

## Appendix 9

---

# NOISE MONITORING RESULTS

## **Attended Noise Monitoring**

June 2010

August 2010 - Crosby

September 2010

December 2010

March 2011



19 July 2010

Ref: 04095/3615

Mr Danny Young  
Tarrawonga Coal Pty Ltd  
PO Box 600  
GUNNEDAH NSW 2380

## RE: TARRAWONGA MINE – JUNE 2010 NOISE MONITORING RESULTS

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on Monday 21st and Tuesday 22<sup>nd</sup> June 2010.

### NOISE CRITERIA

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

<b>Day (Operational Stage) Leq (15 min)</b>	<b>Evening Leq (15 min)</b>	<b>Night Leq (15 min)</b>	<b>Night L1 (1 min)</b>
35	35	35	45

*Table 7: Noise Impact Assessment Criteria dB(A)*

*Notes:*

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
  - wind speeds of up to 3 m/s at 10 metres above ground level; or
  - Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

<b>Day/Evening Leq (1 hr)</b>	<b>Night Leq (1 hr)</b>	<b>Property</b>
60	55	Any residence on privately-owned land.

**Table 8: Road Traffic Noise Criteria dB(A)**

Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources

Section 11.1.3 of the EPA's NSW Industrial Noise Policy (INP) defines non-compliance with noise limits as follows:

*“A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition.”*

The 2 dB ‘tolerance’ is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

*“A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified.”*

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

## NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird <sup>1</sup>	
N2 – “Bollol Creek Station”	J. Picton	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo”	D. Wellwood	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo”	D. Wellwood	Private
“Pine Grove”	J., S., M, & C. Bull	Private
“Brooklyn”	R. Kelly	Public

<sup>1</sup> This property is now mine-owned.

Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

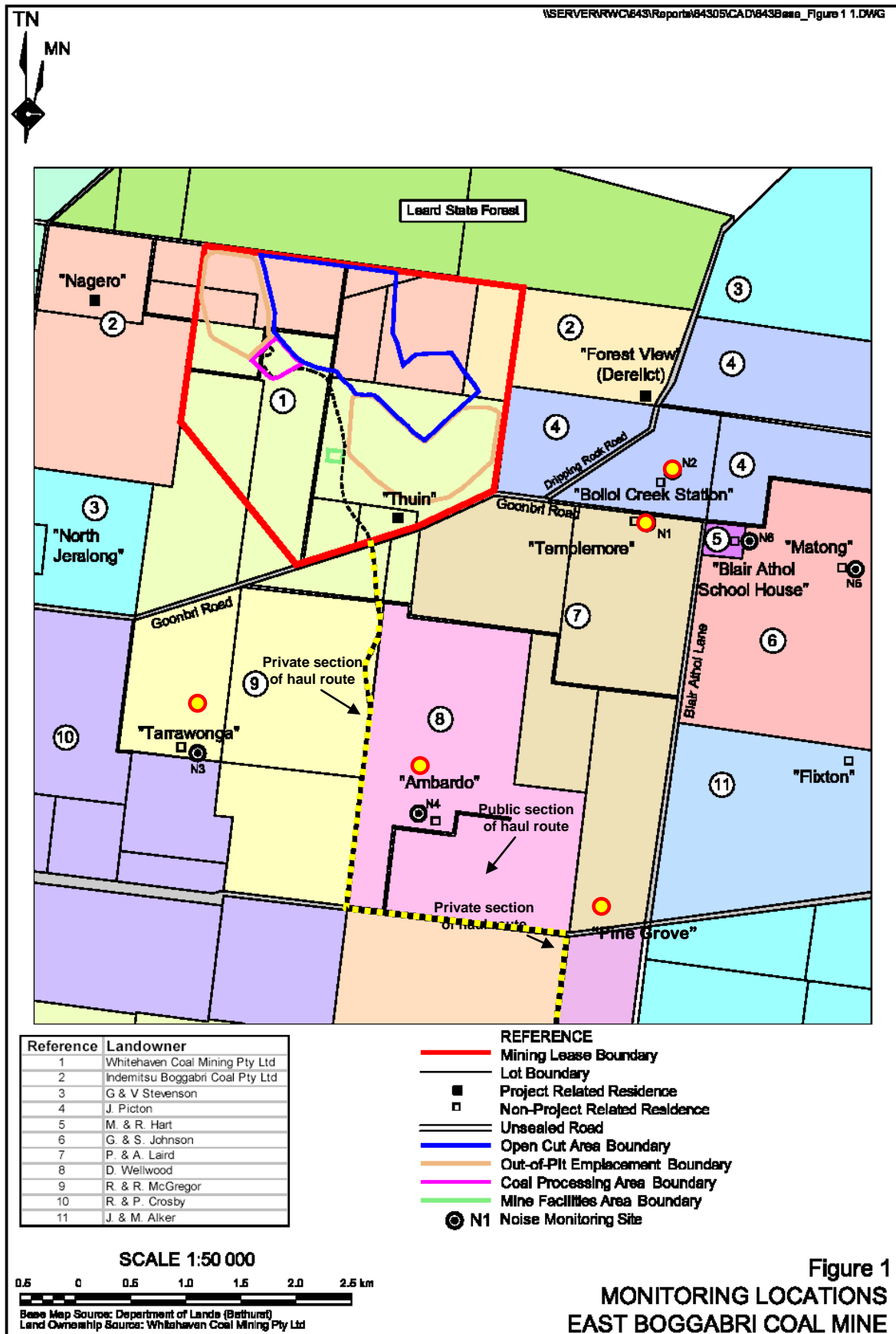
The Kelly residence “Brooklyn” is south of Canyon (formerly Whitehaven) mine on Blue Vale Road and cumulative noise from road haulage of coal is subject to the criteria in Condition 4(7) above. Traffic noise monitoring at this location is the subject of a separate report.

## NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 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.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2m above ground level.



## MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3** and **4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times and all receivers.

Table 2 TCM Noise Monitoring Results – 22 June 2010 (Day)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	8:05 am	43	1.0 m/s SE	Birds & insects (41), Traffic (36), TCM (31)
N3 Tarrawonga	8:25 am	41	1.0 m/s SE	Birds (38), Haul trucks (35), TCM (33)
N4 Ambardo	7:00 am	46	Calm	TCM (43) <sup>1</sup> , Traffic <sup>2</sup> (42), Birds (35)
Pine Grove	7:23 am	48	Calm	Birds (47), TCM (38) <sup>1</sup> , traffic <sup>2</sup> (35)

<sup>1</sup> Trucks on private section of haul road.

<sup>2</sup> TCM trucks and other traffic on the Manilla Road section of the haul route. Criterion on this section is 60 dB(A).

