3 November 2021

Ref: 8413/29569

Metromix Pty Ltd
150 Rhondda Road
Teralba NSW 2284

ADDITIONAL NOISE MONITORING RESULTS, NOVEMBER 2021 – TERALBA QUARRY

This letter report presents the results of attended noise monitoring conducted for the Metromix operated Teralba Quarry (TQ) during the day-shoulder and day periods on Tuesday 2nd and Wednesday 3rd of November, 2021. Noise monitoring was carried out generally in accordance with the conditions of the TQ Noise Management Plan (NMP) as shown in extract on page 2 (referenced from EPL 536).

During the previous noise compliance monitoring for the quarry, in August 2021, the noise criterion was exceeded at two locations (EPL – D and EPL – E) during the day-shoulder and day time monitoring periods. Noise from mobile crushing activities were identified as the source of the elevated noise levels.

The current, follow up, noise monitoring was undertaken whilst similar mobile crushing activities were underway, but with a series of management measures in place to minimise the potential for noise emissions to create adverse impacts.

Table 1 lists the address and coordinates of the noise monitoring locations detailed in the NMP, with the relevant monitoring locations that were monitored during the November 2021 period highlighted in **bold**. The locations are shown on the figure in **Appendix I**.

Table 1
Noise Monitoring Locations (from PA 10-0183)

Location in EPL	Address	Easting	Northing
EPL-A	Awaba Street, Teralba	369080	3651470
EPL-B	Rhondda Road, Teralba	369250	6351915
EPL-C	Rhondda Road, Teralba	369205	6352015
EPL-D	**Rhondda Road, Teralba**	**369150**	**6352135**
EPL-E	**Victoria Avenue, Teralba**	**369060**	**6352620**
EPL-F	Victoria Avenue, Teralba	369130	6352945
EPL-H	School Road, Wakefield	366210	6352520

The following presents noise related conditions of EPL 536 relevant to compliance noise monitoring.

<table>
<tr><th>Condition</th><th>Requirement</th></tr>
<tr><td>L5.2</td><td>The licensee must ensure that noise generated by the activities within the premises do not exceed the following criteria measured by dB(A) at any residence or privately owned land.
<table>
<tr><th>Location</th><th>Day Shoulder 6:00am - 7:00am</th><th>Day 7:00am - 6:00pm</th><th>Evening 6:00pm – 10:00pm</th><th>Night 10:00pm – 6:00am</th></tr>
<tr><td></td><td>$L_{Aeq\ (15\ minute)}$</td><td>$L_{Aeq\ (15\ minute)}$</td><td>$L_{Aeq\ (15\ minute)}$</td><td>$L_{Aeq\ (15\ minute)}$
$L_{A1(1min)}$</td></tr>
<tr><td>EPL-A</td><td>38</td><td>38</td><td>37</td><td>35
45</td></tr>
<tr><td>EPL-B</td><td>42</td><td>46</td><td>36</td><td>35
45</td></tr>
<tr><td>EPL-C</td><td>42</td><td>42</td><td>35</td><td>35
45</td></tr>
<tr><td>EPL-D, EPL-E, EPL-H</td><td>35</td><td>35</td><td>35</td><td>35
45</td></tr>
<tr><td>EPL-F</td><td>37</td><td>38</td><td>38</td><td>35
45</td></tr>
</table>
Note: The licensee may provide to the EPA written evidence of any agreement with a landholder which is subject to the above noise limits. The written evidence may be submitted with a licence variation to remove the landholder from the above table.</td></tr>
<tr><td>L5.3</td><td>For the purposes of Condition L5.2:
a) Day-Shoulder is defined as the period between 6am to 7am Monday to Saturday.
b) Day is defined as:
a. the period from 7am to 6pm Monday to Saturday; and
b. the period from 8am to 6pm Sundays and Public Holidays.
c) Evening is defined as the period from 6pm to 10pm.
d) Night is defined as:
a. the period from 10pm to 7am Monday to Saturday; and
b. the period from 10pm to 8am Sundays and Public Holidays.</td></tr>
<tr><td>L5.4</td><td>The contributed noise level from the premises must not exceed the noise limits specified within EPL 536 at the most noise-affected point on or within the boundary of any residential premises to the north and/or south of the premises, except as expressly provided by this licence, or by the EPA in writing.</td></tr>
<tr><td>L5.5</td><td>The noise limits set out in conditions L5.2 apply under all meteorological conditions except for anyone of the following:
a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater the 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.</td></tr>
<tr><td>L5.6</td><td>For the purpose of condition L5.5:
a) the meteorological data to be used for determining meteorological conditions is the data recorded at the meteorological station identified in this licence as EPA Identification Point W1.
b) Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW industrial Noise Policy (EPA 2000)
Note: The weather station must be designed, commissioned and operated in a manner to obtain the necessary parameters required under the above condition.</td></tr>
<tr><td>L5.7</td><td>To determine compliance:
1. With the $L_{Aeq(15\ min)}$ noise limits in condition L5.2, the licensee must locate noise monitoring equipment;
a) approximately on the boundary, where any dwelling is situated 30 metres or less from the property boundary that is closest to the premises; or,</td></tr>
</table>

