24 March 2017

Ref: 05148/7076

Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: MARCH 2017 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Ashton Coal Project (ACP) commencing at 10:00 p.m. on Thursday 23 March, 2017.

Noise measurements of fifteen minutes duration were taken in one third-octave bands at the following locations (as shown in Figure 1 in **Appendix A**)

Location 1:	N2
Location 2:	N3
Location 3:	N4

Noise monitoring was conducted as per the requirements of the ACP Noise Management Plan (NMP) version D, effective April 2014. The NMP requires noise monitoring at three locations during the night time period only.

At the time of the current monitoring the open cut mining operations were not operating (the North East Open Cut had finished production). The underground mine was operating. The CHPP was operating during the night. No trains were loaded.

Meteorological data used in this report were supplied by the mine from their automatic weather stations. Wind speeds and direction have been interpreted from data measured over 10 minute intervals. Temperature inversion strength was extrapolated from Sigma Theta data from mine operated weather station.

Noise emission levels were measured with a Brüel & Kjær Type 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 sound level calibrator prior to and at the completion of measurements.

To avoid undue influence of noise from local traffic on roads adjacent to some measurement locations, where practical, this noise has been excluded from the measurements prior to further analysis.

Measured noise levels for the monitoring are summarised in the following table. The total measured Leq is shown in the table. This was analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at ACP is **38 dB(A) Leq (15 min)** for all operating times during the day and evening. At night the noise goal is **36 dB(A) Leq (15 min)**. The contribution of mine noise from ACP is shown in bold. Any exceedance of the noise criteria are shown in red.

Table 1
ACP Noise Monitoring Results, 23 March 2017 (Night)

Location	Time	dB(A) Leq	Comments	WS (m/s)/ Direction	Inversion °C/ 100m	ACP Noise Sources
N2	10:45 pm	44	Insects (42), traffic (39), other mine (32), **ACP inaudible**	0.6/275	Lapse	n/a
N3	11:03 pm	40	Traffic (38), insects (33), other mine (32), **ACP inaudible**	1.1/279	Lapse	n/a
N4	11:25 pm	40	Traffic (39), other mine (31), insects (28), **ACP inaudible**	1.2/284	Lapse	n/a

The results shown in Table 1 indicate that, under the operational and atmospheric conditions at the time, noise emissions from ACP were inaudible and therefore did not exceed the noise criterion at any monitoring location.

Noise emissions from ACP must comply with tonal, impulsive or low frequency modifying factor levels as per definitions in the NSW Industrial Noise Policy. ACP was compliant with all of the above.

In addition to the operational noise, the noise from ACP must not exceed 46 dB(A) L1 (1 min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

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, this is assumed to be facing towards the mine.

The measured L1 (1 min) noise from ACP did not exceed the sleep disturbance criterion at any time or location.

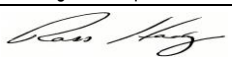
The ACP unattended noise monitor (SX 40) is currently located in the vicinity of the N2 monitoring location. A comparison of the results of the 15 minute attended monitoring at the SX 40 Sentinex location commencing at 10:00 pm and the data from the unattended monitor also commencing at 10:00 pm is shown in **Table 2**.