Table 3 TCM Noise Monitoring Results – 21 June 2010 (Evening)				
Location	Time	dB(A),L eq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	8:27 pm	26	0-1 m/s SE	Insects (23), TCM (23)
N3 Tarrawonga	8:01 pm	33	0-1 m/s SE	TCM (29), Birds & insects (28), Wind (28)
N4 Ambardo	8:01 pm (22 Jun)	37	Calm	Traffic <sup>2</sup> (34), TCM (31) <sup>1</sup> , insects (30)

<sup>1</sup> Trucks on private section of haul road.

<sup>2</sup> TCM trucks and other traffic on the Manilla Road section of the haul route. Criterion on this section is 60 dB(A).

Table 4 TCM Noise Monitoring Results – 21 June 2010 (night)				
Location	Time	dB(A),L eq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	10:38 pm	24	0-1 m/s SE	Insects (21), (TCM 21)
N3 Tarrawonga	10:58 pm	32	0-1 m/s SE	TCM (30), insects (27)
N4 Ambardo	10:59 pm (22 Jun)	24	Calm	Cows (21), TCM (21)

## DISCUSSION OF RESULTS

The results in Tables 1-3 show that noise emissions from operations associated with TCM were higher of the operational noise criterion of 35 dB(A),Leq (15 min) at the monitoring locations at Pine Grove and Ambardo during the morning and evening surveys. The noise was due to emissions from trucks travelling on the private section of the haul road. We understand that TCM currently has an agreement in place with these two receivers in respect to elevated noise levels from haul trucks.

TCM environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m. Data were not available to determine the presence of temperature inversions.

Data from those times where TCM operations were audible were analysed using the “*Evaluator*” software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) 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.

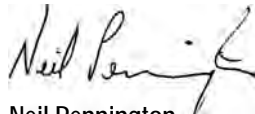
During the night time measurement circuit the L1 (1min) noise from TCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

**SPECTRUM ACOUSTICS PTY LIMITED**

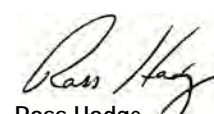
Author:



Neil Pennington

Acoustical Consultant

Review:



Ross Hodge

Acoustical Consultant



5 September 2009

Ref: 04095/3664

Mr Danny Young  
 Tarrawonga Coal Pty Ltd  
 PO Box 600  
 GUNNEDAH NSW 2380

**RE: AUGUST 2010 – ADDITIONAL NOISE MONITORING RESULTS**

This letter report presents the results of attended operational noise monitoring conducted for the Tarrawonga Coal Mine (TCM) on Monday 30 and Tuesday 31 August 2010. The monitoring was undertaken at the proposed location of a residence on the Crosby property.

**NOISE CRITERIA**

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

<b>Day (Operational Stage) <math>L_{Aeq(15\text{ minute})}</math></b>	<b>Evening <math>L_{Aeq(15\text{ minute})}</math></b>	<b>Night <math>L_{Aeq(15\text{ minute})}</math></b>	<b>Night <math>L_{A1(1\text{ minute})}</math></b>
35	35	35	45

*Table 7: Noise Impact Assessment Criteria dB(A)*

**Notes:**

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the  $L_{Aeq(15\text{ minute})}$  noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the  $L_{A1(1\text{ minute})}$  noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
  - wind speeds of up to 3 m/s at 10 metres above ground level; or
  - Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

<b>Day/Evening</b> $L_{Aeq}(1\text{ hour})$	<b>Night</b> $L_{Aeq}(1\text{ hour})$	<b>Property</b>
60	55	Any residence on privately-owned land.

Table 8: Road Traffic Noise Criteria dB(A)

Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources

Section 11.1.3 of the EPA's NSW Industrial Noise Policy (INP) defines non-compliance with noise limits as follows:

*"A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition."*

The 2 dB 'tolerance' is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

*"A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified."*

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

## NOISE MONITORING

The location for the current additional noise monitoring is shown on **Figure 1**.

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

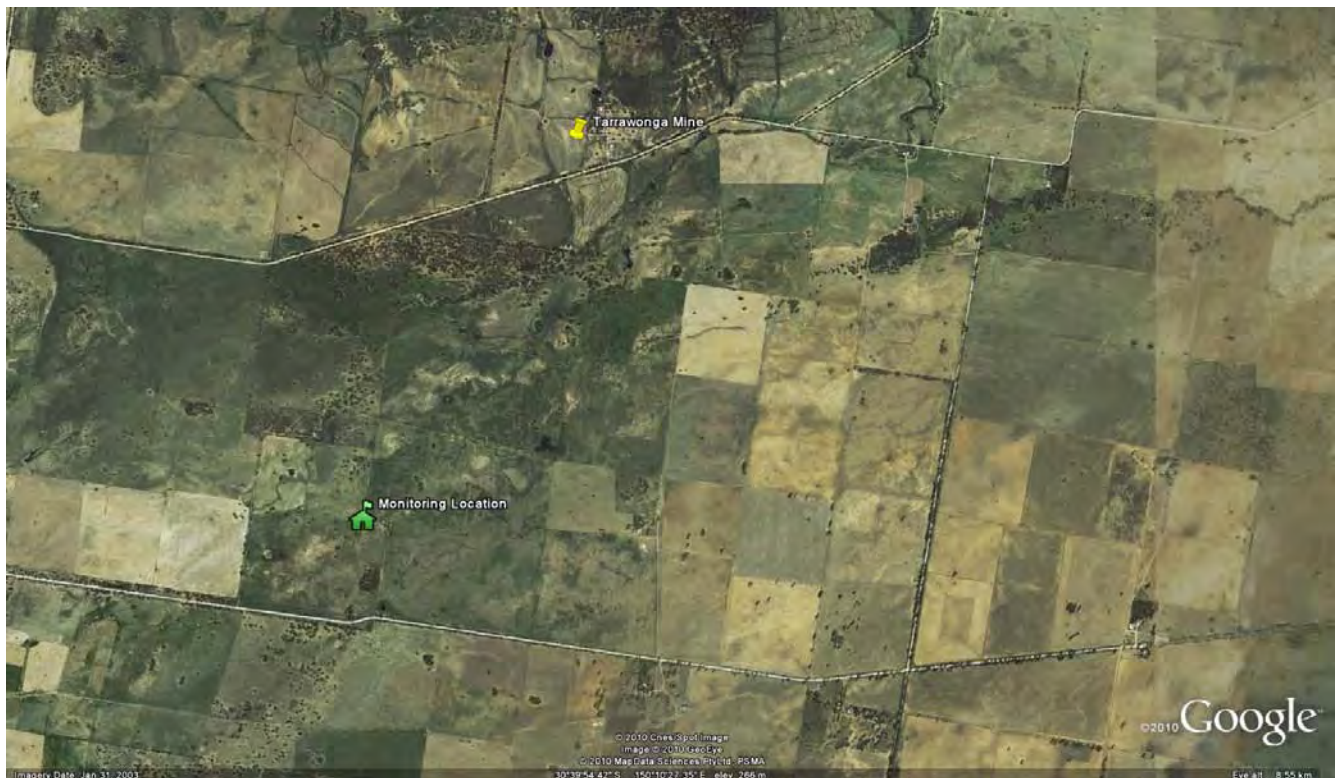


Figure 1 – Noise Monitoring Location

## MEASURED NOISE LEVELS

Measured noise levels at the monitoring location are summarised in **Table 1**. The total measured  $L_{Aeq(15min)}$  is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise source(s). The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A)  $L_{eq(15 min)}$**  for all operating times and all receivers.

