         |
|  |            |                                 |                  |                  | Rain: Nil          | Wildlife 32-46           |
| 18/4/18  | 06:29      | 65                              | 46               | 21               | Dir: E             | Traffic 33-65            |
|  |            |                                 |                  |                  | Wind Speed: 0.1m/s | Quarry Hum 19-22         |
|  |            |                                 |                  |                  | Rain: Nil          | Birds 25-30              |
| Tinda Creek Quarry L <sub>Aeq</sub> (15min) Contribution |            |                                 |                  |                  |                    | 20                       |

Unattended noise monitoring was completed during the morning shoulder assessment period at Q1 and Q2 on Wednesday 18 April 2018 to supplement the attended monitoring data. **Table 4** presents the monitored 15-minute noise levels, observed on-site activities (during deployment) and meteorological conditions at the time of measurements.

**Table 4 Unattended Noise Survey Results – Morning Shoulder Period, Location Q1 and Q2**

| Location | Date    | Time (hrs) | Descriptor (dBA re 20 $\mu$ Pa) |                  |                  | Meteorology        | Onsite Activities |
|----------|---------|------------|---------------------------------|------------------|------------------|--------------------|-------------------|
|          |         |            | L <sub>Amax</sub>               | L <sub>Aeq</sub> | L <sub>A90</sub> |                    |                   |
| Q1       | 18/4/18 | 05:45      | 68                              | 54               | 47               | Dir: E             | Sand Plant        |
| Q2       | 18/4/18 | 05:45      | 92                              | 70               | 53               | Wind Speed: 0.1m/s | Generator         |
|          |         |            |                                 |                  |                  | Rain: Nil          | Loader            |
|          |         |            |                                 |                  |                  |                    | Export Trucks     |

## 4.2 Day Assessment Results

Operational attended noise monitoring was completed during the daytime assessment period at NM1 on Wednesday 18 April 2018. **Table 5** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

**Table 5 Operator-Attended Noise Survey Results – Day Period, Location NM1**

| Date   | Time (hrs) | Descriptor (dBA re 20 µPa) |                  |                  | Meteorology                               | Description and SPL, dBA   |
|--|------------|----------------------------|------------------|------------------|---|--|
|  |            | L <sub>Amax</sub>          | L <sub>Aeq</sub> | L <sub>A90</sub> |   |  |
| 18/4/18  | 09:57      | 66                         | 47               | 24               | Dir: E<br>Wind Speed: 0.2m/s<br>Rain: Nil | Birds 27-32<br>Quarry Hum 20-22<br>Traffic 35-66<br>Aircraft 33-38                 |
| 18/4/18  | 10:13      | 63                         | 45               | 26               | Dir: E<br>Wind Speed: 0.3m/s<br>Rain: Nil | Traffic 50-64<br>Birds 32-54<br>Leaves 29-34<br>Aircraft 34-38<br>Quarry Hum 18-20 |
| 18/4/18  | 10:28      | 62                         | 45               | 24               | Dir: E<br>Wind Speed: 0.1m/s<br>Rain: Nil | Traffic 55-62<br>Aircraft 36-47<br>Quarry 22-24                                    |
| 18/4/18  | 10:44      | 64                         | 44               | 23               | Dir: E<br>Wind Speed: 0.1m/s<br>Rain: Nil | Traffic 50-64<br>Birds 36-38<br>Aircraft 32-34<br>Quarry hum 20-24                 |
| Tinda Creek Quarry L <sub>Aeq</sub> (15min) Contribution |            |                            |                  |                  |   | 20   |

Attended noise monitoring was completed during the daytime assessment period at Q1 and Q2 on Wednesday 18 April 2018. **Table 6** presents the monitored noise level contributions and observed meteorological conditions for each measurement