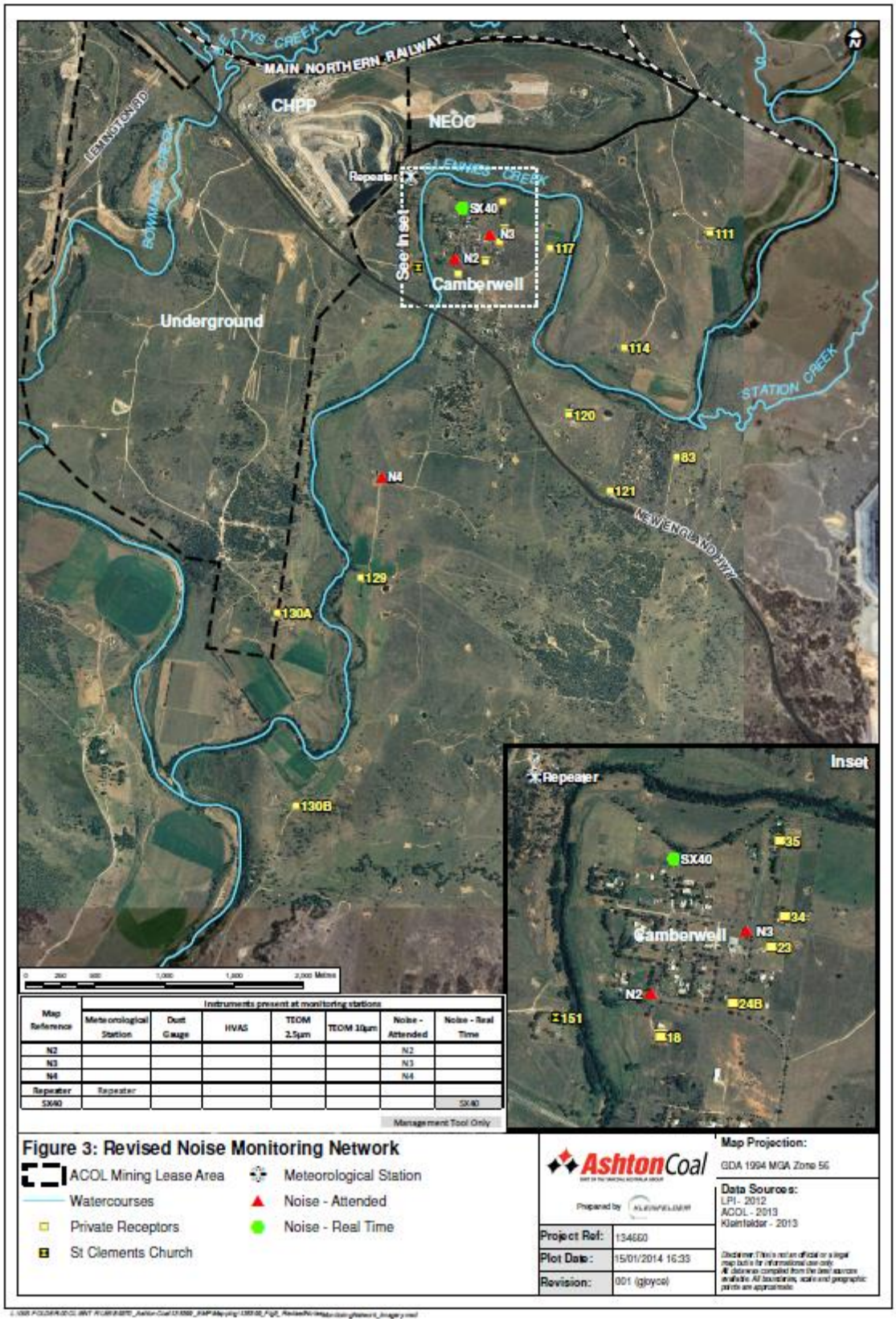
Table 2 Comparison Noise Monitoring Results – 23 March 2017 – SX 40								
Type	**Time**	**dB(A), Leq**	**All Mines dB(A), Leq**	**ACP Contribution dB(A), Leq**	**Criterion dB(A) Leq**	**Wind speed (m/s),dir^{o}**	**Inversion ^{o}C/ 100m**	**Identified Noise Sources**
Attended N2	10:45 pm	44	32	n/a	36	0.6/275	<+3	Insects (42), traffic (39), other mine (32), **ACP inaudible**
Unattended SX 40	10:45 pm	40.7	32	n/a	36	0.6/275	<+3	<1kHz(40.0), >1kHz (32.8)

Monitor SX 40 measures noise levels in all 1/3 octave bands and the analysis of this data shows that the noise in frequencies below 1kHz totals 40.0 dB(A). Noise in these frequencies is often regarded as mining noise (due to the low frequency nature of mining noise at distances removed from the source) but in this instance, as determined by the attended monitoring, noise from traffic on the New England Highway was the dominant low frequency noise source with other mine noise contributing.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Field work / position	**Report Author / position**	**Report Review / position**
T. McCormick / Environmental Engineer	R. Hodge / Principal	N. Pennington / Principal
		


MAIN NORTHERN RAILWAY
CHPP
NEOC
Repeater
See Inset
SX40
N3
N2
Camberwell
Underground
111
117
114
120
83
121
N4
129
130A
130B
STATION CREEK
NEW ENGLAND HWY
Inset
Repeater
35
SX40
34
Camberwell
N3
23
N2
24B
151
18
Instruments present at monitoring stations
Map Reference
Meteorological Station
Dust Gauge
HVAS
TEOM 2.5µm
TEOM 10µm
Noise - Attended
Noise - Real Time
N2
N3
N4
Repeater
SX40
Management Tool Only
Figure 3: Revised Noise Monitoring Network
ACOL Mining Lease Area
Watercourses
Private Receptors
St Clements Church
Meteorological Station
Noise - Attended
Noise - Real Time
AshtonCoal
Prepared by
Project Ref: 134660
Plot Date: 15/01/2014 16:33
Revision: 001 (gjoyce)
Map Projection:
GDA 1994 MGA Zone 56
Data Sources:
LPI - 2012
ACOL - 2013
Klienfelder - 2013

Brüel & Kjær

Australian Calibration Laboratory
Suite 2, 6-10 Talavera Road, North Ryde NSW 2113, Australia

NATA
WORLD RECOGNISED ACCREDITATION
Laboratory No. 1301

CERTIFICATE OF CALIBRATION

Certificate No: CAU1600067 Page 1 of 10

CALIBRATION OF:

Sound Level Meter:	Brüel & Kjær	2250	No: 2653961
Microphone:	Brüel & Kjær	4189	No: 2978778
Preamplifier:	Brüel & Kjær	ZC-0032	No: 23436
Supplied Calibrator:	Brüel & Kjær	None	No: N/A
Software version:	BZ7222 Version 4.5.1	Pattern Approval:	Pending
Instruction manual:	BE1712-18	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 **Environmental conditions** sections*

SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC61672-3:2006 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

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 5.1 - DB: 5.10) 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: 01/02/2016

Sajeeb Tharayil
Calibration Technician

Certificate issued: 01/02/2016

Jan Rasmussen
Approved signatory