Location	Time	dB(A), $L_{eq}$	Wind speed/ direction	Identified Noise Sources
Crosby 30/8	2:44 pm	35	Calm	Birds & Insects (35), TCM (25)
Crosby 30/8	9:40 pm	32	Calm	Frogs (28), TCM (29)
Crosby 31/8	7:54 am	43	Calm	TCM (40), birds & insects (37), traffic on Manilla Rd. (36)

## DISCUSSION OF RESULTS

The results in Tables 1 show that, under the operational and atmospheric conditions at the time, noise emissions from mining operations at TCM would have exceeded the noise criterion of 35 dB(A), $L_{eq(15 min)}$  at the location of the proposed residence during the morning measurement.

At the time of the monitoring the noise emissions were from haul trucks, dozer noise and general mine hum (possibly including noise from shovels). The noise included engine revs, dozer tracks, horns,

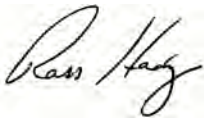
reverse beepers and dumping noise. Haul trucks were visible moving around on the waste emplacements and dust was visible from mining activity within the pit.

Coal haulage trucks were travelling on the haul road during the two day time monitoring periods but noise from these was not a significant contributor to the overall measured levels. There were no trucks on the haul road during the evening monitoring period (i.e. between 9.40 and 10.00 pm).

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED



Ross Hodge  
Acoustical Consultant



11 October 2010

Ref: 04095/3723

Mr Danny Young  
Tarrawonga Coal Pty Ltd  
PO Box 600  
GUNNEDAH NSW 2380

## RE: TARRAWONGA MINE - SEPTEMBER 2010 NOISE MONITORING RESULTS

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 21<sup>st</sup> and 22<sup>nd</sup> September 2010.

### NOISE CRITERIA

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

<b>Day (Operational Stage) Leq (15 min)</b>	<b>Evening Leq (15 min)</b>	<b>Night Leq (15 min)</b>	<b>Night L1 (1 min)</b>
35	35	35	45

Table 7: Noise Impact Assessment Criteria dB(A)

Notes:

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
  - wind speeds of up to 3 m/s at 10 metres above ground level; or
  - Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

<b>Day/Evening Leq (1 hr)</b>	<b>Night Leq (1 hr)</b>	<b>Property</b>
60	55	Any residence on privately-owned land.

*Table 8: Road Traffic Noise Criteria dB(A)*

*Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources*

Section 11.1.3 of the EPA's NSW Industrial Noise Policy (INP) defines non-compliance with noise limits as follows:

*"A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition."*

The 2 dB 'tolerance' is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

*"A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified."*

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

## NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird <sup>1</sup>	
N2 – “Bollol Creek Station”	J. Picton <sup>1</sup>	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo” <sup>2</sup>	D. Wellwood	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo” <sup>2</sup>	D. Wellwood	Private
“Pine Grove” <sup>2</sup>	J., S., M., & C. Bull	Private
“Brooklyn”	R. Kelly	Public

<sup>1</sup> This property is now mine-owned.

<sup>2</sup> Agreements are in place to allow for a higher noise criterion at these receivers.

Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

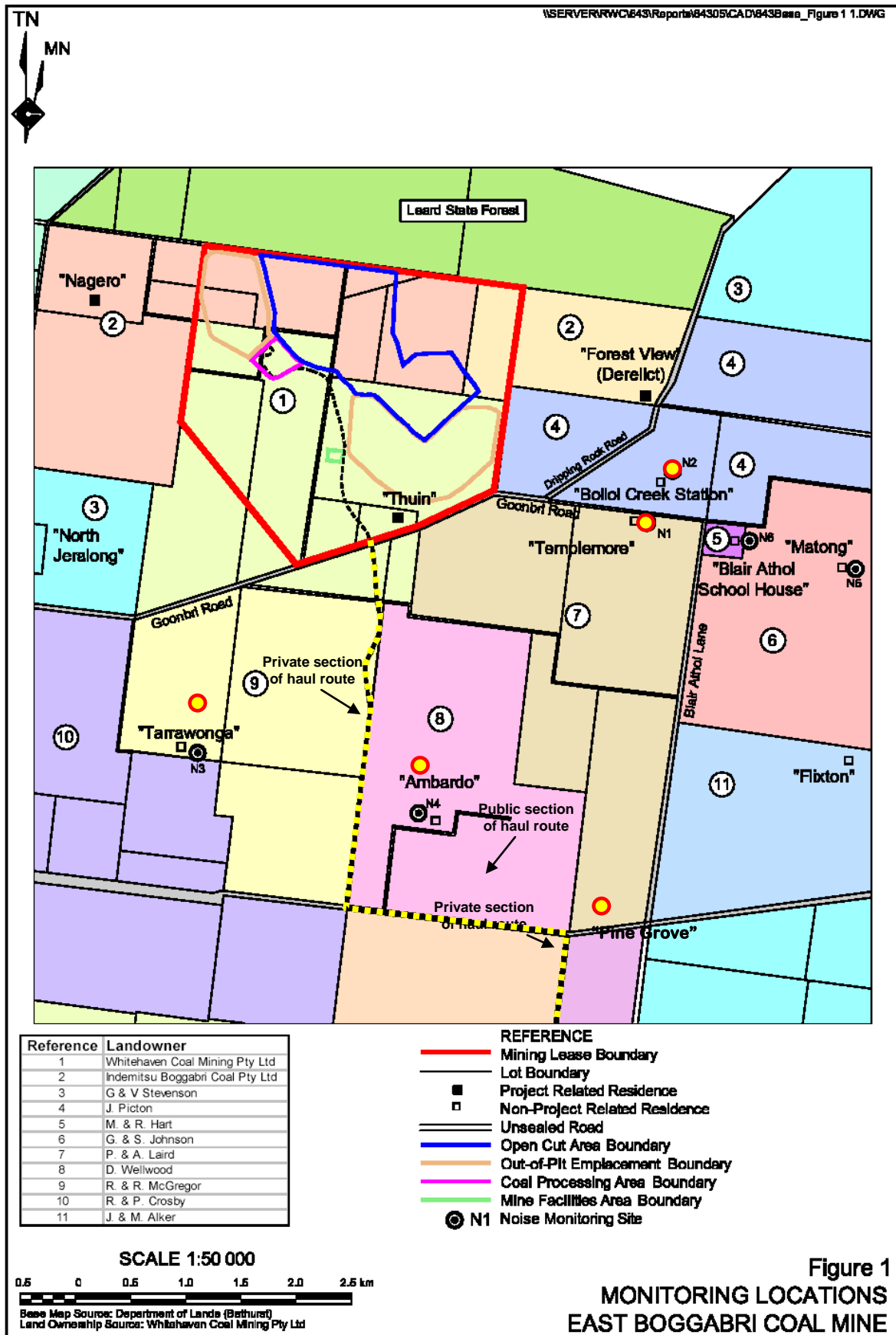
The Kelly residence “Brooklyn” is south of Canyon (formerly Whitehaven) mine on Blue Vale Road and cumulative noise from road haulage of coal is subject to the criteria in Condition 4(7) above. Traffic noise monitoring at this location is the subject of a separate report.

## NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 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.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2m above ground level.



## MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3** and **4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times at receivers *N2* and *N3*, and **40dB(A) Leq (15 min)** for all operating times at *N4* and Pine Grove.

Table 2 TCM Noise Monitoring Results – 21/22 September 2010 (Day) (pm on 21/9 and am on 22/9)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	3:33 pm	42.9	0.5-1 m/s SSE	Birds (42), TCM (25)
<i>N3</i> Tarrawonga	3:52 pm	38.0	Calm	Birds (38), TCM (<20)
<i>N4</i> Ambardo	7:13 am	46.8	1-2 m/s SSE	Birds (45), Quad bike (37), TCM (36) <sup>1</sup>
Pine Grove	6:58 am	41.7	Calm	Birds (39), TCM (39) <sup>1</sup>

<sup>1</sup> Trucks on private section of haul road.

Table 3 TCM Noise Monitoring Results – 21 September 2010 (evening)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	8:23 pm	35.8	Calm	Dogs (32), Pump (30), TCM (<30)
<i>N3</i> Tarrawonga	7:58 pm	33.8	Calm	TCM (32), Insects (29)
<i>N4</i> Ambardo	7:24 pm	40.7	Calm	TCM (40) <sup>1</sup> , Birds (25)

<sup>1</sup> Trucks on private section of haul road.

Table 4 TCM Noise Monitoring Results – 21 September 2010 (night)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	11:11 pm	30.6	Calm	Insects (30), TCM (<20)
<i>N3</i> Tarrawonga	10:15 pm	34.0	Calm	TCM (34), Insects (25)
<i>N4</i> Ambardo	11:37 pm	44.8	>3 m/s SSE	Wind (44), TCM inaudible

## DISCUSSION OF RESULTS

The results in Tables 1-3 show that noise emissions from operations associated with TCM did not exceed the operational noise criteria.

TCM environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m. Data were not available to determine the presence of temperature inversions.

Data from those times where TCM operations were audible were analysed using the “Evaluator” software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) 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.

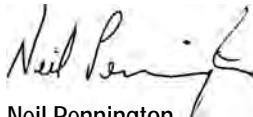
During the night time measurement circuit the L1 (1min) noise from TCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

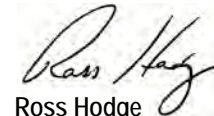
**SPECTRUM ACOUSTICS PTY LIMITED**

Author:



**Neil Pennington**  
Acoustical Consultant

Review:



**Ross Hodge**  
Acoustical Consultant



21 December 2010

Ref: 04095/3812

Mr Danny Young  
Tarrawonga Coal Pty Ltd  
PO Box 600  
GUNNEDAH NSW 2380

**RE: DECEMBER 2010 NOISE MONITORING RESULTS – TARRAWONGA MINE**

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 15th and 16th December 2010.

**NOISE CRITERIA**

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

<b>Day (Operational Stage) Leq (15 min)</b>	<b>Evening Leq (15 min)</b>	<b>Night Leq (15 min)</b>	<b>Night L1 (1 min)</b>
35	35	35	45

*Table 7: Noise Impact Assessment Criteria dB(A)*

*Notes:*

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- *The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table*
- *The noise emission limits identified in the above table apply under meteorological conditions of:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.*

4(7) *The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.*

<b>Day/Evening Leq (1 hr)</b>	<b>Night Leq (1 hr)</b>	<b>Property</b>
60	55	<i>Any residence on privately-owned land.</i>

**Table 8: Road Traffic Noise Criteria dB(A)**

*Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources*

Section 11.1.3 of the EPA's *NSW Industrial Noise Policy (INP)* defines non-compliance with noise limits as follows:

*"A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition."*

The 2 dB 'tolerance' is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

*"A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified."*

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

## NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird <sup>1</sup>	
N2 – “Bollol Creek Station”	J. Picton <sup>1</sup>	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo” <sup>2</sup>	D. Wellwood	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo” <sup>2</sup>	D. Wellwood	Private
“Pine Grove” <sup>2</sup>	J., S., M., & C. Bull	Private
“Brooklyn”	R. Kelly	Public

<sup>1</sup> This property is now mine-owned.

<sup>2</sup> Agreements are in place to allow for a higher noise criterion at these receivers.

