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# ATTENDED NOISE MONITORING QUARTER 4 – DECEMBER 2021 Newcastle Sands Williamtown, NSW

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Prepared for:  
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Cabbage Tree Road  
WILLIAMTOWN NSW 2318

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## **APPENDIX A Description of Acoustical Terms**

## **APPENDIX B Calibration Certificate**

## EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Newcastle Sand (NS) quarry on 15, 16 and 17 December 2021. Monitoring was carried out in accordance with requirements of Development Consent (SSD-6125), EPL21264, the Newcastle Sand Noise Management Plan and other relevant Australian Standards and guidelines.

Monitoring was conducted by Neil Pennington (Principal/Director, Spectrum Acoustics).

The site was in full operation during the entire survey period.

The site-specific operational criteria were not exceeded at any location or at any time throughout the monitoring period.

Data from those times where noise from NS operations was audible and measurable were analysed using Bruel & Kjaer “*Evaluator*” software. This analysis showed the noise did not contain any tonal, impulsive and low frequency components as per definitions of “modifying factor corrections” in the NSW Noise Policy for Industry. It is acknowledged that the general area is impacted by low and mid-range frequency noise from Cabbage Tree Road and identification of individual sources requires subjective assessment.

NS was compliant with Environmental Protection Licence (EPL) 21264 and Newcastle Sand Development Consent (SSD-6125) for Quarter 4 (December) 2021.

## 1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for Newcastle Sand (NS) on 15, 16 and 17 December 2021. Monitoring was undertaken in accordance with requirements of Newcastle Sand Noise Management Plan (NMP) dated March 2019. The noise monitoring programme and procedures in the NMP have been developed in accordance with the NS Environmental Protection Licence (EPL) no 21264 and the Newcastle Sand Development Consent (SSD-6125). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

### 1.1 Noise Monitoring Locations

The NMP (Section 8.1) contains a table (Table 8) detailing recommended locations for attended noise monitoring and corresponding identification numbers for each boundary of the site, as follows.

**Table 8: Noise monitoring locations**

Generalised Location	Recommended Receptor ID
Nearest residence to west (at road level)	27
Nearest residence to west elevated on hill crest	14 <sup>1</sup>
Residence due south of quarry	38
Nearest residence to the south east	74

Condition M8.1 of the EPL states that attended noise monitoring is to be undertaken at a location representative of the most affected residences in the noise limit conditions. Monitoring was conducted at receiver number 42 which is representative of receivers south of the site. The monitoring location is also shown on **Figure 1**.

### 1.2 Monitoring Frequency and Duration

EPL21264 indicates that the attended noise monitoring must be conducted quarterly during the morning-shoulder and day periods only. Each quarterly survey is to consist of 30 minute morning-shoulder measurements and 1.5 hour day measurements at one location representative of the most affected residences in the noise limit conditions (in accordance with EPL21264 to be done over a minimum of three consecutive 24 hour periods).