**Table 6 Attended Noise Survey Results – Day Period, Location Q1 and Q2**

| Location | Date    | Time (hrs) | Descriptor (dBA re 20 µPa) |                  |                  | Meteorology                               | Description and SPL, dBA  |
|----------|---------|------------|----------------------------|------------------|------------------|---|---|
|          |         |            | L <sub>Amax</sub>          | L <sub>Aeq</sub> | L <sub>A90</sub> |   |   |
| Q1       | 18/4/18 | 08:46      | 71                         | 57               | 53               | Dir: E<br>Wind Speed: 0.2m/s<br>Rain: Nil | Generator 62-63<br>Main plant 60-62                                       |
| Q2       | 18/4/18 | 09:05      | 77                         | 65               | 63               | Dir: E<br>Wind Speed: 0.2m/s<br>Rain: Nil | Generator 52-54<br>Onsite Truck 45-71<br>Main Plant 51-54<br>Loader 50-60 |

## 5 Noise Compliance Assessment

### 5.1 Attended Noise Measurement Compliance Assessment

The compliance assessment summary for R1 are presented in **Table 7** for day and morning shoulder assessment periods and compares project contributions against relevant criteria.

| Table 7 Day and Morning Shoulder Noise Compliance Assessment |                           |                          |           |
|--|---------------------------|--------------------------|-----------|
| Period   | Quarry Noise Contribution | Quarrying Noise Criteria | Compliant |
|  | LAeq(15min)               | LAeq(15min)              |           |
| Day  | 20                        | 35                       | ✓         |
| Morning Shoulder   | 20                        | 35                       | ✓         |

### 5.2 Calculated DPE Assessment Methodology

From the noise measurements at monitoring location Q1 and Q2 the LAeq(15min) sound power of the quarry was calculated to be 108dBA. The contribution at each of the receivers R1 to R3 has been calculated taking into account loss due to distance and topography. This noise level was propagated to the surrounding noise sensitive receivers, with the calculated received noise level presented in **Table 8**. Results of the calculations generally align with the measured noise contributions from the project and therefore validate compliance.

| Table 8 Calculated DPE Compliance Assessment |                    |                      |                          |                                   |   |
|--|--------------------|----------------------|--------------------------|-----------------------------------|---|
| Receiver                                     | Quarry Sound Power | Distance to Receiver | Distance attenuation, dB | Attenuation due to Topography, dB | Calculated Quarry Contribution, LAeq(15min) |
| R1   | 108                | 2050                 | 74                       | 12                                | 22  |
| R2   | 108                | 2210                 | 75                       | 12                                | 21  |
| R3   | 108                | 2030                 | 74                       | 12                                | 22  |

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## 6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment for RW Corkery & Co Pty Limited on behalf of Hy-Tec Industries Pty Ltd at the Tinda Creek Quarry, Tinda Creek, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in EPL#12007 for the nominated residential receiver surrounding the quarry.

Operator attended noise monitoring was undertaken on Wednesday 18 April 2018 at the nominated monitoring location with quarry noise contributions compared against the relevant criteria.

The assessment has identified that noise emissions generated by Tinda Creek Quarry comply with relevant noise criteria specified in EPL#12007 at the assessed receiver location for both the morning shoulder and daytime monitoring periods.

Furthermore, the calculated noise contribution at two nearfield reference locations demonstrate that project noise contributions satisfy relevant criteria at R1, R2 and R3.

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# Appendix A – Glossary of Terms

Table A1 provides a number of technical terms have been used in this report.