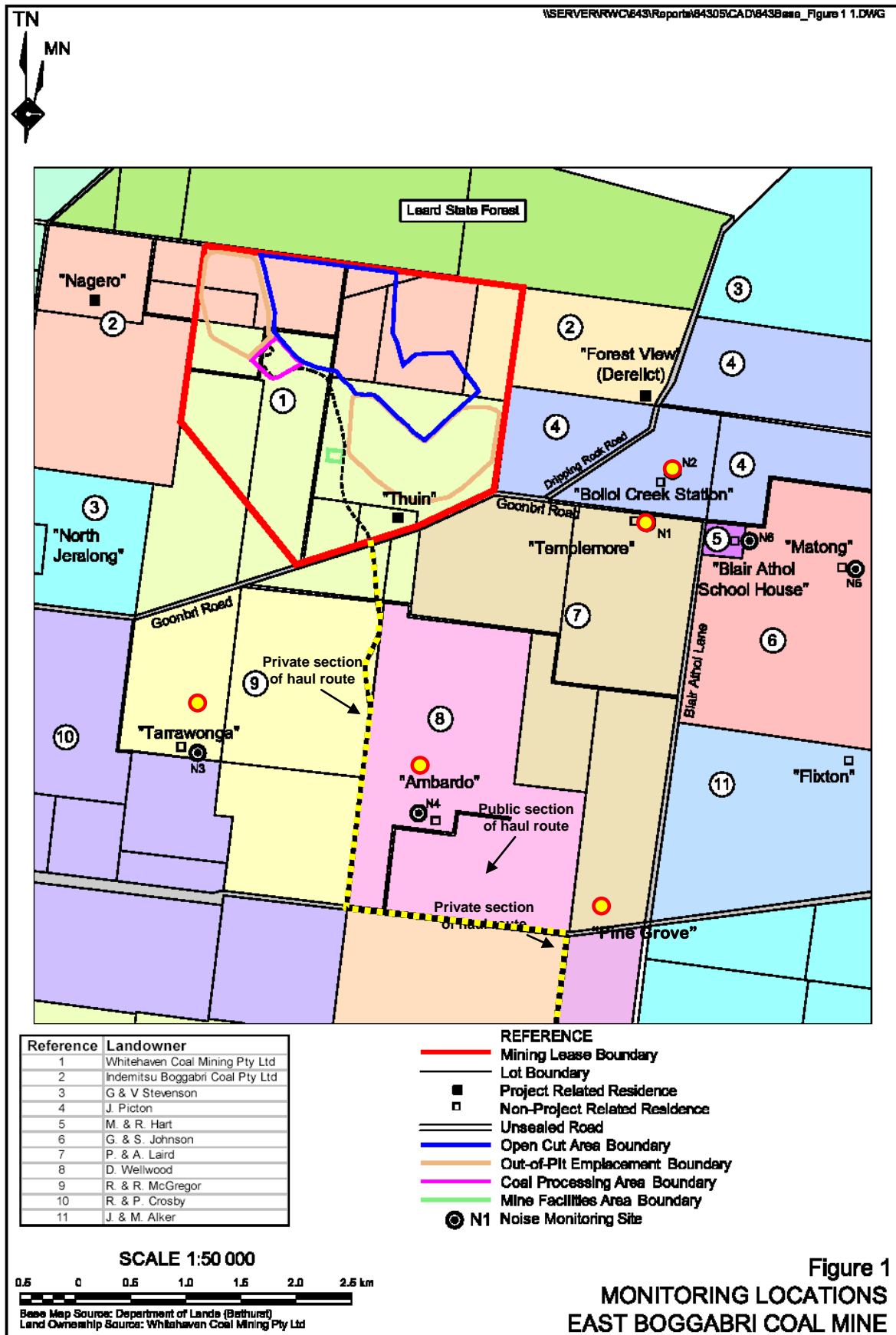
Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

## NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 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.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2m above ground level.



## MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3** and **4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times at receivers *N2* and *N3*, and **40dB(A) Leq (15 min)** for all operating times at *N4* (Ambardo) and Pine Grove.

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	11:09 am	41	0.5-1 m/s NW	TCM (40), birds (34)
<i>N3</i> Tarrawonga	11:36 am	43	<0.5 m/s NW	Birds & insects (43), TCM (35)
<i>N4</i> Ambardo	7:03 am*	57	<0.5 m/s S	Birds (57), TCM (40) <sup>1</sup>
Pine Grove	7:33 am	54	<0.5 m/s S	Birds (54), TCM (40) <sup>1</sup>

<sup>1</sup> Trucks on private section of haul road.

\*see “Discussion of Results” below

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	8:21 pm	50	<0.5 m/s NW	Birds & insects (50), TCM (32)
<i>N3</i> Tarrawonga	9:18 pm	47	<0.5 m/s NW	Insects (47), TCM (<25)
<i>N4</i> Ambardo	11:56 pm	51	<0.5 m/s NW	Insects (51), TCM (39) <sup>1</sup>

<sup>1</sup> Trucks on private section of haul road.

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	11:40 pm	44	Calm	Insects (44), TCM (32)
<i>N3</i> Tarrawonga	10:23 pm	45	<0.5 m/s NW	Frogs & insects (45), TCM (30)
<i>N4</i> Ambardo	11:37 pm	41	Calm	Insects (41), TCM (29)

## DISCUSSION OF RESULTS

The results in Tables 1-3 show that, under the operational and atmospheric conditions at the time, noise emissions from associated with TCM exceeded the operational noise criteria at the Bollol Creek monitoring location during the day time monitoring period. The Bollol Creek monitoring location is also representative of the acoustic environment of Templemore. Both properties are mine owned.

Rain at the time of the day time monitoring at Ambardo meant that the mine was not operating at full capacity. Trucks were running on the private haul road throughout.

TCM environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m. Data were not available to determine the presence of temperature inversions.

Data from those times where TCM operations were audible were analysed using the “*Evaluator*” software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) 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.

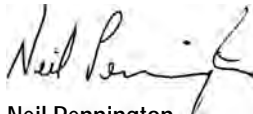
During the night time measurement circuit the L1 (1min) noise from TCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

**SPECTRUM ACOUSTICS PTY LIMITED**

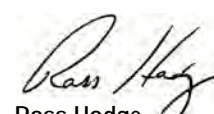
Author:



Neil Pennington

Acoustical Consultant

Review:



Ross Hodge

Acoustical Consultant



13 April 2011

Ref: 04095/3939

Mr Danny Young  
Tarrawonga Coal Pty Ltd  
PO Box 600  
GUNNEDAH NSW 2380

**RE: MARCH 2011 NOISE MONITORING RESULTS – TARRAWONGA MINE**

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 14<sup>th</sup> March 2011.

**NOISE CRITERIA**

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

<b>Day (Operational Stage) Leq (15 min)</b>	<b>Evening Leq (15 min)</b>	<b>Night Leq (15 min)</b>	<b>Night L1 (1 min)</b>
35	35	35	45

*Table 7: Noise Impact Assessment Criteria dB(A)*

*Notes:*

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
  - wind speeds of up to 3 m/s at 10 metres above ground level; or
  - Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

<b>Day/Evening Leq (1 hr)</b>	<b>Night Leq (1 hr)</b>	<b>Property</b>
60	55	Any residence on privately-owned land.

*Table 8: Road Traffic Noise Criteria dB(A)*

*Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources*

Section 11.1.3 of the EPA's NSW Industrial Noise Policy (INP) defines non-compliance with noise limits as follows:

*“A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition.”*

The 2 dB ‘tolerance’ is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

*“A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified.”*

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

## NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird <sup>1</sup>	
N2 – “Bollol Creek Station”	J. Picton <sup>1</sup>	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo” <sup>2</sup>	D. Wellwood	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo” <sup>2</sup>	D. Wellwood	Private
“Pine Grove” <sup>2</sup>	J., S., M., & C. Bull	Private
“Brooklyn”	R. Kelly	Public

<sup>1</sup> This property is now mine-owned.