<table>
<tr><td></td><td>b) within 30 metres of a dwelling facade (but not closer than 3 metres) where any dwelling on the property is situated more than 30 metres from the property boundary that is closest to the premises; or where applicable
c) within approximately 50 metres if the boundary of a national park or nature reserve.
2. With the LA1(1 minute) noise limits in condition L5.2, the noise monitoring equipment must be located within 1 metre of a dwelling facade.
3. With the noise limits in condition L5.2, the noise monitoring equipment must be located;
a) at the most affected point at a location where there is no dwelling at the location, or
b) at the most affected point within an area at a location prescribed by conditions L5.7 1(a) or L5.7 1(b).</td></tr>
<tr><td>L5.8</td><td>A non-compliance will still occur where noise generated from the premises in excess of the appropriate noise limit is measured:
a) at a location other than an area prescribed by the conditions of this licence, and /or
b) at a point other than the most affected point at a location.</td></tr>
<tr><td>L5.9</td><td>For the purpose of determining the noise generated at the premises the licensee must use a Class 1 or Class 2 noise monitoring device as defined by AS IEC61672.1 and AS IEC61672.2-2004, or other noise monitoring equipment accepted by the EPA in writing.</td></tr>
<tr><td>L5.10</td><td>For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.</td></tr>
<tr><td>L7.1</td><td>The licensee must comply with the operating hours specified in Column 2, Column 3, and Column 4 of the table below:
<table>
<tr><th>Day</th><th>Loading and Dispatch of Quarry Trucks</th><th>Extraction and Processing</th><th>Receipt of Concrete</th></tr>
<tr><td>Monday - Friday</td><td>4:00am Monday to midnight Friday</td><td>7:00am to 7:00pm</td><td>7:00am to 5:00pm</td></tr>
<tr><td>Saturday</td><td>Midnight Friday to 6:00pm Saturday</td><td>7:00am to 2:00pm</td><td>7:00am to 2:00pm</td></tr>
<tr><td>Sundays and Public Holidays</td><td>None</td><td>none</td><td>none</td></tr>
</table>
Note: Maintenance activities may occur at any time provided they are inaudible at privately-owned residence.
*VENM = Virgin Excavated Natural Material
**ENM = Excavated Natural Material</td></tr>
</table>

M9 Noise monitoring

M9.1 To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.

POINT 12,13,15,16,18

Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period
Day	2 times a year	1.5 hours	3 consecutive operation days
Evening	2 times a year	30 minutes	3 consecutive operation days
Night	2 times a year	1 hour	3 consecutive operation days

M9.2 The licensee must undertake the operator attended noise monitoring at each one of or at one or more noise monitoring points that is representative of the worse-case location(s) listed in this licence.

NOISE MEASUREMENTS

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration of each instrument was carried out at the start and end of each monitoring period.

The noise monitoring was conducted in general accordance with the requirements of Section 9 of the NMP (Noise Monitoring Protocol and Evaluation of Compliance) as follows;

"*Metromix proposes to adopt a noise monitoring protocol that provides feedback on the effectiveness of the noise control measures and demonstrate compliance with the conditions within the Project Approval 10_0183 and Environment Protection Licence 0536.*

The approach to monitoring compliance is based substantially upon Metromix's experience to date which has identified the on-site activities have not been the source of noise complaints or any recorded non-compliance. Hence, it is considered the monitoring program needs to reflect this fact."