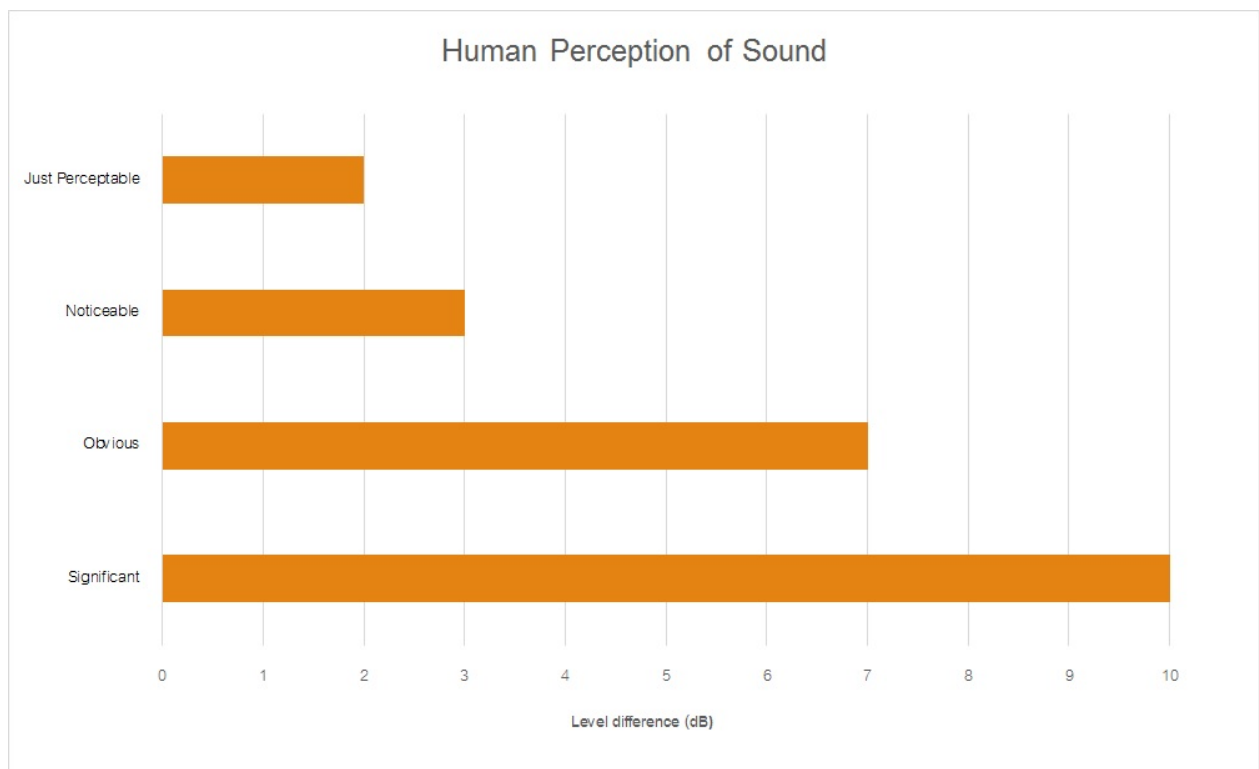
| Table A1 Glossary of Terms |   |
|----------------------------|---|
| Term                       | Description   |
| 1/3 Octave                 | Single octave bands divided into three parts  |
| Octave                     | A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.   |
| ABL                        | Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.  |
| Adverse Weather            | Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).   |
| Ambient Noise              | The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.   |
| A Weighting                | A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.   |
| dBA                        | Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.   |
| dB(Z), dB(L)               | Decibels Linear or decibels Z-weighted.   |
| Hertz (Hz)                 | The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.   |
| LA10                       | A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.  |
| LA90                       | Commonly referred to as the background noise, this is the level exceeded 90 % of the time.  |
| LAeq                       | The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.   |
| LAm <sub>ax</sub>          | The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.  |
| RBL                        | The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.  |
| Sound power level (LW)     | This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by :<br>$= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W <sub>0</sub> is the sound reference power at 10-12 watts. |

Table A2 provides a list of common noise sources and their typical sound level.

**Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA**

| Source                              | Typical Sound Level |
|-------------------------------------|---------------------|
| Threshold of pain                   | 140                 |
| Jet engine                          | 130                 |
| Hydraulic hammer                    | 120                 |
| Chainsaw                            | 110                 |
| Industrial workshop                 | 100                 |
| Lawn-mower (operator position)      | 90                  |
| Heavy traffic (footpath)            | 80                  |
| Elevated speech                     | 70                  |
| Typical conversation                | 60                  |
| Ambient suburban environment        | 40                  |
| Ambient rural environment           | 30                  |
| Bedroom (night with windows closed) | 20                  |
| Threshold of hearing                | 0                   |

**Figure A1 – Human Perception of Sound**



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