<sup>2</sup> Agreements are in place to allow for noise criteria of 45 dB(A) at Ambardo and 50 dB(A) at Pine Grove.

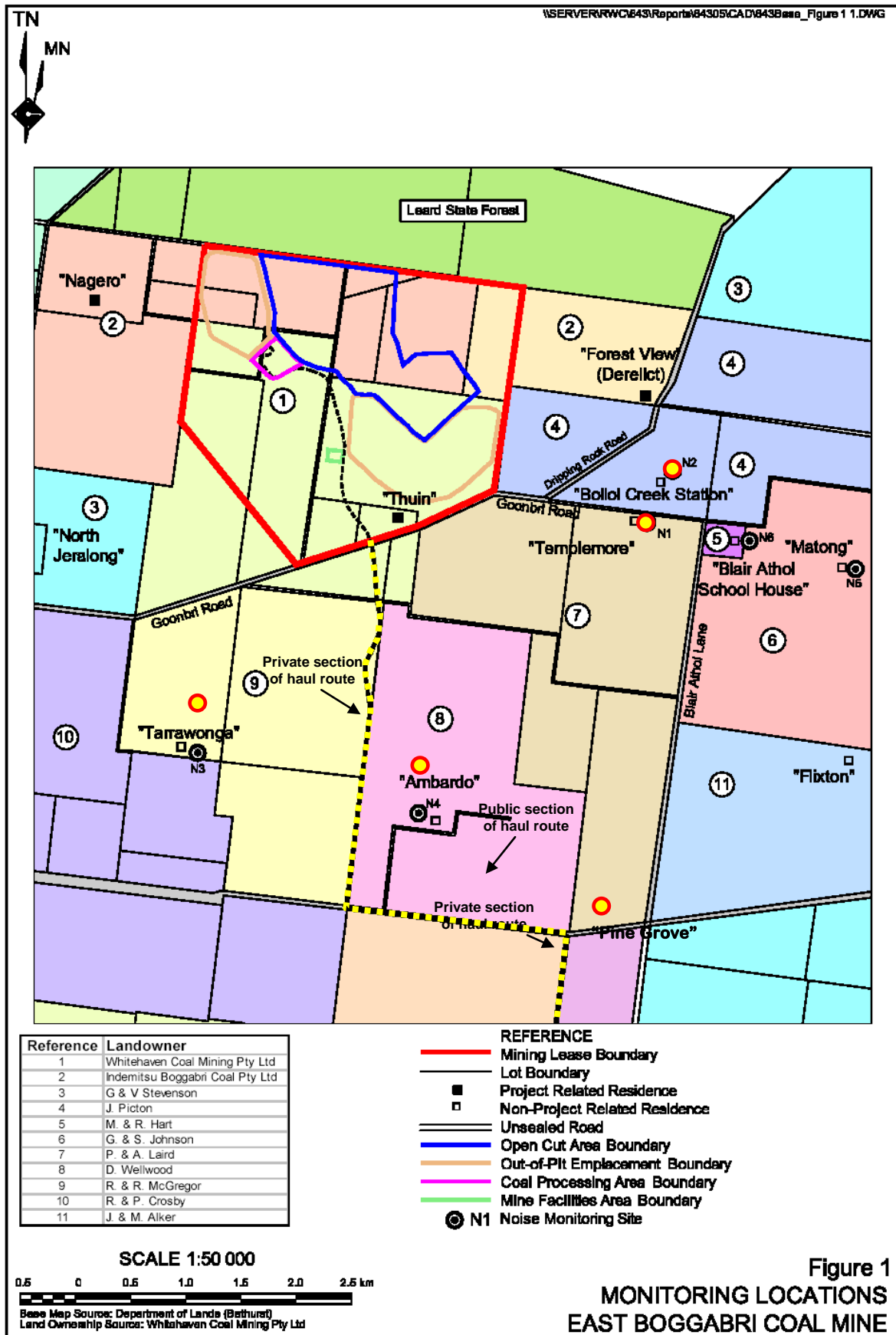
Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

## NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 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.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2m above ground level.



## MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3** and **4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times at receivers *N2* and *N3*, and **40dB(A) Leq (15 min)** for all operating times at *N4* (Ambardo) and Pine Grove.

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	4:27 pm	40.9	1.3 m/s, E	Birds (41), TCM (<25)
<i>N3</i> Tarrawonga	4:23 pm	39.0	2-3 m/s SE	Wind (37), Birds (34), TCM (<25)
<i>N4</i> Ambardo	7:19 am	54.7	Calm	Birds (54), TCM (37) <sup>1</sup>
Pine Grove	7:01 am	46.7	Calm	Birds (45), traffic (39), TCM (39) <sup>1</sup>

<sup>1</sup> Trucks on private section of haul road.

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	8:55 pm	36.8	4.1 m/s, SE	Wind (36), TCM inaudible
<i>N3</i> Tarrawonga	9:30 pm	42.8	3.5 m/s, ESE	Wind (40), insects (39), TCM inaudible
<i>N4</i> Ambardo	7:44 pm	40.5	1.5 m/s, SE	Birds & insects (40), TCM (<25) <sup>1</sup>

<sup>1</sup> Trucks on private section of haul road.

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
<i>N2</i> Bollol Ck Station	11:51 pm	38.6	0.9 m/s, S	Insects (36), wind (34), TCM inaudible
<i>N3</i> Tarrawonga	12:14 am	41.2	1.9 m/s, SSE	Wind (40), insects (35), TCM inaudible
<i>N4</i> Ambardo	10:38 pm	40.0	1.5 m/s, SE	Insects (40), TCM inaudible

## DISCUSSION OF RESULTS

The results in Tables 1-3 show that noise emissions from with TCM were below the operational noise criteria at all monitoring locations at all times.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) 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.

During the night time measurement circuit the L1 (1min) noise from TCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

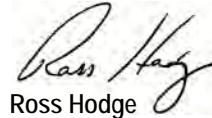
Yours faithfully,  
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington  
Acoustical Consultant

Review:



Ross Hodge  
Acoustical Consultant

# **Road Noise Monitoring**

June 2010  
March 2011



19 July 2010

Ref: 06259/3616

Mr. Danny Young  
Whitehaven Coal Pty Ltd  
PO Box 600  
GUNNEDAH NSW 2380

**RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, JUNE 2010**

This letter report presents the results of a road noise measurements conducted for the Tarrawonga Coal Mine (TCM) and Rocglen Coal Mine (RCM). The measurements were conducted at “Brooklyn” and “Werona” on Blue Vale Road with the intention of determining the  $L_{Aeq(1\text{ hour})}$  noise contribution from mine-related vehicles, particularly coal haul trucks. There are two separate residences on “Brooklyn” and simultaneous noise measurements were made at the front of both residences. Residence 1 is closest to Blue Vale Road (approximately 90m) whilst Residence 2 is approximately 480m from the road.