A-weighted noise levels were measured over 15 minute monitoring periods with data acquired at 1 second statistical intervals and the meter set to "fast" response. Each 1 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

The worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TQ was audible, Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the quarry and other significant noise sources to the overall level.

The measured noise levels are shown in the tables of results below. Quarry noise from TQ is shown in bold type.

Noise levels were recorded for each of the L10, Leq, Lmax, L1, L90 and Lmin percentiles. All noise levels shown in the tables of results are in dB(A) Leq (15 min). Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request.

Meteorological data used in this report was obtained from the quarry-operated weather station at the site. The wind speeds and directions shown in the tables of results are the arithmetic average of the five minute measurement periods throughout the entire noise monitoring period at each site.

Noise Compliance Assessment

The results of the noise measurements undertaken throughout the various time periods are provided in **Tables 2** to **5**. EPL 536 refers to the various time periods as follows:

a) Day-Shoulder is defined as the period between 6am to 7am Monday to Saturday.

b) Day is defined as:

(i) the period from 7am to 6pm Monday to Saturday; and

(ii) the period from 8am to 6pm Sundays and Public Holidays.

Table 2
Teralba Quarry Noise Monitoring Results – 2 November 2021 (Day Shoulder)

Location	Start Time	Total noise dB(A) Leq	Criterion dB(A) Leq	Wind speed (m/s) / direction	Identified Noise Sources (Leq (15 min))
D	6:35 am	54	35	0.3 / 152	Traffic (51), birds (51), **TQ inaudible**
E	6:15 am	50	35	0.3 / 152	Birds (50), traffic (38), domestic noise (35), **TQ inaudible**

Table 3
Teralba Quarry Noise Monitoring Results – 2 November 2021 (Day)

Location	Start Time	Total noise dB(A) Leq	Criterion dB(A) Leq	Wind speed (m/s) / direction	Identified Noise Sources (Leq (15 min))
D	7:00 am	50	35	0.4 / 172	Birds (47), traffic (46), other industry (40), **TQ occasionally audible (<20)**
E	7:00 am	47	35	0.4 / 172	Birds (46), traffic (36), domestic noise, (36), **TQ inaudible**

Table 4
Teralba Quarry Noise Monitoring Results – 3 November 2021 (Day Shoulder)

Location	Start Time	Total noise dB(A) Leq	Criterion dB(A) Leq	Wind speed (m/s) / direction	Identified Noise Sources (Leq (15 min))
D	6:15 am	46	35	1.2 / 32	Birds (46), traffic (32), **TQ inaudible**
E	6:35 am	52	35	1.2 / 32	Birds (52), traffic (35), **TQ inaudible**

Table 5
Teralba Quarry Noise Monitoring Results – 3 November 2021 (Day)

Location	Start Time	Total noise dB(A) Leq	Criterion dB(A) Leq	Wind speed (m/s) / direction	Identified Noise Sources (Leq (15 min))
D	7:00 am	48	35	1.8 / 46	Traffic (46), birds (42), other industry (30), **TQ occasionally audible (<20)**
E	7:00 am	48	35	1.8 / 46	Birds (48), traffic (30), **TQ inaudible**

The results shown in Tables 2 to 5 show that, under the operational and atmospheric conditions at the time of monitoring, noise emissions from TQ did not exceed the relevant criterion at either Location D or E throughout the survey.

Visual inspection of the quarry from Rhondda Road, at these times, identified that the quarry was operating as detailed previously in this report.

The quarry was occasionally audible during the day time period, on both days, at Location D as engine revs and low level hum. This noise was not loud, or consistent, enough to be accurately measurable. The noise level was less than 20 dB(A) Leq (15 min). The quarry was not audible at this location during the day-shoulder period.

At this location noise from other industries within the vicinity, and trains, also contributed to the acoustic environment. Due to the intermittent nature of the noise from these sources the noise from them could be isolated from the worst case 15 minute periods (in relation to quarry noise).

At Location E the noise from the quarry was inaudible during each period on either day.

In addition to the operational noise, the noise from TQ must not exceed **45 dB(A) L1 (1 min)** within the night-time period i.e., between the hours of 10 pm and 7 am, in accordance with *Condition L4.1* of EPL 536. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the quarry. The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents, the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations. It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, a bedroom window is assumed to be facing the operational noise monitoring location.

The noise from the quarry was inaudible at each monitoring location during the night time period (day-shoulder in this reporting) and, therefore, the noise from TQ did not exceed the sleep disturbance criterion.