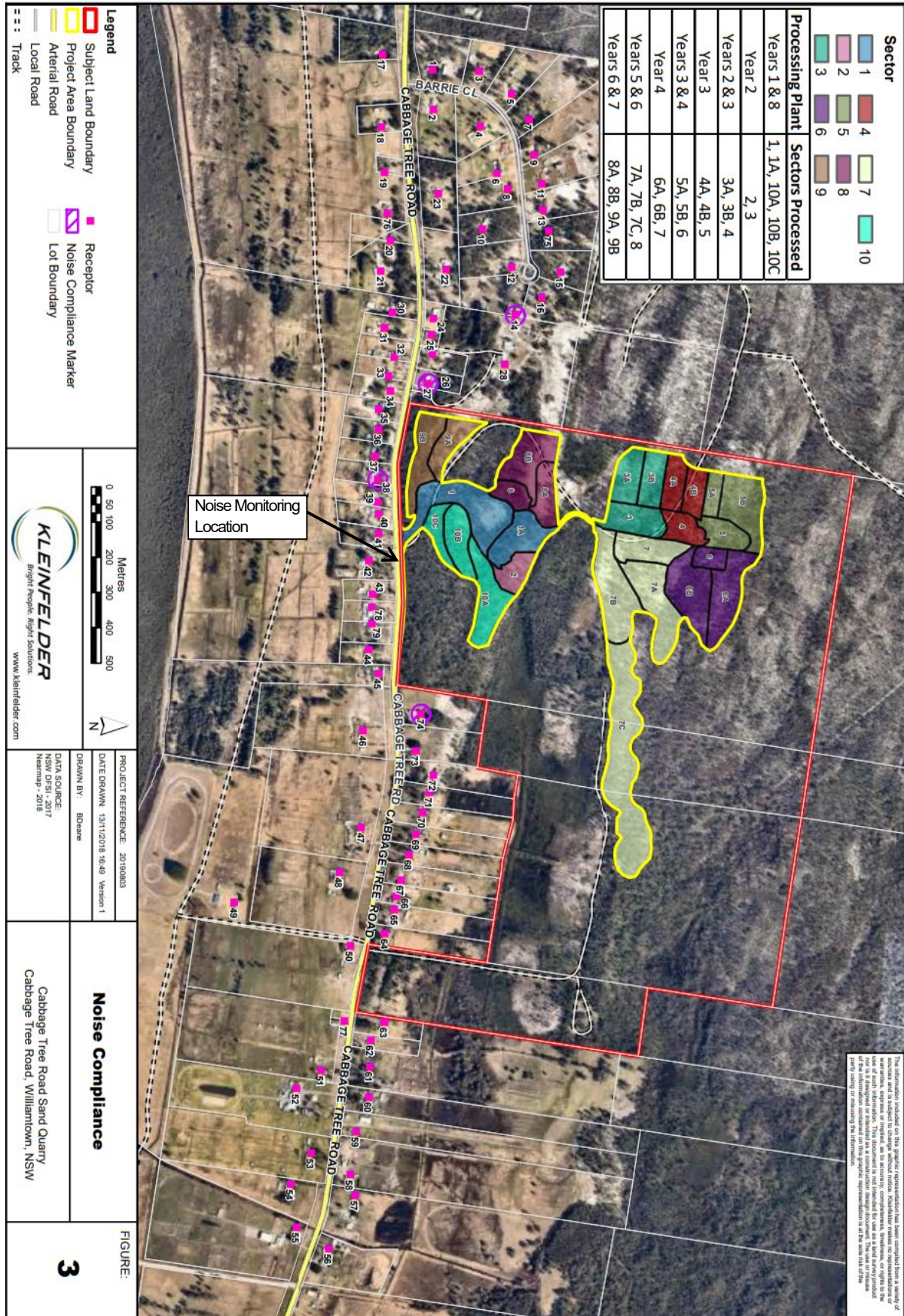


Figure 1  
Noise Monitoring Location

## 2.0 CRITERIA AND CONDITIONS

### 2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L3.1 of the. The criteria vary for each receiver monitoring location. The applicable morning-shoulder and day criterion is shown in the tables of results (**Tables 1 - 6 in Section 4.1**). Noise criteria for all residences listed in the EPL are as shown below. The above noise criteria include the requirement that noise levels at day shoulder must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

Receiver	Day LAeq(15 Min)	Shoulder LAeq(15 Min)	Shoulder LA Max(1 Min)
Any residential receiver	43	39	45

Operational noise generated at the premises must not exceed the noise limits shown in the table above.

### 2.2 Monitoring Location Definition

Condition L3.7 of the EPL states that to determine compliance with the Leq (15 min) operational noise limits the noise measurement equipment must be measured at the most affected point on or within the residential boundary, or at the most affected point within 30m of the dwelling where the dwelling is more than 30m from the boundary.

### 2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

### 2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

## 3.0 NOISE MONITORING PROCEDURE

### 3.1 Monitoring Equipment

Attended noise monitoring was conducted with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2004 and has current NATA calibration. Calibration certificates are included in Appendix C. Field calibration is carried out at the start and end of each monitoring period.



A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to “fast” response. Each 1 or 2 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.

### 3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NS was audible, Bruel & Kjaer “Evaluator” analysis software was used to quantify the contributions of NS and other significant noise sources to the overall noise level. Quarry noise from NS is shown in the tables in bold type.

### 3.3 Meteorological Data

Meteorological data used in this report were taken from the Williamstown Bureau of Meteorology Station.

## 4.0 RESULTS AND DISCUSSION

### 4.1 Measured Noise Levels

#### 4.1.1 NS Operations

Measured noise levels at the monitoring location are summarised in **Tables 1 - 6**.