The approvals granted for TCM and RCM state that the cumulative noise level from traffic generated by the two mines must not exceed 60 dB(A),  $L_{Aeq(1\text{ hour})}$  during the day and 55 dB(A),  $L_{Aeq(1\text{ hour})}$  during the night at these locations. For the purposes of traffic noise assessment the DECCW *Environmental Criteria for Road Traffic Noise* (ECRTN) defines day as 7am – 10pm and night as 10pm – 7am. On Sundays and public holidays the daytime transition changes to 8am.

The noise measurements were made adjacent to the front (eastern) facade of both residences at “Brooklyn” between 10:32am and 11:32am and at “Werona” between 9:16am and 10:16am on Tuesday June 22 with third-octave band Bruel & Kjaer Observer sound level meters (IEC Type 1). The sound level meters were placed on tripods and recorded continuously at 1-second statistical intervals while notes on passing vehicles were written down.

Over the course of the measurement period at “Brooklyn” there were 30 coal truck movements related to TCM and RCM. Other significant noise sources observed throughout the monitoring period included a contribution from birds and insects and a dog barking. The total measured noise level for the measurement period as dB(A),  $L_{Aeq}$ , therefore, represents that from the trucks, birds, wind and other sources.

Due to the discrete nature of the coal truck movements the sound level as each truck past the measurement point (that is from when each truck became audible until it was inaudible again) was readily discernable and the contribution of truck noise could be accurately determined. A breakdown of the heavy vehicle movements for “Brooklyn” is summarised in **Table 1**.

<b>Table 1</b>	
<b>Coal Truck pass bys - “Brooklyn”, Blue Vale Road 22/06/10</b>	
Time (am)	Vehicle direction of travel
10:32	Empty coal truck to mine
10:34	Empty coal truck to mine
10:36	Laden coal truck to CPP
10:38	Empty coal truck to mine
10:42	Laden coal truck to CPP
10:46	Laden coal truck to CPP
10:47	Laden coal truck to CPP
10:47	Laden coal truck to CPP
10:51	Empty coal truck to mine
10:52	Laden coal truck to CPP
10:52	Laden coal truck to CPP
11:00	Empty coal truck to mine
11:02	Laden coal truck to CPP
11:02	Empty coal truck to mine
11:02	Laden coal truck to CPP
11:02	Empty coal truck to mine
11:03	Laden coal truck to CPP
11:03	Laden coal truck to CPP
11:07	Laden coal truck to CPP
11:08	Empty coal truck to mine
11:10	Empty coal truck to mine
11:16	Empty coal truck to mine
11:17	Empty coal truck to mine
11:18	Laden coal truck to CPP
11:18	Laden coal truck to CPP
11:19	Empty coal truck to mine
11:19	Empty coal truck to mine
11:21	Empty coal truck to mine
11:22	Laden coal truck to CPP
11:29	Laden coal truck to CPP

The total measured noise level at Residence 1 at “Brooklyn” was 51 dB(A)  $L_{eq}(1 \text{ hour})$ , and the calculated contribution from mine-related vehicles was **49 dB(A)**,  $L_{eq}(1 \text{ hour})$ . This is below the daytime criterion of **60 dB(A)**  $L_{eq}(1 \text{ hour})$ .

The calculated contribution from mine-related vehicles at Residence 2 was **45 dB(A)**,  $L_{eq}(1 \text{ hour})$ . This is below the daytime criterion of **60 dB(A)**  $L_{eq}(1 \text{ hour})$ .

Over the course of the measurement period at “Werona” there were 46 coal truck movements related to TCM and RCM. A breakdown of the heavy vehicle movements for “Werona” is summarised in **Table 2**.

<b>Table 2</b>	
<b>Coal Truck pass bys - "Werona", Blue Vale Road 22/06/10</b>	
Time (am)	Vehicle direction of travel
9:17	Empty coal truck to mine
9:18	Empty coal truck to mine
9:20	Laden coal truck to CPP
9:25	Empty coal truck to mine
9:25	Laden coal truck to CPP
9:25	Laden coal truck to CPP
9:29	Empty coal truck to mine
9:30	Laden coal truck to CPP
9:31	Laden coal truck to CPP
9:35	Laden coal truck to CPP
9:37	Empty coal truck to mine
9:38	Empty coal truck to mine
9:40	Empty coal truck to mine
9:41	Laden coal truck to CPP
9:41	Laden coal truck to CPP
9:41	Empty coal truck to mine
9:42	Empty coal truck to mine
9:42	Empty coal truck to mine
9:44	Empty coal truck to mine
9:46	Empty coal truck to mine
9:46	Laden coal truck to CPP
9:46	Laden coal truck to CPP
9:47	Laden coal truck to CPP
9:51	Laden coal truck to CPP
9:52	Laden coal truck to CPP
9:52	Laden coal truck to CPP
9:53	Empty coal truck to mine
9:54	Empty coal truck to mine
9:56	Laden coal truck to CPP
9:56	Laden coal truck to CPP
9:57	Laden coal truck to CPP
10:00	Empty coal truck to mine
10:02	Laden coal truck to CPP
10:02	Laden coal truck to CPP
10:03	Laden coal truck to CPP
10:03	Empty coal truck to mine
10:06	Laden coal truck to CPP
10:07	Laden coal truck to CPP
10:08	Empty coal truck to mine
10:09	Empty coal truck to mine
10:12	Empty coal truck to mine
10:12	Laden coal truck to CPP
10:12	Laden coal truck to CPP
10:13	Laden coal truck to CPP
10:16	Empty coal truck to mine
10:16	Empty coal truck to mine

The total measured contribution from mine-related vehicles at "Werona" was **49 dB(A), $L_{eq}$  (1 hour)**. This is below the daytime criterion of **60 dB(A)  $L_{eq}$  (1 hour)**.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

**SPECTRUM ACOUSTICS PTY LIMITED**

Author:



**Ross Hodge**

Acoustical Consultant

Review:



**Neil Pennington**

Acoustical Consultant



24 March 2011

Ref: 06259/3914

Mr. Danny Young  
Whitehaven Coal Pty Ltd  
PO Box 600  
GUNNEDAH NSW 2380

**RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, MARCH 2011**

This letter report presents the results of a road noise measurements conducted for the Tarrawonga Coal Mine (TCM) and Rocglen Coal Mine (RCM). The measurements were conducted at “Brooklyn” and “Werona” on Blue Vale Road with the intention of determining the  $L_{Aeq(1\text{ hour})}$  noise contribution from mine-related vehicles, particularly coal haul trucks. There are two separate residences on “Brooklyn” and simultaneous noise measurements were made at the front of both residences. Residence 1 is closest to Blue Vale Road (approximately 90m) whilst Residence 2 is approximately 480m from the road.