In summary, the results of this follow up noise monitoring programme have shown that TQ did not exceed its noise limits at the monitored locations during the survey.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 0412 023 455.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Ross Hodge MAAS
Acoustical Consultant

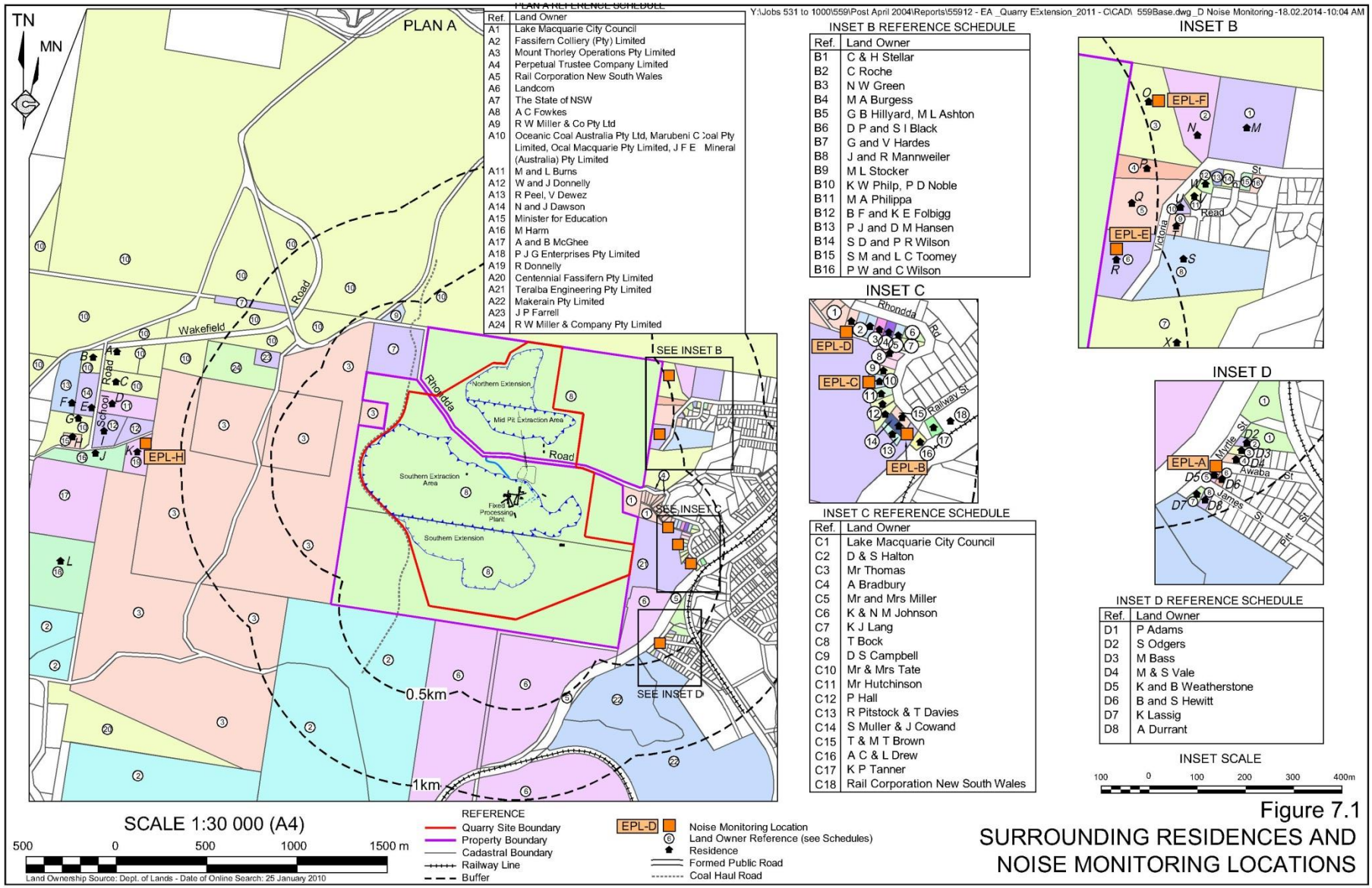

Figure 7.1
SURROUNDING RESIDENCES AND NOISE MONITORING LOCATIONS