Table 1 NS Operational Noise Monitoring Results – 15 December 2021 (Morning-Shoulder)						
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) <sup>1</sup>	Criterion dB(A), L1 (1min) <sup>1</sup>	Identified Noise Sources, LAeq
R42	6:32am	75	39	<20	45	Traffic (75), birds (52), <b>NS (&lt;20)</b>

1. L1 (1 min) from NS quarry noise only.

Table 2 NS Operational Noise Monitoring Results – 15 December 2021 (Day)				
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Identified Noise Sources, LAeq
R42	7:15am	76	43	Traffic (76), birds (49), <b>NS (&lt;20)</b>

Table 3 NS Operational Noise Monitoring Results – 16 December 2021 (Morning-Shoulder)						
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) <sup>1</sup>	Criterion dB(A), L1 (1min) <sup>1</sup>	Identified Noise Sources, LAeq
R42	6:30am	78	39	<20	45	Traffic (78), birds (49), <b>NS (&lt;20)</b>

1. L1 (1 min) from NS quarry noise only.

Table 4 NS Operational Noise Monitoring Results – 16 December 2021 (Day)				
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Identified Noise Sources, LAeq
R42	7:15am	77	43	Traffic (77), birds (46), <b>NS (&lt;20)</b>

Table 5 NS Operational Noise Monitoring Results – 17 December 2021 (Morning-Shoulder)						
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) <sup>1</sup>	Criterion dB(A), L1 (1min) <sup>1</sup>	Identified Noise Sources, LAeq
R42	6:31am	76	39	<20	45	Traffic (76), birds (52), <b>NS (&lt;20)</b>

1. L1 (1 min) from NS quarry noise only.

Table 6 NS Operational Noise Monitoring Results – 17 December 2021 (Day)				
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Identified Noise Sources, LAeq
R42	7:15am	77	43	Traffic (77), birds (47), <b>NS (&lt;20)</b>

## 4.2 Discussion of Results

The results in **Tables 1-6** show that, under the operating and meteorological conditions at the times, for the 30 minute (morning-shoulder) and 1.5 hour (day) compliance measurement periods, the quarry noise from NS was inaudible at the monitoring location. All of the noise measurements were made under compliant meteorological conditions. At the time of this measurement the wind speed at the weather station was less than 3m/s.

### 4.2.1 L1 (1 min)

The noise measurements results in **Tables 1, 3, & 5** (and site observations) show that noise from the operation of NS under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at the monitoring location. Since L1 (1 min) levels were significantly lower than the criterion, at the operational noise monitoring location, measurements at the residential facade was not considered necessary as compliance was assured.



# **APPENDIX A**

## **DESCRIPTION OF ACOUSTICAL TERMS**

**Table A1**  
**Definition of acoustical terms**

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A- Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
L <sub>w</sub>	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

# **APPENDIX B**

## **CALIBRATION CERTIFICATE**



Australian Calibration Laboratory  
Suite 4.03, Level 4, 3 Thomas Holt Drive, Macquarie Park NSW 2113, Australia  
Accredited for compliance with ISO/IEC 17025 - Calibration. Laboratory No. 1301



## CERTIFICATE OF CALIBRATION

Certificate No: CAU2100868

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### CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær	2250	No: 2747794
Microphone:	Brüel & Kjær	4189	No: 2733511
Preamplifier:	Brüel & Kjær	ZC-0032	No: 15339
Supplied Calibrator:	Brüel & Kjær	4231	No: 2466354
Software version:	BZ7224 Version 4.6	Pattern Approval:	PTB
Instruction manual:	BE1712-22	Identification:	N/A

### CUSTOMER:

Spectrum Acoustics Pty Ltd  
Suite 1, 12 Alma Road  
New Lambton NSW 2305

### CALIBRATION CONDITIONS:

Preconditioning:	4 hours at 23 °C
Environment conditions:	see actual values in <i>Environmental conditions</i> sections

### SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The measurements included in this document are traceable to Australian/National standards.

### PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System B&K 3630 with application software type 7763 (version 8.3 - DB: 8.30) and test procedure 2250-4189.

### RESULTS:

	Initial calibration		Calibration prior to repair/adjustment
X	Calibration without repair/adjustment		Calibration after repair/adjustment

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor  $k = 2$  providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of Calibration: 06/12/2021

Certificate issued: 06/12/2021

Sajeeb Tharayil  
Calibration Technician

Craig Patrick  
Approved signatory

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