The approvals granted for TCM and RCM state that the cumulative noise level from traffic generated by the two mines must not exceed 60 dB(A),  $L_{Aeq(1\text{ hour})}$  during the day and 55 dB(A),  $L_{Aeq(1\text{ hour})}$  during the night at these locations. For the purposes of traffic noise assessment the DECCW *Environmental Criteria for Road Traffic Noise* (ECRTN) defines day as 7am – 10pm and night as 10pm – 7am. On Sundays and public holidays the daytime transition changes to 8am.

The noise measurements were made adjacent to the front (eastern) facade of both residences at “Brooklyn” between 9:23am and 10:23am and at “Werona” between 8:03am and 9:03am on Tuesday March 15 22 with third-octave band Bruel & Kjaer Observer sound level meters (IEC Type 1). The sound level meters were placed on tripods and recorded continuously at 1-second statistical intervals while notes on passing vehicles were written down.

Over the course of the measurement period at “Brooklyn” there were 46 coal truck movements related to TCM and RCM. Other significant noise sources observed throughout the monitoring period included a contribution from birds and insects. The total measured noise level for the measurement period as dB(A),  $L_{Aeq}$ , therefore, represents that from the trucks, birds, wind and other sources.

Due to the discrete nature of the coal truck movements the sound level as each truck past the measurement point (that is from when each truck became audible until it was inaudible again) was readily discernable and the contribution of truck noise could be accurately determined. A breakdown of the heavy vehicle movements for “Brooklyn” is summarised in **Table 1**.

<b>Table 1</b>	
<b>Coal Truck pass bys - “Brooklyn”, Blue Vale Road 15/03/11</b>	
Time (am)	Vehicle direction of travel
9:23	Empty coal truck to mine
9:25	Empty coal truck to mine
9:26	Laden coal truck to CPP
9:27	Empty coal truck to mine
9:27	Empty coal truck to mine
9:29	Laden coal truck to CPP
9:30	Laden coal truck to CPP
9:30	Laden coal truck to CPP
9:32	Empty coal truck to mine
9:35	Laden coal truck to CPP
9:36	Empty coal truck to mine
9:38	Laden coal truck to CPP
9:38	Empty coal truck to mine
9:41	Empty coal truck to mine
9:42	Laden coal truck to CPP
9:43	Empty coal truck to mine
9:44	Laden coal truck to CPP
9:44	Empty coal truck to mine
9:48	Empty coal truck to mine
9:49	Laden coal truck to CPP
9:49	Empty coal truck to mine
9:49	Laden coal truck to CPP
9:51	Empty coal truck to mine
9:51	Laden coal truck to CPP
9:53	Laden coal truck to CPP
9:56	Laden coal truck to CPP
9:57	Empty coal truck to mine
9:58	Laden coal truck to CPP
9:59	Laden coal truck to CPP
9:59	Empty coal truck to mine
10:00	Laden coal truck to CPP
10:01	Laden coal truck to CPP
10:03	Empty coal truck to mine
10:05	Laden coal truck to CPP
10:06	Empty coal truck to mine
10:06	Empty coal truck to mine
10:07	Empty coal truck to mine
10:08	Laden coal truck to CPP
10:12	Empty coal truck to mine
10:15	Empty coal truck to mine
10:16	Empty coal truck to mine
10:17	Empty coal truck to mine
10:18	Empty coal truck to mine
10:19	Laden coal truck to CPP
10:21	Laden coal truck to CPP

The total measured noise level at Residence 1 at “Brooklyn was 56 dB(A)  $L_{eq}(1 \text{ hour})$ , and the calculated contribution from mine-related vehicles was **54 dB(A),  $L_{eq}(1 \text{ hour})$** . This is below the daytime criterion of **60 dB(A)  $L_{eq}(1 \text{ hour})$** .

The calculated contribution from mine-related vehicles at Residence 2 was **49 dB(A),  $L_{eq}(1 \text{ hour})$** . This is below the daytime criterion of **60 dB(A)  $L_{eq}(1 \text{ hour})$** .

Over the course of the measurement period at “Werona” there were 46 coal truck movements related to TCM and RCM. A breakdown of the heavy vehicle movements for “Werona” is summarised in **Table 2**.

Time (am)	Vehicle direction of travel
8:03	Laden coal truck to CPP
8:05	Empty coal truck to mine
8:05	Empty coal truck to mine
8:06	Laden coal truck to CPP
8:07	Empty coal truck to mine
8:07	Empty coal truck to mine
8:09	Laden coal truck to CPP
8:12	Empty coal truck to mine
8:12	Empty coal truck to mine
8:12	Laden coal truck to CPP
8:15	Empty coal truck to mine
8:15	Laden coal truck to CPP
8:17	Empty coal truck to mine
8:18	Empty coal truck to mine
8:20	Laden coal truck to CPP
8:20	Empty coal truck to mine
8:21	Laden coal truck to CPP
8:22	Laden coal truck to CPP
8:24	Laden coal truck to CPP
8:26	Laden coal truck to CPP
8:26	Empty coal truck to mine
8:28	Empty coal truck to mine
8:30	Laden coal truck to CPP
8:32	Empty coal truck to mine
8:32	Empty coal truck to mine
8:38	Laden coal truck to CPP
8:40	Empty coal truck to mine
8:40	Empty coal truck to mine
8:43	Empty coal truck to mine
8:45	Laden coal truck to CPP
8:45	Empty coal truck to mine
8:50	Laden coal truck to CPP
8:51	Empty coal truck to mine
8:53	Laden coal truck to CPP
8:55	Empty coal truck to mine
8:56	Empty coal truck to mine
8:58	Empty coal truck to mine

8:59	Laden coal truck to CPP
8:59	Empty coal truck to mine
9:00	Laden coal truck to CPP
9:00	Laden coal truck to CPP
9:01	Empty coal truck to mine
9:01	Laden coal truck to CPP
9:02	Empty coal truck to mine
9:02	Laden coal truck to CPP
9:03	Empty coal truck to mine

The total measured contribution from mine-related vehicles at "Werona" was **49 dB(A), $L_{eq}$  (1 hour)**. This is below the daytime criterion of **60 dB(A)  $L_{eq}$  (1 hour)**.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,  
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Ross Hodge  
Acoustical Consultant

Review:



Neil Pennington  
Acoustical Consultant